International Centre for Allied Health Evidence

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Evidence-Based Review

Effectiveness and Safety of Acupuncture Interventions for the Treatment of Musculoskeletal Conditions

Prepared for:

Meagan Stephenson
Research Advisor
The Accident Compensation Corporation
PO Box 242
Wellington 6011
New Zealand

Prepared by:

International Centre for Allied Health Evidence
University of South Australia
Adelaide
SA 5000
Australia

RESEARCH CENTRE RESPONSIBLE FOR THE PROJECT

International Centre for Allied Health Evidence
School of Health Sciences
City East Campus
University of South Australia
Adelaide
South Australia 5000
Website: www.unisa.edu.au/cahe

Review team
Associate Professor Steve Milanese
Matt Ransom
Holly Bowen
Emile Sach

Centre Director
Associate Professor Steven Milanese
Phone: (08) 8302 2769
Fax: (08) 8302 2766
Email: steve.milanese@unisa.edu.au

Project administrator
Ms. Madeleine Mallee
Business Services Officer
Business Development Unit
Division of Health Sciences
University of South Australia
Phone: (08) 8302 2121
Fax: (08) 8302 1472
Email: madeleine.mallee@unisa.edu.au

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Abbreviations

The following abbreviations are used in this report and are collated here for reader's convenience

Abbreviation		Abbreviation	
AA	Auricular acupuncture	**NPQ**	Northwick Park Neck Pain Questionnaire
ADL	Activities of Daily Living	**NRS**	Numerical Rating Scale
AE	Adverse events	**NSAIDs**	Non-steroidal anti-inflammatory drugs
ALBP	Acute Low Back Pain	**NSLBP**	Non-specific low back pain
AOFAS	American Orthopaedic Foot and Ankle Society	**OA**	Osteoarthritis
AROM	Active Range of Motion	**ODI**	Oswestry Disability Index
BCTQ	Boston Carpal Tunnel Syndrome Questionnaire	**PICO**	Population, Intervention, Comparator, Outcome
BSI	Beck Depression Inventory	**PENS**	Percutaneous Electrical Nerve Stimulation
CTSAQ	Carpal Tunnel Self-Assessment Questionnaire	**PROM**	Passive Range of Motion
CI	Confidence interval	**QOL**	Quality of life
CNP	Chronic neck pain	**RCT**	Randomised controlled trial
DASH	Disabilities of arm, shoulder and hand	**ROM**	Range of Motion
DDN	Deep Dry Needling	**RR**	Risk ratio
DN	Dry Needling	**SF-36**	36-Item Short Form Survey
EA	Electroacupuncture	**SFMPQ**	Short Form McGill Pain Questionaries
ESWT	Extracorporeal shock wave therapy	**SIGN**	Scottish Intercollegiate Guidelines Network
FA	Fixed acupuncture	**SPADI**	Shoulder Pain and Disability Index
FAAM	Foot and Ankle Ability Measure	**SR**	Systematic review
FSHQ	Foot Health Status Questionnaire	**STRICTA**	Standards for Reporting Interventions in Clinical Trials of Acupuncture
GSS	Global Symptom Score	**SMD**	Standard mean difference
GPCRND-KOA	Guiding Principle of Clinical Research on New Drugs in the Treatment of Knee OA	**TA**	Traditional acupuncture
IR	Infrared radiation	**TCA**	Traditional Chinese acupuncture
LA	Laser acupuncture	**TCM**	Traditional Chinese medicine
LAI	Lequesne Algofunctional Index	**TDN**	Trigger Point Dry Needling

LBP	Low Back Pain	**TENs**	Transcutaneous electrical nerve stimulation
LEFS	Lower Extremity Functional Scale	**TMJ**	Temporomandibular Joint
LIG	Lidocaine Injection Group	**TrP**	Trigger Point
LKSS	Lysholm Knee Score Scale	**TrP DN**	Trigger Point Dry Needling
LLLT	Low-level laser therapy	**TUGT**	Timed Up and Go Test
MA	Manual acupuncture	**UK**	United Kingdom
MA	Meta-Analysis	**US**	Ultrasound
MD	Mean difference	**UT**	Upper Trapezius
MPS	Myofascial pain syndrome	**USA**	United States of America
MTrP	Myofascial trigger point	**VAS**	Visual Analogue Scale
NDI	Neck Disability Index	**VNS**	Visual Numerical Scale
NHP	Nottingham Health Profile	**WA**	Western acupuncture
NICMAN	National Institute for Complementary Medicine Acupuncture Network	**WAD**	Whiplash associated disorders
NP	Neck Pain	**WMD**	Weighted mean difference
NPRS	Numerical Pain Rating Scale	**WOMAC**	Western Ontario and McMaster Universities Osteoarthritis Index
	Quality Ratings		
AQ	Acceptable Quality	**LQ**	Low Quality
CS	Can't say	**NA**	Not Applicable
HQ	High Quality	**R**	Reject (Unacceptable Quality)
QS	Quality of Study		

Timeframes

The following timeframes are utilised in this review

Timeframe	Duration from Commencement of Treatment
Short Term	< 6 weeks
Medium Term	6 to 12 weeks
Long Term	> 12 weeks

EXECUTIVE SUMMARY

Objective of the Review

The objective of this evidence-based review is to systematically identify, critically appraise, extract, and synthesise the published academic literature on the effectiveness and safety of acupuncture interventions for the treatment of musculoskeletal conditions and injuries. This review aims to answer the following research questions:

Primary research questions:

1. What is the clinical effectiveness of acupuncture interventions for the treatment of musculoskeletal injuries?
2. What is the safety of acupuncture interventions for the treatment of musculoskeletal injuries?

Secondary research questions:

3. What evidence is there for acupuncture therapies (Chinese traditional, Western, dry needling, electroacupuncture, auricular acupuncture, and laser acupuncture)?
4. What evidence is there for allied therapies (moxibustion, cupping, Gua Sha scraping, traditional Chinese Tui Na massage)?
5. What is the clinical effectiveness of acupuncture interventions for specific body sites and injury types/conditions?
6. What is the evidence for the effectiveness of acupuncture interventions for injury subgroups or stage of recovery e.g., acute versus chronic?
7. What evidence is there regarding the recommended length of treatment, number of treatments, and duration of each individual session?

Evidence sourced

The search for all musculoskeletal conditions yielded 13,090 articles. After scrutiny, 12,996 articles were excluded as duplicates or failing to meet the inclusion criteria (shown in Figure 1), leaving 96 studies for inclusion including 54 systematic reviews and 42 randomised controlled trials. These studies examined the effectiveness and safety of acupuncture treatments across 24 musculoskeletal conditions.

The main issues affecting the methodological quality of the studies include:

Systematic Reviews

A) Very few studies addressed the potential for publication bias in reporting their reviews.

B) Limited databases were often sourced during the search process.

C) Excluded studies were frequently not listed.

D) The included studies were mostly of poor quality, with moderate to high risk of bias.

E) Conflicts of interest were often not identified or reported.

F) The studies often did not stratify results into clinically relevant subgroups, such as type of acupuncture or the musculoskeletal condition treated.

G) Heterogeneous comparison groups were often used.

H) The studies often lack valid and reliable outcome measures.

I) Studies frequently report details of the intervention and control inadequately.

J) The status of publication was often not used as an inclusion criteria.

K) Studies often did not adopt sham controls to blind the participants and practitioners.

L) Significant variability in treatments were common within the reviews.

M) Not all studies screened for methodological quality of trials using validated critiquing tools.

N) Rarely do studies utilise two independent researchers to screen the search results, assess trial eligibility, assess risk of bias, and extract data from the included trials.

Randomised controlled trials

A) With the small numbers reported in the randomised controlled trials it was difficult to ensure that the effect of confounders was dealt with.

B) Power calculations were often not conducted.

C) A number of studies failed to report the use of intention to treat analysis when reporting findings.

D) Studies often did not use valid and reliable primary outcome measures.

E) Convenience sampling was frequently used, with participants often self-selecting following attendance at a clinic for treatment.

F) Studies rarely controlled for the patient's involvement in co-interventions such as exercise, medication, and so forth.

G) Subjects and investigators were rarely blinded to the intervention involved.

H) Studies often did not include a no intervention control group or sham technique.

I) Drop outs and cause of attrition were infrequently reported.

J) Expertise of practitioners administrating the intervention was regularly not reported.

K) Lack of long-term follow-up was common.

L) Interpretation of results is difficult due to the lack of reported information in studies.

General comments on the evidence base of acupuncture for musculoskeletal conditions:

A) While some studies adhere well to the use of STRICTA criteria for reporting, there are still many studies, especially those published in Asian journals, which do not report important details of the treatment regimen and training/experience of practitioners.

B) The definition of dry needling is ambiguous, and the intervention used within the studies is not always clear/provided.

C) Needle retention time and total treatment time is not well reported within studies. The evidence statements referring to treatment length and duration reflect the most commonly reported treatment characteristics within the included studies for each condition, and are not intended to be a treatment guideline.

D) Comparators and control groups varied widely and were not always well-reported.

E) Follow-up times during the studies were often not sufficient to evaluate the extended effectiveness of acupuncture.

F) Insufficient quality and quantity of studies for many conditions and acupuncture modalities meant conclusions about effectiveness could not be made.

G) The available evidence made it difficult to draw conclusions on the relationship between training/experience and safety/risk because it was poorly reported in papers.

H) The framework utilised for treatment (traditional Chinese medicine/Western acupuncture) was not outlined well in many studies.

What is the clinical effectiveness of acupuncture interventions for the treatment of musculoskeletal injuries?

Arthritic Neck Pain

1. **Limited low to moderate quality evidence is available on traditional Chinese medicine acupuncture and Tui Na massage for treating pain and disability associated with arthritic neck pain in the short to long term.**
2. **There is conflicting evidence regarding the benefits of traditional acupuncture on the outcomes of pain and function over the short-term in patients with arthritic neck pain when compared to sham interventions.** Based on two HQ++ SRs of level 1 and 1+ evidence and one AQ+ SR of level 1 evidence. The SRs included four relevant RCTs.
3. **The evidence suggests that acupuncture may have little to no effect in improving pain and disability in the long term for patients with arthritic neck pain when compared to sham interventions.** Based on two HQ++ SRs of level 1 and 1+ evidence and one AQ+ SR of level 1 evidence. The SRs included four relevant RCTs.
4. **The evidence suggests that Tui Na massage provides mostly positive effects on pain and disability for patients with arthritic neck pain when compared to manual therapy and traction.** Based on one AQ+ SR of level 1+ evidence. The SR included six relevant RCTs.

5. **Insufficient evidence is available on dry needling and other acupuncture therapies including electroacupuncture, auricular acupuncture, laser acupuncture, moxibustion, cupping, and Gua Sha scraping for patients with arthritic neck pain.**
6. **The length, number, and duration of treatment sessions were most commonly 20 to 30 minutes long, with 7 to 9 sessions over a period of 2 to 4 weeks.**

Non-Specific Neck Pain

7. **Moderate quality evidence is available on treatments using a traditional Chinese medicine framework and delivering traditional acupuncture and electroacupuncture for patients with non-specific neck pain.**
8. **The evidence indicates that traditional acupuncture and electroacupuncture are more effective than sham/placebo control in the short term for reducing pain and improving function for patients with non-specific neck pain, however, there is conflicting evidence regarding the long-term effect.** Based on two HQ++ SRs of level 1+ evidence, one AQ+ SR of level 1- evidence, and one LQ- SR of level 1 evidence. The SRs included six relevant RCTs.
9. **Limited low-quality evidence is available on treatments delivering dry needling, laser acupuncture and Gua Sha scraping for patients with non-specific neck pain.**
10. **The evidence suggests that dry needling may be more effective than sham dry needling in reducing pain in patients with non-specific neck pain at short-term follow-up.** Based on two AQ+ SRs of level 1 evidence and one AQ+ RCT. The SRs included one relevant RCT.
11. **The evidence indicates that laser acupuncture may be more effective than placebo for reducing pain in the short to medium term in patients with non-specific neck pain, but does not improve function.** Based on one HQ++ SR of level 1+ evidence. The SRs included two relevant RCTs.
12. **The evidence suggests that Gua Sha scraping may be effective in improving pain in patients with non-specific neck pain when compared to waiting list or heat pack.** Based on one HQ++ SR of level 1+ quality. The SR included two relevant RCTs.
13. **The evidence indicates that acupuncture interventions may be effective in reducing pain and improving function for patients with non-specific neck pain in the short term, however, there is little evidence supporting its sustained effect over the long term.**
14. **Insufficient evidence is available on other acupuncture therapies including auricular acupuncture, moxibustion, cupping, and traditional Chinese Tui Na massage for patients with non-specific neck pain.**
15. **The length, number, and duration of treatment sessions were most commonly 20 to 45 minutes long, with 5 to 10 sessions delivered over 3 to 5 weeks.**

Mechanical Neck Pain

16. **Limited low to moderate quality evidence is available on treatments using traditional Chinese acupuncture, electroacupuncture and dry needling for patients with mechanical neck pain.**

17. **There is conflicting evidence suggesting that traditional acupuncture may be more effective at reducing pain and improving disability in the short term for patients with mechanical neck pain when compared to sham acupuncture, however, the evidence does not provide support for long-term effects.** Based on two HQ++ SRs of level 1+ evidence and one LQ- SR of level 1- evidence. The SRs included four relevant RCTs.
18. **There is conflicting evidence regarding the benefits of dry needling and electroacupuncture on the outcome of pain over the short term in patients with mechanical neck pain when compared to control interventions.** Based on one HQ++ SR of level 1+ evidence, three AQ+ SRs of level 1 evidence and one HQ++ RCT. The SRs included three relevant RCTs; two on dry needling and one on EA.
19. **Insufficient evidence is available on other acupuncture therapies including auricular acupuncture, laser acupuncture, moxibustion, cupping, and Gua Sha scraping for patients with mechanical neck pain.**
20. **The length, number, and duration of treatment sessions were most commonly 15 to 30 minutes long, with 5 to 15 sessions over a period of 4 to 5 weeks.**

Cervicogenic Headache

21. **Insufficient evidence is available on the outcomes of pain, function, and quality of life using needle-based and other acupuncture therapies for patients with cervicogenic headaches.** Based on one LQ- RCT.

Radicular Neck Pain

22. **Limited low-quality evidence is available on treatments using traditional Chinese acupuncture and Tui Na massage for patients with radicular neck pain.**
23. **The evidence suggests that Tui Na massage provides mostly positive effects on pain, function, and disability for patients with radicular neck pain when compared with traction.** Based on one AQ+ SR of level 1 evidence. The SR included nine relevant RCTs.
24. **The evidence indicates that traditional acupuncture interventions may be more effective than wait list or sham interventions for reducing pain at immediate to short-term follow-up for patients with radicular neck pain.** Based on two HQ++ SRs of level 1+ evidence. The SRs included two relevant RCTs.
25. **Insufficient evidence is available on dry needling and other acupuncture therapies including auricular acupuncture, laser acupuncture, moxibustion, electroacupuncture, cupping, and Gua Sha scraping for patients with radicular neck pain.**
26. **The length, number, and duration of treatment sessions were most commonly 15 to 30 minutes long, with 8 to 20 sessions over a period of 2 to 4 weeks.**

Whiplash Associated Disorders

27. **Limited low to moderate quality evidence is available on needle-based acupuncture therapies including dry needling, Chinese traditional acupuncture, and electroacupuncture for patients with whiplash associated disorders.**

28. **The evidence indicates that acupuncture and electroacupuncture, alone or in combination with standard treatments, may be effective in reducing pain in the short to medium term when compared with usual care, sham electroacupuncture/acupuncture or medication for patients with whiplash associated disorders. However, the evidence does not provide support for improving function and disability.** Based on one HQ++ SR of level 1+ evidence and one AQ+ SR of level 1- evidence. The SRs included four relevant RCTs.
29. **The evidence indicates that acupuncture and electroacupuncture interventions may be effective in reducing pain in the short term, however, there is little evidence supporting its sustained effect over the long term and its effect on improving function and disability.**
30. **The evidence suggests that there is little or no difference between dry needling and sham interventions for the outcomes of pain and function in patients with whiplash associated disorders in the short and long term.** Based on one HQ++ SR of level 1+ evidence and three AQ+ SRs, two of level 1 and one of level 1- evidence. The SRs included two relevant RCTs.
31. **Insufficient evidence is available on other acupuncture therapies including auricular acupuncture, laser acupuncture, moxibustion, cupping, Gua Sha scraping, and traditional Chinese Tui Na massage for patients with whiplash associated disorders.**
32. **The length, number, and duration of treatment sessions were most commonly 15 to 30 minutes long, with 6 to 12 sessions over a period of 2 to 6 weeks.**

Rotator Cuff Pathology +/- Bursitis

33. **Limited low to moderate quality evidence is available on treatments delivering traditional acupuncture, electroacupuncture, laser acupuncture and dry needling for patients with rotator cuff pathology.**
34. **The evidence indicates that the addition of traditional acupuncture or electroacupuncture to an exercise programme may have little or no effect on outcomes for function, disability, and range of motion in patients with rotator cuff pathology.** Based on one HQ++ RCT.
35. **The evidence suggests that acupuncture and electroacupuncture may be more effective than sham/placebo acupuncture in reducing pain and improving function and quality of life in the short and long term for patients with rotator cuff pathology.** Based on one AQ+ SR of level 1+ evidence, one LQ- SR of level 1 evidence and one LQ- RCT. The SRs included four relevant RCTs.
36. **The evidence indicates that there is no significant difference between treatment with acupuncture and cortisone injection for the outcomes of pain and function in patients with rotator cuff pathology, but that acupuncture may not be as effective as platelet rich plasma injections.** Based on two AQ+ RCTs, one on acupuncture and one on dry needling.
37. **There is conflicting evidence regarding the benefits of dry needling in combination with exercise/physiotherapy on the outcomes of function and disability in patients with rotator cuff pathology when compared to exercise/physiotherapy alone. The**

evidence suggests that there is little or no effect on the reduction of pain. Based on two AQ+ RCTs.

38. **There is limited and conflicting evidence regarding the benefits of laser acupuncture when compared to sham/placebo on the outcomes of pain, range of motion, disability, and function in patients with rotator cuff pathology.** Based on one HQ++ SR and one LQ- RCT. The SR included one relevant RCT.
39. **Insufficient evidence is available for other acupuncture therapies including moxibustion, cupping, Gua Sha scraping, and traditional Chinese Tui Na massage for patients with rotator cuff pathology.**
40. **The length, number, and duration of treatment sessions were most commonly 15 to 30 minutes long, with 4 to 10 sessions over a period of 4 to 7 weeks.**

Frozen Shoulder

41. **Limited low-quality evidence is available on treatments delivering traditional acupuncture or electroacupuncture for patients with Frozen Shoulder.**
42. **The evidence suggests that acupuncture or electroacupuncture, alone or in combination with physiotherapy or electrotherapy, may be effective for reducing pain, improving range of motion and function in patients with frozen shoulder when compared to physiotherapy or electrotherapy alone.** Based on one LQ- SR of level 1- evidence containing three RCTs and one LQ- RCT.
43. **Insufficient evidence is available on other acupuncture therapies including auricular acupuncture, laser acupuncture, dry needling, moxibustion, cupping, Tui Na massage, and Gua Sha scraping for patients with Frozen Shoulder.**
44. **The length, number, and duration of treatment sessions were most commonly 30 to 40 minutes long, with 8 to 10 sessions delivered over 4 to 6 weeks.**

Lateral Epicondylitis/Lateral Elbow Pain

45. **Low to moderate quality evidence is available on treatments using a traditional Chinese medicine framework and delivering traditional acupuncture and laser acupuncture for patients with lateral epicondylitis/lateral elbow pain.**
46. **The evidence suggests that traditional acupuncture provides short-term reductions of pain and improvements in strength and function in patients with lateral epicondylitis/lateral elbow pain when compared to placebo, sham, and ultrasound, however, there is conflicting evidence regarding the medium- to long-term effect.** Based on one HQ++ SR of level 1 evidence and two AQ+ SRs of level 1 evidence. The SRs included 14 relevant RCTs.
47. **The evidence indicates that there is little or no difference between treatment with laser acupuncture and placebo/sham for the outcomes of pain and strength in patients with lateral epicondylitis/lateral elbow pain.** Based on one HQ++ SR of level 1+ evidence, one AQ+ SR of level 1 evidence and one LQ- SR of level 1- evidence. The SRs included eight relevant RCTs.
48. **Insufficient evidence is available on other acupuncture therapies including auricular acupuncture, electroacupuncture, dry needling, moxibustion, cupping, Gua Sha**

scraping, and traditional Chinese Tui Na massage for patients with lateral epicondylitis/lateral elbow pain.

49. **The length, number, and duration of treatment sessions were most commonly 20 to 30 minutes long, with around 10 sessions delivered over 2 to 6 weeks.**

Carpal Tunnel Syndrome

50. **Limited low to moderate quality evidence is available for treatments using a traditional Chinese medicine framework and delivering traditional acupuncture for patients with carpal tunnel syndrome.**
51. **There is limited and conflicting evidence regarding the benefits of acupuncture on patients' symptoms and nerve conduction study results in patients with mild to moderate carpal tunnel syndrome when compared to placebo and conventional medication.** Based on two AQ+ SRs of level 1 and 1+ evidence and one AQ+ RCT. The SRs included six relevant RCTs.
52. **Insufficient evidence is available for dry needling and other acupuncture therapies including auricular acupuncture, laser acupuncture, moxibustion, Gua Sha scraping, and traditional Chinese Tui Na massage for patients with carpal tunnel syndrome.**
53. **The length, number, and duration of treatment sessions were most commonly 30 minutes long, with 8 to 10 sessions delivered over 4 to 6 weeks.**

De Quervain's Tenosynovitis

54. **Limited low-quality evidence is available on traditional acupuncture for patients with De Quervain's Tenosynovitis.**
55. **The evidence indicates that there may be little or no difference between treatment with traditional Chinese acupuncture and injection in the short term for the outcomes of pain and disability in patients with De Quervain's Tenosynovitis.** Based on one AQ+ RCT.
56. **Insufficient evidence is available on dry needling and other acupuncture therapies including electroacupuncture, auricular acupuncture, laser acupuncture, moxibustion, cupping, Gua Sha scraping, and traditional Chinese Tui Na massage for patients with De Quervain's Tenosynovitis.**

Non-Specific Low Back Pain

57. **Moderate quality evidence is available on treatments using a traditional Chinese medicine framework and delivering traditional acupuncture for patients with non-specific low back pain.**
58. **The evidence suggests that traditional acupuncture is probably effective in reducing pain in the short term for patients with non-specific low back pain when compared to a waiting list/no treatment control, however, its effect on function and quality of life remains unclear and conflicting.** Based on four AQ+ SRs of level 1 (1) and 1+ (3) evidence, and two LQ- SR of level 1 and 1- evidence. The SRs included 15 relevant RCTs.
59. **There is conflicting evidence suggesting that acupuncture may be more effective at reducing pain in the short term for patients with non-specific low back pain when**

compared to sham acupuncture, placebo, and conventional medication. However, acupuncture may have little or no effect on function and quality of life or when compared to transcutaneous electrical nerve stimulation. Based on one HQ++ SR of level 1+ evidence, four AQ+ SRs of level 1 (2) and 1+ (2) evidence, and two LQ- SRs of level 1 and 1- evidence. The SRs included 26 relevant RCTs.

60. **Limited evidence suggests that the addition of acupuncture to usual care or medication may improve outcomes for pain and function in the short term for patients with non-specific low back pain when compared with those who received usual care or medication alone.**
61. **Limited low to moderate quality evidence is available for electroacupuncture and cupping for patients with non-specific low back pain.**
62. **The evidence indicates that electroacupuncture may be effective in reducing pain immediately post-intervention and in the short term when compared with conventional medication and exercise.** Based on two AQ+ SRs of level 1 and 1+ evidence. The SRs included six relevant RCTs.
63. **The evidence suggests that cupping may be effective in reducing pain in the short term compared with conventional medications for patients with non-specific low back pain.** Based on one HQ++ SR of level 1+ evidence and two AQ+ SR of level 1 and 1- evidence. The SRs included nine relevant RCTs.
64. **The evidence suggests that the effectiveness of acupuncture treatments on non-specific low back pain is affected by the patient's age and duration of the condition, with the evidence indicating a relationship between increased patient age or increased chronicity of condition (> 3 months) and reduced treatment outcomes.**
65. **Insufficient evidence is available on dry needling and other acupuncture therapies including auricular acupuncture, laser acupuncture, moxibustion, Gua Sha scraping, and traditional Chinese Tui Na massage for patients with non-specific low back pain.**
66. **The length, number, and duration of treatment sessions were most commonly 20 to 30 minutes long, with 10 to 20 sessions delivered over 3 to 7 weeks.**

Lumbar Disc Herniation

67. **Limited low-quality evidence is available on treatments delivering traditional acupuncture and Tui Na massage for patients with lumbar disc herniation.**
68. **The evidence indicates that traditional acupuncture plus traction may be effective in reducing pain post-treatment for patients with lumbar disc herniation when compared to traction alone.** Based on one LQ- SR of level 1- evidence. The SR included five relevant RCTs.
69. **The evidence suggests that Tui Na massage may be effective in improving pain and function for patients with lumbar disc herniation when compared to conventional medication and traction, however, the evidence for functional improvement was not as strong as that for pain relief.** Based on one AQ+ SR of level 1+ evidence. The SR included eight relevant RCTs.
70. **Insufficient evidence is available on other acupuncture therapies including electroacupuncture, auricular acupuncture, laser acupuncture, dry needling,**

moxibustion, cupping, and Gua Sha scraping for patients with lumbar disc herniation.

71. **The length, number and duration of treatment sessions were most commonly 20 to 30 minutes long, with 3 to 15 sessions delivered over 2 to 5 weeks.**

Sciatica

72. **Moderate quality evidence is available on traditional Chinese acupuncture and electroacupuncture for treating the pain associated with sciatica in the short term.**
73. **The evidence indicates that traditional acupuncture and electroacupuncture are probably effective in reducing pain in the short term when compared with conventional medication. However, there is little evidence on its sustained effect over the medium and long term and its effect on function and quality of life.** Based on two SRs of HQ++ and one SR of AQ+, all of level 1 evidence. The SRs included 13 relevant RCTs.
74. **Insufficient evidence is available on other acupuncture therapies including dry needling, auricular acupuncture, laser acupuncture, moxibustion, cupping, Gua Sha scraping, and traditional Chinese Tui Na massage for patients with sciatica.**
75. **The length, number, and duration of treatment sessions were most commonly 20 to 45 minutes long, with 5 to 20 sessions over a period of 1 to 3 weeks.**

Myofascial Pain

76. **Numerous high and moderate quality systematic reviews are available on treatments using dry needling for patients with myofascial pain.**
77. **The evidence suggests that dry needling improves pain intensity and range of motion post-intervention and at short-term follow-up when compared with no intervention, sham, or placebo for patients with myofascial pain. However, the improvement was not sustained over the long term.** Based on two HQ++ SRs of level 1 and 1+ evidence, six AQ+ SRs (two of level 1+ and four of level 1 evidence), and one LQ- SR of level 1- evidence. The SRs included 32 relevant RCTs.
78. **The evidence indicates that there is little or no difference between treatment with dry needling or acupuncture and other treatments such as manual therapy, pharmaceutical injections, and conventional medication for the outcomes of pain and function in patients with myofascial pain.** Based on three HQ++ SRs (one of level 1 and two of level 1+ evidence); six AQ+ SRs (two of level 1+ and four of level 1 evidence) one LQ- SR of level 1- evidence, and three RCTs (two of AQ+ and one of LQ). The SRs included 32 relevant RCTs.
79. **There is conflicting evidence about the benefits of dry needling on the outcomes of quality of life and function over the short term in patients with myofascial pain.** Based on two HQ++ SRs of level 1 and 1+ evidence, five AQ+ SRs (two of level 1+ and three of level 1 evidence), and one LQ- SR of level 1- evidence. The SRs included 31 relevant RCTs.
80. **Low to moderate quality evidence is available for traditional acupuncture and laser acupuncture for patients with myofascial pain.**

81. **The evidence indicates that traditional acupuncture may be more effective than control or placebo for reducing pain and improving function at immediate to short-term follow-up for patients with myofascial pain.** Based on two HQ++ SRs of level 1+ evidence. The SRs included six relevant RCTs.
82. **The evidence suggests that laser acupuncture may be more effective than placebo in reducing pain in patients with myofascial pain at short- to long-term follow-up.** Based on one SR of HQ++ and level 1+ evidence, and one LQ- SR of level 1- evidence. The SRs included 17 relevant RCTs.
83. **Insufficient evidence is available on other acupuncture therapies including auricular acupuncture, moxibustion, Gua Sha scraping, and traditional Chinese Tui Na massage for patients with myofascial pain.**
84. **The length, number, and duration of treatment sessions were most commonly 30 minutes long, with 4 to 20 sessions delivered over 3 to 10 weeks.**

Upper and Lower Limb Fractures

85. **There is insufficient evidence for acupuncture therapies for patients with upper and lower limb fractures based on the primary and secondary outcomes of interest within this review including pain, function, and quality of life.** Based on one SR of AQ+ with level 1- evidence, and two LQ- RCTs. The SR included four relevant RCTs.
86. **There is insufficient and conflicting evidence for traditional Chinese Tui Na massage for the treatment of upper and lower limb fractures.**

Sacrococcygeal Pain

87. **Insufficient evidence is available on the outcomes of pain, function, and quality of life on needle-based and other acupuncture therapies for patients with sacrococcygeal pain.** Based on one SR of AQ+ with level 1 evidence. The SR included one relevant RCT.

Hip Osteoarthritis

88. **Low quality evidence is available on traditional Chinese acupuncture for patients with hip osteoarthritis.**
89. **The evidence indicates that treatment with TCM acupuncture may have little or no effect compared with sham acupuncture for the outcomes of pain and function in patients with hip osteoarthritis.** Based on one AQ+ SR of level 1+ evidence, which included three relevant RCTs.
90. **Insufficient evidence is available on other acupuncture therapies including electroacupuncture, dry needling, auricular acupuncture, laser acupuncture, moxibustion, cupping, Gua Sha scraping, and traditional Chinese Tui Na massage for patients with hip osteoarthritis.**
91. **The length, number, and duration of treatment sessions were most commonly 20 to 30 minutes long, with six to 10 sessions over a period of 3 to 6 weeks.**

Greater Trochanteric Pain Syndrome

92. **Limited low-quality evidence is available on dry needling in the short term for patients with Greater Trochanteric Pain Syndrome. However, there was insufficient medium- to long-term evidence.**

93. **The evidence suggests that there may be little or no difference between treatment with dry needling and cortisone injection for the outcomes of pain, function, and medication intake in the short term for patients with Greater Trochanteric Pain Syndrome.** Based on one AQ+ SR.

94. **Insufficient evidence is available on acupuncture therapies including traditional acupuncture, electroacupuncture, laser acupuncture, auricular acupuncture, moxibustion, cupping, Gua Sha scraping, and traditional Chinese Tui Na massage for patients with Greater Trochanteric Pain Syndrome.**

Patellofemoral Pain

95. **A small quantity of moderate- to high-quality evidence is available on traditional Chinese acupuncture and dry needling within a multimodal programme for patients with patellofemoral pain.**

96. **The evidence indicates that there is probably little or no difference between treatment with traditional Chinese acupuncture and no treatment for patients with patellofemoral pain in the short or long term.** Based on one AQ+ SR of level 1 evidence, which included one relevant RCT.

97. **The evidence indicates that the addition of dry needling to a manual therapy and exercise programme makes little or no difference to pain and function in patients with patellofemoral pain.** Based on one HQ++ RCT with level 1+ evidence.

98. **Limited evidence suggests that traditional Chinese acupuncture or the inclusion of dry needling to a manual therapy and exercise programme may make little or no difference to pain and function in individuals with chronic patellofemoral pain. However, insufficient evidence is available during the acute stage of the condition.**

99. **Insufficient evidence is available on other acupuncture therapies including electroacupuncture, auricular acupuncture, laser acupuncture, moxibustion, cupping, Gua Sha scraping, and traditional Chinese Tui Na massage for patients with patellofemoral pain.**

100. **The length, number, and duration of treatment sessions were most commonly 20 to 40 minutes long, with three to eight sessions over a period of 3 to 4 weeks.**

Knee Osteoarthritis

101. **Numerous low to moderate quality systematic reviews and randomised controlled trials are available on treatments using the traditional Chinese medicine framework and delivering traditional acupuncture, trigger point acupuncture, or moxibustion for patients with knee osteoarthritis.**

102. **Limited moderate quality evidence is available for laser acupuncture and pulsatile cupping for patients with knee osteoarthritis.**

103. **The evidence suggests that acupuncture and electroacupuncture probably reduces pain in the short term when compared to the controls of medication,**

placebo, and waiting list, however, their effects on function and quality of life remain unclear and conflicting. Based on three AQ+ SRs and three LQ- SRs (three of level 1+ evidence and three of level 1 evidence), and two RCTs (one of LQ- evidence and one of AQ+ evidence). The SRs included 43 relevant RCTs.

104. **The evidence suggests that the effectiveness of acupuncture treatments depends on the age of the patient and severity of their osteoarthritis. Specifically, the evidence suggests that laser acupuncture, needle acupuncture, and moxibustion are probably not effective in improving pain and function in older patients with moderate or severe knee pain.** Based on one HQ++ RCT of level 1+ evidence quality on laser and needle acupuncture, and one HQ++ RCT of 1+ evidence quality on moxibustion.

105. **There is conflicting evidence about the benefits of moxibustion on the outcomes of pain and function over the short term in patients with knee osteoarthritis.** Based on one HQ++ SR, two AQ+ SRs of level 1 evidence, and four RCTs of HQ++ (1), AQ+ (1) and LQ- (2) of level 1 and 1- quality. The SRs included 21 relevant RCTs.

106. **The evidence indicates that pulsatile cupping may be effective in improving knee pain and function in patients with knee osteoarthritis in the short and medium term when compared to no intervention.** Based on one AQ+ SR and one AQ+ RCT both of level 1 evidence quality, and one LQ- RCT of level 1- evidence. The SR included seven relevant RCTs.

107. **Insufficient evidence is available for other acupuncture therapies including Gua Sha scraping and traditional Chinese Tui Na massage for patients with knee osteoarthritis.**

108. **The length, number, and duration of treatment sessions were most commonly 20 to 30 minutes long, with 5 to 20 sessions delivered over 5 to 9 weeks, or daily treatments delivered over a short period of 7 to 10 days.**

Ankle Sprain

109. **Insufficient evidence is available for the outcomes of pain, function, and quality of life using needle-based and other acupuncture therapies for patients with ankle sprains. The available evidence lacks validated outcome measures for the primary and secondary outcomes of interest within this review including pain, function, and quality of life.** Based on three HQ++ and AQ+ SRs with level 1+ and 1 evidence. The SRs included 18 relevant RCTs.

110. **The length, number, and duration of treatment sessions were most commonly 30 minutes long, with 5 to 15 sessions delivered over a short period of 1 to 2 weeks.**

Achilles Tendinopathy

111. **Low to moderate quality evidence is available on treatments using a traditional Chinese medicine framework and delivering traditional acupuncture and electroacupuncture for patients with Achilles tendinopathy.**

112. **The evidence suggests that needle acupuncture may be effective in reducing symptom severity in comparison to stretching and exercise in the short term, but**

not long term, for patients with chronic Achilles tendinopathy. Based on one AQ+ SR of level 1 evidence which contained one relevant RCT.

113. **The evidence indicates that needle acupuncture interventions may be effective in reducing symptom severity for patients with chronic Achilles tendinopathy in the short term (up to 6 weeks), however, there is little evidence supporting its sustained effect over the long term.**

114. **Insufficient evidence is available on other acupuncture therapies including auricular acupuncture, laser acupuncture, dry needling, moxibustion, cupping, Gua Sha scraping, and traditional Chinese Tui Na massage for patients with Achilles tendinopathy.**

115. **Insufficient evidence is available on acute Achilles tendinopathy, as most studies were of patients with chronic Achilles Tendinopathy.**

116. **The length, number, and duration of treatment sessions were most commonly 30 minutes long, with 12 to 24 sessions delivered over 6 to 8 weeks.**

Plantar Heel Pain

117. **Low to moderate quality evidence is available on needle-based acupuncture therapies including Western, Chinese traditional, and electroacupuncture for patients with plantar heel pain.**

118. **The evidence suggests that acupuncture and electroacupuncture may be effective in the short-term reduction of pain in patients with plantar fasciitis; however, the improvement is not sustained over the medium to long term.** Based on one AQ+ SR and one LQ- SR, both of level 1 evidence. The SRs included five relevant RCTs.

119. **The evidence indicates that dry needling may be more effective than control or placebo for reducing pain but not improving quality of life in the short and long term when treating patients with plantar heel pain.** Based on five AQ+ SRs, four of level 1 evidence and one of 1- evidence. The SRs included eight relevant RCTs.

120. **The evidence indicates that acupuncture interventions may be effective in reducing pain in the short term (up to 6 weeks), however, there is little evidence supporting its sustained effect over the medium and long term and its effect on improving quality of life in the short and long term.**

121. **The evidence suggests that as the duration of plantar fasciitis increases, the improvement from treatment including electroacupuncture decreases.** Based on one LQ- SR of level 1 evidence, containing one relevant RCT.

122. **Insufficient evidence is available on other acupuncture therapies including auricular acupuncture, laser acupuncture, moxibustion, cupping, Gua Sha scraping, and traditional Chinese Tui Na massage for patients with plantar heel pain.**

123. **The length, number, and duration of treatment sessions were most commonly 20 to 30 minutes long and of two different treatment schedules; one of daily treatments over a duration of 1 to 2 weeks, and the other of weekly sessions over 4 to 8 weeks.**

What is the safety of acupuncture interventions for the treatment of musculoskeletal injuries?	***Safety and Risk*** 1. **Serious adverse events associated with needling practices such as acupuncture and dry needling are rare and usually resolve after treatment, however, these practices are not risk-free.** Based on three LQ- SRs of level 1- and 2- evidence on adverse events, 26 acupuncture and dry needling intervention SRs, and 14 RCTs. 2. **Needle-based acupuncture interventions have a very low rate of adverse events when conducted among licensed and qualified practitioners.** Based on three LQ- SRs of level 1- and 2- evidence on adverse events, 26 acupuncture and dry needling intervention SRs, and 14 RCTs. 3. **Several possible adverse events including allergies, burns, and infection are associated with moxibustion, meaning it is not entirely risk-free and should be monitored with a degree of caution.** Based on one LQ- SR of 2- evidence on adverse events, four moxibustion intervention SRs, and four RCTs. 4. **Minor complications such as scarring, burns, and bullae associated with cupping are not uncommon. Most adverse events associated with cupping are minor.** Based on one LQ- SR of 2- evidence on adverse events, four cupping intervention SRs, and two cupping intervention RCTs.

1. Background

1.1 Objective of this review

The objective of this evidence-based review is to systematically identify, critically appraise, extract, and synthesise the published academic literature on the effectiveness and safety of acupuncture interventions for the treatment of musculoskeletal conditions and injuries. This review aims to answer the following research questions:

Primary research questions:

1. What is the clinical effectiveness of acupuncture interventions for the treatment of musculoskeletal injuries?
2. What is the safety of acupuncture interventions for the treatment of musculoskeletal injuries?

Secondary research questions:

3. What evidence is there for needle-based acupuncture therapies (Western, Chinese traditional, electroacupuncture (EA), auricular acupuncture (AA), and laser acupuncture (LA))?
4. What evidence is there for other acupuncture therapies (moxibustion, cupping, Gua Sha scraping, traditional Chinese Tui Na massage)?
5. What is the clinical effectiveness and safety of acupuncture interventions for specific body sites and injury types/conditions?
6. What is the evidence for the effectiveness of acupuncture interventions for injury subgroups or stage of recovery, e.g., acute versus chronic?
7. What evidence is there regarding the recommended length of treatment, number of treatments, and duration of each individual session?

1.2 Description of the intervention

Acupuncture as a treatment modality first developed in China, however, it is now practised throughout the world (McDonald & Janz, 2017). Worldwide, acupuncture treatment is increasingly more accepted, particularly as an alternative and/or adjunct to pharmacological interventions for pain (MacPherson & Hammerschlag, 2012; Vickers et al., 2018). The term “acupuncture” is derived from the two Latin words “acus” and “punctum”, (past participle of the word “pungere”), meaning to puncture or pierce (Bivins, 2001).

The World Health Organization (WHO) has broadly defined acupuncture as the insertion of needles into the human body with the goal of achieving therapeutic effects (WHO, 2007), but it can include a range of procedures involving the stimulation of various points on the body using a variety of techniques (Langevin et al., 2011; Ulett, Han, & Han, 1998; White & Ernst, 2004). Besides the needling of acupuncture points, treatment can be delivered by stimulating acupoints or musculoskeletal trigger points using low-level laser radiation (laser acupuncture), electrical current (electroacupuncture), herbal preparations such as moxibustion, suction (cupping), massage (Tui Na) or scraping the skin over the acupuncture points (Gua Sha) (Cardini & Weixin, 1998; Shen et al., 2006; Deare et al. 2013). In addition, different styles of acupuncture have developed in relation to needle point selection, location of points according to microsystems (e.g., auriculotherapy), depth of needling, and duration of needle retention (Lao, 1996).

Two broad approaches to acupuncture are widely known within the literature: Traditional Chinese Medicine (TCM) and Western biomedical acupuncture (White et al., 2009). The TCM approach is based on the various concepts of the balance of Yin and Yang, Qi theory, five element theory, meridian theory, and traditional diagnostic methods of Oriental medicine (Birch & Kaptchuk, 1999; Lu & Needham, 2002). Traditional acupuncture training utilises a TCM approach but includes study of Western medical science. Biomedical assessment also contributes to the development of a diagnosis and treatment plan. The approach emphasises that illness, pain, or dysfunction is a result of an imbalance, but also a disruption to the flow of energy or Qi within the human body (White, 2006). According to traditional philosophy, energy circulates the body in 'meridians', and imbalance can result due to a blockage, affecting meridian energy circulation (Deadman, Al-Kahfaji, & Baker, 2007). The symptoms experienced due to an illness or dysfunction are believed to be outward manifestations of such an imbalance. Therefore, the emphasis is placed on treating the cause of imbalance, rather than the symptoms, to maintain one's health (White, 2006). Acupuncture treatment seeks to correct the flow of energy and improve a person's Qi by placing thin needles into very specific points to restore equilibrium within the body (Deadman, et al., 2007; White & Ernst, 2004). The ancient Chinese treatment has been traditionally used for a multitude of problems ranging from pain management through to systemic disorders, psychological problems, and addiction (Deadman et al., 2007; Lu & Needham, 2002).

The Western biomedical acupuncture approach also involves inserting fine needles into the body to provide a therapeutic effect; this and the use of named acupuncture points are the only theoretical parallel between traditional and Western/biomedical acupuncture (Campbell, 1998; White et al., 2009). As part of this approach, the scientific methodology of Western medicine is utilised, integrating knowledge of anatomy, physiology, pathology, and evidence-based medicine to clinically reason treatment (Bradnam, 2011; White et al., 2008). Consequently, the actual acupuncture treatment for a particular condition may be very similar to those of TCM; however, the clinical reasoning behind treatment selection may be entirely different (White, 2006). Both the TCM and Western acupuncture approaches treat painful (ashi) points and trigger points, which characterise the practice of so called 'dry needling' (Kohut et al., 2011). Dry needling is the brief, pecking type insertion of an acupuncture (or hypodermic) needle to deactivate a myofascial trigger point (Furlan et al., 2005).

The exact mechanisms underlying the action of acupuncture, particularly in relation to TCM, are still unclear; however, several mechanisms are proposed by Western scientific research. Acupuncture research publications, particularly in the areas of pain and neuroscience, demonstrate exponential growth (Feng, Han, Lai, Wang, & Lui, 2017; Ma et al., 2016). This is supported in part by significant Chinese governmental funding for acupuncture research into predominantly neuroscience mechanisms (Lim, Zhao, & Ha, 2015). MacPherson and Hammerschlag (2012) note that acupuncture research has taken different paths beyond using randomised controlled trials to investigate clinical effectiveness. The first path includes investigations of biochemical and physiologic endpoints ('biomarkers') to evidence the physiological response to needling. Biomarkers demonstrate changes, such as in neuropeptide concentrations, rather than explain the mechanism by which they occurred; for example, opioid and monoamine acupuncture-related analgesia (Zhao, 2008). The second research path utilises the biomedical model to describe and explain the mechanism of action, and explores the neurophysiological (and anatomical) pathways activated in response to acupuncture needle (and acupuncture point) parameters of stimulation and how acupuncture signalling could affect

clinical change (Fox, Gray, Koptiuch, Badger & Langevin, 2014; Kagitani, Uchida, & Hotta, 2010; Langevin & Yandow, 2002; Uchida, Kagitani, & Sato-Suzuki, 2017).

The Accident Compensation Corporation (ACC) includes acupuncture within the suite of allied health treatment modalities. Allied Health is the third major group in the New Zealand health and disability workforce (alongside medical and nursing professionals), and includes physiotherapists, chiropractors, osteopaths, occupational therapists, speech therapists, and acupuncturists (www.ahanz.org.nz). ACC currently funds two sets of treatment modalities within acupuncture services: Conventional therapies and adjunct therapies. The conventional therapies are comprised of traditional acupuncture, Western acupuncture, laser acupuncture, electroacupuncture, and auricular acupuncture. The adjunct therapies include cupping, Gua Sha scraping, Tui Na massage, and moxibustion. To better understand how acupuncture can be used to treat musculoskeletal conditions, ACC requested an evidence-based review of the effectiveness and safety of acupuncture modalities across a wide range of musculoskeletal conditions. The goals of the review were to evaluate the evidence for specific conditions and acupuncture modalities and to extract information on treatment dose, duration, and frequency where possible. Two previous ACC evidence-based reviews have examined the use of acupuncture for musculoskeletal conditions (Hodges & Maskill, 2002; Hardaker & Ayson, 2011). The current review aims to build on the evidence base presented in previous reviews and, where possible, provide additional information regarding specific conditions and treatment modalities.

1.3 Introduction to safety/risk

Although acupuncture has a relatively sound safety profile, adverse events after treatment have been reported (Lin et al., 2014). An overview of systematic reviews (SRs) of adverse events associated with acupuncture identified four main categories, which included organ or tissue injuries, local adverse events or reactions, and other complications such as dizziness or syncope (Chan et al., 2017). A SR on the adverse events of acupuncture highlighted internal organ, tissue, or nerve injury as the main complications of acupuncture. Other adverse events highlighted included syncope, haemorrhage, infections, burns, allergy, aphonia, hysteria, cough, thirst, fever, somnolence, and broken needles (Wu et al., 2015). These potential complications are often considered uncommon, usually mild and transient, and very rarely serious (Park et al., 2014). However, as minor and serious adverse events can occur it has been highlighted that acupuncture is not harmless and that considerations should be made regarding acupuncturists' training credibility (Chan et al., 2017). Witt et al. (2009) presented a summary of the complications involved with acupuncture:

- Common (*1 to 10 out of 100 people treated*): Bleeding and haematoma.
- Uncommon (*1 to 10 of out 1,000 people treated*): Inflammation at the application site, swelling, strong pain during needling, local muscle pain, nerve injury causing sensation difficulties or a temporary weakness in the associated musculature, headache, fatigue, vertigo, and nausea.
- Rare (*1 to 10 out of 10,000 people treated*): Local infection, redness, itching, sweating, decreased blood pressure, increased blood pressure, unconsciousness, tachycardia, breathing difficulties, vomiting, worsening health state, generalised muscle pain, restricted movement, joint problems, feeling of coldness, menstrual problems, depressive mood, anxiety, sleep disturbance, restlessness, nervousness, disturbed vision, and tinnitus.

- Very rare (*less than 1 out of 10,000 people treated*): Palpitations, constipation, diarrhoea, gastrospasm, enterospasm, weight loss, circulatory disturbance, blood vessel lesions, systemic infection, euphoria, nightmares, poor concentration, imbalance, speech disturbance, disorientation, shivering, eye irritation, and pneumothorax.

This evidenced-based review will aim to assess the safety of acupuncture interventions for the treatment of musculoskeletal conditions by investigating the adverse events reported within the included studies. It will aim to define the training and experience of the acupuncture practitioners when outlining the levels of safety, and explore the safety profiles for different interventions and musculoskeletal conditions.

2. Methodology

2.1 Review question

What is the clinical effectiveness and safety of acupuncture interventions for the treatment of musculoskeletal conditions and injuries?

2.2 Methods

ACC Research completed an evidence-based review of the effectiveness and safety of acupuncture treatments for musculoskeletal pain in 2011. The review summarised the evidence for the lumbar spine, neck, shoulder, knee and ankle, and included studies published between 2000 and 2011. This review provides an updated source of evidence to the 2011 review, as well as presenting evidence from 2006 onwards for other body sites and conditions that were not included within the 2011 review including the foot, hip, wrist, and elbow. A review of published research literature was undertaken to provide a synthesis of the currently available research evidence related to the effectiveness and safety of acupuncture interventions for the treatment of musculoskeletal conditions and injuries. A systematic and rigorous search strategy was developed to locate all published and accessible research evidence from 2006 onwards for new conditions, or 2011 onwards for conditions included in the previous ACC reviews, up to December 2017. The evidence base for this review included research evidence from existing systematic reviews, meta-analyses, and high-level primary research. This review took a pragmatic approach to the presentation of the literature, sub-dividing the studies into the most common major clinical presentations reported in the literature. Where clinical conditions are not represented, no controlled studies that met inclusion criteria were identified.

2.3 Search strategy

The search was developed using a standard PICO structure (shown in Table 1). All study timeframes were considered within the review and for the analysis the timeframes were divided into short term (< 6 weeks), medium term (6 to 12 weeks), and long term (> 12 weeks). Only articles published in English, Chinese, Japanese, and Korean that used human participants and were accessible in full text were included.

Table 1: Criteria for considering studies in the review

Population	Included: Adults aged 18 years and over receiving treatment for musculoskeletal conditions in primary care. **Excluded:** Pain due to malignancy; systemic inflammatory conditions; pregnancy-related conditions; obesity; stroke; burns; paediatric care; inpatient care – pre/post-operative pain relief; emergency room care		
Intervention	• Acupuncture • Traditional Chinese acupuncture • Western acupuncture • Medical acupuncture • Electroacupuncture	• Auricular acupuncture • Ear acupuncture • Auriculotherapy • Laser acupuncture • Moxibustion • Cupping	• Gua Sha scraping • Traditional Chinese Tui Na massage • Biomedical acupuncture • Dry needling • Trigger point acupuncture
	Excluded: Herbal plasters, liniments, herbalism, nutritional supplements, and ion-pumping cords.		

Comparator	• Placebo/sham acupuncture • Minimal acupuncture • Usual care • Standard care • Waitlist	• Conservative treatments • Exercise therapy • Physical therapy • Physiotherapy • Manipulation	• Steroids • Non-steroidal anti-inflammatory drugs • Pain medication • Analgesia
Outcomes	• Chronic pain • Acute pain • Function • Return to work or other activity	• Absenteeism • Presenteeism • Safety • Adverse events • Risks	• Quality of life • Satisfaction • Range of movement • Strength

A combination of search terms (shown in Table 2) were used to identify and retrieve articles in the following databases:

- OVID
  - EMBASE
  - MEDLINE
- CINAHL
- AMED
- PEDro
- AcuTrials
- VIP
- CBM
- PreMEDLINE
- The Cochrane Library
- Trip database
- SportDiscus
- Scopus
- Google Scholar

Table 2: Search strategy

The search strategy for the MEDLINE database search is presented below. The MeSH keyword search terms and Boolean operators were modified to accommodate each search database. The detailed search strategy can be found in Appendix 1.

Search term 1	Search terms 2	Search terms 3	Search terms 4
Acupuncture	Achilles tendon	Arm injuries	Randomized controlled
Acupuncture therapy	Calcaneus	Back injuries	trial
Acupuncture, ear	Peroneal nerve	Joint dislocations	Controlled clinical trial
Electroacupuncture	Tibial nerve	Fractures	Clinical trial
Pharmacoacupuncture	Sural nerve	Hand injuries	Non-randomized
Dry needling	Hallux	Hip injuries	controlled trials
Electro-acupuncture	Subtalar joint	Neck injuries	Random allocation
Auriculotherapy	Foot joints	Shoulder injuries	Double-Blind method
Needling	Foot	Strains and sprains	Single-Blind method
Laser	Foot bones	Tendon injuries	Placebo effect
LLLT	Metatarsal bones	Leg injuries	Random
Low-level laser therapy	Tarsal bones	Contusion	Sham
Moxibustion	Talus	Spine	Placebo
Moxabustion	Toe phalanges	Cervical vertebrae	Mask
Mugwort	Ankle	Coccyx	Blind
Moxa	Achilles	Intervertebral disc	Non-randomized
Cupping	Calcaneus	Lumbar vertebrae	Non-randomised
Hijama	Tibialis	Sacrum	Pseudo-randomised

Gua Sha	Peroneas	Spinal canal	
Guasha	Hallucis	Back muscles	
Cao gio	Subtalar	Erector spinae	
Scraping	Talo-crural	Multifidus	
Spooning therapy	Talocrural	Quadratus lumborum	
Coining therapy	Malleolus	Neck muscles	
Tribo-effleurage	Metatarsal	Atlanto-axial joint	
Tui-na	Tibio-fibula	Atlanto-occipital joint	
Tui Na	Tarsal	Sacroiliac joint	
Chinese massage therapy	Os trigonum	Spinal cord	
Chinese Meridian Massage	Phalanges	Spinal nerves	
Trigger point	Sesamoid	Cervical plexus	
Meridian	Foot	Lumbosacral plexus	
Acupoint	Feet	Spinal nerve roots	
	Toe	Polyradiculopathy	
	Inter-phalangeal	Spondylosis	
	Interdigital neuroma	Spondylolysis	
	Morton neuroma	Spondylolisthesis	
	Pollicis	Piriformis muscle	
	Interossei	syndrome	
	Lumbrical	Sciatica	
	Digitorum	Neck	
	Knee joint	Zygapophyseal joint	
	Meniscus	Whiplash injuries	
	Menisci	Causalgia	
	Anterior cruciate ligament	Back pain	
	Patellar ligament	Brachial plexus	
	Posterior cruciate ligament	neuropathies	
	Prepatellar	Reflex sympathetic	
	Patella	dystrophy	
	Patellar	Complex regional pain	
	Intrapatella	syndromes	
	Meniscal	Peripheral nerve	
	Meniscas	Arthritis	
	Hamstring muscles	Low back pain	
	Hamstring tendons	Headache disorders	
	Knee	Radiculopathy	
	Leg	Spine	
	Lower Extremity	Vertebra	
	Hamstrings	Coccygeal	
	Semimembranosus	Lumbar	
	Semi-membranosus	Sacral	
	Semitendinosus	Cervical	
	Semi-tendinosus	Lumbarsacral	
	Rectus femoris	Interspinale	
	Gastrocnemius	Longissimus	
	Soleus	Sacrospinalis	

	Quadriceps	Multifidus	
	Ilio-tibial band	Paraspinal	
	ITB	Piriformis muscle	
	Plica	Zygapophyseal	
	Cruciate	Apophyseal	
	Bakers cyst	Lumbago	
	Politeus	Suboccipital	
	Femur	Cervicogenic headache	
	Tibia	Thoracolumbar	
	Fibula	Sternocleidomastoid	
	Osteoarthritis	Scalene	
	Osteophytosis	Facet joint	
	Nerve compression	Radiculopathy	
	syndrome	Secondary headache	
	Plantaris	Hip	
	Peroneus	Thigh	
	Brachialis	Femur	
	Bicep	Hip joint	
	Tricep	Sacroiliac joint	
	Supinator	Buttocks	
	Anconeus	Gracilis muscle	
	Carpi	Hamstring muscles	
	Pollicis	Hamstring tendons	
	Brachioradialis	Pelvis	
	Shoulder	Pelvic bones	
	Acromioclavicular joint	Quadriceps muscle	
	Sternoclavicular joint	Psoas muscles	
	Rotator cuff	Fascia lata	
	Coracoid process	Pubic symphysis	
	Clavicle	Gracilis muscle	
	Scapula	Obturator nerve	
	Acromion	Iliotibial Band Syndrome	
	Humerus	Cox	
	Arm	Coxa	
	Axilla	Trochanter	
	Upper extremity	Gluteal	
	Shoulder	Gluteus	
	Upper arm	Gracilis	
	Axilla	Hamstring	
	Glenohumeral	Semimembranos	
	Coracoclavicular	Semitendinos	
	Brachial plexus	Sacrum	
	Glenoid	Tailbone	
	Supraspinatus	Tail bone	
	Infraspinatus	Obturator	
	Teres minor	Pectineus	
	Teres major	Adductor	

	Pectoralis	Ligamentum teres	
	Deltoid	Hand	
	Levator scapulae	Carpal Tunnel Syndrome	
	Rhomboid	Wrist	
	Serratus anterior	Tenosynovitis	
	Subscapularis	Digit	
	Subacromial	Digits	
	Rotator cuff injuries	Finger	
	Shoulder impingement	Thumb	
	syndrome	Metacarpal	
	Shoulder pain	Carpal	
	Shoulder dislocation	Triangular fibrocartilage	
	Glenoid cavity	Thenar eminence	
	Polymyalgia rheumatic	Pollicis	
	Bursitis	Hypothenar eminence	
	Adhesive capsulitis	Digiti minimi	
	Elbow	Palmar	
	Elbow joint	Palm	
	Radius	Lumbrical	
	Ulna	Phalange	
	Olecranon process	Os capitatum	
	Median nerve	Hamate	
	Musculocutaneous nerve	Lunate	
	Forearm	Scaphoid	
	Upper arm	Scapholunate	
	Upper arms	Trapezium	
	Radial	Trapezoid	
	Radius	Triquetral	
	Pronator	Triquetrum	
	Ulna	Flexor retinaculum	
	Humerus	Extensor digitorum	
	Capitulum	Extensor indicis	
	Olecranon		

The titles and abstracts identified from the above search strategy were assessed for eligibility by the *iCAHE* researchers. Full-text copies of eligible articles were retrieved for full examination and assessed for eligibility by ACC. Reference lists of included full-text articles were searched for relevant literature not located through database searching.

2.4 Study Selection

Inclusion Criteria

- Study types: SRs, RCTs and quasi-randomised controlled trials.
- Participants: Patients receiving acupuncture interventions for the treatment of musculoskeletal conditions and injuries in primary care.

- Intervention: Traditional Chinese acupuncture (TCA), Western acupuncture, electroacupuncture (EA), auricular acupuncture (AA), laser acupuncture (LA), moxibustion, cupping, Gua-sha scraping, and traditional Chinese Tui Na massage.
- Controls: Placebo/sham acupuncture, minimal acupuncture, usual care, standard care, wait list, conservative treatments, exercise therapy, physical therapy, physiotherapy, manipulation, steroids, non-steroidal anti-inflammatory drugs (NSAIDs), pain medication, and analgesia.
- Outcomes: Chronic pain, acute pain, function, return to work or other activity, absenteeism, presenteeism, safety, adverse events, risks, quality of life, range of movement and strength.
- Publication criteria: English, Chinese, Japanese, and Korean language, full text available, in peer reviewed journal.

Exclusion criteria

- Studies only available in abstract form, for example, conference presentations.
- Grey literature.
- Animal studies.
- Studies without an appropriate control group (e.g., studies comparing one acupuncture intervention with another acupuncture intervention).
- Studies involving healthy volunteers or experimentally induced pain.
- Studies that did not investigate for therapeutic or rehab purposes (e.g., those designed to investigate underlying physiological mechanisms).
- Study populations with conditions that do not fall under ACC legislation (i.e., stroke, cancer, etc.).
- Studies reporting on: Pain due to malignancy or infection (e.g., post-herpetic neuralgia), dental pain, dysmenorrhoea, systemic inflammatory conditions, angina, visceral pain, peripheral vascular disease, or haematological disorders.

Predatory journals – While papers weren't excluded on the basis of the journal they were published in, all papers went through a standardised critical appraisal process.

2.5 Critical Appraisal (SIGN)	The SIGN (Scottish Intercollegiate Guidelines Network) checklist specific to the study design of the included studies was used to assess the methodological quality of the included studies. The SIGN checklist asks a number of questions with 'yes', 'no', 'can't say', or 'not applicable' as responses with the appraiser giving an overall rating of quality, based on the responses to questions of either high quality (++), acceptable (+), low quality (-), or unacceptable. Two STRICTA criteria were adapted and added to the core SIGN appraisal questions: 1) Was the treatment rationale (or differential diagnosis for TCM approaches) explained and followed through? Yes/No/Unclear 2) Did the acupuncture practitioners administering the intervention meet one of the following criteria: a) registered with a regulatory authority, or b) met at least the minimum WHO standard for acupuncturists? Yes/No/Unclear Copies of the SIGN checklist are provided in Appendix 2.
2.6 Data Extraction	Data was extracted from the identified publications using a data extraction tool which was specifically developed for this review using STRICTA and NICMAN tool criteria as a guide. The following information was extracted from individual studies: • Evidence source (author, date, country) • Study design • Level of evidence • Research question • Funding • Characteristics of participants • Style of acupuncture • Treatment rationale • Interventions • Treatment regimen • Practitioner qualifications and background • Control or comparator interventions • Outcome measures • Results • Adverse events The description of the clinical condition and intervention provided by the SRs and RCTs included in this review was used to classify the data. There is the potential that there is crossover between some groups of conditions. For example, arthritic neck pain, mechanical neck pain, radicular neck pain, and whiplash associated disorders.

Table 3: Timeframes utilised in the review

Timeframe	Duration from Commencement of Treatment
Short Term	< 6 weeks
Medium Term	6 to 12 weeks
Long Term	> 12 weeks

2.7 Data Synthesis (SIGN)

As described, for this review each study was graded for overall methodological quality using the SIGN checklist specific to the study design of the included studies.

Recommendations from the literature were made and scored according to a modification of the SIGN Evidence Grading matrix (see Table 4). The modification was to add levels 1 and 2 to differentiate between the 1+ and 1-, 2+ and 2- levels of evidence.

Table 4: Modified SIGN Evidence Grading Matrix

Levels of scientific evidence	
1++	High-quality meta-analyses, high-quality systematic reviews of clinical trials with very little risk of bias.
1+	Well-conducted meta-analyses, systematic review of clinical trials, or well-conducted clinical trials with low risk of bias.
1	Meta-analyses, systematic review of clinical trials, or clinical trials with a moderate (acceptable) level risk of bias.
1-	Meta-analyses, systematic reviews of clinical trials, or clinical trials with high risk of bias.
2++	High-quality systematic reviews of cohort or case and control studies; cohort or case and control studies with very low risk of bias and high probability of establishing a causal relationship.
2+	Well-conducted cohort or case and control studies with low risk of bias and moderate probability of establishing a causal relationship.
2	Cohort or case and control studies with moderate risk of bias and potential risk that the relationship is not causal.
2-	Cohort or case and control studies with high risk of bias and significant risk that the relationship is not causal.
3	Non-analytical studies, such as case reports and case series.
4	Expert opinion.

To standardise the strengths of recommendations from the extensive literature used for this review, a structured system was developed to incorporate a number of quality measures. Four measures were selected as important variables in assessing the strength of recommendations from the primary and secondary research sources.

These were:

a) Combination of data via meta-analysis

b) Quality of systematic review/trials

c) Number of RCTs

d) Consistency of the evidence

A scoring system was developed based on a 0 and 1 score for each of these variables:

1. Combination of data via meta-analysis: Yes = 1, No = 0
2. Quality of systematic review: HQ/AQ (+) = 1, LQ (0)/R = 0
3. Number of RCTs: ≥ 5 RCTs = 1, < 5 = 0
4. Consistency: ≥ 75% agreement = 1, < 75% agreement = 0

Total Score	**SIGN Evidence Grading matrix score**
4	1++
3	1+
2	1
1/0	1-

This allowed for a maximum potentials score of 4 and a minimum score of 0, which reflected a measure of the evidence strength across a range of studies. The resultant score was transferred to the SIGN Evidence Grading matrix.

3. Results

3.1 Evidence Sources

The search for all musculoskeletal conditions using 11 databases yielded 13,165 articles (see Appendix 1 for search strategy). The final search date was December 15, 2017. After removing duplicates from the search, 7,864 articles were identified for title and abstract screening. After scrutiny, 7,768 articles were excluded for failing to meet the inclusion criteria (shown in Figure 1), leaving 96 studies that fitted all inclusion criteria for the report. Figure 1 illustrates the process involved in study selection.

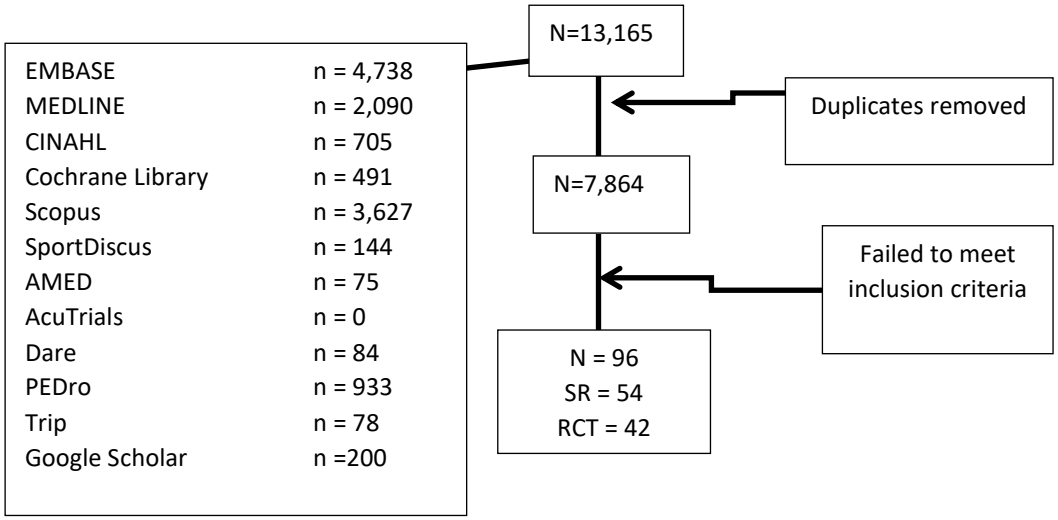

Figure 1: Flow chart of search results

3.2 Quality of the Evidence

The overall assessment of evidence strength and quality across the range of included studies within this review, using the SIGN Evidence Grading matrix score considerably varies.

	N =	1++	1+	1	1-	2+
SRs	54	0	19	25	9	1
RCTs	42	0	6	18	18	0

The literature found for this report varied significantly in quality according to the SIGN Critical Appraisal checklists.

	N =	HQ (++)	AQ (+)	LQ (-)	R (0)
SRs	54	9	31	14	0
RCTs	42	6	18	18	0

Appendix 2 presents the SIGN critical appraisal tools used in this review. Appendices 3 and 4 present the critical appraisal scores for the SRs and RCTs included in this review.

The main issues affecting the methodological quality of the studies include:

Systematic reviews

A) Very few studies addressed the potential for publication bias in reporting their reviews.

B) Limited databases were often sourced during the search process.

C) Excluded studies were frequently not listed.

D) The included studies were mostly of poor quality, with high risk of bias.

E) Conflicts of interest were often not identified or reported.

F) The studies often did not stratify results into clinically relevant subgroups such as type of acupuncture or musculoskeletal condition treated.

G) Heterogeneous comparison groups were often used.

H) The studies often lack valid and reliable outcome measures.

I) Studies frequently report details of the intervention and control inadequately.

J) The status of publication was often not used as an inclusion criteria.

K) Studies often did not adopt sham controls to blind the participants and practitioners.

L) Significant variability in treatments were common within the reviews.

M) Not all studies screened for methodological quality using validated critiquing tools.

N) Rarely do studies utilise two independent researchers to screen the search results, assess trial eligibility, assess risk of bias, and extract data from the included trials.

Randomised controlled trials

A) With the small numbers reported in the RCTs it was difficult to ensure that the effect of confounders was dealt with.

B) Power calculations were often not conducted.

C) A number of studies failed to report the use of intention to treat analysis when reporting findings.

D) Studies often did not use valid and reliable primary outcome measures.

E) Convenience sampling was frequently used, with participants often self-selecting following attendance at a clinic for treatment.

F) Studies rarely controlled for the patients' involvement in co-interventions such as exercise, medication, and so forth.

G) Subjects and investigators were rarely blinded to the intervention involved.

H) Studies often did not include a no intervention control group or sham technique.

I) Drop outs and cause of attrition were infrequently reported.

J) Expertise of practitioners administrating the intervention was regularly not reported.

K) Lack of long-term follow-up was common.

L) Interpretation of results is difficult due to the lack of reported information in studies.

General comments on the evidence base of acupuncture for musculoskeletal conditions:

A) While some studies adhere well to the use of STRICTA criteria for reporting, there are still many studies, especially those published in Asian journals, which do not report important details of the treatment regimen and training/experience of practitioners.

B) The definition of dry needling is ambiguous, and the intervention used within the studies is not always clear/provided.

C) Needle retention time and total treatment time is not well reported within studies. The evidence statements referring to treatment length and duration reflect the most commonly reported treatment characteristics within the included studies for each condition, and are not intended to be a treatment guideline.

D) Comparators and control groups varied widely and were not always well-reported.

E) Follow-up times during the studies were often not sufficient to evaluate the extended effectiveness of acupuncture.

F) Insufficient quality and quantity of studies for many conditions and acupuncture modalities meant conclusions about effectiveness could not be made.

G) The available evidence made it difficult to draw conclusions on the relationship between training/experience and safety/risk because it was poorly reported in papers.

H) The framework utilised for treatment (TCM/WA) was not outlined well in many studies.

3.3 Findings

Systematic reviews

A total of 54 SRs were found in this review that investigated the effectiveness of acupuncture as a treatment for musculoskeletal conditions. These SRs appraised 364 individual relevant RCTs. Appendix 5 presents the RCTs included in these SRs. Appendix 6 presents the findings from the SRs included in this review.

Randomised controlled trials

A total of 42 relevant RCTs that were not included in the 54 SRs were identified in this review. Appendix 7 presents the data extraction from the RCTs included in this review.

3.4

Outcome Measures – Pain, Function, QOL

This review took a pragmatic approach to the presentation of the literature, sub-dividing the studies into the most common major clinical presentations reported in the literature. Where SRs reported studies involving a range of pathologies, if possible the data for each pathology has been extracted from the individual reviews and is presented separately below. Where clinical conditions are not represented, no controlled studies which met inclusion criteria were identified.

Arthritic Neck Pain

A total of 4 SRs were identified that reviewed the effectiveness of acupuncture interventions in treating arthritic neck pain. No RCTs were identified that were not included in the SRs. Included studies investigated treatments that used mainly a TCM framework and delivered acupuncture treatments including traditional acupuncture and Tui Na therapy. The majority of interventions were used solely by themselves and were not combined with other treatments, and were generally compared to traction, wait list, manual therapy, sham acupuncture, or sham TENs. The SRs ranged from low to high quality, however, the majority of included studies were subject to many forms of bias, thus reducing their quality level. Acupuncture interventions were often of 20 to 30 minute duration with the majority of studies conducting between 7 and 9 sessions, with a course of treatment of approximately 2 to 4 weeks.

Systematic Reviews

Lu et al. 2011

Lu et al. (2011) (QS: LQ (-)) conducted a SR regarding the effectiveness of acupuncture for improving QOL for patients with pain associated with the spine. Within this SR only one included study assessed arthritic neck pain (White et al., 2004). White et al. (2004) looked at the efficacy of an acupuncture intervention by a trained physiotherapist over a 4-week period with 20-minute sessions, in comparison to a sham TENs control. Results were displayed for a SF-36 physical function scale, immediate follow-up (SMD: 0.07 (−0.28, 0.42)), and short-term follow-up (< 3 months (SMD: −0.13 (−0.49, 0.23)). SF-36 mental scales were also assessed and showed immediate follow-up results (SMD: −0.05 (−0.41, 0.30)), as well as short-term follow-up results (< 3 months (SMD: 0.23 (−0.13, 0.59)). VAS pain scores were also assessed for immediate follow-up (SMD: 0.48 [0.13, 0.84]), short-term follow-up (< 3 months (SMD: 0.29 (−0.07, 0.66)), and intermediate-term follow-up from 3 months to a year (SMD: 0.13 [−0.25, 0.51]).

Study	SIGN rating	Conclusions	Quality of Evidence
Lu et al. 2011	Level 1 LQ (-)	The limited evidence in this review does not provide support for the effectiveness of acupuncture treatments when treating arthritic neck pain in the short and medium term for the outcomes measures of VAS and SF-36 when compared to sham TENs.	Based on one RCT with a high risk of bias.

Lee et al. 2017

Lee et al. (2017) (QS: AQ (+)) conducted a SR and meta-analysis on the effectiveness of Chuna (or Tui Na) manual therapy on pain and function for musculoskeletal disorders. Six studies were included that related to arthritic neck pain and were assessed in this review (Zhu et al., 2009, Yan et al., 2014, Gao et al., 2011, Zeng et al., 2015, Wang et al., 2012, Yang et al., 2014). Zhu et al. (2009) looked at the effectiveness of Tui Na manual therapy intervention, conducted over a 2-week duration for a total of seven sessions, in comparison to a traction control. Yan et al. (2014) looked at the differences in effect between a Tui Na manual therapy intervention with a duration of 2 weeks, including seven total sessions, in comparison to a traction control. Zeng et al. (2015) studied the effect of eight sessions over 4 weeks of Tui Na manual therapy compared to microcurrent therapy. Yang et al. (2014) looked at a Tui Na manual therapy intervention with a duration of 2 weeks consisting of six sessions, in comparison to a traction control. Gao et al. (2011) studied the effect of Tui Na manual therapy over 14 days and seven sessions compared to traction. Wang et al. (2012) also compared Tui Na manual therapy to traction with treatment lasting 2 weeks.

Zhu et al. (2009) (1-month follow-up) and Yan et al. (2014) used a VAS pain scale to measure the effectiveness of the treatment, which was reported as positive. Gao et al. (2011) used the outcome measure of ROM and reported positive results. Zeng et al.'s (2015) outcomes were not assessable. Wang et al. (2012) (1 month) used the WOMAC scale and found significant results in the physical function subscale, but not in the pain and stiffness subscale. Yang et al. (2014) used the NDI to identify the effectiveness of the treatment, which in this case was reported as positive. The authors concluded that given the low quality of the included studies and the diverse methods of intervention techniques, the available evidence is insufficient to determine the effects of Tui Na manual therapy for musculoskeletal conditions. More high-quality RCTs such as sham-controlled studies with standardised interventions are needed.

Study	SIGN rating	Conclusions	Quality of Evidence
Lee et al. (2017)	Level 1 AQ (+)	The evidence in this review suggests that Tui Na therapy has mostly positive effects on pain and disability for arthritic neck pain in the short term.	Based on six RCTs of low to moderate quality with moderate to high risk of bias.

Trinh et al. (2016)

Trinh et al. (2016) (QS: HQ (++)) conducted a SR looking at the available evidence on the effects of acupuncture on function, disability, patient satisfaction, and global perceived effect among individuals with neck pain. Four relevant studies were identified within the review, which related to arthritic neck pain (Fu et al., 2009; Liang et al., 2009; Thomas et al., 1991; White et al., 2004). All studies were identified by the review as studying patients with chronic neck pain due to arthritic changes. Fu et al. (2009) looked at an acupuncture intervention consisting of nine treatments over 18 days, in comparison to superficial insertion of non-acupoints. Liang et al. (2009) compared nine sessions over 3 weeks of acupuncture to sham acupuncture. The study by Thomas et al. (1991) was a crossover RCT and, therefore, was excluded from analysis. White et

al. (2004) looked at the effectiveness of eight sessions of acupuncture over 4 weeks compared to mock TENs.

Fu et al. (2009) found significant immediate post-treatment effects for VAS pain favouring acupuncture but not over the long term (SMD -0.53 (95% CI -0.91 to -0.16) immediate post-treatment, SMD -0.59 (95% CI -0.97 to -0.21) at 4 weeks, and SMD -0.23 (95% CI -0.61 to 0.14) at 3 months). In regard to NPQ, the study showed a significant effect that favoured acupuncture (SMD -0.41 (95% CI -0.79 to -0.04) immediate post-treatment, SMD -0.50 (95% CI -0.88 to -0.12) at 4 weeks, and SMD -0.40 (95% CI -0.78 to -0.03) at 3 months). Liang et al. (2009) measured the effectiveness of the treatment using the Northwick Park Neck Pain Questionnaire (NPQ), which showed significant improvements favouring acupuncture immediately post-treatment (SMD -0.39 (95% CI -0.77 to -0.00)) with both groups showing improvement. White et al. (2004) found that acupuncture reduced pain with no clinically effective difference between groups (SMD -0.48 (95% CI -0.84 to -0.13) at 1 week, SMD -0.29 (95% CI -0.66 to 0.07) at 8 weeks, SMD -0.07 (95% CI -0.45 to 0.30) at 6 months, and SMD -0.13 (95% CI -0.51 to 0.25) at 1 year). In regards to NDI, no significant difference was found at any time points (SMD -0.08 (95% CI -0.43 to 0.27) at 1 week, SMD -0.24 (95% CI -0.60 to 0.12) at 8 weeks, SMD -0.09 (95% CI -0.47 to 0.28) at 6 months, and SMD -0.23 (95% CI -0.61 to 0.15) at 1 year). Non-significant differences were also found for SF-36, physical component (SMD 0.07 (95% CI -0.28 to 0.42) at 1 week and SMD -0.13 (95% CI -0.49 to 0.23) at 8 weeks).

The authors concluded that the overall quality of the relevant included studies was hindered by the relatively high risk of bias for blinding (performance and detection bias), however, random sequence generation (selection bias) was delivered well for both studies. In addition, it was reported that acupuncture was beneficial immediately following treatment and at short-term follow-up in comparison with sham treatments for pain intensity; at short-term follow-up compared with sham treatments for disability (NPQ); at short-term follow-up compared with inactive treatments for pain intensity; and at short-term follow-up compared with wait list control for pain intensity and neck disability improvement. Effects do not seem sustainable over the long term. These findings relate to the specific studies on arthritic neck pain.

Study	SIGN rating	Conclusions	Quality of Evidence
Trinh et al. (2016)	Level 1+ HQ (++)	Acupuncture appears to be more beneficial immediately following treatment and at short-term follow-up in comparison with sham treatments for pain intensity; at short-term follow-up compared with sham treatments for disability (NPQ); at short-term follow-up compared with inactive treatments for pain intensity.	Based on four RCTs of low to moderate quality with moderate to high risk of bias.
		The available evidence in this review suggests that the improvement in pain and disability does not seem sustainable over the long term.	

Yuan et al. (2015)

Yuan et al. (2015) (QS: HQ (++)) conducted a SR that looked at the available evidence towards the effectiveness of TCM treatments for neck and low back pain. Within the review three studies were identified relating to arthritic neck pain (Fu et al., 2009, Thomas et al., 1991, White et al., 2004). Fu et al. (2009) and Thomas et al.'s (1991) results were reported in Trinh et al. (2016). White et al.'s (2004) results were reported in Trinh et al. (2016) as well as Lu et al. (2011). The authors concluded from all included studies that there was moderate evidence that acupuncture was more effective than sham acupuncture in reducing pain immediately post-treatment for CNP (VAS) MD = -0.58 (-0.94, -0.22), p = 0.01.

Study	SIGN rating	Conclusions	Quality of Evidence
Yuan et al. (2015)	Level 1 HQ (++)	The review demonstrated that acupuncture could be efficacious in reducing chronic neck pain in the immediate term, however, the evidence is insufficient to make recommendations on the subcategory of arthritic neck pain as no new trials that were not included in previous SRs were identified.	Based on three RCTs of low to moderate quality with moderate to high risk of bias.

Randomised Controlled Trials

No RCTs that were not included in previously reported SRs were identified investigating the effectiveness of acupuncture interventions for treating arthritic neck pain.

Non-Specific Neck Pain

A total of nine SRs and two RCTs were identified that reviewed the effectiveness of acupuncture for non-specific neck pain. Included studies investigated treatments using a variety of frameworks and delivered a large variety of interventions including traditional acupuncture, EA, LA, AA, dry cupping and DN. Needle-based acupuncture/DN interventions were mainly compared with sham and placebo controls (sham acupuncture, sham electrostimulation such as TENs and placebo), however, they were also compared to the conservative therapies in isolation or in combination (physical therapy, exercise, analgesics, traction, manipulation, and stretching) or no treatment/wait list. Cupping was mainly compared to a usual care control or a wait list control. Gau Sha was compared to wait list control and heat therapy. Included studies investigated a wide range of patients with shoulder and neck region pain, which were classified into the diagnosis of non-specific neck pain, making generalisability questionable when results are transposed to an individual patient's neck pain related condition. The number, duration, and frequency of needle-based acupuncture/dry needling sessions were about 20–45 minutes long, with 5–10 sessions delivered over 3–5 weeks. Cupping interventions were not reported well, however, were often between 10–20 minutes long, with sessions every 3–4 days for a total of between 24 and 84 days. Length of follow-up was adequate for needle-based acupuncture/dry needling with a number of studies reporting short- and long-term functional and pain outcomes, however, interventions such as Gau Sha and cupping had mostly short-

term follow-up with few studies reporting long-term functional or pain outcomes. Studies varied significantly in quality ranging from low to high quality.

Systematic Reviews

Trinh et al. (2016)

Trinh et al. (2016) (QS: HQ ++) undertook a SR and meta-analysis on the effectiveness of acupuncture on function, disability, patient satisfaction, and global perceived effect among individuals with neck pain. The review contained 22 relevant studies to this review and four studies associated with non-specific neck pain (He et al., 2004, He et al., 2005, Nabeta et al., 2002, and Vas et al., 2006). He et al. (2004) and He et al. (2005) compared acupuncture with electrostimulation to sham electrostimulation plus alternate points over 3–4 weeks, including ten 45-minute sessions. Nabeta et al. (2002) compared acupuncture to sham acupuncture over 3 weeks, including three sessions with a 5-minute retention time. Vas et al. (2006) compared acupuncture to TENs placebo over 5 weeks, including five 30-minute sessions.

He et al. (2004) reported a statistically significant difference in pain (VAS) favouring acupuncture at immediate post-intervention and 6-month follow-up but not at 3-year follow-up. He et al. (2005) reported a statistically significant difference in pain (VAS) favouring acupuncture at immediate post-intervention, 6-month and 3-year follow-up. In the review by Trinih et al. (2016) the results of the Nabeta et al. (2002) study were reported as significant favouring acupuncture, however, the VAS SMD reported was -0.15 (95% CI -0.82 to 0.52) at 9 days, suggesting a non-significant difference. Vas et al. (2006) reported significant differences in VAS in favour of the acupuncture group at 1 week and 6 month follow-up. For the outcomes of the NPQ and SF-36 physical component in the study by Vas et al. (2006) the difference was significant at 1 week favouring acupuncture, however, it was not at 6 months for the NPQ and not reported for SF-36.

The authors concluded that moderate-quality evidence suggests that acupuncture relieves neck pain better than sham acupuncture, as measured at completion of treatment and at short-term follow-up, and that those who received acupuncture report less pain and disability at short-term follow-up than those on a wait list. However, the review was on all neck pain conditions and not specifically non-specific neck pain. It was also reported that moderate-quality evidence also indicates that acupuncture is more effective than inactive treatment for relieving neck pain at short-term follow-up. The authors reported that the number of acupuncture treatment sessions was associated with outcomes. Six or more acupuncture sessions were suggested as the ideal amount. Both studies by Nabeta et al. (2002) and Vas et al. (2006) provided under dosing with fewer than six treatment sessions if this suggestion is taken into account.

Study	SIGN rating	Conclusions	Quality of Evidence
Trinh et al. (2016)	Level 1+ HQ (++)	Moderate evidence was found in favour of acupuncture and EA being an effective treatment for non-specific neck pain at immediate to short-term follow-up when compared to sham/placebo control for reducing pain intensity.	Based on four RCTs of low to moderate quality with

		There is conflicting evidence regarding the long-term effect of acupuncture in terms of pain intensity and disability for patients with non-specific neck pain.	moderate to high risk of bias.
		Limited evidence suggests that acupuncture may be an effective treatment for non-specific neck pain at short-term but not long-term follow-up when compared to TENs placebo for improving function (SF-36 physical component).	

Asher et al. (2010)

Asher et al. (2010) (QS: AQ (+)) conducted a SR and meta-analysis of randomised controlled trials to evaluate the efficacy of auriculotherapy for pain management. A total of 17 studies met the inclusion criteria and were, therefore, included in the SR, however, out of these only two were relevant to this evidenced-based review (Sator-Katzenshlager et al. 2003; Sator-Katzenshlager et al. 2004) and only one looked at non-specific neck pain (Sator-Katzenshlager et al. 2003). Information regarding participant characteristics was not reported. Sator-Katzenshlager et al. (2003) assessed the efficacy of indwelling electroacupuncture (EA) in comparison to indwelling auricular acupuncture (AA) plus mock EA, targeting cervical spine, shenmen and cushion points in response to chronic neck pain. Sator-Katzenshlager et al. (2004) also assessed the efficacy of indwelling EA and indwelling AA, however, this study targeted cushion, shenmen, and lumbar spine points in response to chronic low back pain.

These studies both used VAS pain measurement scales, however, the results were not reported within the Asher et al. (2010) review. Both of these studies were noted as clear outliers in this review because these studies used an active control known to be efficacious for pain, which lead them to be excluded from the analysis. Within these studies there were a combined 82 participants, which represented 10% of the sample. In addition, they used a summed weekly pain score in combination with including subjects with high baseline pain scores. When removed from the analysis, heterogeneity was nominally reduced (Q-value = 19.18, $p < 0.002$, $I2 = 74$) and the SMD dropped to 1.01 (95% CI: 0.51, 1.51).

Study	SIGN rating	Conclusions	Quality of Evidence
Asher et al. (2010)	Level 1- AQ (+)	The available evidence in this review is insufficient to draw conclusions on auriculotherapy for non-specific neck pain.	Based on one RCT of low quality with high risk of bias.

Law et al. (2015)

Law et al. (2015) (QS: HQ++) completed a SR on LA for musculoskeletal pain. The review contained two non-specific neck pain related studies (Chow et al., 2006 and Chow et al., 2004). Both studies compared the intervention of LA to placebo with treatment parameters of average

output of 300 Mw, power density of 670 Mw/cm2 and dose of 9 J. Chow et al. (2006) reported that the laser group showed a greater improvement in pain scores at 6- to 26-week follow-up, however, there was a non-significant improvement in SF-36 mental and physical scores. Chow et al. (2004) reported that the laser group showed a greater improvement from pain related outcome measures after treatment compared to the placebo group, however, no significant difference was observed from the result of SF-36 mental and physical scores. No meta-analysis was conducted for the subgroup of non-specific neck pain in the SR by Law et al. (2015) due to the limited number of studies available for LA and non-specific neck pain, in comparison to the condition subgroups of lateral epicondylitis and TMJ disorders.

Study	SIGN rating	Conclusions	Quality of Evidence
Law et al. (2015)	Level 1+ HQ (++)	Evidence in this review for LA as an evidence-based treatment option for non-specific neck pain shows short- to medium-term benefits for pain relief in the LA group compared to the placebo group, however, the evidence does not provide support for its effect on SF-36 mental and physical scores.	Based on two RCTs of high quality with low risk.

Lu et al. (2011)

Lu et al. (2011) (QS: LQ-) conducted a SR on the effectiveness of acupuncture on QOL and pain for patients with pain associated with the spine. The review contained eight relevant studies to this evidence-based review with one of these studies evaluating the effect of acupuncture on non-specific neck pain (Vas et al. 2006). This RCT looked at the intervention of acupuncture plus auricular seeds over 3 weeks, including five 30-minute sessions on patients with neck pain greater than 3 months' duration. The intervention was compared to sham TENs. The study found a significant improvement in SF-36 physical function and VAS at immediate follow-up but not long-term follow-up, and in SF-36 mental at long-term (3 months to 1 year) follow-up but not immediate follow up.

Study	SIGN rating	Conclusions	Quality of Evidence
Lu et al. (2011)	Level 1 LQ (-)	Low quality evidence was found regarding the significant effect of acupuncture on SF-36 physical function and VAS for patients with non-specific neck pain when compared to sham TENs at immediate post-intervention follow-up, however, not at long-term follow-up. Low quality evidence was found regarding the significant effect of acupuncture on SF-36 mental for patients with non-specific neck pain when compared to sham TENs at long-term (3 months to 1 year) follow-up, however, not at immediate follow-up.	Based on one RCT of moderate quality with high risk of bias.

Gattie et al. (2017)

Gattie et al. (2017) (QS: AQ +) conducted a SR and meta-analysis on the effectiveness of DN delivered by a physical therapist for any musculoskeletal pain condition. The review contained one non-specific neck pain related study (Pecos-Martin et al., 2015) which looked at patients who had the condition for an average duration of 5.7 ± 2.6 months. The study looked at the intervention of DN compared to sham DN in the outcome measures of VAS and NPQ. A significant difference was found between the groups at 1- and 4-week follow-ups for pain in both the outcome measures used (VAS and NPQ).

Study	SIGN rating	Conclusions	Quality of Evidence
Gattie et al. (2017)	Level 1 AQ (+)	Limited evidence suggests a statistically significant difference between dry needling delivered by physical therapists and sham dry needling when treating pain in patients with non-specific neck pain in the short term.	Based on one RCT of high quality with moderate risk of bias

Cao et al. (2014)

Cao et al. (2014) (QS: AQ (+)) conducted a SR which assessed the available evidence for the effectiveness and safety of cupping for the treatment of different types of pain. A total of 16 studies were included in this review and out of these only 11 were relevant to musculoskeletal conditions (Chen, 2009; Cramer, 2011; Farhadi, 2009; Kim, 2011; Kim, 2012; Lauche, 2011; Lauche, 2013; Oyang, 2001; Teut, 2012; Wu K, 2013; Wu, 2007). Three studies (Cramer, 2011; Lauche, 2011; Lauche, 2013) looked at non-specific neck pain. Cramer et al. (2011) assessed the effectiveness of a moving dry cupping intervention on the neck and shoulder, with a glass cup applied on a 10 to 15 minute basis and another four cups retained for 5-10 minutes over the trapezius muscles, once every 3-4 days, in comparison to a usual care control (physical therapy, exercise, analgesics), with a general practitioner or orthopaedist. Lauche et al. (2011) investigated the effectiveness of dry cupping, retaining affected areas for 10 to 20 minutes every 3–4 days for a total of 25 days, in comparison to a wait list control. Lauche et al. (2013) compared moving cupping as an intervention (10–15 minute twice weekly) with a progressive muscle relocation control (20 minutes twice weekly), both for a total of 84 days, in attempt to address chronic neck pain.

No individual data was provided within the review (only meta-analysis results), therefore, no conclusions can be made regarding the subgroup of non-specific neck pain. The review found moderate evidence that cupping is more efficacious than no treatment or other treatments (such as heat therapy, usual care, and conventional medications) in reducing pain over the short term (within 4 weeks), however, this was based on all pain conditions including a number not necessarily related to injury. The review did find that wet cupping, mainly on ashi points, was the most commonly used method (68.75% trials) for treating pain.

Study	SIGN rating	Conclusions	Quality of Evidence
Cao et al. (2014)	Level 1 AQ (+)	The available evidence in this review is insufficient to draw conclusions on cupping for non-specific neck pain.	Based on three RCTs of low to moderate quality.

Espejo-Antúnez et al. (2017)

Espejo-Antúnez et al. (2017) (QS: AQ +) conducted a SR and meta-analysis on the effectiveness of DN in the treatment of MTrPs and explored the impact of specific aspects of the technique on its effectiveness. The review contained 13 RCTs with only one non-specific neck pain related study (Pecos-Martin et al. 2015). Pecos-Martin et al. (2015) compared DN to DN outside the MTrP. The between-group difference in pain (VAS score) at 1-week post-treatment was 2.4 (95% CI: 1.6, 3.2, $p < 0.001$), and at 1-month post-treatment was 2.7 (95% CI: 2.0, 3.4); ($p < 0.001$). Therefore, a significant between-group difference was found at 1-week and 1-month follow-up.

The authors concluded that dry needling is effective in the short term for pain relief, increasing range of motion, and improving QOL when compared to no intervention/sham/placebo. There was insufficient evidence on its effect on disability, analgesic medication intake, and sleep quality. The one study looking at non-specific neck pain found significant results in favour of the TrP DN dry needling group at 1 week and 1 month follow-up.

Study	SIGN rating	Conclusions	Quality of Evidence
Espejo-Antúnez et al. (2017)	Level 1 AQ (+)	Limited evidence suggests a significant effect in favour of TrP DN at MTrP when compared to TrP DN at non-MTrP sites (sham) when treating pain in patients with non-specific neck pain in the short term.	Based on one RCT of high quality.

Yuan et al. (2015)

Yuan et al. (2015) (QS: HQ ++) conducted a SR on the evidence of TCM treatments for NP and LBP in regard to pain and disability. The review included 75 RCTs of which 11 were relevant to non-specific neck pain. All RCTs examined forms of acupuncture that adhered to the traditional acupuncture theory for treating neck and low back pain. From the 18 studies that looked at acupuncture for all neck pain conditions, the duration of treatment was 25 minutes (20, 30 mins) with 8.5 (5.8, 10.5) treatment sessions over a course of treatment of 4 weeks (3, 4.5 weeks). Exclusion criteria included trials of neck or back pain caused by trauma, infection, cauda equina syndrome, bone rarefaction, compression fracture of a vertebral body, tumour, or fibromyalgia. Because a history of traumatic injury was an exclusion criterion and this may limit the relevance of the findings for ACC.

Six of the relevant included studies' data had not been reported in previous data extractions (Itoh et al., 2007; Liang et al., 2011; Lauche et al., 2012a; Lauche et al., 2012b; Zhang et al., 2003; Li et al., 2006; Braun et al., 2011). Itoh et al. (2007) compared trigger point acupuncture to non-trigger point acupuncture and also sham. Liang et al. (2011) compared traditional acupuncture three times per week with 20-minute sessions for a total of 3 weeks to sham points. Lauche et al. (2012a) compared a single 10- to 15-minute session of Gau Sha to wait list control. Zhang et al. (2003) compared one treatment a day for 15 treatments with three courses of EA compared to traction. Li et al. (2006) compared 15-minute acupuncture sessions to spinal manipulation over a 2-week period. Braun et al. (2011) compared a single 30-minute session of Gau Sha to heat therapy.

Itoh et al. (2007) reported a non-significant difference between groups in pain (VAS) and disability at immediate term follow-up: WMD: -0.87 (-2.81, 1.07) and WMD -0.2 (-1.22, 0.82) respectively. Liang et al. (2011) reported a significant between-group difference in VAS score at immediate term (WMD -0.53 (-1.05, -0.01)) and 1-month follow-up (WMD -0.6 (-1.04, -0.16)), however, not at 3-month follow-up (WMD -0.31 (-0.76, 0.14)). The study showed non-significant changes in disability at immediate follow-up, however, the study showed significant differences at 1 month and 3 month follow-up. Lauche et al. (2012a) showed significantly different improvement in pain and disability in the immediate term for the cupping group compared to wait list. Li et al. (2006) showed non-significant results for short-term pain outcomes when acupuncture was compared to manipulation. Zhang et al. (2003) found an immediate post-treatment difference of 3.66 ± 2.3 for the intervention group and 3.29 ± 1.86 for the control group. Braun et al. (2011) reported baseline VAS of 61.3 ± 14.0 for intervention and 58.3 ± 16.2 for control; and post-treatment mean scores of 22.2 ± 22.3 and 50.3 ± 23.4 respectively. The intervention group's NDI was 32.8 ± 11.5 at baseline, compared to 35.6 ± 11.0 for control. These changed to 21.8 ± 12.9 and 32.8 ± 12.5 post-treatment. Braun et al. (2011) also reported that both the interventions and controls SF-36 physical and mental improved significantly, however, there was no significant difference in change between groups.

Meta-analysis results found that acupuncture was more effective than sham acupuncture in reducing pain immediately post-treatment for all CNP conditions (VAS), (MD = -0.58 (-0.94, -0.22), 95% confidence interval, p = 0.01). The authors reported finding moderate evidence that acupuncture is more effective than sham acupuncture in reducing pain immediately post-treatment for all CNP conditions and also that cupping could be more effective than wait list in VAS for all CNP conditions. These results did match the reported findings for most of the six relevant studies looking at acupuncture interventions on non-specific neck pain, however, some of the studies reported conflicting findings.

Study	SIGN rating	Conclusions	Quality of Evidence
Yuan et al. (2015)	Level 1+ HQ (++)	Moderate evidence suggests that acupuncture is more effective than sham acupuncture in reducing pain and disability immediately post-intervention and in the short term for non-specific neck pain, however, not in the long term.	Based on 11 RCTs of low to moderate quality with moderate to high risk of bias.

		Limited evidence found that Gua Sha showed significant differences favouring Gua Sha over wait list or heat pack therapy for non-specific neck pain with respect to pain.	
		Limited evidence supports that cupping could be more effective than wait list in VAS for non-specific neck pain.	

Vickers et al. (2012)

Vickers et al. (2012) (QS: LQ-) conducted an individual patient data meta-analysis on the effectiveness of acupuncture for chronic pain. Four conditions were assessed individually (non-specific back and neck pain, osteoarthritis, shoulder pain, and headache). The review contained five non-specific neck pain studies (Irnich et al., 2001; White et al., 2004; Salter et al., 2006; Vas et al., 2006; Witt et al., 2006). Of these studies, only Salter et al. (2004) had not been reported on by previous SRs in the above analysis. The study contained 21 participants and compared acupuncture to usual care. The outcome measure of interest for the study was the NPQ and it was used at the study end point of 3 months. Details regarding the acupuncture treatment were not detailed within the Vickers et al. (2012) SR paper or supplementary appendices. The study by Salter et al. 2004 found a non-significant difference between the groups (1.75 (no CI given), p = 0.8).

Meta-analysis results found a significant difference in favour of acupuncture when compared to sham acupuncture for combined non-specific back and neck pain (studies n = 8), 95% CI: 0.37 (0.27-0.46, P < 0.001). A significant difference was also found (studies n = 7, 95% CI: 0.55 (0.51-0.58), P < 0.001) between acupuncture and non-sham acupuncture in non-specific back and neck pain studies. The authors concluded that acupuncture was superior to both no-acupuncture control and sham acupuncture for the treatment of chronic pain. This conclusion did fit with the results reported for the non-specific neck and low back studies. The authors also suggested that the data indicates that acupuncture is more than a placebo; the differences between true and sham acupuncture are relatively modest, suggesting that factors in addition to the specific effects of needling are important contributors to therapeutic effects.

Study	SIGN rating	Conclusions	Quality of Evidence
Vickers et al. (2012)	Level 1 LQ (-)	Acupuncture had a statistically significant effect on pain when compared to sham acupuncture and non-sham acupuncture in patients with chronic non-specific back and neck pain.	Based on 15 RCTs of varying quality with moderate to high risk of bias

Randomised Controlled Trials

Two RCTs that were not included in the previously reported SRs were identified that investigated the effectiveness of acupuncture interventions for non-specific neck pain.

Intervention	Study	QS	Outcome measure	Result
Deep dry needling plus passive stretching – 4 sessions over 2 weeks vs. passive stretching alone	Cerezo-Tellez et al. (2016)	AQ (+)	VAS Cervical ROM NDI	• Significant and clinically relevant differences in favour of dry needling in VAS scores at 1 week, 2 week, and 6 month follow-ups. • Neck active ROM significantly increased in the DDN group for all movement directions, whereas no significant change was observed for the control group. At all measurement points apart from baseline, the DDN group showed significantly larger neck ROM compared to the control group. • Significant and clinically relevant differences in favour of dry needling in NDI scores at 1 week, 2 week, and 6 month follow-ups.
• Appears that deep dry needling and passive stretching are more effective than passive stretching alone in people with non-specific neck pain in regard to pain, ROM, and disability at 1 week, 2 week, and 6 month follow-up (1 x AQ RCT).				
Acupuncture intervention of median 12 sessions over 18 weeks compared to control 1: Alexander technique, control 2: usual care	MacPherson et al. (2014)	AQ (+)	Text message pain scores NPQ SF-12 Physical SF-12 Mental	• Acupuncture sessions and Alexander Technique lessons both led to significant reductions in neck pain and associated disability compared with usual care at 3, 6, and 12 months. • No significant differences between the interventions and usual care for the physical component score of the SF-12 at 6 or 12 months (acupuncture, 0.68 [CI, -1.08 to 2.44] [P = 0.44]; Alexander Technique lessons, 0.38 [CI, -1.54 to 2.30] [P =0.69]), or for the mental component score at 6 months. • Significantly larger improvements in the mental component score occurred in the intervention groups than in the usual care group at 12 months (acupuncture, 1.76 [CI, 0.15 to 3.37] [P = 0.033]; Alexander Technique lessons, 2.12 [CI, 0.42 to 3.82] [P = 0.016]).
• Appears that both acupuncture and Alexander Technique lessons are associated with statistically significant and clinically relevant long-term reductions in neck pain and disability at 3, 6 and 12 months compared with usual care alone (1 x AQ RCT).				

Mechanical Neck Pain

A total of seven SRs and one RCT were identified that reviewed the effectiveness of acupuncture for mechanical neck pain. Included studies investigated treatments using either a TCM or Western medical framework and delivered traditional acupuncture, EA, dry needling, and cupping. Acupuncture interventions were mainly compared with sham acupuncture, wait list, or inactive treatment (e.g., sham laser or TENs). Participants within the included studies

varied significantly in regard to duration and severity of neck pain, with conditions ranging from acute to chronic durations. The number, duration, and frequency of treatment sessions was often 15–30 minutes long, with 5–15 sessions delivered over 3–5 weeks of treatment. Study quality varied, however, most were of moderate to high quality. Length of follow-up was mostly short- to medium-term with a small number of studies reporting long-term functional or pain outcomes.

Systematic Reviews

Trinh et al. (2016)

Trinh et al. (2016) (QS: HQ ++) undertook a SR and meta-analysis on the effectiveness of acupuncture on function, disability, patient satisfaction, and global perceived effect among individuals with neck pain. The review contained 22 relevant studies to this review and five studies associated with subacute or chronic mechanical neck pain (Liang et al., 2011; Irnich et al., 2001; Petrie & Hazelman 1986; Sahin et al. 2010; Seidel and Uhlmann 2002). Liang (2011) compared acupuncture to sham acupuncture over 3 weeks, including nine 20-minute treatment sessions. Petrie and Hazelman (1986) compared acupuncture to sham TENS over 8 weeks with eight 20-minute treatments. Irnich et al. (2011) compared acupuncture to sham LA. Sahin et al. (2010) compared EA to sham EA over 3 weeks and 10 treatment sessions. Seidel and Uhlmann (2002) compared eight 15-minute sessions over 4 weeks of acupuncture to sham acupuncture.

The authors concluded that for mechanical neck pain, acupuncture is beneficial at immediate-term follow-up compared with sham acupuncture for pain intensity; at short-term follow-up compared with sham or inactive treatment for pain intensity; at short-term follow-up compared with sham treatment for disability; and at short-term follow-up compared with wait list control for pain intensity and neck disability improvement. Statistical pooling was appropriate for acupuncture compared with sham for short-term outcomes due to statistical homogeneity (P value = 0.83; I2 = 20%). Results of the meta-analysis favoured acupuncture (SMD -0.23, 95% CI -0.20 to -0.07; P value = 0.0006). This effect does not seem sustainable over the long term. Whether subsequent repeated sessions would be successful was not examined by investigators.

Study	SIGN rating	Conclusions	Quality of Evidence
Trinh et al. (2016)	Level 1+ HQ (++)	Moderate evidence was found in favour of acupuncture being an effective treatment for mechanical neck pain compared to sham acupuncture for pain intensity and disability at immediate and short-term follow-up.	Based on five RCTs of low to moderate quality with moderate to high risk of bias.
		The effect of acupuncture does not seem sustainable over the long term in terms of pain intensity and disability for patients with mechanical neck pain.	

Cao et al. (2014)

Cao et al. (2014) (QS: AQ (+)) conducted a SR that assessed the available evidence for the effectiveness and safety of cupping for the treatment of different types of pain. A total of 16 studies were included in this review and out of these only 12 were relevant to musculoskeletal conditions (Chen 2009; Cramer 2011; Farhadi 2009; Kim 2011; Kim 2012; Lauche 2011; Lauche 2013; Oyang 2001; Teut 2012; Wu K 2013; Wu 2007). One of the studies (Kim et al., 2011) looked at mechanical neck pain. Kim et al. (2011) assessed the efficacy of wet cupping that targeted bilateral BL23, BL24, and BL25 points with 2 mm needle depth and cups applied and retained for five minutes, three times weekly along with exercise (same as control), in comparison to a wait list exercise control group, which participated in eight types of stretching and strengthening exercises.

No individual data was provided within the review (only meta-analysis results), therefore, no conclusions can be made regarding the subgroup of mechanical neck pain. The review found moderate evidence that cupping is more efficacious than no treatment or other treatments (such as heat therapy, usual care, and conventional medications) in reducing pain over the short term (within 4 weeks), however, this was based on all pain conditions including a number not related to ACC. The review did find that wet cupping, mainly on ashi points, was the most commonly used method (68.75% trials) for treating pain.

Study	SIGN rating	Conclusions	Quality of Evidence
Cao et al. (2014)	Level 1 AQ (+)	The available evidence in this review is insufficient to draw conclusions on cupping for mechanical neck pain.	Based on one RCT of low quality with moderate risk of bias.

Gattie et al. (2017)

Gattie et al. (2017) (QS: AQ +) conducted a SR and meta-analysis on the effectiveness of dry needling delivered by a physical therapist for any musculoskeletal pain condition. The review contained two mechanical neck pain related studies (Llamas-Ramos et al., 2014, Mejuto-Vazquez et al., 2014). Llamas-Ramos et al. (2014) compared dry needling to an ischaemic compression technique in patients with chronic mechanical neck pain of 7.4 ± 2.6 months. Mejuto-Vazquez et al. (2014) compared dry needling to control in patients with acute mechanical neck pain of 3.4 ± 0.7 days' duration. Llamas-Ramos et al. (2014) found non-significant results at immediate, 1 week and 2 week follow-ups for NRPS (immediate: SMD –0.18 (–0.59, 0.22), 1 week: SMD –0.23 (–0.63, 0.18), 2 week: SMD –0.10 (–0.51, 0.31)) and non-significant results at 2 weeks for NPQ SMD 0.12 (–0.30, 0.53). Mejuto-Vazquez et al. (2014) found non-significant results after treatment for pain, however, they found significant results at 1-4 week follow-up (immediate: SMD –0.81 (–1.81, 0.19), 1-4 weeks: SMD –1.30 (–2.38, –0.23)).

The authors concluded that for all 13 included studies looking at DN by physical therapists for musculoskeletal pain, very low to moderate-quality evidence suggests that dry needling performed by physical therapists is more effective than no treatment, sham dry needling, or other treatments for reducing pain in patients presenting with musculoskeletal pain in the immediate to 12-week follow-up period. Very low to low-quality evidence suggests superior

outcomes with DN for functional outcomes when compared to no treatment or sham needling, but no difference in functional outcomes when compared to other physical therapy treatments. Evidence of the long-term benefit of DN is currently lacking. However, the two studies looking at mechanical neck pain showed conflicting results in regard to pain, and non-significant results in regard to function.

Study	SIGN rating	Conclusions	Quality of Evidence
Gattie et al. (2017)	Level 1 AQ (+)	Limited evidence suggests conflicting results between dry needling delivered by physical therapists compared to control when treating pain in patients with mechanical neck pain in the short term. Limited evidence suggests no statistically significant differences between dry needling delivered by physical therapists compared to ischaemic compression technique when treating function in patients with mechanical neck pain in the short term.	Based on two RCTs of moderate quality with moderate risk of bias.

Lu et al. (2011)

Lu et al. (2011) (QS: LQ -) undertook a SR and meta-analysis on the effectiveness of acupuncture on QOL and pain for patients with pain associated with the spine. The review contained one relevant study associated with mechanical neck pain: Irnich et al. (2001). This RCT looked at patients with mechanical neck pain of greater than a month duration. The intervention included five 30-minute sessions of acupuncture over 5 weeks and was compared to sham acupuncture. The results showed non-significant results in regard to SF-36 and VAS (SF-36 physical functioning immediate follow-up SMD: 0.29 [−0.09, 0.66], SF-36 physical functioning short-term follow-up (< 3 months) SMD: −0.13 [−0.51, 0.25], VAS pain immediate follow-up SMD: 0.25 [−0.13, 0.62]).

The SR contained three studies on neck pain and four studies on low back pain. The authors concluded that for all conditions that included pain associated with the spine, acupuncture was more effective than sham treatment at the immediate and short-term follow-ups, however, no group difference was identified at the intermediate-term follow-up. The results favoured acupuncture on neck (SMD = 0.31. 95% CI 0.02 to 0.60 I2 = 48%) but showed no group difference for LBP. Acupuncture was shown to have a moderate effect on the improvement of physical functioning and pain for patients with pain associated with the spine in the short term, but the effect for mental functioning is small and delayed. However, the only included study that looked at patients with mechanical neck pain (Irnich et al., 2001) showed non-significant results.

Study	SIGN rating	Conclusions	Quality of Evidence
Lu et al. (2011)	Level 1- LQ (+)	Very limited evidence suggests no statistically significant differences between acupuncture and sham treatment when treating pain and function in	Based on one RCT of moderate quality.

		patients with mechanical neck pain, however, the available evidence in this review is insufficient to draw conclusions.	

Espejo-Antúnez et al. (2017)

Espejo-Antúnez et al. (2017) (QS: AQ +) conducted a SR and meta-analysis on the effectiveness of DN in the treatment of MTrPs and to explore the impact of specific aspects of the technique on its effectiveness. The review contained 13 RCTs with two mechanical neck pain related studies (Llamas-Ramos et al., 2014, Mejuto-Vazquez et al., 2014). Both of these studies were found in the SRs by Gattie et al. (2017) and Boyles et al. (2015). Llamas-Ramos et al. (2014) compared DN to manual therapy with MTrP pressure release plus stretching of the upper trapezius muscle. Between-group difference for pain VAS was non-significant (0.3 (95% CI: −0.3, 1.0); 1 week: 0.3 (95% CI: −0.2, 0.9); 2 week: 0.1 (95% CI: −0.4, 0.7); $p > 0.05$). Mejuto-Vazquez et al. (2014) compared DN to control and found significant between-group differences (post: 2.1 (95% CI: 1.0, 3.2); $p < 0.01$, 1 week: 3.0 (95% CI: 2.1, 3.9); $p < 0.01$).

The authors concluded that DN is effective in the short term for pain relief, increasing range of motion, and improving QOL when compared to no intervention, sham, or placebo. There was insufficient evidence on its effect on disability, analgesic medication intake, and sleep quality. The two studies looking at mechanical neck pain found conflicting results in regard to the effect of dry needling on pain.

Study	SIGN rating	Conclusions	Quality of Evidence
Espejo-Antúnez et al. (2017)	Level 1 AQ (+)	Limited evidence suggests conflicting results between dry needling and control when treating pain in patients with mechanical neck pain in the short term.	Based on two RCTs of moderate quality with moderate risk of bias.

Boyles et al. (2015)

Boyles et al. (2015) (QS: AQ +) conducted a SR on the effectiveness of trigger point DN based on high-quality RCTs for all body regions. The review contained 13 relevant studies with two of those studies related to mechanical neck pain (Llamas-Ramos et al., 2014, Mejuto-Vazquez et al., 2014). Both of these studies were found in the SRs by Gattie et al. (2017) and Espejo-Antúnez et al. (2017). The results of these studies have been reported in the previous results section for the SRs by Gattie et al. (2017) and Espejo-Antúnez et al. (2017). The SR by Boyles et al. (2015) also reported the mean age and duration of symptoms of the two included relevant studies. Llamas-Ramos et al.'s (2014) participants had a mean age of 31 ± 3 years with a duration of symptoms of 7.4 ± 2.6 months. Mejuto-Vazquez et al.'s (2014) participants had a mean age of 25 ± 4 years with a duration of symptoms of 3.1 ± 0.8 days.

The authors concluded that the majority of high-quality studies included in this review show measured benefit from TrP DN for MTrPs in multiple body areas, suggesting broad applicability

of TrP DN treatment for multiple muscle groups. They reported that for MTrPs in muscles attaching to the cervical spine and shoulder, TrP DN appears to be effective in reducing pain and tenderness and improving ROM over time, with results being significantly better than sham and at least equivalent to other treatments such as manual MTrP release, pharmaceutical injections, acupuncture, and oral anti-inflammatories. The two included studies on mechanical neck pain showed conflicted results for the outcome of pain.

Study	SIGN rating	Conclusions	Quality of Evidence
Boyles et al. (2015)	Level 1 AQ (+)	Limited evidence suggests conflicting results between dry needling and control when treating pain in patients with mechanical neck pain in the short term.	Based on two RCTs of moderate quality with moderate risk of bias.

Yuan et al. (2015)

Yuan et al. (2015) (QS: HQ ++) conducted a SR on the evidence of TCM treatments for NP and LBP in regard to pain and disability. The review included 75 RCTs of which three (Irnich et al. 2001; Petrie & Hazelman 1986; Kim et al. 2012) were relevant to mechanical neck pain. All three of these relevant studies to mechanical neck pain have been reported in previous SRs' data extractions and results sections. All RCTs examined forms of acupuncture that adhered to the traditional acupuncture theory for treating neck and low back pain. From the 18 studies which looked at acupuncture for all neck pain conditions, the duration of treatment was 25 mins (20, 30 mins) with 8.5 (5.8, 10.5) treatment sessions over a course of treatment of 4 weeks (3, 4.5 weeks).

Irnich et al. (2001) compared ear acupuncture and DN of myofascial points to sham laser acupuncture using a treatment schedule of five sessions over 3 weeks with each session lasting 30 minutes in duration. No significant difference between groups at 1 week and 3 months for VAS was found. Petrie and Hazelman (1986) compared acupuncture to sham TENS and also found no significant differences between groups in regard to VAS at the end of the treatment (4 weeks) and at the month follow-up. Kim et al. (2012) looked at cupping: Three times per week during a total of 2 weeks, 5 to 10 mins, dry or wet cupping compared to heating pads. Individual data for this study was unable to be extracted.

Meta-analysis results found that acupuncture was more effective than sham acupuncture in reducing pain immediately post-treatment for all CNP conditions (MD = −0.58 (−0.94, −0.22), 95% confidence interval, p = 0.01). The authors reported finding moderate evidence that acupuncture is more effective than sham acupuncture in reducing pain immediately post-treatment for all CNP conditions and also that cupping could be more effective than wait list in VAS for all CNP conditions. These results do not match the reported findings for the two relevant studies looking at needle-based acupuncture/dry needling on mechanical neck pain, which showed non-significant results.

Study	SIGN rating	Conclusions	Quality of Evidence
Yuan et al. (2015)	Level 1+ HQ (++)	Evidence suggests no statistically significant differences between needle-based acupuncture/dry needling interventions and sham when treating pain in patients with mechanical neck pain, however, the available evidence in this review is insufficient to draw conclusions.	Based on two RCTs of moderate quality with moderate risk of bias.

Randomised Controlled Trials

One RCT was not included in the previously reported SRs that investigated the effectiveness of acupuncture interventions for mechanical neck pain.

Intervention	Study	QS	Outcome measure	Result
EA: 9 sessions over 3 weeks compared to sham laser	Zhang et al. 2013	HQ (++)	NPRS NPQ SF-36 – Physical SF-36 – Mental	• No significant difference between groups for pain (NPRS) or function (NPQ) score at any time point (1 month, 3 months, and 6 months). • No significant difference between groups for QOL (SF-36 physical and mental components) at any time point (1-month, 3 months, and 6 months).
• Appears to be no significant difference between EA and sham EA for pain, function, and QOL at 1 month, 3 month and 6 month follow-ups (1 x HQ RCT).				

Cervicogenic Headache

No SRs and only one RCT was found, investigating the effectiveness of acupuncture treatments on cervicogenic headache.

Randomised Controlled Trial

Intervention	Study	QS	Outcome measure	Result
Tui Na Therapy – 10 sessions over 10 days vs. medication (ibuprofen)	Li et al 2009	LQ (-)	VAS NDI Headache frequency	• The headache VAS, frequency of headache occurrence and NDI were all improved in the two groups. The improvement was better in tui na group ($P < 0.01$).
• Appears that Tui Na therapy is more effective for treating patients with cervicogenic headache in regard to the outcomes of headache pain intensity, frequency and disability when compared to a routine does of ibuprofen (1 x LQ RCT)				

Radicular Neck Pain

A total of three SRs were identified that reviewed the effectiveness of acupuncture interventions in treating radicular neck pain. One RCT was identified that was not included in the SRs. Included studies investigated treatments which used mainly a TCM framework and

delivered a variety of acupuncture treatments including traditional acupuncture, Tui Na, and moxibustion. The majority of interventions were used solely by themselves and were not combined with other treatments. The interventions were generally compared to traction, wait list, or placebo control and durations varied among the different studies. The included studies all varied in relation to patient characteristics, however, it was a common to include participants > 17 years and all conditions associated with neck pain and lower back pain, however, only neck pain was used in this context. Overall the SRs were of moderately high quality, however, the majority of included studies were subject to many forms of bias, thus reducing their quality level. Duration within the included studies varied, however similar interventions used similar duration lengths and treatment schedules. Acupuncture interventions were often of 15-to-30-minute duration with the majority of studies conducting between 8–20 sessions, with a course of treatment of approximately 2–4 weeks.

Lee et al. (2017)

Lee et al. (2017) (QS: AQ (+)) conducted a SR and meta-analysis on the effectiveness of Chuna (or Tui Na) manual therapy on pain and function in association with radicular neck pain. Nine relevant studies relating to radicular neck pain were assessed within this review (Zhu et al. 2007; Wang et al. 2009; Huang et al. 2010; Jiang et al. 2012; Xu et al. 2013c; Xue 2015; Yang 2015; Liu 2015; Cheng & Tang 2013). Zhu et al. (2007) looked at the effectiveness of Tui Na manual therapy intervention, conducted over a 4-week duration for a total of eight sessions, in comparison to a traction control. Wang et al. (2009) looked at the differences in effect between Tui Na manual therapy interventions, (seven sessions over 2 weeks), in comparison to a traction control. Huang et al. (2010) investigated the effectiveness of Tui Na manual therapy for a duration of 4 weeks, including 28 20-minute sessions, in comparison to a traction control with a varied duration to the intervention.

Jiang et al. (2012) looked at a Tui Na manual therapy intervention with a duration of 2 weeks, consisting of seven sessions, in comparison to a traction control with a varied duration from the intervention. Xu et al. (2013c) looked at a Tui Na manual therapy intervention with a duration of 4 weeks and 12 included sessions, in comparison to a traction control with a varied duration to the intervention. Xue (2015) investigated the effectiveness of a Tui Na manual therapy, with a duration of 2 weeks, consisting of 14 sessions for a total of 15 minutes each, in comparison to a traction control. Yang (2015) investigated the efficacy of a Tui Na manual therapy intervention, with a duration of 2 weeks, including six sessions each running for 30 minutes, in comparison to a traction control. Liu (2015) looked at the difference between Tui Na manual therapies (four sessions for 30 minutes each), compared to both traction and Tui Na manual therapy controls, each with the same number of sessions. Lastly, Cheng and Huang (2014) looked at the effectiveness of a Tui Na manual therapy intervention in conjunction with traction for a duration of 3 weeks, inclusive of 15 sessions, in comparison to a traction only control, using the same number of session as the intervention.

Zhu et al. (2007), Wang et al. (2009), Huang et al. (2010), Liu (2015), Jiang et al. (2012), and Xu (2013) all used the VAS pain scale relevant to pain and function to measure the effectiveness of the treatment, which was reported as positive. Xue (2015) used VAS as well as the neck disability index in order to test the effectiveness of the treatment, which both measures reported as positive in this review. Yang (2015) used VAS, the NDI and the SF-36 to identify the effectiveness of the treatment, which in this case was reported as positive for all three outcome measures. Cheng and Huang (2014) used VAS as well as a pain rating index and a present pain

intensity measure to assess the effectiveness of the treatment, which was reported to be positive for all three measurements.

The authors concluded that given the low quality of the included studies and the diverse methods of intervention techniques, the available evidence is insufficient to determine the effects of Tui Na manual therapy for musculoskeletal conditions. More high-quality RCTs such as sham-controlled studies with standardised interventions are needed.

Study	SIGN rating	Conclusions	Quality of Evidence
Lee et al. (2017)	Level 1 AQ (+)	Tui Na manual therapy has mostly positive effects on pain and function for radicular neck pain, according to the outcome measurements used in this review. However, the evidence for functional improvement was not as strong as pain relief.	Based on nine RCTs of mainly low quality with a high risk of bias.

Trinh et al. (2016)

Trinh et al. (2016) (QS: HQ (++)) conducted a SR looking at the available evidence on effects of acupuncture on function, disability, patient satisfaction, and global perceived effect among individuals with neck pain. Two relevant studies were identified within the review, which related to radicular neck pain (Coan et al., 1982, Petrie & Langley, 1983). Coan et al. (1982) looked at the effectiveness of acupuncture as an index treatment (meridian theory healing, electroacupuncture, and moxibustion) with no specified duration, in comparison to a wait list control, consisting of 3–4 sessions on a 4 week schedule with an 8-week follow-up. Petrie and Langley (1983) looked at an acupuncture index treatment intervention, consisting of five standard targeted points, in comparison to a placebo TNS group, using sham electrical stimulation applied to the side of the neck. The treatment schedule for both intervention and control was reported at 4 weeks, two times per week, with each session running for an average of 20 minutes. No follow-up duration was noted.

Coan et al. (1982) measured the effectiveness of the treatment using a VAS pain scale (0–10), which showed significant improvements favouring acupuncture at 8 weeks (SMD -0.74 (95% random CI -1.49 to 0.00)). Petrie and Langley (1983) used a pain intensity (5-point scale) to assess the effectiveness of treatment, which resulted in significant improvements favouring acupuncture. The authors concluded that the overall quality of all of the included studies was hindered by the relatively high risk of bias for blinding (performance and detection bias), however, random sequence generation (selection bias) was delivered well for both studies. In addition, it was reported that acupuncture was beneficial immediately following treatment and at short-term follow-up in comparison with sham treatments for pain intensity; at short-term follow-up compared with sham treatments for disability (NPQ); at short-term follow-up compared with inactive treatments for pain intensity; and at short-term follow-up compared with wait list control for pain intensity and neck disability improvement. Effects do not seem sustainable over the long term.

Study	SIGN rating	Conclusions	Quality of Evidence
Trinh et al. (2016)	Level 1+ HQ (++)	The limited available evidence in this review suggests that acupuncture interventions are more beneficial at short- and medium-term follow-up compared with wait list and sham treatments.	Based on two RCTs of low quality with high risk of bias.

Yuan et al. (2015)

Yuan et al. (2015) (QS: HQ (++)) conducted a SR that looked at the available evidence towards the effectiveness of TCM treatments for neck and low back pain. One relevant RCT was identified within this review, which was related to radicular neck pain (Coan et al., 1982). Coan et al. (1982) looked at an acupuncture intervention versus a wait list control (no treatment) in the treatment of radicular neck pain. This trial was relatively small with 30 participants, however it showed a significant difference in pain for chronic neck pain immediately post-treatment, using a VAS (0–10) outcome measurement, with an odds ratio of 26.00 (3.69 to 183.42, p = 0.001).

Study	QS	Conclusions	Quality of Evidence
Yuan et al. (2015)	Level 1+ HQ (++)	The review demonstrated that acupuncture could be efficacious in reducing pain related to radicular neck pain in the immediate term, however the evidence is limited.	Based on one RCT of low quality with high risk of bias.

Randomised Controlled Trials

One RCT that was not included in the previously reported SRs was identified that investigated the effectiveness of acupuncture treatments on radicular neck pain.

Intervention	Study	QS	Outcome measure	Result
Acupuncture treatments for radicular neck pain				
Tui Na – 14 sessions over 14 days plus medication vs. medication alone	Wen et al. (2015)	LQ (-)	VAS	• Post-treatment, VAS pain scores dropped markedly in both groups (both P ＜ 0.01), and there was a significant difference between the two groups (P ＜ 0.01) in favour of the Tui Na group.
• Appears to be a significant difference in the improvement of pain in patients with radicular neck pain when treated with Tui Na plus medication compared to medication alone at short-term follow-up (1 x LQ RCT).				

Whiplash Associated Disorders

A total of five SRs, which included six RCTs, were identified that reviewed the effectiveness of acupuncture for whiplash associated disorders (WAD). No RCTs were found that were not included in the SRs. The included studies varied significantly in terms of methodological design, WAD grades, style of acupuncture, and control groups. Included studies investigated treatments which used a variety of frameworks including TCM and Western, and mainly delivered traditional acupuncture, EA, and dry needling. Acupuncture interventions were mainly compared with sham acupuncture/EA, usual care, and medication. WAD grading was not well reported in studies, however, the majority of studies recruited patients with WAD grade I or II. The number, duration, and frequency of treatment sessions were often between 6–12 sessions delivered over 2–6 weeks. The length of time of individual treatment sessions was often not well reported, however, reported durations ranged from 15–30 minutes. Length of follow-up was mostly short- to medium-term with few studies reporting long-term functional, QOL, or pain outcomes. Quality of the studies varied significantly, with studies ranging from low to high quality.

Systematic Reviews

Moon et al. (2014)

Moon et al. (2014) (QS: AQ +) conducted a SR on the effectiveness of acupuncture for the treatment of WAD. The review contained five relevant studies (Kwak et al. 2012; Cameron et al. 2011; Han et al. 2011; Tough et al. 2010; Aigner et al. 1998). The included studies varied significantly in terms of methodological design, WAD grades, style of acupuncture, control groups, and primary outcome measures. The styles of acupuncture used included traditional acupuncture (Kwak et al., 2012, and Aiger et al., 1998), electroaacupuncture (Cameron et al., 2011, and Han et al., 2011) and dry needling (Tough et al., 2010). The control group included usual care (Kwak et al., 2012), sham EA (Cameron et al., 2011), sham EA plus herbal medicine (Han et al., 2011), sham acupuncture plus physiotherapy (Tough et al., 2010), and medication (Aigner et al., 1998).

Kwak et al. (2012) found a significant reduction ($p = 0.0001$) in the VAS scores after six sessions of acupuncture plus usual care when compared to usual care alone. Cameron et al. (2011) found a statistical but not clinically significant difference in VAS scores between the EA and sham EA groups at 3 months ($p = 0.05$), and at 6 months ($p = 0.007$), however, they found non-statistically significant results in regard to function (NDI) and QOL (SF-36). Han et al. (2011) also showed a significant difference in pain (VAS) ($p = 0.043$) but not in function (NDI) when cotreating with EA and medicine compared to sham and medicine. Tough et al. (2010) also showed no significant difference in functional (NDI) ($p = 0.43$) and QOL (SF-MPQ) ($p = 0.67$) measures in a cotreating approach of dry needling plus physiotherapy when compared to sham plus physiotherapy. Aigner et al. (1998) reported that acupuncture can improve ROM in the cervical spine, however, no individual data was reported. The authors concluded that of the five RCTs, four of them suggest that acupuncture and/or EA have a positive effect on pain in WAD patients. However, none of them showed effectiveness in reducing disability and function.

Study	SIGN rating	Conclusions	Quality of Evidence
Moon et al. (2014)	Level 1- AQ (+)	Low quality evidence was found for acupuncture treatments (TCM acupuncture and EA) alone or in combination with standard treatments for reducing pain in WAD in the short to medium term when compared to usual care, sham EA/acupuncture, and medication The evidence does not provide support for the effectiveness of acupuncture treatments (EA and dry needling), alone or in combination with other non-surgical interventions, for reducing function and disability in WAD.	Based on five RCTs of low to moderate quality with moderate to high risk of bias

Trinh et al. (2016)

Trinh et al. (2016) (QS: HQ ++) undertook a SR and meta-analysis on the effectiveness of acupuncture on function, disability, patient satisfaction, and global perceived effect among individuals with neck pain. The review contained 22 relevant studies and three studies associated with WAD ranging from acute to chronic (Tough et al., 2010, Cameron et al., 2011, and Kwak et al., 2012). These three studies were also mentioned in the review by Moon et al. (2014) and have been described above.

The authors concluded that for neck pain (including studies representing individuals with WAD, chronic myofascial neck pain, chronic pain due to arthritic changes, chronic non-specific neck pain, neck pain with radicular signs, and chronic mechanical neck pain), moderate-quality evidence suggests that acupuncture relieves pain better than sham acupuncture, as measured at completion of treatment and at short-term follow-up, and that those who received acupuncture report less pain and disability at short-term follow-up than those on a wait list. Moderate-quality evidence also indicates that acupuncture is more effective than inactive treatment for relieving pain at short-term follow-up. This conclusion fits the results of the three studies associated with WAD in regard to the outcome of pain, however, not in respect to the outcome of disability as none of the three studies found a significant result.

Study	SIGN rating	Conclusions	Quality of Evidence
Trinh et al. (2016)	Level 1 HQ (++)	Moderate evidence was found in favour of acupuncture interventions being an effective treatment for pain in patients with WAD when compared to sham acupuncture and inactive treatment at completion of treatment and at short-term follow-up.	Based on three RCTs of low to moderate quality with moderate to high risk of bias.

Law et al. (2015)

Law et al. (2015) (QS: HQ ++) completed a SR and meta-analysis on the effectiveness of LA for treating musculoskeletal pain. The review contained one WAD-related study (Aigner et al., 2006), which looked at the effect of LA of 5 Mw/cm2 power density and 0.9J dose compared to placebo. The authors reported that there was no significant difference observed at any time point between the two groups, including the long-term follow-ups of 6 and 12 months. No quantitative data was reported in the SR or supplementary appendices regarding the Aigner et al. (2006) study.

Study	SIGN rating	Conclusions	Quality of Evidence
Law et al. (2015)	Level 1+ HQ (++)	Insufficient evidence available to make evidence-based treatment recommendations for the use of LA in the treatment of patients with WAD.	Based on one RCT of low quality with high risk of bias.

Liu et al. (2015)

Liu et al. (2015) (QS: AQ +) undertook a SR and meta-analysis on the effectiveness of dry needling of myofascial trigger points associated with neck and shoulder pain. The review contained one study related to WAD (Tough et al. 2010), which looked at MTrP pain due to a whiplash injury of a mean duration 6.8 ± 4.3 weeks. This study was also reported in the SR by Moon et al. (2014). The authors reported that there was no significant difference observed in the medium term (SMD 0.1 (-0.57, 0.78)) between the dry needling intervention group and the sham control group.

Study	SIGN rating	Conclusions	Quality of Evidence
Liu et al. (2015)	Level 1 AQ (+)	Very limited evidence that suggests no statistically significant differences between dry needling and sham when treating pain in patients with WAD.	Based on one RCT of moderate quality and risk of bias.

Gattie et al. (2017)

Gattie et al. (2017) (QS: AQ +) conducted a SR and meta-analysis on the effectiveness of dry needling delivered by a physical therapist for any musculoskeletal pain condition. The review contained one WAD-related study (Sterling et al. 2015) that looked at patients who had the condition for longer than 3 months with a mean length of 20.6 ± 18.0 months. The study looked at the interventions of dry needling combined with exercise compared to sham dry needling and exercise in the outcome measures of VAS and NDI. No significant difference was found between the groups at 5–8 week, 9–12 week and 12 month follow-ups for VAS, however, at 6

months a significant difference was found in favour of the intervention group. No significant difference was found between the groups at all four follow-ups in regard to NDI.

Study	SIGN rating	Conclusions	Quality of Evidence
Gattie et al. (2017)	Level 1 AQ (+)	Limited evidence that suggests no statistically significant differences between dry needling delivered by physical therapists plus exercise, and sham plus exercise when treating pain and function in patients with WAD in the short and long term.	Based on one RCT of high quality with moderate risk of bias.

Randomised Controlled Trials

No RCTs were identified that were not included in the previously reported SRs that investigated the effectiveness of acupuncture interventions on WAD.

Rotator Cuff Pathology ± Bursitis

A total of 3 SRs which included 6 RCTs were identified that reviewed the effectiveness of acupuncture treatments for rotator cuff pathology ± bursitis. Seven RCTs were found that were not included in the SRs. Included studies investigated treatments that mainly delivered traditional acupuncture, LA, or dry needling alone or in combination with the control intervention. Acupuncture interventions were mainly compared with sham acupuncture/placebo, exercise, and physiotherapy. Most studies included a mixed cohort of patients diagnosed with rotator cuff tendinopathy/disease or subacromial pain syndrome, which made the generalisability of the results to certain clinical presentations difficult. The number, duration, and frequency of treatment sessions were often between 4–10 sessions delivered over 4–7 weeks with the length of time of individual treatment sessions being 15–30 minutes. Length of follow-up was short, medium, and long term for a number of outcomes within studies. The quality of the studies was low to moderate.

Systematic Reviews

Cox et al. (2016)

Cox et al. (2016) (QS: AQ +) conducted a SR into the effectiveness and safety of acupuncture therapies for the management of musculoskeletal disorders of the upper and lower extremities. The review contained two rotator cuff pathology-related studies (Guerra de Hoyos et al., 2004, and Vas et al., 2008). Guerra de Hoyos et al. (2004) looked at patients with soft tissue injuries to the shoulder, including cuff tendinitis, capsulitis, bicipital tendinitis, and bursitis with shoulder pain, decreased movement, local tenderness, and no swelling signs. The study conducted seven 15-minute sessions of EA over 7 weeks and compared the treatment to placebo acupuncture. The study found significant differences in mean change between the intervention and the control group at post-intervention, 3-month and 6-month follow-ups in pain intensity (VAS), Lattinen index, ROM, and SPADI global, pain and disability indexes. Vas et al. (2008) looked at patients with persistent unilateral subacromial syndrome (rotator cuff tendinitis or subacromial bursitis, in some cases associated with capsulitis for ≥ 3 months). The study conducted three 20-minute sessions of acupuncture plus physiotherapy over 3 weeks

and compared it to mock TENs plus physiotherapy. The study found significant differences in mean change at 1 month follow-up in pain and disability, daytime NRS, and night-time NRS.

Cox et al. (2016) reported that the study by Guerra de Hoyos et al. (2004) suggested that EA is more effective than placebo non-penetrating acupuncture in improving pain. They reported that the EA group reported statistically and clinically significant improvements in pain over the 6-month follow-up (mean difference on VAS at 6 months, 2.0 (95% CI 1.2, 2.9)). The group also had statistically significant improvements in disability, ROM, and QOL; however, the clinical significance of these outcomes is unknown. Cox et al. (2016) reported that statistically significant differences favoured the acupuncture group in the study by Vas et al. (2008) for pain, disability, and patient self-reported improvement; however, these differences were not clinically important (or uncertain for the Constant-Murley score). There were no statistically significant differences between groups for duration of sick leave.

Study	SIGN rating	Conclusions	Quality of Evidence
Cox et al. (2016)	Level 1+ AQ (+)	EA showed statistically and clinically significant improvements in relieving pain at 6-month follow-up when compared to placebo acupuncture.	Based on two RCTs with low risk of bias.
		EA showed statistically significant improvements in disability, range of motion, and quality of life at 6-month follow-up when compared to placebo acupuncture, however, the clinical significance of these outcomes is unknown.	
		Acupuncture plus physiotherapy showed statistically significant differences in improving pain and disability compared to mock TENs plus physiotherapy at short-term follow-up (1 month), however, these differences were not clinically significant.	

Law et al. (2015)

Law et al. (2015) (QS: HQ ++) completed a SR and meta-analysis on the effectiveness of LA for treating musculoskeletal pain. The review contained two rotator cuff pathology-related studies (Al-Shenqiti & Oldgam 2003; Vecchio et al., 1993). Both studies looked at patients with the diagnosis of rotator cuff tendinitis. Al-Shenqiti and Oldgam (2003) studied the effect of LA of 100 Mw average output, 800 MW/cm2 power density and 4J dose compared to placebo. The authors reported that the laser group showed a greater improvement from all outcome measures (VAS pain, ROM, and SPADI) after treatment compared to placebo group. No quantitative data was reported in the SR, including supplementary appendices, regarding the Al-Shenqiti and Oldgam (2003) study. Vecchio et al. (1993) looked at the effect of LA of 30 Mw average output, 429 MW/cm2 power density and 3J dose and also compared it to placebo. The authors reported that both groups showed improvement in all outcome measures (VAS pain and ROM) after treatment but there was no significant difference between groups (pain after intervention SMD: -0.47 [-1.15, 0.20]).

Study	SIGN rating	Conclusions	Quality of Evidence
Law et al. (2015)	Level 1+ HQ (++)	Limited evidence suggests conflicting results between the effectiveness of LA on the outcomes of pain, ROM, and disability compared to placebo for treating patients with rotator cuff pathology.	Based on two RCTs of high quality.

Vickers et al. (2012)

Vickers et al. (2012) (QS: LQ-) conducted an individual patient data meta-analysis on the effectiveness of acupuncture for chronic pain. Four conditions were assessed individually (non-specific back and neck pain, osteoarthritis, shoulder pain, and headache). The review contained four shoulder pain studies (Kleinhenz et al., 1999; Guerra de Hoyos et al., 2004; Vas et al., 2008; Molsberger et al., 2010), of which all except Molsberger et al. (2010) studied a population of patients with rotator cuff pathology/bursitis. Molsberger et al. (2010) studied patients with chronic shoulder pain with mixed diagnoses. The study reported that the sample clinical diagnoses included bursitis subacromialis (40.0%), bursitis calcarean (29.4%), frozen shoulder (3.9%), and biceps tendinitis (2.5%). Of these studies, only Kleinhenz et al. (1999) and Molsberger et al. (2010) had not been reported on by previous SRs in the above analysis.

The study by Kleinhenz et al. (1999) contained 45 participants and compared acupuncture to non-penetrating needle. Molsberger et al. (2010) studied 208 participants and compared acupuncture to non-penetrating needle and also usual care. The study looked at the outcome of VAS pain and compared the final results at the study end point of 6 months. Details regarding the acupuncture treatment were not detailed within the Vickers et al. (2012) SR paper or supplementary appendices. Kleinhenz et al. (1999) found significant differences between the groups in favour of acupuncture ((95% CI 2.3, 19.4), p = 0.001). Molsberger et al., (2010) also found significant differences between the groups in favour of acupuncture when compared to sham (14, (95% CI 7.87–20.13), p < 0.001) and no acupuncture (14 (95% CI 8.22–19.78), p < 0.001).

Meta-analysis results found a significant difference in favour of acupuncture when compared to sham acupuncture for shoulder pain (studies n = 3, 95% CI: 0.62 (0.46–0.77), P < 0.001). No studies were included in the meta-analysis of acupuncture versus non-sham acupuncture for shoulder pain. The authors concluded that acupuncture was superior to both no-acupuncture control and sham acupuncture for the treatment of chronic pain. This conclusion did fit with the results reported for the chronic shoulder pain studies in regard to acupuncture versus sham acupuncture.

Study	SIGN rating	Conclusions	Quality of Evidence
Vickers et al. (2012)	Level 1 LQ (-)	Acupuncture had a statistically significant effect on pain when compared to sham acupuncture in patients with chronic shoulder pain.	Based on five RCTs of varying quality with moderate to high risk of bias.

Randomised Controlled Trials

Seven RCTs investigating the effectiveness of acupuncture for rotator cuff pathology that were not included in the previously reported SRs were identified.

Intervention	Study	QS	Outcome measure	Result
Acupuncture 1 x weekly for 4 weeks vs. sham acupuncture	Rueda Garrido et al. (2016)	LQ (-)	VAS UCLA shoulder score	• VAS: Significant differences in the intensity of pain decrease were found between the two groups in favour of the acupuncture group at post-intervention and 3-month follow-up. • UCLA shoulder score: Clinically meaningful results in favour of the acupuncture group in terms of functional assessment of the shoulder.
• Appears that acupuncture produces a significant reduction of pain and improvement in functional status post-intervention and at 12-week follow-up in patients with impingement syndrome when compared to sham acupuncture (1 LQ RCT).				
DN plus exercise vs. exercise alone – 1 x weekly for 4 weeks	Arias-Buria et al. (2017)	AQ (+)	NRPS DASH	• NRPS: No significant differences in shoulder pain were observed between groups; both groups experienced similar improvements from baseline at all follow-up periods. • Patients receiving exercise plus TrP DN exhibited higher improvements in function at all follow-up periods (post-intervention: -20.6 [95% CI -23.8 to -17.4]; 3 months: -23.2 [95% CI -28.3 to -18.1]; 6 months: -23.6 [95% CI -28.9 to -18.3]; and 12 months: -13.9 [95% CI -17.5 to -10.3]; all P < .001) than those receiving the exercise protocol alone.
Appears that the inclusion of dry needling into an exercise programme is effective for improving pain-related disability at short-, medium-, and long-term follow-up in patients with subacromial pain syndrome, however, not for the outcome of pain (1 x AQ RCT).				
LA 5 x weekly for 3 weeks vs. sham laser acupuncture	Kibar et al. (2017)	LQ (-)	VAS at rest VAS activity SPADI	• Significant between-group difference in favour of LA (p = 0.00) in the post-intervention changes in VAS pain at rest and VAS activity pain. • Statistically significant difference in SPADI scores in favour of the LA group (p = 0.00).
• Appears that LA significantly reduces pain and functional status post-intervention in patients with subacromial impingement syndrome when compared to sham acupuncture (1 LQ RCT).				

Dry needling (3 sessions over 4 weeks) plus physiotherapy (10 sessions) compared to physiotherapy alone	Perez et al. (2017)	AQ (+)	VAS ROM Functionality (Constant-Murley score)	• Significant between-group difference in VAS post-intervention (0.86 (0.06, 1.67)), however, not at 3-month follow-up (0.52 (–0.37, 1.42)). • There were no clinically or statistically significant differences between the groups in terms of range of motion at 3-month follow-up. • There were no clinically or statistically significant differences between the intervention groups in terms of Constant-Murley score post-intervention and at 3-month follow-up.
• Dry needling plus physiotherapy did not prove to be superior to physiotherapy alone in terms of pain, function, and ROM in the treatment of patients with rotator cuff tendinopathy or subacromial syndrome (1 AQ RCT).				
Acupuncture (6 x 30-minute sessions over 3 weeks) plus exercise (6 x 50–55 minute sessions) vs. EA plus exercise vs. exercise	Lewis et al. (2017)	HQ (++)	Oxford shoulder score SPADI ROM Analgesic use	• Oxford shoulder score: Between-group comparisons yielded small and non-significant effects. • SPADI: Non-significant between-group differences. • ROM: Post-intervention, 6-month and 12-month follow-up of shoulder flexion, shoulder abduction and shoulder rotation all showed non-significant difference between group comparisons. • Analgesic use: Between-group comparisons yielded non-significant effects at all follow-ups.
• Appears that neither acupuncture nor EA were found to be more beneficial than exercise alone in the treatment of subacromial pain syndrome for the outcomes of function, disability, ROM, and analgesic use (1 x HQ SR).				
Acupuncture plus physiotherapy exercise: 10 sessions over 5 weeks vs. subacromial corticosteroid injection	Johansson et al. (2011)	AQ (+)	The Adolfsson–Lysholm shoulder assessment EuroQol-five dimensions EuroQol - VAS	• No significant differences in the primary outcome, pain, and shoulder function measured by AL-score at 6-week, 3-month, 6-month, and 12-month follow-ups. • EuroQol: No significant differences between groups at all follow-ups. • EuroQol – VAS: No significant differences between groups at all follow-ups.
• Appears that both subacromial corticosteroid injection and a series of acupuncture treatments combined with home exercises significantly decreases pain and improves shoulder function in patients with subacromial impingement syndrome, however, neither treatment was significantly superior to the other (1 x AQ RCT).				
U/S guided dry needling: 2 sessions over 4 weeks vs. Platelet-rich plasma injections	Rha et al. (2012)	AQ (+)	SPADI – total pain score ROM	• No significant difference between the two groups when the SPADI total pain score was compared at 1-week, 3-month and 6-month follow-ups. • ROM: IR and Flexion significantly improved in the platelet-rich plasma group at 3- and 6-month follow-up,

			SPADI – total	however, improvements in ER and ABD were not different between the two groups at each time point (P < 0.05). • SPADI: Significant improvement favouring the platelet-rich plasma injection group at 3- and 6-month follow-up (P < 0.05).
• Appears that both platelet rich plasma injection and dry needling demonstrated beneficial effects on patients with rotator cuff disease, however, it appears that platelet rich plasma injections provided more symptomatic relief and functional improvement than dry needling at 6 month follow-up.				

Frozen Shoulder

A total of four SRs and one RCT were identified that reviewed the effectiveness of acupuncture for frozen shoulder. The SRs included six RCTs. Included studies investigated treatments that mainly used a TCM framework and delivered a combined or individual treatment of acupuncture (traditional acupuncture, cupping, EA, Tui Na therapy, and LA) and rehabilitation, physiotherapy, or electrotherapy. These interventions were mainly compared with physiotherapy, electrotherapy, and injections alone. Patients were generally around 50 years of age and in varying and poorly reported stages of the condition. The number, duration, and frequency of treatment sessions were around 30–40 minutes long, with 8–10 sessions delivered over 4–6 weeks of treatment. Length of follow-up was both short- and long-term in a number of the included studies that reported functional or pain outcomes. Studies were of low to moderate quality.

Systematic Reviews

Jain et al (2014)

Jain et al. (2014) (QS: LQ -) conducted a SR on the evidence of the effectiveness of physical therapy interventions for the management of frozen shoulder. The review contained three frozen shoulder related studies relevant to this review (Cheing et al. 2008; Ma et al. 2006; Sun et al. 2001). The review contained 39 RCTs with the included patients' ages ranging from 22–96 years with a mean age of 53.77 ± 3.97 years. The duration of symptoms in the reviewed studies ranged from 6 weeks to 10.2 months, placing almost all of the subjects in stages 1, 2, and 3 of frozen shoulder.

Cheing et al. (2008) looked at patients between the age of 30 and 90 years with a mean duration of symptoms of 6.71 ± 6.50 months. The study conducted 10 treatment sessions, 2-3 times per week for 4 weeks and compared three groups results: Group 1: EA plus a home exercise programme, group 2: Interferential plus a home exercise programme and a control group of home exercise programme only. The study's results found a significant change in Constant-Murley Assessment and VAS score in EA and the interferential group compared to control at least until the 6-month follow-up. Jain et al. (2014) reported that the study by Cheing et al. (2008) found both EA and interferential therapy to be effective in short-term and long-term pain relief. EA and interferential therapy were also reported to be effective in improving function.

Ma et al. (2006) looked at patients with a mean age of 58.4 years and with a mean duration of symptoms of 25.8 weeks. The study conducted eight treatment sessions, two times per week

for 4 weeks and compared acupuncture to physiotherapy. The study found that all patients showed improvement in QOL (SF-36) and that pain was controlled better by acupuncture, while ROM improved following physical therapy. Jain et al. (2014) reported that the study by Ma et al. (2006) found pain to be better controlled by acupuncture as compared to physical therapy. They suggested integration of acupuncture and physical therapy for short-term pain relief. Ma et al. (2006) found ROM to be better improved by physical therapy as compared to acupuncture. They further reported that combined acupuncture and physical therapy gives better improvement in ROM than either acupuncture alone or physical therapy alone. The authors suggested integration of acupuncture and physical therapy for short-term improvement in ROM.

Sun et al. (2001) looked at patients ranging in age from 41 to 69 years with a mean duration of symptoms of 5.5 ± 1.6 months. The study conducted an unknown number of treatment sessions over a 6-week period and compared acupuncture plus physiotherapy exercises to physiotherapy exercises only. Compared with the exercise group, the exercise plus acupuncture group significantly improved in regard to function. Improvements in scores by 39.8% and 76.4% were seen for the exercise and the exercise plus acupuncture groups, respectively at 6 weeks and were sustained at the 20-week reassessment. Jain et al. (2014) reported that the study by Sun et al. (2001) showed that combined acupuncture and physical exercises gives better improvement in function than physical exercises alone. The authors suggested integration of acupuncture and physical therapy for short-term improvement in function. Jain et al. (2014) concluded that acupuncture along with physical therapy exercises is moderately recommended for pain relief, improving ROM, and function in patients with frozen shoulder.

Study	SIGN rating	Conclusions	Quality of Evidence
Jain et al. (2014)	Level 1 LQ (-)	Limited moderate quality evidence was found in favour of acupuncture and EA, alone or in combination with physiotherapy/electrotherapy for reducing pain, improving ROM, and function in patients with frozen shoulder when compared to physiotherapy/electrotherapy alone.	Based on three RCTs of moderate quality with a moderate to high risk of bias.

Cao et al. (2014)

Cao et al. (2014) (QS: AQ (+)) conducted a SR which assessed the available evidence for the effectiveness and safety of cupping for the treatment of different types of pain. A total of 16 studies were included in this review and out of these 12 were relevant to musculoskeletal conditions (Chen 2009; Cramer 2011; Farhadi 2009; Kim 2011; Kim 2012; Lauche 2011; Lauche 2013; Oyang 2001; Teut 2012; Wu K 2013; Wu 2007). One study (Chen et al., 2009) looked at frozen shoulder. Chen et al. (2009) assessed the effectiveness of wet cupping targeting ashi points around the shoulder joint for 10 minutes, once every two days, in comparison to EA control, which targeted the points LI15, SJ14, SI9, GB21, Ex-UE, SI11, and LI11, and after De-qi, needles were connected to electric stimulator for 30 min; this was done once daily. The treatment ran for a total of 60 days.

No individual data was provided within the review (only meta-analysis results), therefore, no conclusions can be made regarding the subgroup of frozen shoulder. The review found moderate

evidence that cupping is more efficacious than no treatment or other treatments (such as heat therapy, usual care, and conventional medications) in reducing pain over the short term (within 4 weeks), however, this was based on all pain conditions including non-traumatic conditions. The review did find that wet cupping, mainly on ashi points, was the most commonly used method (68.75% trials) for treating pain.

Study	SIGN rating	Conclusions	Quality of Evidence
Cao et al. (2014)	Level 1 AQ (+)	The available evidence in this review is insufficient to draw conclusions on cupping for frozen shoulder.	Based on one RCT of moderate quality.

Law et al (2015)

Law et al. (2015) (QS: HQ ++) completed a SR and meta-analysis on the effectiveness of LA for treating musculoskeletal pain. The review contained one frozen shoulder related study (Tam et al. 2005), which looked at the effect of LLLT of 27 Mw average output, 135 MW/cm2 power density and 3 to 4 J dose compared to Cortisone injection, and wait and see.

The authors reported that the corticosteroid injection group showed better improvement for all outcome measures at week six compared with the other two groups. Beyond week 26, LLLT group showed a better result than the other two groups. No quantitative data was reported in the SR, including supplementary appendices, regarding the Tam et al. (2005) study.

Study	SIGN rating	Conclusions	Quality of Evidence
Law et al. (2015)	Level 1+ HQ (++)	Insufficient evidence available to make evidence-based treatment recommendations for the use of LA in the treatment of patients with frozen shoulder.	Based on one RCT of moderate quality.

Lee et al. 2017

Lee et al. (2017) (QS: AQ (+)) conducted a SR and meta-analysis on the effectiveness of Chuna (or Tui Na) manual therapy on pain and function for musculoskeletal disorders. One study was included that related to frozen shoulder and was utilised in this analysis (Chen et al., 2014). Chen et al. (2014) compared 24 sessions over 4 weeks of Chuna (or Tui Na) manual therapy to EA and TENs. The study used the VAS pain scale and ROM to measure the effectiveness of the treatment, with both reported as positive. The authors concluded that given the low quality of the included studies and the diverse methods of intervention techniques, the available evidence is insufficient to determine the effects of Tui Na manual therapy for musculoskeletal conditions.

Study	SIGN rating	Conclusions	Quality of Evidence
Lee et al. (2017)	Level 1+ AQ (+)	Evidence in this review suggests that Tui Na manual therapy has positive effects on pain and ROM for frozen shoulder, however, the evidence is insufficient to make recommendations.	Based on one RCT of low quality and moderate to high risk of bias.

Randomised Controlled Trials

One RCT not included in the previously reported SRs was identified that investigated the effectiveness of acupuncture for frozen shoulder.

Intervention	Study	QS	Outcome measure	Result
Acupuncture plus physiotherapy. 10 sessions over 5 weeks compared to physiotherapy alone	Asheghan et al. 2016	LQ (-)	VAS AROM PROM SPADI	• No significant improvement in VAS pain scores post-treatment, however, significant improvement in the acupuncture group at 6-week follow-up. • AROM: Significant improvement compared to control post-treatment and at 6-week follow-up for the movements of flexion and abduction, however, not adduction, extension, internal rotation, and external rotation. • PROM: Significant improvement compared to control post-treatment and at 6-week follow-up for the movements of flexion and abduction, however, not adduction, extension, internal rotation, and external rotation. • No significant difference in SPADI score at post-treatment and 6-week follow-up.
Appears that acupuncture plus physiotherapy is more effective than physiotherapy alone in patients with frozen shoulder in regard to improving pain and ROM, but not function, at 6-week follow-up (1 x LQ RCT).				

Lateral Epicondylitis/Lateral Elbow Pain

A total of six SRs and two RCTs were identified that reviewed the effectiveness of acupuncture for lateral epicondylitis. Included studies mainly investigated treatments that used a TCM framework and delivered traditional acupuncture and LA. Acupuncture interventions were mainly compared with sham acupuncture, ultrasound, and placebo. Patients were generally outpatients aged greater than 40 years old. The number, duration, and frequency of treatment sessions were about 20 to 30 minutes long, with around 10 sessions delivered over 2–6 weeks. Length of follow-up was mostly short-term, however, a number of studies reported long-term

functional, strength, and pain outcomes. Included RCTs within the SRs were generally of low to moderate quality.

Systematic Reviews

Law et al. (2015)

Law et al. (2015) (QS: HQ ++) conducted a SR on LA for musculoskeletal pain. The review contained seven lateral elbow pain related studies (Skorupska et al. 2012; Emanet et al. 2010; Lam & Cheing 2007; Papadopulous et al. 1996; Haker & Lundeberg 1991; Haker & Lundeberg 1990; Lundeberg et al. 1987). Skorupska et al. (2012) compared LLLT to ultrasound at trigger points or anatomical sites. Haker and Lundeberg (1991), Haker and Lundeberg (1990), Papadopulous et al. (1996), Emanet et al. (2010), and Lam and Cheing (2007) compared laser to placebo. Lundeberg et al. (1987) compared HeNe laser and GaAs laser to placebo. Participants received from 3 to 15 LA treatment sessions over a 1- to 12-week period.

Skorupska et al. (2012) reported that all groups showed significantly less pain after treatment and that the ultrasound group using trigger point application showed a more significant improvement in grip strength compared to the other three groups. No quantitative data was reported in the SR, including supplementary appendices. Emanet et al. (2010) reported that both groups showed significant improvement in all outcome measures after treatment, however, the improvement was only retained in laser group at the 12-week follow-up. The study showed a non-significant result in pain after the intervention (SMD: 0.32 [-0.25, 0.90]) and at intermediate follow-up (-0.42 [-1.00, 0.16]). DASH scores were not significant after the intervention (SMD: -0.55 [-1.13, 0.04]), however, were at intermediate follow-up (SMD: -0.95 [-1.56, -0.34]). Lam and Cheing (2007) found that the laser group showed a greater improvement from all outcome measures after treatment compared to the placebo group (pain after intervention SMD -1.18 [-1.87, -0.49] and at 6- to 26-week follow-up SMD: -1.57 [-2.30, -0.84]). Papadopulous et al. (1996) reported no significant difference observed at any time point between the two groups. Haker and Lundeberg (1991), and Haker and Lundeberg (1990) reported no significant difference observed at any time point between groups. No quantitative data was reported in the SR, including supplementary appendices, for Papadopulous et al. (1996), Haker and Lundeberg (1991), and Haker and Lundeberg (1990). Lundeberg et al. (1987) found that no significant difference was observed at any time point between groups in regard to pain (6- to 26-week follow-up SMD: Ga-As Laser -1.96 [-2.75, -1.17] and He-Ne Laser -0.98 [-1.66, -0.30]). A meta-analysis was conducted for the subgroup of lateral epicondylitis in the SR by Law et al. (2015) which contained two studies with short-term and intermediate-term follow-up outcome of pain (6 to 26 weeks). The results did not suggest any favourable effect of LA at any time point (short term (SMD: -0.42; -1.89 to 1.06) and intermediate term (-0.97; -2.10 to 0.15)).

Study	SIGN rating	Conclusions	Quality of Evidence
Law et al. (2015)	Level 1+ HQ (++)	The available evidence on the effect of LA on lateral elbow pain did not suggest any favourable result of the intervention on the outcome of pain when compared to placebo at short- and intermediate-term follow-up.	Based on seven RCTs of mainly low to moderate quality with moderate to high risk of bias.

Baxter et al. (2008)

Baxter et al. (2008) (QS: LQ (-)) conducted a SR which assessed the clinical effectiveness of laser acupuncture, principally for the reduction of pain of musculoskeletal origin. The review included 10 studies which were relevant to this evidence-based review, with three being relevant to lateral epicondylitis (Lundeberg et al. 1987, Haker & Lundeberg 1991, Haker & Lundeberg 1990). Lundeberg et al. (1987) looked at patients with the diagnosis of lateral epicondylitis (tennis elbow). The interventions studied were 10 sessions over 5–6 weeks of HeNe laser or GaAs laser and were compared to placebo. Laser parameters for the GaAs laser were: wavelength: 904 nm; pulsed: 73 Hz; power output: 0.07 Mw; and dose: 0.042 J point × 10 points. Parameters for the He Ne laser were: wavelength: 632.4 nm; continuous wave; power output: 1.56 mW; and dose: 0.0936 J point × 10 points. Haker and Lundeberg (1990) and Haker and Lundeberg (1991) studied patients with lateral epicondylitis. The intervention utilised was 10 laser treatment sessions conducted over 4–5 weeks and 3–4 weeks respectively with both being compared to placebo. Laser parameters utilised by Haker and Lundeberg (1990) were: wavelength: 904 nm; pulsed: 70 Hz/180 ns, average power: 12 Mw; peak power: 8.3 W; and dose: 0.36 J point. Parameters utilised by Haker and Lundeberg (1991) were: wavelength: 632.8 nm; continuous wave; power output – 5 mW (70 mrad); and dose: 0.3 J point.

Lundeberg et al. (1987) found no significant change in any outcome (VAS, pain on wrist dorsiflexion, grip strength, patient and medical assessment of outcome, and nerve conduction study) post-intervention. Haker and Lundeberg (1990) found no significant difference at any point in NPRS or grip strength. Haker and Lundeberg (1991) found no significant difference at end of treatment, however, they found a significant difference in favour of placebo treatment at follow-up in terms of grip strength ($p < 0.05$). The authors concluded that evidence was found to support the use of laser acupuncture in the treatment of myofascial pain, post-operative nausea and vomiting, and for the relief of chronic tension headache, however, lateral epicondylitis was not identified in this list.

Study	SIGN rating	Conclusions	Quality of Evidence
Baxter et al. (2008)	Level 1- LQ (-)	The available evidence in this review does not support laser acupuncture as an effective treatment for lateral epicondylitis.	Based on three RCTs of low to moderate quality with moderate to high risk of bias.

Lee et al. 2017

Lee et al. (2017) (QS: AQ (+)) conducted a SR and meta-analysis on the effectiveness of Chuna (or Tui Na) manual therapy on pain and function for musculoskeletal disorders. Two studies were included that related to lateral elbow pain and were utilised in this analysis (Ding et al., 2010; Wu 2011). Wu (2011) compared five sessions over 9 days of Chuna (or Tui Na) manual therapy plus physiotherapy plus interferential therapy to physiotherapy plus interferential therapy alone. Ding et al. (2010) compared two weeks of Chuna (or Tui Na) manual therapy alone to 14 sessions of physiotherapy (interferential therapy). Ding et al. (2010) used the VAS pain scale and Mayo score to measure the effectiveness of the treatment, with both reported

as positive. Wu (2011) used the outcome measure of VAS and reported positive results. The authors concluded that given the low quality of the included studies and the diverse methods of intervention techniques, the available evidence is insufficient to determine the effects of Tui Na manual therapy for musculoskeletal conditions. More high-quality RCTs such as sham-controlled studies with standardised interventions are needed.

Study	SIGN rating	Conclusions	Quality of Evidence
Lee et al. (2017)	Level 1+ AQ (+)	Evidence in this review suggests that Tui Na manual therapy has positive effects on pain for lateral epicondylitis, however, the evidence is insufficient to make recommendations.	Based on two RCTs of low quality and moderate to high risk of bias.

Chang et al. (2014)

Chang et al. (2014) (QS: AQ (+)) conducted a SR that assessed the available evidence for the effectiveness of manual acupuncture and laser acupuncture on lateral epicondylalgia. A total of nine studies were relevant to the analysis of lateral elbow pain (Wang 2011; Gu & Shan 2007; Fink et al. 2002a; Fink et al. 2002b; Molsberger & Hille 1994; Haker & Lundeberg 1991; Haker & Lundeberg 1990a; Haker & Lundeberg 1990b; Lundeberg et al. 1987). Wang (2011) looked at patients of mean age 42.1 years and compared 20 30-minute sessions of acupuncture to placebo. Gu & Shan (2007) studied patients of mean age 48.6 years and conducted 10 30-minute sessions of needle acupuncture and compared it to placebo. Fink et al. (2002a) and Fink et al. (2002b) studied patients with mean age 52.1 and conducted 10 25-minute sessions twice a week of needle acupuncture compared to placebo. Molsberger and Hille (1994) studied patients with mean age 47.9 years and compared needle acupuncture to placebo, however, the treatment parameters were not reported. Haker and Lundeberg (1991) looked at patients with a mean age of 47.9 years and compared 10 sessions over 4 weeks of laser acupuncture to sham. Haker and Lundeberg (1990a) studied patients with mean age 47 years and compared needle acupuncture to placebo with 10 sessions over 3–4 weeks. Haker and Lundeberg (1990b) compared 10 sessions over 5–6 weeks of laser acupuncture to sham acupuncture in patients with mean age 46.7 years. Lundeberg et al. (1987) studied patients with a mean age of 43 years and compared 10–12 sessions over 5–6 weeks of laser acupuncture compared to sham.

Wang (2011) found that after treatment at the 7- and 30-day follow-up, pain was reduced ($p < 0.05$) compared with the placebo group. Results from Gu and Shan (2007) showed that after treatment, pain was reduced, and ADL was improved ($p < 0.05$) compared with the placebo group. Fink et al. (2002a) reported that after treatment, pain for isometric wrist extension was reduced ($p < 0.05$) compared with the placebo group. Fink et al. (2002b) reported that after treatment, pain for isometric wrist extension was reduced and strength of wrist extensor and DASH was improved ($p < 0.05$) compared with the placebo group. Molsberger and Hille (1994) found that after treatment, pain was reduced ($p < 0.05$) compared with the placebo group. Haker and Lundeberg (1991) found no differences at 3-, 6-, and 12 week follow-up in pain and strength outcomes. Haker and Lundeberg (1990a) showed that after treatment and 3 months follow-up, grasp force and strength of wrist extensors were improved ($p < 0.05$) compared with the placebo group. Haker and Lundeberg (1990b) found no differences at tenth session, 3-month, and 12-

month follow-up in pain and strength outcomes. Lundeberg et al. (1987) found no differences at 3-month follow-up in pain and strength outcomes. The authors concluded that manual acupuncture is effective in short-term pain relief for the treatment of lateral epicondylalgia, however, its long-term analgesic effect is unremarkable. Manual acupuncture had stronger evidence of an analgesic effect than laser acupuncture.

Study	SIGN rating	Conclusions	Quality of Evidence
Chang et al. (2014)	Level 1 AQ (+)	Low to moderate quality evidence suggests that manual acupuncture may be more effective in the short term for reduction in pain and improvements in strength for the treatment of lateral epicondylalgia when compared to placebo/sham acupuncture.	Based on nine RCTs of low to moderate quality with moderate to high risk of bias.
		The effect on pain of manual acupuncture does not seem sustainable over the long term for patients with lateral epicondylalgia.	
		Low quality evidence suggests that there are no significant differences between LA and sham/placebo in the short- and long-term outcomes of pain and strength when treating patients with lateral epicondylalgia.	

Tang et al. (2015)

Tang et al. (2015) (QS: AQ (+)) conducted a SR looking at the evidence of the effectiveness and safety of acupuncture for lateral epicondylitis. A total of four studies were relevant to the analysis of lateral elbow pain (Fink et al. 2002; Irnich et al. 2003; Jiang et al. 2005; Li et al. 2014). Fink et al. (2002) compared 10 25-minute sessions over 5 weeks of acupuncture compared to sham acupuncture. Irnich et al. (2003) looked at the effect of three sessions over 10 days of acupuncture compared to sham acupuncture. Jiang et al. (2005) looked into the effect of 10 20-minute sessions over 2 weeks of EA plus moxibustion with material insulation compared to blockage therapy. Li et al. (2014) compared 10 30-minute sessions over 10 days of EA plus massage and blockage therapy compared to blockage therapy.

Fink et al. (2002) found non-significant between-group results for maximal muscle strength and elbow functional status. Irnich et al. (2003) reported a statistically significant effect on elbow functional status (impairment caused by pain), however, a non-significant improvement in grip strength. Jiang et al. (2005) reported a statistically significant result for elbow functional status, however, it was difficult to determine which outcome measure was used. Li et al. (2014) found non-significant results in both elbow functional status (Mayo elbow performance) and grip strength index.

Meta-analysis results showed that for the comparison of acupuncture versus sham acupuncture for the outcome of elbow functional status, a statistically significant result was shown (two studies (Frink et al., 2002, Irnich et al., 2003), SMD: -0.56 [−0.98, −0.15], heterogeneity: $\chi 2$ = 1.13, df = 1 (P = 0.29); I2 = 11%). For the outcome of elbow myodynamia (grip strength) the results also showed a significant result (two studies (Frink et al., 2002, Irnich et al. 2003), SMD:

0.44 [0.03, 0.85], heterogeneity: $\chi 2$ = 0.26, df = 1 (P = 0.61); I2 = 0%). However, the authors concluded that for the small number of included studies with poor methodological quality, no firm conclusion can be drawn regarding the effect of acupuncture on elbow functional status and myodynamia for lateral epicondylitis.

Study	SIGN rating	Conclusions	Quality of Evidence
Tang et al. (2015)	Level 1 AQ (+)	Acupuncture may have favourable effects on elbow functional status and grip strength for patients with lateral epicondylitis, however, the evidence is insufficient to make recommendations.	Based on four studies of low to moderate quality with moderate to high risk of bias.

Gadau et al. (2014)

Gadau et al. (2014) (QS: HQ (++)) conducted a SR of the effectiveness of acupuncture and moxibustion for lateral elbow pain. The review had two primary questions: Is acupuncture or moxibustion alone more effective than sham acupuncture or other conventional treatments in the treatment of lateral elbow pain? Is acupuncture and moxibustion combined more effective than acupuncture or moxibustion alone? Five out of the 19 studies included in the review were relevant to this evidence-based review (Fink et al. 2002; Irnich et al. 2003; Molsberger et al. 1994; Davidson et al. 2001; Grua et al. 1999). Sample sizes of the included 19 studies within the review ranged from 16 to 120 participants. All subjects were outpatients with an age ranging from 17 to 74 years in the treatment arm, and 20 to 76 years in the control arm. In all 19 studies the total number of treatment sessions ranged from one to 36 and the frequency of treatments varied from once a day to once every 3 days. The number of needles used per session ranged from one to 12 needles and the number of moxa-cones used in the moxibustion interventions ranged from two to seven cones per acupoint. Fourteen studies reported that De-qi sensation was sought. The duration of each treatment session lasted between one and 30 minutes, with most studies ranging between 20 to 30 minutes.

Fink et al. (2002) compared 10 25-minute sessions over 5 weeks of acupuncture compared to sham acupuncture. Irnich et al. (2003) looked at the effect of three sessions over 10 days of acupuncture compared to sham acupuncture. Molsberger et al. (1994) looked at the effect of one session of acupuncture and compared it to sham. Davidson et al. (2001) conducted 8–12 sessions of acupuncture over 4 weeks and compared it to ultrasound. Grua et al. (1999) conducted 10 20-minute sessions over 5 weeks of acupuncture and compared it to ultrasound. Fink et al. (2002) found significantly different strength test results, DASH, and pain (VAS) results at 2-week follow-up, however, not at 2-month follow-up. Irnich et al. (2003) found a significantly different improvement in the outcome of pain free grip strength at 2-week and 2-month follow-up. Molsberger et al. (1994) found a significant improvement in NRS for pain immediately following treatment. Davidson et al. (2001) found no significant differences in the outcomes of pain free grip strength, pain score (VAS), and DASH score immediately post-treatment and at 4-week follow-up for DASH scores. Grua et al. (1999) found significant between-group difference in favour of acupuncture for the outcomes of Maigne functional index and pain (VAS) post the last treatment and at 6 months. The authors concluded that the current evidence identified from

the review suggested that acupuncture may be effective in the relief of lateral elbow pain up to a period of 6 months. They also identified that the findings from moderate quality studies with subject-blinded and sham-controlled acupuncture intervention groups showed that acupuncture was more effective than sham acupuncture in treatment of lateral elbow pain.

Study	SIGN rating	Conclusions	Quality of Evidence
Gadau et al. (2014)	Level 1 HQ (++)	Moderate quality evidence suggests that acupuncture was more effective than sham acupuncture and ultrasound at improving pain, strength, and functional outcomes in patients with lateral elbow pain in the short term. There is conflicting evidence regarding the medium- to long-term effect of manual acupuncture on the outcomes of pain, strength, and function compared to sham and ultrasound for patients with lateral epicondylalgia.	Based on five RCTs of mostly moderate quality with moderate risk of bias.

Randomised Controlled Trials

Two RCTs that were not included in the previously reported SRs were identified that investigated the effectiveness of acupuncture for lateral epicondylitis.

Intervention	Study	QS	Outcome measure	Result
Dry needling: 5 sessions vs. NSAIDs and forearm brace	Uygur et al. (2017)	LQ (-)	Patient-rated Tennis Elbow Evaluation (PRTEE) pain score Patient-rated Tennis Elbow Evaluation (PRTEE) functional score	• Significant difference in regard to PRTEE pain score in favour of DN group post-treatment and at 6-month follow-up. • Significant difference in regard to PRTEE functional score in favour of DN group post-treatment and at 6-month follow-up.
• Appears that dry needling is more effective than first line treatment consisting of NSAIDs and forearm brace use in people with lateral epicondylitis in regard to pain and function immediately post-treatment and at 6-month follow-up (1 x LQ RCT).				
Acupuncture: 4 sessions vs. manipulation therapy	Hsu et al. (2017)	LQ (-)	VAS Grip strength DASH	• No significant changes were observed in pain VAS scores at rest in the acupuncture group during the 10-week period. In contrast, significant changes were observed during rest in the manipulation group. • A significant difference was observed in grip strength (pain free) at the 8-week follow-up in both groups, whereas a significant difference was

				observed only in the acupuncture group for grip strength (maximum). • A significant difference was observed in the DASH questionnaire at the 8-week follow-up in both groups.
• Appears to be no significant difference in pain, function, and grip strength improvements between acupuncture and manipulation therapy in individuals with lateral epicondylitis at 8-week follow-up (1 x LQ RCT).				

Carpal Tunnel Syndrome

A total of three SRs that included seven RCTs were identified that reviewed the effectiveness of acupuncture for carpal tunnel syndrome. Four RCTs were found that were not included in the SRs. Included studies investigated treatments that used a TCM framework and delivered traditional acupuncture, EA, and LA. Acupuncture interventions were mainly compared with sham acupuncture/placebo, night wrist splint, and medication. Most studies were concerned with patients diagnosed as having mild to moderate carpal tunnel syndrome. The number, duration, and frequency of treatment sessions were often between 8–10 sessions delivered over 4–6 weeks with the length of time of individual treatment sessions being around 30 minutes. Length of follow-up was mostly short- to medium-term with few studies reporting long-term outcomes. The quality of the studies was mainly low to moderate.

Systematic Reviews

Cox et al (2016)

Cox et al (2016) (QS: AQ +) completed a SR into the effectiveness and safety of acupuncture therapies for the management of musculoskeletal disorders of the upper and lower extremities. The review contained three carpal tunnel syndrome related studied (Khosrawi et al. 2012; Kumnerddee & Kaewtong 2010; Yang et al 2011). All three studies looked at patients with mild/moderate carpal tunnel syndrome. Khosrawi et al. (2012) looked at the effect of twice weekly 60-minute sessions for 4 weeks of acupuncture compared to placebo. Kumnerddee and Kaewtong (2010) looked at 10 30-minute sessions over 5 weeks of EA compared to a night wrist splint. Yang et al. (2011) compared the intervention of twice weekly needle acupuncture for 30 minutes over a period of 4 weeks to oral steroids.

Khosrawi et al. (2012) found statistically significant differences between groups for distal motor latency, nerve conduction velocity, and global symptom score post-intervention, however, non-significant differences for distal sensory latency. Kumnerddee and Kaewtong (2010) found no statistically significant differences between groups for the BCTQ Symptom Severity Scale and Functional Status Scale. A statistically significant but not clinically important difference favoured EA for pain immediately post-intervention with the difference in mean change for VAS being 9.63 (95% CI: 1.07, 18.20). Yang et al. (2011) found a significant difference in mean change post-intervention for distal motor latency (0.7 (95% CI: 0.39, 1.00)), but no statistically significant difference between groups for the outcomes of global symptoms score, numbness, pain, paraesthesia, weakness, nocturnal wakening, motor nerve conduction velocity, distal sensory latency, compound muscle action potential, sensory nerve action potential, and wrist-palm sensory nerve conduction velocity. At 13-month follow-up, a significant difference was found in global symptoms score (0-50) (8.25 (95% CI: 4.04, 12.46)), distal motor latency (1.26 (95% CI: 0.78, 1.74)), and distal sensory latency (0.59 (95% CI: 0.28, 0.89)), however, there was no statistically significant difference between groups for the outcomes of compound muscle

action potential, motor nerve conduction velocity, sensory nerve action potential, and wrist-palm sensory nerve conduction velocity. Cox et al. (2016) reported that the evidence suggested that traditional needle acupuncture or EA may be a useful intervention for adults with carpal tunnel syndrome.

Study	SIGN rating	Conclusions	Quality of Evidence
Cox et al. (2016)	Level 1+ AQ (+)	Limited and conflicting evidence suggests that acupuncture may be an effective treatment for mild to moderate carpal tunnel syndrome at short- and long-term follow-up when compared to placebo and oral steroids for improving global symptoms score, distal motor latency, and nerve conduction velocity, however, the clinical importance of these findings is unknown.	Based on three RCTs with low risk of bias.

Law et al. (2015)

Law et al. (2015) (QS: HQ ++) completed a SR and meta-analysis on the effectiveness of LA for treating musculoskeletal pain. The review contained one carpal tunnel related study (Wong et al. 2001), which looked at the effect of LA of 5 Mw average output, 25.5 MW/cm2 power density, and 0.98 J dose compared to placebo. The authors reported that the laser group showed a greater improvement from all outcome measures except pinch test after one stage of treatment compared to placebo group. No quantitative data was reported in the SR, including supplementary appendices, regarding the Wong et al. (2001) study.

Study	SIGN rating	Conclusions	Quality of Evidence
Law et al. (2015)	Level 1+ HQ (++)	Insufficient evidence available to make evidence-based treatment recommendations for the use of LA in the treatment of patients with carpal tunnel syndrome.	Based on one RCT of low quality.

Sim et al (2011)

Sim et al. (2011) (QS: AQ +) conducted a SR on the evidence of the effectiveness of acupuncture and acupuncture-like treatments for carpal tunnel syndrome. The review contained three carpal tunnel syndrome related studied relevant to this review (Weinstein et al. 2003; Yang et al. 2009; Shi et al. 2006). The review contained six RCTs which had a mean duration of carpal tunnel syndrome of 26.9 months and average duration of treatment of 4.1 weeks. Weinstein et al. (2003) looked at patients with a mean duration of the condition of 84 months and conducted acupuncture treatment over 6 weeks. The study used two control groups both using sham acupuncture, one using acupoints but five bilateral irrelevant meridian points, and one using sham points. Yang et al. (2009) studied patients with a mean condition duration of 7.65 months and conducted eight acupuncture sessions over 4 weeks and compared it to oral steroids (prednisolone). Shi et al. (2006) looked at patients with a mean condition duration of

2.47 months and conducted 30 treatments. The intervention group received acupuncture plus Tui Na massage therapy while the control group received Tui Na massage therapy only.

Weinstein et al. (2003) looked at the outcome measure symptoms severity score and found no significant difference between all groups. Yang et al. (2009) found no significant difference in the global symptom score (numbness, pain, paraesthesia, weakness) (P = 0.15, MD, -0.33 [-0.78, 0.12]). The nerve conduction study looking at six variables found that the acupuncture group had a significantly better improvement in distal motor latency compared with the steroid group at week 4, however, they found no significant results to all other variables. Shi et al. (2006) looked at the 4th digit median nerve sensory nerve conduction velocity (D4MNSCV) and the 4th digit ulnar nerve sensory nerve conduction velocity (D4UNSCV). Results were significant for the median nerve test (P = 0.0002, MD, 1.05 [0.51, 1.59]), however, not the ulnar nerve (P = 1.00, MD, 0.00 [-0.51, 0.51]). Shi et al. (2006) reported that tui na massage showed more effective improvement than the massage treatment alone.

Sim et al. (2011) reported that for the comparison of needle acupuncture verses sham acupuncture, no statistical difference was found between groups. They identified that for the comparison of needle acupuncture verses oral steroids, Yang et al. (2009) evaluated the effect of manual acupuncture compared with oral steroids. Although the study described a superior effect of needle acupuncture over oral steroids in terms of GSS score, the SR's recalculation of the mean difference showed no statistical difference (P = 0.15), except for distal motor latency in terms of NCS (P = 0.007). Recalculation of the mean difference revealed a favourable effect for acupuncture in terms of the nerve conduction velocity of the median nerve (P = .0002) but not of the ulna nerve (P = 1.00). Sim et al. (2011) concluded that the existing evidence is not convincing enough to suggest that acupuncture is an effective therapy for carpal tunnel syndrome.

Study	SIGN rating	Conclusions	Quality of Evidence
Sim et al. (2011)	Level 1 AQ (+)	Evidence in this review for acupuncture as an evidence-based treatment option for carpal tunnel syndrome is insufficient and contradicting.	Based on three RCTs of low to moderate quality with a moderate to high risk of bias.

Randomised Controlled Trials

Four RCTs that were not included in the previously reported SRs were identified, investigating the effectiveness of acupuncture for carpal tunnel syndrome.

Intervention	Study	QS	Outcome measure	Result
Acupuncture for carpal tunnel syndrome				
Cupping therapy: 1 session vs. heat application	Michalsen et al. (2009)	AQ (+)	VAS (Pain at rest) NPQ DASH Levine CTS score	• VAS: Significant difference between cupping group and thermal therapy (-22.9 (-35.3; -10.5) P < .001). • NPQ: Significant difference between cupping group and thermal therapy (-12.6 (-18.8 ± -6.4) P < .001). • DASH: Significant group difference (-11.1 (-17.1, -5.1) P < 0.001). • Levine CTS score: Symptom severity and functional status both significant (p < 0.002 for both treatments).
• A single cupping session appears to be better than heat therapy in relieving the pain and other symptoms related to carpal tunnel syndrome at 1-week post-treatment (1 x AQ RCT). • Long-term management of CTS and related mechanisms remains to be clarified (1 x AQ RCT).				
Acupuncture: 6 weekly sessions plus wrist brace vs. Steitberger placebo acupuncture needles plus wrist brace	Yao et al. (2012)	AQ (+)	Tip pinch Key pinch Carpal tunnel self-assessment questionnaire symptom scale and functional scale (CTSAQ)	• No statistically significant difference was found between the groups treated with acupuncture and placebo acupuncture with respect to improvement in tip/key pinch. • No statistically significant difference was found between the groups for the outcomes of the symptom scale and functional scale CTSAQ.
• Acupuncture did not prove to be superior to placebo acupuncture when used in conjunction with bracing in the treatment of chronic mild to moderate carpal tunnel syndrome, however, both groups showed statistically significant improvement in symptoms at 3-month follow-up (1 x AQ RCT).				
Acupuncture: 9 sessions over 4 weeks compared with steroid treatment	Yang et al. (2009)	AQ (+)	Global Symptoms Score Nerve conduction studies	• No statistically significant difference was found between the groups for the outcomes of global symptoms score at week 2 and week 4. • Patients with acupuncture treatment had a significant decrease in distal motor latency compared with the steroid group at week 4 (P = 0.012).
• Acupuncture did not prove to be superior to steroid treatment in regard to global symptoms score in the treatment of patients with mild to moderate carpal tunnel syndrome, however, acupuncture did show significant improvements in nerve conduction (1 x AQ RCT).				
EA and splinting: 13 sessions over 17 weeks vs. splinting alone	Chung et al. (2016)	AQ (+)	NRS Tip pinch strength (lb) BCTQ score - SSS BCTQ score - FSS DASH	• NRS: Significant between-group difference at week 17 (-0.7 (95% CI -1.34 to -0.06) P = 0.03). • Tip pinch strength: Significant between-group difference at week 17 (1.17 (95% CI 0.48 to 1.86) P < 0.01). • BCTQ score, SSS and FSS: Significant between-group difference at week 17.

				• DASH: Significant between-group difference at week 17 (-6.72 (95% CI -10.9 to -2.57) P < 0.01).
• EA appears to produce small significant changes in symptoms, disability, function, dexterity, and pinch strength when combined with nocturnal splinting for patients with primary chronic carpal tunnel syndrome with mild to moderate symptoms and no indication for surgery (1 x AQ RCT).				

De Quervain's Tenosynovitis

No SRs and only one RCT was found investigating the effectiveness of acupuncture treatments on De Quervain's Tenosynovitis.

Randomised Controlled Trial

Intervention	Study	QS	Outcome measure	Result
Acupuncture: 5 treatments over 1 week plus splint vs. injection plus splint	Hadianfard et al. (2014)	AQ (+)	VAS Q-DASH	• VAS: Significant difference in favour of injection (p = 0.021) at 2-week follow-up, however, non-significant difference at 6-week follow-up. • Q-DASH: Non-significant difference at 2- and 6-week follow-up.
• Appears that acupuncture improves pain intensity and disability status in patients with De Quervain's Tenosynovitis in the short term, however, there was no significant difference in improvement when compared to the injection group (1 x AQ RCT).				

Non-Specific Low Back Pain

A total of 15 SRs and two RCTs were identified that reviewed the effectiveness of acupuncture interventions for NSLBP. Included studies investigated treatments which used mainly a TCM framework and delivered a variety of acupuncture treatments including traditional acupuncture, LA, EA, Tui Na, Gua sha, and cupping therapies. Acupuncture interventions were mainly compared with sham acupuncture, sham TENS, medication, no treatment or waiting list. The included studies varied significantly in regard to age of participants, duration (varied from acute within a week, to 3-12 months, or greater than 5 years) and severity of condition, which makes it difficult to draw clinically meaningful results. Acupuncture interventions were often of 20- to 30-minute duration with the large majority of studies conducting between 10-20 sessions, with a course of treatment of 3–7 weeks. Studies focusing on acute low back pain typically conducted 3–12 sessions over 1–6 weeks. Studies utilising LA conducted 3–15 treatment sessions over a 1–12 week period. Tui Na interventions were often of 30-minute duration over a 1 to 4 week period. A history of traumatic injury was often an exclusion criteria so this may limit the relevance of the findings for ACC. Length of follow-up was mostly short-term with few studies reporting long-term functional or pain outcomes. Study quality varied significantly from low to high quality.

Systematic Reviews

Lee et al. (2013)

Lee et al. (2013) (QS: AQ +) conducted a SR on the effects of acupuncture for acute LBP of less than 12 weeks. The review included five RCTs which were relevant to the analysis of non-specific low back pain (Liu & Li 2010; Lan 2009; Kennedy et al. 2008; Kittang et al. 2001; Araki et al. 2001). Liu and Li (2010) compared five sessions of acupuncture to diclofenac alone and acupuncture plus diclofenac for acute low back pain over a 5-day duration. Lan (2009) assessed the efficacy of EA compared to ibuprofen at the first, second, and third treatment over a 3-day period. Kennedy et al. (2008) compared acupuncture to sham over a 4- to 6-week treatment period. Kittang et al. (2001) assessed the efficacy of four sessions of acupuncture over two weeks, compared to Naproxen at 1-week, 2-week, 3-month, and 6-month follow-up. Araki et al. (2001) compared acupuncture to sham after a single session of treatment.

Liu and Li (2010) found no significant difference between the acupuncture group and the medication group at 5-day follow-up in regard to NPRS (3.2 ± 1.0 vs. 3.3 ± 1.0, $p > 0.05$), however, combined acupuncture and diclofenac was significantly better than diclofenac alone (4.9 ± 0.8 vs. 3.3 ± 1.0, $p < 0.00001$). Lan (2009) found that EA was significantly better than ibuprofen after each session in regard to VAS pain (after session 1: 4.89 ± 0.65 vs 7.31 ± 0.87, $p < 0.01$, after session 2: 2.13 ± 0.43 vs 5.23 ± 0.88, $p < 0.01$, after session 3: 0.18 ± 0.13 vs. 3.31 ± 0.76, $p < 0.01$). Kennedy et al. (2008) found no significant difference in VAS scores between the intervention and control at 4-and 6-week follow-up. Kittang et al. (2001) also found no significant difference in VAS scores at all time periods ($p > 0.05$). Araki et al. (2001) showed no significant difference immediately after one session (49.9 ± 22.2 vs 51.8 ± 26.1, $p = 0.80$) in VAS scores. The authors concluded that for pain, there exists inconsistent evidence that acupuncture is more effective than medication. Acupuncture in addition to medication appears more effective for pain relief and overall functional improvement than medication alone.

Study	SIGN rating	Conclusions	Quality of Evidence
Lee et al. (2013)	Level 1 AQ (+)	Inconsistent evidence was found for the effectiveness of acupuncture compared to medication (NSAIDs) on the outcome of pain in patients with NSLBP.	Based on five RCTs of mostly poor quality with moderate to high risk of bias.
		Low quality evidence suggests that acupuncture may be more effective at relieving pain when compared to sham acupuncture, however, the evidence does not provide support for its effect on function and disability, or on subacute low back pain.	
		Low quality evidence was found for acupuncture treatments in combination with medication for reducing pain and functional improvement in patients with NSLBP than medication alone.	

Law et al. (2015)

Law et al. (2015) (QS: HQ++) completed a SR on LA for musculoskeletal pain. The review contained two NSLBP related studies (Lin et al., 2012; Glazov et al., 2009). Both studies compared the intervention of LA to placebo, however, the treatment parameters differed with the average output of 40 Mw, power density of 50 Mw/cm2, and dose of 12 J in the study by Lin et al. (2012), compared to the average output of 10 Mw, power density of 50 Mw/cm2, and dose of 0.2 J in the study by Glazov et al. (2009).

The study by Lin et al. (2012) reported that both the intervention and control groups showed significantly less pain after treatment but no between-group differences (SMD: -0.05 (-0.66, 0.55)). This study was one of the five studies out of the 49 total studies that found no significant benefit of LA for any type of musculoskeletal pain. In contrast, the study by Glazov et al. (2009) found that the laser group showed significant less pain at 6-week follow-up compared with the placebo group. No meta-analysis was conducted for the subgroup of NSLBP in the SR by Law et al. (2015) due to the limited number of studies available for LA and NSLBP, in comparison to the condition subgroups of lateral epicondylitis and TMJ disorders.

Study	SIGN rating	Conclusions	Quality of Evidence
Law et al. (2015)	Level 1+ HQ (++)	Evidence in this review for LA as an evidence-based treatment option for NSLBP is insufficient and contradicting.	Based on two RCTs of varying quality and moderate to high risk of bias.

Xu et al. (2013b)

Xu et al. (2013b) (QS: AQ +) conducted a SR on the effects of acupuncture for chronic LBP of greater than 3 weeks with an interest in long-term follow-up of outcome measures between a month and one year. The review included 14 RCTs which were relevant to the analysis of NSLBP (Grant et al. 1999; Leibing et al. 2002; Molsberger et al. 2002; Kerr et al. 2003; Meng et al. 2003; Yeung et al. 2003; Kazunori et al. 2006; Brinkhaus et al. 2006; Thomas et al. 2006; Haake et al. 2007; Szczurko et al. 2007; Cherkin et al. 2009; Itoh et al. 2009; Zaringhalam et al. 2010). Individual data regarding the acupuncture intervention used within the included RCTs was unfortunately not reported which limits generalisability and clinical utility of results. Mean age of participants within the included studies was usually between 50 and 60 years old. The participants' duration of low back pain at baseline significantly varied between studies, with most studies reporting durations of either 3–12 months, or mean of about ten years.

Xu et al. (2013b) conducted a number of meta-analyses comparing acupuncture to no treatment, other treatments, and sham treatment for the outcomes of pain, disability, and QOL. When acupuncture was compared to control (overall) the effect on pain (SMD: -0.43 (-0.64, -0.21)), disability (-0.43 (-0.66, -0.21)), and QOL (SMD: 0.47 (0.15, 0.78)) was significantly different. When acupuncture was compared to no treatment the results of the meta-analysis showed that acupuncture was significantly more effective for reducing pain intensity (SMD: -0.64 (-1.13, -0.14)). However, the results showed inconsistency when acupuncture was

compared with sham acupuncture (pain intensity SMD: -0.26 (-0.56, 0.05), disability SMD: Not reported, however, subjectively reported as non-significant). The authors reported that some studies found there is moderate evidence that acupuncture is more effective than sham acupuncture, while other studies have published strong evidence of no significant difference between acupuncture and sham acupuncture.

The authors also conducted a secondary meta-analysis dividing studies into chronic low back pain of duration 3 weeks to 12 weeks, or more than 12 weeks. The authors reported that the effect of acupuncture in treating chronic low back pain was significantly limited by the duration of the disease, with a much smaller effect observable when the definition of chronic low back pain encompassed those with pain for more than 12 weeks. When only looking at studies that defined chronic as greater than 12 weeks and compared acupuncture to sham acupuncture, no superior benefit was found in all four outcome types (pain intensity, disability, spinal flexion, and QOL).

Study	SIGN rating	Conclusions	Quality of Evidence
Xu et al. (2013b)	Level 1 + AQ (+)	Moderate quality evidence was found for acupuncture achieving better medium- to long-term outcomes in terms of pain, disability, and QOL when compared to all control groups including no treatment, however, these effects were not observed when compared to sham acupuncture alone. The evidence does not provide support for the effectiveness of acupuncture treatments when treating chronic low back pain of greater than 12 weeks as the effect of acupuncture was significant limited by the duration of the disease, with a much smaller effect observable when the definition of chronic low back pain encompassed those with pain for more than 12 weeks instead of 3 weeks.	Based on 14 RCTs of moderate quality with moderate risk of bias.

Lu et al. (2011)

Lu et al. (2011) (QS: LQ -) conducted a SR on the effectiveness of acupuncture on QOL and pain for patients with pain associated with the spine. The review contained eight relevant studies to this evidence-based review with five of these studies evaluating the effect of acupuncture on low back pain (Kennedy et al. 2008; Kerr et al. 2003; Brinkhaus et al. 2006a; Itoh et al. 2006; Witt et al. 2006). These studies included participants with pain associated with the spine due to arthritis, disc protrusion, trauma, degeneration, and non-specific origin limiting the relevance of the findings for ACC. Studies varied in regard to population and time since diagnosis, with a majority of the studies looking at low back pain of greater than 6 months duration (Brinkhaus et al. 2006a; Itoh et al. 2006; Kerr et al. 2003; Witt et al. 2006) with only one study assessing low back pain less than 3 month duration (Kennedy et al. 2008). The styles of acupuncture used included traditional acupuncture (Brinkhaus et al. 2006a; Itoh et al. 2006; Kerr et al. 2003; Kennedy et al. 2008) and EA (Witt et al. 2006). The control groups used included sham acupuncture (Brinkhaus et al., 2006a, Itoh et al., 2006, Kennedy et al., 2008), waiting list (Witt et al., 2006), and sham TENs (Kerr et al., 2003, Brinkhaus et al., 2006a).

Brinkhaus et al. (2006a) found a significant improvement in SF-36 physical function and VAS at immediate follow-up and SF-36 mental at intermediate (3 months–1 year) follow-up, however, there was no statistical difference at intermediate follow-up or immediate follow-up respectively. Kerr et al. (2003) found non-statistically significant results in regard to VAS at immediate follow-up. Itoh et al. (2006) showed significant results at immediate follow-up but not short-term follow-up (less than 3 months) in regard to SF-36 physical function and also found significant improvement in VAS pain at immediate and short-term follow-up. Kennedy et al. (2008) found no significant difference in any of the outcome measures (SF-36 physical functioning and VAS at immediate and short-term follow-up). Witt et al.'s (2006) data was not individually reported. The authors of Lu et al. (2011) concluded that the results favoured acupuncture on neck pain (SMD = 0.31. 95% CI 0.02 to 0.60 I2 = 48%) but showed no group difference for LBP. Acupuncture was not better than sham intervention at the short-term follow-up; but had a small superior effect at the intermediate-term follow-up.

Study	SIGN rating	Conclusions	Quality of Evidence
Lu et al. (2011)	Level 1+ LQ (-)	Acupuncture was effective in reducing low back pain when compared to waiting list control and sham interventions in the short term. Low quality evidence was found regarding the significant effect of acupuncture on QOL when compared to waiting list at short-term follow-up, however, the evidence does not provide reliable and consistent support when acupuncture was compared to sham intervention.	Based on five RCTs of moderate quality with moderate to high risk of bias.

Lam et al. (2013)

Lam et al. (2013) (QS: AQ +) conducted a SR on the evidence of effectiveness of acupuncture for non-specific chronic low back pain. The review included 27 relevant RCTs (Coan et al. 1980; MacDonald et al. 1983; Grant et al. 1999; Carlsson & Sjolund 2001; Cherkin et al. 2001; Leibing et al. 2002; Molsberger et al. 2002; Kerr et al. 2003; Giles et al. 2003; Itoh et al. 2005, Thomas et al. 2006; Muller & Giles 2005; Brinkhaus et al. 2006a; Brinkhaus et al. 2006b; Witt et al. 2006; Haake et al. 2007; Itoh et al. 2009; Cherkin et al. 2009; Zaringhalam et al. 2010; Hunter et al. 2012; Yun et al. 2012; Giles & Muller 1999; Meng et al. 2003; Yeung et al. 2003; Tsui & Cheing 2004; Lin et al. 2010; Shankar et al. 2012). All included RCTs examined forms of acupuncture that adhered to the traditional acupuncture theory for treating non-specific chronic low back pain including primarily needle acupuncture and EA. Treatment sessions were often of 20 to 30-minute duration with the large majority of studies conducting between 10 and 20 sessions, however, frequency of treatment sessions was not well-reported. Acupuncture interventions were compared to a variety of controls including no treatment, medication, TENs, sham, and usual care.

Meta-analysis results found: Significant moderate difference between acupuncture and no treatment immediately post-intervention in regard to VAS or NPS (SMD = −0.72 [95% CI, −0.94 to −0.49], P < 0.000; I2 = 51%); Immediately post-intervention statistically significant difference

between the intervention and the control in regard to function (SMD = −0.94 [95% CI, − 1.41 to − 0.47], P < 0.00, I2 = 78%); Statistically but not clinically relevant difference in self-reported pain immediately post-intervention when acupuncture was compared to medication for improvement in VAS (MD = −10.56 [95% CI, −20.34 to −0.78], P = 0.03, I2 = 0%); Significant moderate difference in favour of acupuncture with respect to the levels of activity limitation immediately post-intervention when compared to medication (SMD = −0.36 [95% CI, −0.67 to −0.04], P = 0.03, I2 = 7%); No significant difference in self-reported pain intensity between acupuncture and TENS post-intervention (P = 1.00) and in the follow-up range between 10 and 12 weeks (p = 0.29); Acupuncture to be clinically more effective in reducing pain when compared with sham acupuncture (MD = −16.76 [95% CI, −33.33 to − 019], P = 0.05, I2 = 90%) immediately post-intervention with the significant difference evident up to 3 months after intervention (MD = −9.55 [95% CI, −16.52 to −2.58], P = 0.007, I2 = 40%); Significant but no clinically meaningful difference in favour of acupuncture plus usual care when compared to usual care alone with respect to self-reported levels of pain immediately post-intervention (MD = −13.99 [95% CI, −20.48 to −7.50], P < 0.000, I2 = 34%), with similar findings reported at follow-up (MD = −12.91 [95% CI, −21.97 to −3.85], P < 0.005, I2 = 63%); Significant difference in self-reported pain between the EA group and usual care group immediately post-intervention (SMD = −1.39 [95% CI, −2.37 to −0.40], P <0.000, I2 = 92%) with a moderate significant difference in pain reduction between the intervention and control group at follow-up (SMD = −0.66 [95% CI, −1.17 to −0.15], P < 0.01, I2 = 66%).

Study	SIGN rating	Conclusions	Quality of Evidence
Lam et al. (2013)	Level 1+ AQ (+)	Patients who received acupuncture reported statistically significant lower levels of pain at the post-intervention assessment than their counterparts who received no treatment, sham acupuncture, or medications such as NSAIDs, muscle relaxants, or analgesics.	Based on 27 RCTs of mainly low methodological quality with a moderate to high risk of bias.
		Patients who received acupuncture demonstrated a statistically significant improvement in levels of activity post-intervention when compared with no treatment or NSAIDs, muscle relaxants, or analgesics.	
		Patients who received acupuncture in addition to usual care reported significantly greater improvements in self-reported pain and activity levels immediately post-intervention and at follow-up assessments when compared with those who received usual care alone.	
		Patients who received EA reported significantly less pain and levels of activity limitation than the control group immediately post-intervention and follow-up.	
		No evidence in support of acupuncture over TENS.	

Morihisa et al. (2016)

Morihisa et al. (2016) (QS: AQ +) conducted a SR on dry needling in subjects with muscular trigger points in the lower quarter. Two of the 20 RCTs were relevant to the NSLBP analysis (Itoh et al, 2007 and MacDonald et al., 1983). Itoh et al. (2007) looked at comparing standard acupuncture to superficial acupuncture and deep acupuncture with six 30-minute sessions over 6 weeks. MacDonald et al. (1983) compared acupuncture to placebo and DN and also used six sessions as the treatment duration. Itoh et al. (2007) found that the group that received DN to deep trigger points reported less pain intensity ($P < 0.5$) and improved QOL ($P < 0.01$) compared to the other groups. MacDonald et al. (1983) found that the acupuncture group had pain relief ($P < 0.01$), reduction in pain activity score, decreased physical signs ($P < 0.01$), and decreased pain severity ($P < 0.01$) compared to the placebo group. The measurements were statistically significant with $P < 0.05$. The authors concluded that the current literature suggests that DN is effective in reducing pain associated with lower quarter trigger points in the short term. However, the findings suggest that dry needling does not have a positive effect on function, quality of life, depression, range of motion, or strength.

Study	SIGN rating	Conclusions	Quality of Evidence
Morihisa et al. (2016)	Level 1 AQ (+)	The limited available evidence in this review suggests that dry needling was effective in reducing pain, and improving function and QOL in the short term when compared to placebo and control interventions for patients with NSLBP.	Based on two RCTs of moderate quality and moderate risk of bias.

Hutchinson et al. (2012)

Hutchinson et al. 2012 (QS: LQ -) conducted a SR on the effectiveness of acupuncture in the treatment of adults with chronic NSLBP of greater than 12 weeks which only included English studies from 2001–2011. The review contained seven relevant studies (Haake et al. 2007; Witt et al. 2006; Brinkhaus et al. 2006; Thomas et al. 2006; Cherkin et al. 2009; Kerr et al. 2003; Leibing et al. 2002). All included studies looked at MA which was defined as the insertion of needles into acupuncture points along a meridian. The control group used included sham acupuncture (Haake et al. 2007; Brinkhaus et al. 2006; Cherkin et al. 2009; Leibing et al. 2002), no acupuncture (Witt et al. 2006), usual care (Thomas et al. 2006), and placebo TENS (Kerr et al. 2003). The number, duration, and frequency of treatment sessions was not well-reported, but where it was, the number of treatment sessions was between 10 and 15 and of 15 to 30-minute duration.

Haake et al. (2007) found a significant difference between acupuncture over conventional therapy for the outcomes Von Korff chronic pain scale, HFAQ, and SF-12, however, no significant difference between acupuncture and sham at 6 months. Witt et al. (2006) found a significant improvement in the acupuncture group for back pain and function. The SF-36 and low back pain rating scale were statistically significantly improved at 3 months in the acupuncture group compared to the control ($p < 0.01$). Sub-analysis showed that acupuncture had a greater effect on patients with worse back function ($p < 0.01$), on patients that were younger ($p < 0.01$), and at 3 months compared to at 6 months. Brinkhaus et al. (2006) showed a significant difference between acupuncture and no treatment, however, no difference

between acupuncture and sham. The difference between acupuncture and minimal acupuncture was 5.1 mm ($p > 0.05$), and 21.77 mm between the acupuncture group and the waiting list group ($p < 0.01$), however, at 26- and 52-week follow-up the differences in outcome measures were reduced. Thomas et al. (2006) results showed an intervention effect of 5.6 points ($p = 0.06$) in the SF-36 at 12 months and an estimated effect of 8.0 points ($p < 0.01$) at 24 months in the acupuncture group. No evidence of functional improvement was found and no data at 3 months was reported.

Cherkin et al. (2009) found a significant difference between all acupuncture groups including individualised, standardised, and simulated including statistically significant improvement in function (RMDQ) in all groups at 8 weeks ($p < 0.01$) but was no longer significant at 52 weeks. Kerr et al. (2003) showed significant improvement in all outcomes for acupuncture (SF-36 ($p < 0.01$), MPQ ($p < 0.01$), and ROM ($p < 0.01$)), however, no significant difference between the two groups of acupuncture and placebo TENs for any outcome measure. Leibing et al. (2002) showed significant improvement in the acupuncture group in all outcomes over control at 12 weeks (pain intensity ($p < 0.01$), pain disability ($p < 0.01$), and psychological distress ($p < 0.05$)), however, no significant difference in sham acupuncture and acupuncture in pain disability or intensity. The authors concluded that the review provides some evidence to support acupuncture over no treatment, and some forms of conventional therapy in providing pain relief, however, they reported that the review supports the theory that there is no significant difference between acupuncture and sham acupuncture in providing pain relief and improvements in function.

Study	SIGN rating	Conclusions	Quality of Evidence
Hutchinson et al. 2012	Level 1- LQ (-)	Low quality evidence suggests that acupuncture is better than no treatment in providing pain relief for patients with chronic NSLBP. Evidence supports that there is no significant difference between acupuncture and sham acupuncture in reducing pain or improving function. Low quality evidence supports that acupuncture has a greater effect on patients with worse back function, patients who are younger, and at 3 months compared to 6 months.	Based on seven RCTs of low to moderate quality.

Lee et al. (2017)

Lee et al. (2017) (QS: AQ +) conducted a SR and meta-analysis on the effectiveness of Chuna (or Tui Na) manual therapy on pain and function for musculoskeletal disorders. Two relevant NSLBP studies were identified by the review (Zhang et al., 2005, Xue et al., 2016). Zhang et al. (2005) looked at the intervention of Tui Na manual therapy conducted over a duration of 5–7 days, including five 30-minute sessions, compared to oral drugs. Xue (2016) looked at the intervention of Tui Na manual therapy conducted over a duration of 3–4 weeks, including ten 30-minute sessions, compared to oral drugs. Individual data was not reported for the studies

by Zhang et al. (2005) and Xue et al. (2016). The authors reported that Zhang et al. (2005) found positive results for ALBP clinical score and that Xue et al. (2016) found positive results for VAS. The authors concluded that given the low quality of the included studies and the diverse methods of intervention techniques, the available evidence is insufficient to determine the effects of Tui Na manual therapy for musculoskeletal conditions. More high-quality RCTs such as sham-controlled studies with standardised interventions are needed.

Study	SIGN rating	Conclusions	Quality of Evidence
Lee et al. (2017)	Level 1+ AQ (+)	Tui Na manual therapy may have favourable effects on pain and function, however, the evidence is insufficient to make recommendations.	Based on two low quality RCTs with moderate to high risk of bias.

Kim et al. (2011)

Kim et al. (2011) (QS: AQ+) conducted a SR on the effectiveness of cupping as a treatment option for pain. Two RCTs were relevant to NSLBP (Hong et al., 2006, Farhadi et al., 2009). Hong et al. (2006) looked at patients with NSLBP of 1-week to 3.1-year duration, while Farhadi et al. (2009) studied patients with NSLBP greater than 4-week duration. The interventions varied between the studies with Hong et al. (2006) examining dry cupping over six treatment sessions, while Farhadi et al. (2009) examined wet cupping over three sessions. These cupping interventions were compared to the two different controls of NSAIDs and usual care. Hong et al. (2006) found a significant effect in favour of cupping on VAS scores (MD 22.8 (95% CI, 11.4–34.2), P < .0001). Farhadi et al. (2009) also found a significant difference in favour of the intervention for pain scores using the 6-point Likert pain scale (MD 2.2 points (95% CI, 1.7–2.6), *P* < .01). The authors concluded that the results of the SR provide some suggestive evidence for the effectiveness of cupping in the management of pain conditions. However, the total number of RCTs included in the analysis and the methodological quality were too low to draw firm conclusions.

Study	SIGN rating	Conclusions	Quality of Evidence
Kim et al. (2011)	Level 1 AQ (+)	Evidence suggests that cupping therapy may have evidence of effectiveness when compared to conventional treatment in the management of pain in patients with NSLBP, however, the evidence is insufficient to draw firm conclusions.	Based on two RCTs of low methodological quality with a low and unclear risk of bias.

Cao et al. (2014)

Cao et al. (2014) (QS: AQ+) conducted a SR of RCTs on the effectiveness and safety of cupping for the treatment of different types of pain. Two of the 12 RCTs were relevant to the NSLBP analysis (Farhadi et al., 2009, Kim et al., 2011). Both studies looked at similarly aged (mean 44.9

± 14.8 and 44.2 ± 9.4 year old) patients with NSLBP. Duration of the condition was 52.7 ± 71.7 months for the intervention group and 55 ± 49.7 months for the control group in the study by Farhadi et al. (2009), however, the duration was not reported within the study by Kim et al. (2011). Cup retention time was simular between studies with both studies being between 3 and 4 minutes. The cupping interventions were compared to the two different controls of usual care and wait list/exercise. No individual data was provided within the review (only meta-analysis results), therefore, no conclusions can be made regarding the subgroup of NSLBP. The review found moderate evidence that cupping is more efficacious than no treatment or other treatments (such as heat therapy, usual care, and conventional medications) in reducing pain over the short term (within 4 weeks), however, this was based on all pain conditions including a number not related to ACC's evidence-based review requirements. The review did find that wet cupping, mainly on ashi points, was the most commonly used method (68.75% trials) for treating pain.

Study	SIGN rating	Conclusions	Quality of Evidence
Cao et al. (2014)	Level 1 AQ (+)	The available evidence in this review is insufficient to draw conclusions on cupping for NSLBP.	Based on two RCTs of low to moderate quality.

Madsen et al. (2009)

Kim et al. (2009) (QS: AQ +) conducted a SR on the analgesic effect of acupuncture and placebo acupuncture. They also explored whether the type of placebo acupuncture used is associated with the estimated effect of acupuncture. Three RCTs were relevant to NSLBP (Leibing et al., 2002, Molsberger et al., 2002, Brinkhaus et al., 2006a). All three studies compared acupuncture plus standard care to placebo acupuncture (superficial needling) plus standard care. Leibing et al. (2002) compared 20 sessions over 12 weeks; Molsberger et al. (2002) compared 12 sessions over 4 weeks; and Brinkhaus et al. (2006a) compared 12 sessions over 8 weeks. Poor reporting of the acupuncture intervention was found in all studies, limiting the clinical utility of results. Results of the comparison were as follows: Brinkhaus et al. (2006a): VAS (0–100mm) SMD: -0.32 (-0.61 to -0.03); Molsberger et al. (2002): VAS (0–100mm) SMD: -0.50 (-0.87 to -0.13); and Leibing et al. (2002): VAS (0–10 cm) SMD: -0.27 (-0.73 to 0.19).

The authors concluded that for all pain conditions included in the review a small difference was found between acupuncture and placebo acupuncture, and a moderate difference between placebo acupuncture and no acupuncture. The effect of placebo acupuncture varied considerably. The evidence from the three studies involving patients with NSLBP does support the statement that small differences are found between acupuncture and placebo, with two of the three studies finding statistically significant results.

Study	SIGN rating	Conclusions	Quality of Evidence
Madsen et al. (2009)	Level 1	Evidence suggests that a small difference exists between acupuncture and placebo acupuncture, and	Based on three RCTs of varying

	AQ (+)	a moderate difference between placebo acupuncture and no acupuncture when treating NSLBP.	quality and high to low risk of bias.

Boyles et al. (2015)

Boyles et al. (2015) (QS: AQ +) conducted a SR on the effectiveness of trigger point DN based on high-quality RCTs for all body regions. One RCT was relevant to NSLBP (Perez-Palomares et al., 2010). The study included participants with low back pain of duration greater than 4 months with a mean age of 45.85 ± 14.4 years. The intervention utilised was TDN once per week for 3 weeks, followed by spray and stretch. The control was PENS 3 times per week for 3 weeks. The regions treated were deep lumbar paraspinals, quadratus lumborum, and gluteus medius muscles. The study reported decreased disability scores on the ODI for "lifting weight" in TDN group only ($P < 0.05$). The authors concluded that there was little benefit from TDN for treatment to lumbar paraspinal muscles in the only included study for this body region.

Study	SIGN score	Conclusions	Quality of Evidence
Boyles et al. (2015)	Level 1- AQ (+)	Limited evidence suggests that there is little benefit from TDN for treatment to the low back.	Based on one RCT of high quality and moderate risk of bias.

Yuan et al. (2015)

Yuan et al. (2015) (QS: HQ++) conducted a SR on the evidence of TCM treatments for NP and LBP in regard to pain and disability. The review included 75 RCTs of which 31 were relevant to NSLBP. Nine of the relevant included studies data had not been reported in previous data extractions (Miyanzaki et al. 2009; Hasegawa et al. 2013; Giles et al. 2003; Cho et al. 2013; Vas et al. 2012; Xu et al. 2009; Li et al. 2009; Liu et al. 2008; Lauche et al. 2012b). All included RCTs examined forms of acupuncture that adhered to the traditional acupuncture theory for treating low back pain including traditional acupuncture, cupping, and Gua sha. Acupuncture interventions within the included studies were of 25 (20, 30) minute duration, with the number of treatment sessions being 10 (6, 12) with a course of treatment of 4.5 (3.3, 7) weeks. The average number of acupoints selected per session was 9.8 (6, 14). Cupping interventions for low back pain were of 15- or 20-minutes duration, with the number of treatment session on average 7.5 (3.5, 10) with a course of treatment of 3 (1.9, 3) weeks. The only study that looked at Gua sha on low back pain was of 15 minutes duration. Acupuncture interventions were compared to a variety of controls including sham acupuncture, no treatment, TENs, medication, usual care, and wait list. Exclusion criteria included trials of neck or back pain caused by trauma, infection, cauda equina syndrome, bone rarefaction, compression fracture of a vertebral body, tumour, or fibromyalgia. Therefore, as a history of traumatic injury was an exclusion criterion for this review, these results may limit the relevance of the findings for ACC.

Meta-analysis results found: Moderate evidence that acupuncture was more effective than sham acupuncture in reducing pain immediately post-treatment for chronic LBP (standardised mean difference = -0.47 (-0.77, -0.17), p = 0.003), and acute LBP (VAS 10 cm, MD = -0.99 (-1.24, -0.73), p< 0.001); A significant difference ($p < 0.05$) between acupuncture and sham

acupuncture in regard to pain at immediate term, short term and intermediate term, however, not in regard to disability at any time point; A significant difference between acupuncture and no treatment immediately post-intervention in regard to pain (SMD = -0.73 [-0.96, -0.49], P < 0.000; I2 = 53.2%); No significant difference between acupuncture and TENs, and acupuncture and medication in regard to pain; Cupping could be more effective than medications (e.g., NSAID) for pain and disability for chronic LBP (MD = -0.54 (-0.89, -0.19), p = 0.003); Moving cupping (one study), wet cupping (one study), and balance cupping (two studies) all showed a significant difference (p < 0.05), however, retention cupping (three studies) did not; A significant difference in pain between Gua Sha and wait list immediately post-intervention (one study) (SMD = 95% CI, -1.1 (-2.0, -0.2), P < 0.000).

Study	SIGN rating	Conclusions	Quality of Evidence
Yuan et al. (2015)	Level 1+ HQ (++)	Moderate evidence suggests that acupuncture is more effective than sham acupuncture in reducing pain, but not disability immediately post-intervention and in the short term for chronic NSLBP and acute NSLBP.	Based on 31 RCTs of mainly moderate quality with moderate to high risk of bias.
		No evidence in support of acupuncture over TENS, or acupuncture over medication in regard to the outcome of pain for NSLBP.	
		Limited evidence supports that there is a statistically significant difference between Gua Sha and wait list in reducing pain in the immediate term for patients with NSLBP.	
		Evidence supports that there is a statistically significant difference between cupping (balance, moving, and wet) and medications (NSAIDs), but no difference in retention cupping in regard to pain and disability for chronic LBP.	

Wang et al. (2017)

Wang et al. (2017) (QS: AQ +) conducted a SR on the effectiveness and safety of cupping for patients with LBP. The review contained six studies including five relevant studies with two studies looking at dry cupping (Liu et al., 2008, Li & Chen, 2009), two looking at wet cupping (Farhadi et al., 2009, AlBedah et al., 2015), and one looking at moving cupping (Hong et al., 2006). The control group used included oral medication (Hong et al., 2006, Liu et al., 2008, Li & Chen, 2009) or usual care (Farhadi et al., 2009, AlBedah et al., 2015). The number, duration, and frequency of treatment sessions was not well-reported. Hong et al.'s (2006) treatment lasted for 11 days, Liu et al.'s (2008) for 21 days, Li and Chen's (2009) for 3 weeks, Faradi et al.'s (2009) for 6 days, and AlBedah et al.'s (2015) treatment was three times per week for 2 weeks.

The results and data extraction for Hong et al. (2006), Liu et al. (2008), Li and Chen (2009), and Farhadi et al. (2009) have been reported elsewhere (Kim et al., 2011, Yuan et al., 2015, and Cao et al., 2014 data extractions and results sections). AlBedah et al. (2015) found a significant difference between wet cupping and usual care in regard to the McGill pain questionnaire

(SMD: -15.28 (-17.72, -12.79) and ODI (SMD: -10.48 (-12.18, -8.74)). Meta-analysis results found a significant difference in favour of cupping in regard to VAS for cupping therapy verses control (SMD: -0.73 (-1.42, -0.04), P = 0.04), and ODI (SMD: -3.64 (-5.85, -1.42), P = .001), however, no significant difference in the McGill pain questionnaire (SMD: -6.12 (-14.54, 2.31)).

Study	SIGN rating	Conclusions	Quality of Evidence
Wang et al. (2017)	Level 1- AQ (+)	Evidence supports that there is a significant decrease in VAS and ODI scores, however, not McGill pain questionnaire scores when cupping is compared to usual care or medication in NSLBP.	Based on five RCTs of low to moderate quality.

Vickers et al. (2012)

Vickers et al. (2012) (QS: LQ-) conducted an individual patient data meta-analysis on the effectiveness of acupuncture for chronic pain. Four conditions were assessed individually (non-specific back and neck pain, osteoarthritis, shoulder pain, and headache). The review contained 10 non-specific back pain studies (Carlsson & Slojundl 2001; Cherkin et al. 2001; Kerr et al. 2003; Brinkhaus et al. 2006; Thomas et al. 2006; Witt et al. 2006; Haake et al. 2007; Molsberger et al. 2002; Kennedy et al. 2008; Cherkin et al. 2009). Of these studies, only Cherkin et al. (2001) had not been reported on by previous SRs in the above analysis. The study contained 249 participants and compared acupuncture to non-specific advice. The outcome measure of interest for the study was the Roland Morris Disability Questionnaire and was used at the study end point of 2 months. Details regarding the acupuncture treatment were not detailed within the Vickers et al. (2012) SR paper or supplementary appendices. The study by Cherkin et al. (2001) found a non-significant difference between the groups (adjusted p = 0.75 (no estimate given)).

Meta-analysis results found a significant difference in favour of acupuncture when compared to sham acupuncture for combined non-specific back and neck pain (studies n = 8), 95% CI: 0.37 (0.27-0.46, P < 0.001). In regard to acupuncture versus non-sham acupuncture for non-specific back and neck pain studies, a significant difference was also found (studies n = 7, 95% CI: 0.55 (0.51-0.58), P < 0.001). The authors concluded that acupuncture was superior to both no-acupuncture control and sham acupuncture for the treatment of chronic pain. This conclusion did fit with the results reported for the non-specific neck and low back studies. The authors also suggested that acupuncture is more than a placebo; the differences between true and sham acupuncture are relatively modest, suggesting that factors in addition to the specific effects of needling are important contributors to therapeutic effects.

Study	SIGN rating	Conclusions	Quality of Evidence
Vickers et al. (2012)	Level 1 LQ (-)	Acupuncture had a statistically significant effect on pain when compared to sham acupuncture and non-sham acupuncture in patients with chronic non-specific back and neck pain.	Based on 15 RCTs of varying quality with moderate to high risk of bias.

Randomised Controlled Trials

Two RCTs that were not included in the previously reported SRs were identified that investigated the effectiveness of acupuncture for NSLBP.

Intervention	Study	QS	Outcome measure	Result
(A) Low dose LA, (B) High dose LA: 8 sessions over 8 weeks (C) Sham LA	Glazov et al. (2014)	HQ (++)	NPRS (0-10) ODI	• No significant difference between groups for pain (VAS) or disability (ODI) score at any time point (1 week, 6 weeks, 6 months and 1 year). • All three groups including sham group showed reduction in pain and ODI scores across all time points ($p < 0.0005$).
• Appears to be no significant difference between low dose LA, high dose LA, and sham LA for pain and disability at 1 week, 6 weeks, 6 months and 1 year follow-ups (1 x HQ RCT).				
(A) Combined needle acupuncture, moxibustion, EA, Tui Na, and cupping treatment, (B) Acupuncture alone, (C) Spinal manipulation therapy over a 60-day period	Kizhakkevettil et al. (2017)	LQ (-)	Roland Morris LBP disability score NRS 0–10 Missed days last week because of LBP SF-36 Physical function SF-36 Mental health	• All groups improved in the disability scale between baseline and all follow-ups up until 120 days, however, no statistically significant mean change between groups at any time point. • No statistically or clinically meaningful differences in mean changes of low back pain intensity between groups from baseline to 60 days, or from baseline to any other time point, or at any time over the 120-day follow-up for low back pain. • Negligible differences between groups with respect to pain frequency, disability days, medication use, patient satisfaction, and overall health status.
• Appears to be no significant difference in changes to pain, disability, or QOL between a combined needle acupuncture, moxibustion, EA, Tui Na, cupping treatment, acupuncture alone, or spinal manipulation therapy for low back pain at 14, 30, 60, 90 and 120-day follow-up (1 x LQ RCT).				

Lumbar Disc Herniation

Two SRs which included 14 RCTs were identified that reviewed the effectiveness of acupuncture interventions for lumbar disc herniation. One looked at the effectiveness of Chuna (Tunia) manual therapy while the other looked at the interventions of acupuncture and EA. Tui Na manual therapy was also used in conjunction with other interventions, mostly oral drugs, traction, and intravenous injections. The control groups were mainly oral drugs and traction using varied duration periods that were different to the intervention in most cases. The included studies that reported treatment schedules averaged 11.3 ± 8.1 sessions (range 1–36) and the length of each session was 25.3 ± 5.7 minutes (range 15–30). Follow-up length was

only reported within two of the included RCTs and ranged between 1 day and 60 weeks. Studies were reported to be of low quality.

Systematic Reviews

Lee et al. (2017)

Lee et al. (2017) (QS: AQ +) conducted a SR and meta-analysis on the effectiveness of Chuna (or Tui Na) manual therapy on pain and function associated with musculoskeletal disorders. Nine relevant lumbar disc herniation studies were identified by the review (Chen et al. 2009; Wang et al. 2010; Zhou et al. 2012; Lou et al. 2013; Deng et al. 2012; Dong & Wang 2014; Song et al. 2015; Yin et al. 2015; Wu et al. 2016). Chen et al. (2006) looked at the effectiveness of a Tui Na manual therapy intervention conducted over a duration of 4 weeks, including eight 15-minute sessions compared to oral drugs, which varied in duration. Wang et al. (2010) looked at the intervention of Tui Na manual therapy conducted over a duration of 3 weeks, which included treatment on every second day, in comparison to traction on pain control, varying in duration to the intervention. Zhou et al. (2012) looked at the benefits of Tui Na manual therapy for treating pain, conducted over a 12-day duration, including six 20-minute sessions, in comparison to traction with a varied duration.

Lou et al., (2013) looked at the intervention of Tui Na manual therapy conducted over a 1-month period, inclusive of eight sessions, in comparison to a traction control. Deng et al. (2012) looked at the effectiveness of Tui Na manual therapy conducted over a 2-week duration, including treatment every second day in comparison to oral drugs, with no specified duration. Dong and Wang (2014) compared an intervention of Tui Na manual therapy, plus oral drugs through intravenous injection, for a duration of 30 days, in comparison to an oral drug, and intravenous injection control, with no specified duration. Song et al. (2015) looked at the intervention of Tui Na manual therapy, plus traction for a ten-day period in comparison to traction alone with no specified duration. Yin et al. (2015) looked at the effectiveness of a Tui Na manual therapy, plus intravenous injection intervention, over a two-week duration, in comparison to an intravenous injection control with no indicated duration. Lastly, Wu et al. (2016) compared Tui Na manual therapy plus traction, over a 10-day duration, including 10 sessions, with a traction control with the same duration.

Chen et al. (2009) measured the effectiveness of treatment using a VAS pain scale, with results being reported as positive. Wang et al. (2010) and Zhou et al. (2012) also used a VAS pain measurement scale, which reported positive results. Lou et al. (2013) used a VAS and SF-36 pain function and mental health measurement scale to assess the effectiveness of treatment; results were reported as being positive using these measurements. Deng et al. (2012) utilised a VAS measurement, which reported both neutral and positive results. Dong and Wang (2014) also used a VAS outcome measurement and reported neutral results, whereas Song et al. (2015), Yin et al. (2015), and Wu et al. (2016) reported positive results. The authors concluded that given the low quality of the included studies and the diverse methods of intervention techniques, the available evidence is insufficient to determine the effects of Tui Na manual therapy for musculoskeletal conditions. More high-quality RCTs such as sham-controlled studies with standardised interventions are needed.

Study	SIGN rating	Conclusions	Quality of Evidence
Lee et al. (2017)	Level 1+ AQ (+)	Tui Na manual therapy had mostly positive effects on pain and function for lumbar disc herniation, according to the outcome measurements used. Having said this, the evidence for functional improvement was not as strong as pain relief.	Based on nine RCTs of low quality with moderate to high risk of bias.

Li et al. (2014)

Li et al. (2014) (QS: AQ+) conducted a SR on the effectiveness of acupuncture combined with traction therapy for lumbar disc herniation. The SR was reported in Chinese. Five relevant lumbar disc herniation studies were identified by the review (Wang, 2007; Guan, 2010; Tuo et al. 2011; Wu et al. 2012; Zhong et al. 2013). Wang (2007) and Zhong et al. (2013) compared acupuncture plus traction to traction alone. Guan (2010), Tuo et al. (2011), and Wu et al. (2012) compared EA plus traction to traction alone. Wang (2007) found a statistically significant result in favour of the acupuncture plus traction group (SMD -1.31 (-1.77, -0.86)). Guan (2010) and Tuo et al. (2011) found a statistically significant result in favour of the EA plus traction group (SMD -1.26 (-1.66, -0.86)) and (-2.5 (-3.18, -1.81)) respectively. The results for Zhong et al. (2013) were not reported. Wu et al. (2012) also found a statistically significant result in favour of the electroacupuncture plus traction group (SMD -1.53 (-2.11, -0.95)). Meta-analysis results of four studies (n = 165) found a statistically significant result in favour of acupuncture interventions plus traction in comparison to traction alone (SMD: -1.59 (-2.07, -1.12)).

Study	SIGN rating	Conclusions	Quality of Evidence
Li et al. (2014)	Level 1- LQ (-)	Low quality evidence suggests that acupuncture plus traction may be more effective at relieving pain than traction alone.	Based on five RCTs of low quality.

Randomised Controlled Trials

No RCTs that were not included in the previously reported SR were identified, investigating the effectiveness of acupuncture interventions in treating lumbar disc herniation.

Sciatica

A total of three SRs were identified that reviewed the effectiveness of acupuncture interventions for sciatica. No RCTs were identified that were not included in the SRs. Included studies mainly investigated treatments which used a TCM framework and delivered traditional acupuncture, EA, and warm acupuncture. Acupuncture interventions were mainly compared

with conventional medication (ibuprofen, Prednisone, meloxicam and diclofenac). Patient age and duration of condition significantly varied between the included studies ranging from 18–79 years of age and reported durations of 4 days to 18 years. The number, duration, and frequency of treatment sessions was well-reported, with sessions often of 20–45 minutes long, with 5–20 sessions delivered over a short period of 1–3 weeks. Length of follow-up was mostly short-term with few studies reporting long-term functional or pain outcomes. Studies were of low to moderate quality.

Systematic Reviews

Qin et al. (2015)

Qin et al. (2015) (QS: AQ+) conducted a SR on the effects and safety of acupuncture for treating sciatica. The review included 11 relevant RCTs (Wang and La 2004; Chen et al. 2009; Zeng 2012; Zhang et al. 2008; Hu et al. 2010; Du et al. 2009; Chen 2010; Wang 2008; Meng 2014; Ren 2013; Zhao 2004). The review included patients with sciatica, including those diagnosed with sciatica synonyms, such as radiculopathy, nerve root compromise, nerve root compression, nerve root pain, and pain radiating below the knee. Six of the included studies included EA as the intervention (Wang & La 2004; Zhang et al. 2008; Hu et al. 2010; Du et al. 2009; Meng 2014; Zhoa 2004), three warming acupuncture (Chen et al. 2009, Wang 2008, Ren 2013), and two needle acupuncture with manual stimulation (Zeng 2012; Chen 2010). The number of acupoints used varied within the trials from one to more than 10 with the most common points used being GB 32, BL 40, and GB 34.

Wang and La (2004) compared seven 25-minute sessions of EA over 7 days to diclofenac, while Chen et al. (2009) compared 30 20- to 35-minute sessions of warming acupuncture to injection. Zeng (2012) compared 20 30-minute sessions of needle acupuncture over 10 days to ibuprofen. Zhang et al. (2008) looked at the comparison of 20 20-minute sessions of EA over 10 days compared to meloxicam. Hu et al. (2010) looked at comparing 20 30-minute sessions of EA over 10 days to meloxicam. Du et al. (2009) compared four 45-minute sessions over a week and a half to diclofenac. Chen (2010) compared two 30-minutes sessions of needle acupuncture over a week to ibuprofen. Wang (2008) compared 20 sessions of EA over 10 days with ibuprofen. Meng (2014) compared 19 30-minute sessions of EA plus ibuprofen over 7 days against ibuprofen alone. Ren (2013) compared 10 30-minute sessions of warm acupuncture over 10 days plus mannitol plus dexamethasone plus mecobalamin tablets against mannitol plus dexamethasone plus mecobalamin tablets alone. Zhao (2004) compared 20 30-minute sessions of EA over 10 days to sham acupuncture.

Meta-analysis results of acupuncture verses NSAIDs (ibuprofen, meloxicam, and diclofenac) showed that acupuncture may be more effective in decreasing the VAS for leg pain/low back pain (three trials (Chen et al. 2009, Zeng 2012, Wang 2008)), 160 participants, MD −1.23, 95% CI −1.87 to −0.60, and I = 0%). One RCT (Meng 2014) concluded that acupuncture plus an NSAID (ibuprofen) was superior to the same NSAIDs alone (pain intensity on VAS; 3.04 ± 0.53 versus 4.82 ± 0.62). As a result, the authors concluded that the use of acupuncture may be more effective than drugs and may enhance the effect of drugs for patients with sciatica, but because of the insufficient number of relevant and rigorous studies, the evidence is limited.

Study	SIGN rating	Conclusions	Quality of Evidence
Qin et al. (2015)	Level 1 AQ (+)	Limited evidence was found suggesting that acupuncture may be more effective than NSAIDs in reducing pain related to sciatica in the short term.	Based on 11 RCTs of low to moderate quality and moderate to high risk of bias.

Ji et al. (2015)

Ji et al. (2015) (QS: HQ ++) completed a SR on the effectiveness and safety of acupuncture therapy for treating sciatica. The review contained 14 studies of which three were relevant to this review (Chen 2010; Dong et al. 2008; Ye et al 2015) as the review contained a high majority of RCTs that only looked at the subjective outcome of effectiveness as that was the review's primary outcome of interest. The participants within the 14 included studies ranged from 18 to 77 years old with the condition duration of between 4 days to 18 years. Participating patients must have been diagnosed with sciatica or presented with any or all of the following symptoms: Radiating pain in the sciatic nerve distribution area, tenderness at the nerve stem, positive Lasegue's sign, Kernig's sign, and Bonnet's sign. Chen (2010) compared six 30-minute sessions of EA over 2 weeks to ibuprofen (taken orally), and Prednisone (taken orally) seven times per course. Dong et al. (2008) compared 15 30-minute daily sessions over 15 days to ibuprofen sustained release capsules (taken orally) 15 times per course. Ye et al. (2015) compared six 30-minute sessions of EA over 3 weeks to diclofenac diethylamine gel (external use) four times per day over 3 weeks.

Meta-analysis results containing the three studies (Chen 2010; Dong et al. 2008; Ye et al. 2015), which reported on pain intensity using VAS to measure pain, found that the acupuncture group experienced a significantly greater reduction in pain intensity than those who received conventional medication (MD: −1.25; 95% CI: −1.63 to −0.86, $p < 0.00001$, $I2 = 41\%$). Subgroup analysis of treatment method (oral vs. external) and drug categories (ibuprofen plus Prednisone, ibuprofen alone and diclofenac alone) found a maintained statistically significant effect ($p < 0.05$). The authors reported that acupuncture may be effective in treating the pain associated with sciatica, however, reported that they were unable to draw definite conclusions due to the poor quality of the available trials.

Study	SIGN rating	Conclusions	Quality of Evidence
Ji et al. (2015)	Level 1 HQ (++)	Acupuncture was effective in reducing pain associated with sciatica when compared to conventional medication (ibuprofen, Prednisone and diclofenac) in the short term.	Based on three RCTs of low to moderate quality and moderate to high risk of bias.

Yuan et al. (2015)

Yuan et al. (2015) (QS: HQ ++) conducted a SR and meta-analysis on the effectiveness of TCM treatments for NP and LBP in regard to pain and disability. The review contained 75 RCTs, however, only one (Wang and La, 2004) was relevant to the condition of sciatica. Wang and La (2004) looked at the intervention of EA with once daily 25-minute sessions for 7 days compared to diclofenac 25 mg /tablet for 5 days. Baseline VAS levels in the intervention group were 4.95 ± 1.4 compared to 5.03 ± 1.2. The immediate post-treatment levels were 2.6 ± 2.3 in the intervention groups compared to 3.3 ± 2.5 in the control group. Exclusion criteria included trials of neck or back pain caused by trauma, infection, cauda equina syndrome, bone rarefaction, compression fracture of a vertebral body, tumour, or fibromyalgia. Therefore, as a history of traumatic injury was an exclusion criterion for this evidence-based review, these results may limit the relevance of the findings for ACC.

Meta-analysis results found: Moderate evidence that acupuncture was more effective than sham acupuncture in reducing pain immediately post-treatment for chronic LBP (standardised mean difference = -0.47 (-0.77, -0.17), p = 0.003), and acute LBP (VAS 10 cm, MD = -0.99 (-1.24, -0.73), p < 0.001); A significant difference (p < 0.05) between acupuncture and sham acupuncture in regard to pain at immediate term, short term, and intermediate term, however, not in regard to disability at any time point; A significant difference between acupuncture and no treatment immediately post-intervention in regard to pain (SMD = -0.73 [-0.96, -0.49], P < 0.000; I2 = 53.2%); No significant difference between acupuncture and TENs, and acupuncture and medication in regard to pain; That cupping could be more effective than medications (e.g., NSAID) for pain and disability for chronic LBP (MD = -0.54 (-0.89, -0.19), p = 0.003); That moving cupping (one study), wet cupping (one study), and balance cupping (two studies) all showed a significant difference (p < 0.05), however, retention cupping (three studies) did not; A significant difference in pain between Gua Sha and wait list immediately post-intervention (one study) (SMD = 95% CI, -1.1 (-2.0, -0.2), P < 0.000). However, this was based on all types of TCM treatments for both neck pain and low back pain and was not specific to Sciatica.

Study	SIGN rating	Conclusions	Quality of Evidence
Yuan et al. (2015)	Level 1+ HQ (++)	The available evidence in this review is insufficient to draw conclusions on acupuncture for sciatica.	Based on one RCT of moderate quality and moderate to high risk of bias.

Randomised Controlled Trials

No RCTs were identified that were not included in the previously reported SRs that investigated the effectiveness of acupuncture interventions on sciatica.

Myofascial Pain

A total of 13 SRs and three RCTs were identified that reviewed the effectiveness of acupuncture treatments for myofascial pain. Due to the difficulty of identifying pure myofascial pain studies

a decision was made to discuss findings as a whole and not incorporate the studies into relevant body sites during the analysis. Included studies mainly investigated treatments which delivered DN, traditional acupuncture, and LA. Acupuncture interventions were mainly compared with sham, placebo, injection, exercise, manual therapy, and no treatment. Patients were generally aged between 30 and 60 years old and suffered from myofascial pain in the neck and shoulders or low back for greater than 6 months, however, the included studies varied significantly. The number, duration, and frequency of treatment sessions were about 30 minutes long, with 4–20 sessions delivered over 3–10 weeks of treatment. Length of follow-up was mostly short- to medium-term with few studies reporting long-term functional and pain outcomes. Studies were of low to moderate quality.

Systematic Reviews

Liu et al. (2017)

Liu et al. (2017) (QS: HQ (++)) conducted a SR which assessed the available evidence for the effectiveness of DN of myofascial trigger points associated with low back pain. A total of 11 studies were included in this review and out of these only six were relevant to this evidence-based review (Chen 2014; Itoh & Katsumi 2005; Mahmoudzadeh et al. 2016; Shen & Ding 2015; Yang & Zhou 2010; Tellez-Garcia et al 2015). Chen (2014) studied patients with low back pain of greater than 6-month duration and with mean age of 41.48 ± 8.14 years. The intervention conducted was DN once every 2 days for 40 days and it was compared to super laser therapy. Itoh and Katsumi (2005) studied the effect of DN in comparison to superficial needling, acupoint acupuncture, or sham dry needling. The study was conducted on patients with a mean duration of low back pain of 7.1 ± 4.4 years and were of mean age 72.3 ± 3.7 years.

Mahmoudzadeh et al. (2016) studied a population which was quite different to Itoh and Katsumi (2005), with a younger population of mean age 36.1 ± 7.8 years and a duration of low back pain of 16.5 ± 21.0 months. The intervention was conducted over 20 days with one session of DN every 2 days. Shen and Ding (2015) conducted 14 DN sessions over 4 weeks and compared it to super laser therapy in patients with low back pain of 6.80 ± 1.26 years duration and mean age 54.00 ± 2.31 years. Yang and Zhou (2010) conducted four sessions of dry needling over 4 weeks and compared it to local anaesthetic injection. Tellez-Garcia et al. (2015) compared DN plus education to education alone over three weekly sessions on patients with low back pain of 19 ± 8 months duration and of mean age 27 ± 13 years.

Meta-analysis results showed a statistically significant effect of DN compared with other treatments in pain intensity (VAS) post-treatment (I2 = 94%; SMD: -1.06 (-1.77 to -0.36) P = 003). Statistically significant effects of DN compared with other treatments were also found post-treatment in functional disability (I2 = 88%; SMD: -0.76 (-1.46 to -0.06) P = 0.03). However, no significant effects of DN compared with other treatments in pain intensity and functional disability were found at follow-up ((I2 = 83%; SMD: -0.43 (-1.17 to 0.30) P = 0.25) and (I2 = 75%; SMD: -0.2 (-0.8 to 0.4) P = 0.51), respectively). When comparing DN to DN plus other treatments post-treatment a significant effect was observed in the meta-analysis of studies assessing pain intensity in favour of DN plus other treatments (I2 = 0%, SMD: 0.83 (0.55–1.11), p < 0.00001), however, no significant difference was observed in the assessment of functional disability (I2=0%; SMD: 0.13 (-0.14 to 0.40) p = 0.36). The authors concluded that moderate evidence showed that DN of MTrPs, especially if associated with other therapies, could be recommended

to relieve the intensity of LBP at post-intervention; however, the clinical superiority of dry needling in improving functional disability and its follow-up effects still remains unclear.

Study	SIGN rating	Conclusions	Quality of evidence
Liu et al. (2017)	Level 1 HQ (++)	Low to moderate quality evidence showed that compared with other treatments, dry needling resulted in significant reduction in pain intensity and functional disability at post-intervention, however, this significant effect was not seen at follow-up.	Based on six RCTs of low to moderate quality and mostly moderate risk of bias.
		Dry needling plus other treatments for LBP was more effective than dry needling alone in pain intensity reduction at post-intervention.	

Trinh et al. (2016)

Trinh et al. (2016) (QS: HQ (++)) conducted a SR looking at the available evidence on effects of acupuncture on function, disability, patient satisfaction, and global perceived effect among individuals with neck pain. Four relevant studies were identified within the review, which related to myofascial neck pain (Birch & Jamison 1998; Ilbuldu et al. 2004; Sun et al. 2010; Itoh et al. 2007). Birch and Jamison (1998) looked at patients with myofascial neck pain lasting more than 6 months and compared the effect of 14 sessions over 12 weeks of 30-minute relevant acupuncture sessions to irrelevant acupuncture, and also to medical control. Ilbuldu et al. (2004) compared four sessions over 4 weeks of DN to placebo laser for patients with chronic myofascial pain syndrome. Sun et al. (2010) also looked at patients with myofascial pain syndrome and compared six sessions of acupuncture over 3 weeks to sham acupuncture. Itoh et al. (2007) undertook six sessions of acupuncture within 10 weeks and compared it to trigger point acupuncture, non-trigger point acupuncture, and sham acupuncture for patients with chronic myofascial neck pain.

Birch and Jamison (1998) reported that the relevant acupuncture group had significantly lower pain scores, including hourly ratings immediate post-treatment (SMD -2.52 (95% CI random -3.49 to -1.54). Ilbuldu et al. (2004) found significant differences favouring laser compared with DN and placebo post-treatment only when looking at VAS immediate post-treatment (SMD -0.02 (95% CI -0.64 to 0.60) and) at 6 months (SMD 0.01 (95% CI random -0.61 to 0.63). Significant differences were also found favouring laser compared with DN and placebo when looking at the Nottingham Health Profile Physical Activity immediate post-treatment (SMD 0.22 (95% CI -0.40 to 0.84)and at 6 months (SMD -0.14 (95% CI -0.76 to 0.48). Sun et al. (2010) found no significant difference between groups in VAS pain scores immediate post-treatment (SMD -0.42 (95% CI -1.10 to 0.26)), at 4 weeks (SMD -0.54 (95% CI -1.22 to 0.15)), and at 12 weeks (SMD 0.00 (95% CI -0.67 to 0.67)). Itoh et al. (2007) reported statistically significant improvements only in the TrP group's VAS scores: Acupuncture verses sham: SMD -0.24 (95% CI random -1.26 to 0.78) immediate post-treatment, and acupuncture verses sham: SMD -0.10 (95% CI random -1.11 to 0.92) at 3 weeks. Itoh et al. (2007) also found that the TrP group demonstrated greatest improvement in the NDI: Acupuncture verses sham: SMD -0.19 (95% CI random -1.21 to 0.83) immediate post-treatment, and acupuncture verses sham: SMD -0.03 (95% CI random -1.05 to 0.98) at 3 weeks.

The authors concluded that moderate-quality evidence suggests that acupuncture relieves neck pain better than sham acupuncture, as measured at completion of treatment and at short-term follow-up, and that those who received acupuncture report less pain and disability at short-term follow-up than those on a wait list. However, the review was on all neck pain conditions and not specifically myofascial neck pain. It was also reported that moderate-quality evidence also indicates that acupuncture is more effective than inactive treatment for relieving neck pain at short-term follow-up. The authors reported that the number of acupuncture treatment sessions was associated with outcomes. Six or more acupuncture sessions was suggested as the ideal amount. The study by Ilbuldu et al. (2004) was considered as providing under dosing with fewer than six treatment sessions if this suggestion is taken into account.

Study	SIGN rating	Conclusions	Quality of Evidence
Trinh et al. (2016)	Level 1+ HQ (++)	Moderate evidence was found in favour of acupuncture being an effective treatment for myofascial neck pain at immediate to short-term follow-up when compared to sham/placebo control for reducing pain intensity.	Based on four RCTs of moderate quality and risk of bias.
		Limited evidence suggests that acupuncture may be an effective treatment for myofascial neck pain at short- and medium-term follow-up when compared to placebo for improving function (Nottingham Health Profile Physical Activity Component).	

Law et al. (2015)

Law et al. (2015) (QS: HQ ++) completed a SR on LA for musculoskeletal pain. The review contained 17 related studies (Kannan 2012; Lee & Han 2011; Rayegani et al. 2011; Oz et al. 2010; Carasco 2009; Dundar et al. 2007; Kiralp et al. 2006; Altan et al. 2005; Ceylan et al. 2004; Gur et al. 2004; Hakguder et al. 2003; Chen et al. 1997; Laaskso et al. 1997; Logberg-Andersson et al. 1997; Ceccherelli et al. 1989; Snyder-Mackler et al. 1986; Ilbuldu et al. 2004). Kannan (2012) compared LA to ultrasound and compression. Oz et al. (2010) compared laser to occlusal splint. Kiralp et al. (2006) compared laser to trigger point injection. Lee and Han (2011), Rayegani et al. (2011), Carasco (2009), Dundar et al. (2007), Altan et al. (2005), Ceylan et al. (2004), Gur et al. (2004), Chen et al. (1997), Logberg-Andersson et al. (1997), Ceccherelli et al. (1989), Snyder-Mackler et al. (1986), and Ilbuldu et al. (2004) compared LA to placebo. Hakguder et al. (2003) compared laser to no laser. Laaskso et al. (1997) compared red laser or infrared laser to placebo. Participants received from three to 15 LA treatment sessions over a 1- to 12-week period.

Kannan (2012) reported that all groups showed significant improvement after treatment and that the laser group had a significant reduction in pain compared to the other two groups (SMD: 0.52 [-0.11, 1.15]). Rayegani et al. (2011) reported that the laser group showed significantly less pain and improved NDI score after treatment compared to the other two groups. Carasco

(2009) reported that both groups showed significant less pain after treatment, but no significant difference was found between the two groups. Dundar et al. (2007) reported that both groups showed significant improvement in all outcome measures after treatment but no significant differences between two groups. Kiralp et al. (2006) also reported that both groups showed significant improvement in all outcome measures after treatment but no significant difference was seen between the two groups. Altan et al. (2005) reported that both groups showed significant improvement in all outcome measures after treatment but no significant difference between the two groups. Ceylan et al. (2004) reported that the laser group showed significantly less pain after treatment compared with the placebo group. Gur et al. (2004) reported that the laser group showed a greater improvement from all outcome measures after treatment. Only SAI and VAS score were significant compared to the placebo group. Hakguder et al. (2003) found that the laser group showed significantly less pain after treatment compared to the placebo group. Other outcome measures were not significant but favourable to laser group. Chen et al. (1997) reported that all groups showed significantly less pain after treatment. Both laser groups showed more significant improvement in PPT and ROM compared to the placebo group. Laaksо et al. (1997) reported that all groups showed significantly less pain after treatment. Between-group differences were not significant. Logberg-Andersson et al. (1997) reported that the laser group showed a greater improvement from all outcome measures after treatment. Ceccherelli et al. (1989) reported that the laser group showed significant less pain after treatment and at 3 months compared to the placebo group. Snyder-Mackler et al. (1986) reported that the laser group showed significant less pain and increase in skin resistance after treatment.

A meta-analysis was conducted for the subgroup of myofascial pain in the SR by Law et al. (2015) and contained 14 studies in the short term follow-up outcome of pain and six studies in the long-term outcome of pain (6 to 26 weeks). The results were both significant for short term (SMD: -0.49; -0.83 to -0.16) and long term (SMD -0.95; -1.68 to -0.23).

Study	SIGN rating	Conclusions	Quality of Evidence
Law et al. (2015)	Level 1+ HQ (++)	Moderate-quality evidence supports the effectiveness of laser acupuncture in improving myofascial pain and functional outcomes in the short and long term (6 to 26 weeks).	Based on 17 RCTs of mostly moderate quality with moderate to high risk of bias.

Liu et al. (2015)

Liu et al. (2015) (QS: AQ +) undertook a SR and meta-analysis on the effectiveness of dry needling myofascial trigger points associated with neck and shoulder pain. The review contained 15 studies (Rayegani et al. 2011; Ilbuldu et al. 2004; Ay et al. 2010; Byeon et al. 2003; Chou et al. 2009; Chou et al. 2011; DiLorenzo et al. 2004; Ga et al a. 2007; Ga et al b. 2007; Hong 1994; Kamanli et al. 2005; Ma et al. 2010; Tekin et al. 2013; Tsai et al. 2010; Ziaeifar et al. 2014). Ay et al. (2010) looked at patients of mean age 38.08 ± 9.81 years with myofascial pain syndrome of average 34.27 ± 40.95 months duration. Byeon et al. (2003) also looked at patients diagnosed with myofascial pain syndrome and with a mean age of 50.9 ± 9.7 years. Chou et al.

(2009) and Chou et al. (2011) conducted a study on patients with active MTrPs of mean age 37.7 ± 11.3 and 34.1 ± 10.7 years respectively, and with a condition duration of 5.9 ± 3.3 months and 6.1 ± 2.2 months respectively.

DiLorenzo et al. (2004) looked at patients with shoulder pain due to activation of MTrPs with a condition duration of 3.53 weeks. Ga et al. (2007a) and Ga et al. (2007b) looked at patients with chronic shoulder or neck pain due to MPS. Hong (1994) looked at patients with MPS of duration 7.6 ± 4.7 months. Illbuldu et al. (2004) studied patients with MTrPs of duration 38.48 ± 31.94 months. Itoh et al. (2007) looked at patients with neck pain due to MTrPs of condition duration 2.9 ± 2.7 years. Kamanli et al. (2005) also looked at patients diagnosed with MTrPs and with a duration of 32.50 ± 21.99 months. Ma et al. (2010), Rayegani et al. (2014), and Terkin et al. (2013) looked at patients with myofascial pain syndrome of mean duration 22.5 ± 15.3 years, 9.6 ± 8.4 years, 63.5 ± 50.7 months respectively. Ziaeifar et al. (2014) also looked at patients diagnosed with MTrPs, however, did not report the duration of the condition. Tough et al. (2010) looked at patients with MTrPs pain due to whiplash injury of duration 6.8 ± 4.3 weeks. Tsai et al. (2010) studied patients of mean age 46.4 ± 12.2 years with a diagnosis of unilateral shoulder pain due to MTrPs of average 7.5 ± 3.9 months duration.

Meta-analysis compared the outcome measures at short term: Immediately to 3 days after the final reported treatment, medium term: Nine to 28 days after final treatment, and long term: 2 to 6 months after the final treatment. Dry needling verses sham/control analysis found significant results in regard to pain at short term (SMD: -1.91 (-3.1, -0.73)) and medium term (SMD: -1.07 (-1.87, -0.27)), however, not at long-term follow-up (SMD: -1.15 (-3.34, 1.04)). Dry needling verses injection analysis found non-significant results in the short term (SMD: -0.01 (-0.41, 0.4)), and significant results in favour of injection in the medium term (1.69 (0.4, 2.98)), but not at the long term (SMD: 0.33 (-0.11, 0.78)).

Study	SIGN rating	Conclusions	Quality of Evidence
Liu et al. (2015)	Level 1 AQ (+)	Evidence suggests that dry needling is effective in relieving MTrP pain in the neck and shoulders in the short and medium term when compared to control/sham, however, not in the long term.	Based on 15 RCTS of low to moderate quality with moderate to high risk of bias.
		Injection was found to be more effective than dry needling in relieving MTrP pain in neck and shoulders in the short term, however, not in the long term.	

Baxter et al. (2008)

Baxter et al. (2008) (QS: LQ (-)) conducted a SR which assessed the clinical effectiveness of laser acupuncture, principally for the reduction of pain of musculoskeletal origin. The review included 10 studies which were relevant to this evidence-based review, with seven being relevant to myofascial pain (Snyder-Mackler et al. 1986; Ceccherelli et al. 1989; Laasko et al. 1997; Hakguder et al. 2003; Gur et al. 2004; Ilbuldu et al. 2004; Altan et al. 2005). Snyder-Mackler et al. (1986) looked at patients diagnosed with MTrP pain in the neck and back. The study compared laser TrP acupuncture to placebo over 10 treatment sessions during a 5–6 week period. Laser parameters: wavelength: 632.8 nm, continuous wave; power output: 0.95 Mw; and dose: 0.019

J point × 3 each. Ceccherelli et al. (1989) studied patients diagnosed with myofascial pain in the cervical region. The study compared laser to placebo over a 4-week period consisting of 12 sessions. Laser parameters: wavelength: 904 nm; pulsed: 1000 Hz/200 ns; peak power: 25 W; and dose: 1 J point; total 5 J. Laaskso et al. (1997) looked at patients diagnosed with MTrP pain. The study compared laser low dose/red, laser high dose/red, laser low dose/IR, laser high dose/IR, and placebo.

Hakguder et al. (2003) studied patients with myofascial pain syndrome of the neck and upper back. The study looked at comparing laser and exercise to exercise alone (stretching the cervical region) over 10 daily treatments. Laser parameters: wavelength: 780 nm, continuous; power output: 5 mW/spot; diameter 0.5 cm; and dose: 0.98 J point, 5 J cm – 2. Gur et al. (2004) studied patients with myofascial pain syndrome of the neck and shoulder region. Laser was compared to placebo over 10 treatments over 2 weeks. Laser parameters: wavelength: 904 nm; pulsed: 2800 Hz/200 ns; power output: average 11.2 Mw; peak power: 20 W; dose: 2 J cm – 2 point. Ilbuldu et al. (2004) studied patients with trigger point pain in the upper trapezius and compared laser to dry needling and to placebo laser. The participants had 12 treatments, three times a week over 4 weeks. Laser parameters: wavelength: 632.8 nm, continuous wave; power output: not specified; dose: 2 J cm – x 3 points. Altan et al. (2005) studied patients with myofascial pain in the cervical region. The intervention studied was 10 sessions of laser over 2 weeks and was compared to placebo laser. Additional treatment was also given, which was daily exercise consisting of isometric and stretching just short of pain for 2 weeks at home. Laser parameters: wavelength: 904 nm; pulsed: 1000 Hz/180 ns; power output: available of 27 W, 50 W, or 27×4 W; and dose: unclear 2 minutes over each point.

Snyder-Mackler et al. (1986) reported a positive conclusion with a significant decrease in pain (VAS) ($p < 0.05$) following laser treatment. Ceccherelli et al. (1989) found significant decreases in pain after treatment and at 3 months in favour of laser group. Laaskso et al. (1997) found significant reductions in pain in all laser groups, however, reductions in the laser group were higher. The authors' conclusion was negative. Hakguder et al. (2003) found significant differences in the laser group in terms of pain immediately after treatment and at 3-week follow-up. Gur et al. (2004) found significant differences in the mean number of trigger points ($p < 0.01$) favouring laser at all follow-ups, pain ($p < 0.01$) decreased versus baseline at all follow-ups in laser; week 2 only in placebo and NPDS, NHP, BDI ($p < 0.01$) in favour of laser at all follow-ups except week 12 (NHP). Ilbuldu et al. (2004) found significant decreases in pain (at rest and on activity), ROM, and NHP immediately post-treatment, however, no significant differences were found between groups at 6 months. Altan et al. (2005) reported significant improvements in all parameters for both groups (within group analysis), however, comparison of the percentage changes did not show significant differences relative to pre-treatment values (between-group analyses). The authors concluded that there is moderate evidence that laser acupuncture is effective at reducing myofascial pain—at least when applied at certain irradiation parameters (i.e., power outputs of at least 10 mW and dosages of at least 0.5 J point).

Study	SIGN rating	Conclusions	Quality of Evidence
Baxter et al. (2008)	Level 1- LQ (-)	The available evidence in this review supports laser acupuncture as an effective treatment for	Based on seven RCTs of low to moderate quality

		reducing myofascial pain, at least when applied at certain irradiation parameters.	with moderate to high risk of bias.

Gattie et al. (2017)

Gattie et al. (2017) (QS: AQ +) undertook a SR and meta-analysis on the evidence of short- and long-term effectiveness of dry needling delivered by a physical therapist for any musculoskeletal pain condition. The review contained four articles relevant to the analysis of myofascial pain (Santos et al. 2014; Edwards & Knowles 2003; Ziaeifar et al. 2014; Campa-Moran et al. 2015). Santos et al. (2014) studied patients with myofascial pain of greater than 6-week duration. The study examined the effect of dry needling compared to the ischaemic compression technique and the control group. Edwards and Knowles (2003) studied patients with myofascial pain of 16 ± 23 months duration. The study looked at the effect of dry needling compared to stretching and control groups. Ziaeifar et al. (2014) looked at patients with trigger points in the upper trapezius and compared dry needling to the ischaemic compression technique. Campa-Moran et al. (2015) studied patients with myofascial neck pain of 10.0 ± 2.9 months duration. The study compared dry needling to the ischaemic compression technique and also mobilisation (manual therapy).

Edwards and Knowles (2003) found non-significant results in the short form of the McGill Pain Questionnaire for 1–4 weeks verses control (SMD –0.33 (–1.09, 0.43)), 5–8 weeks verses control (SMD –0.50 (–1.27, 0.27)), 1–4 weeks verses stretching (SMD –0.31 (–1.07, 0.45)), and 5–8 weeks verses stretching (SMD –0.57 (–1.34, 0.20)). The results for Santos et al. (2014) were not reported. Ziaeifar et al. (2014) found significant results in VAS 1–4 weeks (SMD –0.79 (–1.51, –0.08)), however, non-significant results in DASH 1–4 weeks (SMD –0.37 (–1.06, 0.32)). Campa-Moran et al. (2015) found a significant difference between dry needling and the ischaemic compression technique in VAS immediately post-treatment (SMD –1.37 (–2.28, –0.46)). However, non-significant results were found for VAS immediately post-treatment (SMD 0.08 (–0.72, 0.88)) and NDI 1–4 weeks (SMD –0.51 (–1.33, 0.30)) versus the ischaemic compression technique. Compared to mobilisation, non-significant results were found for VAS immediately post-treatment (SMD 0.54 (–0.28, 1.35)), VAS 1–4 weeks (SMD 0.30 (–0.51, 1.10)), and NDI 1–4 weeks (SMD 0.38 (–0.43, 1.19)). The authors concluded for all included studies that very low-quality to moderate-quality evidence suggests that dry needling performed by physical therapists is more effective than no treatment, sham dry needling, and other treatments for reducing pain in patients presenting with musculoskeletal pain in the immediate to 12-week follow-up period. Low-quality evidence suggests superior outcomes with dry needling for functional outcomes when compared to no treatment or sham needling. However, no difference in functional outcomes exists when compared to other physical therapy treatments. Evidence for the long-term benefit of dry needling is currently lacking. This conclusion does not match the evidence available in the review on studies looking at myofascial pain.

Study	SIGN rating	Conclusions	Quality of Evidence
Gattie et al. (2017)	Level 1+ AQ (+)	The available evidence in this review for patients with myofascial pain does not support dry needling as an	Based on four RCTs of low to moderate quality with

		effective treatment for improving pain and function in the short and medium term when compared to control and manual therapy.	moderate to high risk of bias.

Cagnie et al. (2015)

Cagnie et al. (2015) (QS: LQ -) conducted a SR on the effectiveness of ischaemic compression and dry needling on trigger points in the upper trapezius muscle in patients with neck pain. The SR contained 15 RCTs; seven studies looked at ischaemic compression and eight studies looked at dry needling. The number of patients varied between 39 and 117 in each study. Six of the included studies were relevant to this review and myofascial pain (Ay et al. 2010; Eroglu et al. 2013; Ga et al. 2007; Hong et al. 1994; Itoh et al. 2007; Ma et al. 2010). Ay et al. (2010) looked at patients with idiopathic neck pain with active trigger points in the UTs and compared DN and neck exercises for 12 weeks to lidocaine injection plus neck exercises. Eroglu et al. (2013), Hong et al. (1994), and Ga et al. (2007) also looked at patients with idiopathic neck pain with active trigger point in the UT and compared DN plus self-stretching to lidocaine injection plus self-stretching. Itoh et al. (2007) compared dry needling to non-TP DN, sham acupuncture, and standard acupuncture in patients with chronic neck pain. Ma et al. (2010) looked at patients with chronic neck pain with active trigger points in UT and compared DN plus self-stretching to self-stretching and mini scalpel release.

Ay et al. (2010) found improvement in both groups for ROM and BDI at 4 and 12 weeks, but no difference between groups. Eroglu et al. (2013) found improvement in all groups on the third and fourteenth day of treatment, but no significant difference between groups. Ga et al. (2007) found pain decreases and ROM increases in both groups, but no difference between the groups. Hong et al. (1994) found a pain decrease in both groups immediately after treatment, but no difference between the groups. A greater increase in the lidocaine injection group 2 weeks after treatment was found. A ROM increase was also found immediately after treatment in both groups; effects decreased 2weeks after treatment with no difference between the groups. Itoh et al. (2007) found decreases in pain in all groups, but with different time course. After 9 weeks, the DN group reported relatively lower pain than the other groups did. The study found a NDI decrease in the DN group only. Ma et al. (2010) found a greater improvement for mini scalpel release and DN for all parameters compared with self-stretching at 2-week and 3-month follow-up. Greater decreases were also found in pain and increase in ROM compared with DN at 3-month follow-up. The authors concluded that DN has a positive effect on pain, however, it is not statistically different from other therapeutic approaches.

Study	SIGN rating	Conclusions	Quality of Evidence
Cagnie et al. (2015)	Level 1- LQ (-)	Evidence suggests that dry needling has a positive effect on pain, however, it is not statistically different from other therapeutic approaches.	Based on six RCTs of low to moderate quality and moderate to high risk of bias.

Morihisa et al. (2016)

Morihisa et al. (2016) (QS: AQ +) conducted a SR on DN in subjects with muscular trigger points in the lower quarter. Two of the 20 RCTs were relevant to the myofascial pain analysis (Edwards & Knowles, 2003 and Huguenin et al., 2005). Huguenin et al. (2005) looked at the effect of one treatment of therapeutic needling per week for 30 mins for a total of 6 weeks in comparison to placebo dry needling. The study found no significant changes in VAS scores for gluteal pain after running, but both groups improved in hamstring tightness ($P < 0.001$) and hamstring pain ($P < 0.001$). There was no significant change in ROM. Edwards and Knowles (2003) studied the effect of between three and seven treatments of needling and stretching compared to stretching only and control. The study reported that the mean number of treatment sessions was lower for the stretching only group compared to the needling and stretching group, and that the SFMPQ decreased ($P < 0.009$). The authors concluded that the current literature (all 20 studies) suggests that dry needling is effective in reducing pain associated with lower quarter trigger points in the short term. However, the findings suggest that dry needling does not have a positive effect on function, quality of life, depression, range of motion, or strength.

Study	SIGN rating	Conclusions	Quality of Evidence
Morihisa et al. (2016)	Level 1+ AQ (+)	The available evidence in this review is insufficient to draw conclusions on the effect of dry needling on myofascial pain.	Based on two RCTs of moderate quality and moderate risk of bias.

Tough et al. (2009)

Tough et al. (2009) (QS: AQ (+)) conducted a SR which assessed the question: Does dry needling directly into MTrPs achieve superior pain reduction in patients with a diagnosis of MTrP pain when compared with either no additional intervention, indirect local dry needling either superficially over the MTrP or elsewhere in the muscle, or a placebo control such as a non-penetrating sham needle or sham laser? A total of six studies were relevant to this evidence-based review (Chu 1997; Ilbuldu et al. 2004; DiLorenzo et al. 2004; Huguenin et al. 2005; Itoh et al. 2004; Itoh et al. 2007). Chu (1997) looked at patients with myofascial neck pain and compared direct needling into MTrPs to EMG needle into non-MTrPs. Ilbuldu et al. (2004) studied patients with myofascial neck pain and compared direct needling into MTrPs plus a home exercise programme of upper and middle trapezius and pectoral muscle stretches to the control of inactive laser over site of MTrPs. DiLorenzo et al. (2004) looked at patients with myofascial shoulder pain and compared direct needling into MTrPs plus standard rehabilitation to the control of standard rehabilitation of physical therapy and ongoing daily medication. Huguenin et al. (2005) looked at myofascial hamstring pain and compared direct needling into MTrPs to blunt end needle applied via guide tube over site of MTrP with the needle manipulated to mimic real needling. Itoh et al. (2004) looked at patients with myofascial low back pain and compared direct needling into MTrPs to the control of superficial insertion of needle into skin over site of MTrP. Itoh et al. (2007) studied patients with myofascial neck pain

and compared the intervention of direct needling into MTrPs to the control of blunt end needle applied over site of MTrP.

Chu (1997) did not formally test the between-group, however, they reported that the intervention induced more pain relief than the control. Ilbuldu et al. (2004) found no difference between groups at long-term outcome. DiLorenzo et al. (2004) found that the intervention was superior to the control ($p < 0.001$) and that there was a significant reduction in pain in both groups (both $p < 0.05$) (VAS 0–10). Huguenin et al. (2005) found no between-group differences (p = NS), however, they found a significant reduction in pain in both groups (both $p < 0.001$). Itoh et al. (2004) reported no between-group difference (p = NS), however, they found a significant reduction in pain in the dry needling group ($p < 0.01$) but not in the control group (p = NS). Itoh et al. (2007) did not report a between-group comparison, however, they found a significant reduction in pain in the intervention group ($p < 0.01$) but not in blunt end needle group (p = NS). Overall, evidence from one study suggests that direct MTrP needling was effective in reducing pain compared with no intervention. Two studies provided contradictory results when comparing needling MTrPs directly versus needling elsewhere in muscle. The evidence of four studies combined failed to show that needling directly into MTrP is superior to various non-penetrating sham interventions. Meta-analysis results showed a non-significant difference when comparing MTrP dry needling to sham (four studies, WMD: 14.09 (-5.91, 33.99), I2 = 88%).

Study	SIGN rating	Conclusions	Quality of Evidence
Tough et al. (2009)	Level 1 AQ (+)	The available evidence in this review failed to show that needling into MTrPs is superior to various non-penetrating sham interventions.	Based on six RCTs of mostly low quality with moderate to high risk of bias.

Espejo-Antúnez et al. (2017)

Espejo-Antúnez et al. (2017) (QS: AQ +) conducted a SR and meta-analysis on the effectiveness of DN in the treatment of MTrPs and to explore the impact of specific aspects of the technique on its effectiveness. The review contained 14 RCTs with 10 myofascial pain related studies (Couto et al. 2014; Ilbuldu et al. 2004; Ay et al. 2010; Ga et al. 2007; Kamanli et al. 2005; Tekin et al. 2013; Tsai et al. 2010; Ziaeifar et al. 2014; Eroglu et al. 2013; Irnich et al. 2002) of which nine were related to myofascial neck pain. The conditions studied by the RCTs varied significantly and included cervical myofascial pain syndrome (Irnich et al., 2002, Tekin et al., 2013, Couto et al., 2014), MTrPs in the upper trapezius muscle (Ilbuldu et al., 2004, Ay et al., 2010, Ga et al., 2007, Ziaeifar et al., 2014), unilateral shoulder pain with active MTrP in the upper trapezius and latent MTrP in the extensor carpi radialis muscle (Tsai et al., 2010), and MTrPs in the cervical and/or periscapular regions (Kamanli et al., 2005, Eroglu et al., 2013). The number of treatment sessions varied from one to eight with the frequency and duration not reported within the SR.

Irnich et al. (2002) compared DN to needle acupuncture at distant points and also sham laser. The significance of the results was not reported. Ilbuldu et al. (2004) compared DN to laser and placebo laser and found a significance difference between DN and placebo for the outcomes of VAS rest and VAS activity, as well as disability dimensions of “pain” and “physical activity”.

Tekin et al. (2013) compared DN to sham DN and found a significant between-group difference in VAS after the first session ($p = 0.034$) and after the sixth session ($p < 0.001$). Kamanli et al. (2005) compared DN to lidocaine injection as well as botulin toxin injection. Between-group differences in VAS were: verses DN: $p = 0.023$; and botulin toxin injection verses DNG: $p = 0.022$. In regards to disability, the study also showed a significant between-group difference when comparing lidocaine injection to DN ($p = 0.023$). Eroglu et al. (2013) compared DN to oral flurbiprofen and also lidocaine injection. The study found non-significant results between groups in VAS pain. In regard to QOL, there were no significant differences except for fatigue dimension on the third and fourteenth days in the lidocaine injection group ($p = 0.02$).

Couto et al. (2014) compared DN to placebo-sham EA as well as lidocaine injection. Between-group difference in VAS was: DN verses placebo-sham (relative change 44.8% (33.6–63.9%)), $p < 0.001$; DN verses LIG (relative change: 28.73% (7.5–49.7%)), $p < 0.01$; and LIG verses placebo-sham (relative change: 22.5% (5.6–39.2%)), $p < 0.001$. Between-group difference for QOL physical health was: DN verses placebo-sham (relative change: −22.8% (−36.2–9.4%)), $p < 0.01$; LIG verses DN (relative change: −15.6% (−27.2–3.9%)), $p < 0.01$; and placebo-sham verses LIG (relative change: −6.3% (−8.2–2.3)), $p > 0.05$. Between-group difference for QOL mental health was: DN verses placebo-sham (relative change: 23.0% (13.0–32.9%)), $p < 0.001$; LIG verses DN (relative change: 11.9% (0.4–23.4%)), $p < 0.001$; and placebo-sham verses LIG (relative change: 12.6% (3.0–22.1%)), $p < 0.001$. Ay et al. (2010) compared DN to lidocaine injection plus a home-based exercise programme. The results showed a non-significant between-group difference in VAS post-4 weeks ($p = 0.053$) and post-12 weeks ($p = 0.215$), and also disability at both 4 weeks and 12 weeks ($p = 0.716$ and $p = 0.903$ respectively). Ga et al. (2007) compared DN to DN plus needling of multifidus muscle at the C3-C5 level plus self-stretching exercises. The RCT found a non-significant mean difference between groups ($p > 0.05$). Ziaeifar et al. (2014) compared DN to trigger point manual compression and found a significant between-group difference in pain ($p = 0.01$), but not disability ($p = 0.34$). The authors concluded that dry needling is effective in the short term for pain relief, increasing ROM, and improving quality of life when compared to no intervention, sham or placebo. There was insufficient evidence on its effect on disability, analgesic medication intake, and sleep quality.

Study	SIGN rating	Conclusions	Quality of Evidence
Espejo-Antúnez et al. (2017)	Level 1 AQ (+)	Evidence suggests that dry needling is effective in the short term for pain relief, increasing range of motion and improving QOL when compared to no intervention, sham, or placebo for patients with myofascial pain.	Based on 10 RCTs of mostly moderate quality with moderate risk of bias.
		Insufficient evidence is available in this review on the long-term effectiveness of DN.	
		The available evidence in this review found an absence of differences between dry needling, manual therapy, and pharmacological interventions.	

Cao et al. (2014)

Cao et al. (2014) (QS: AQ (+)) conducted a SR which assessed the available evidence for the effectiveness and safety of cupping for the treatment of different types of pain. A total of 16 studies were included in this review and out of these 11 were relevant to musculoskeletal conditions (Chen 2009; Cramer 2011; Farhadi 2009; Kim 2011; Kim 2012; Lauche 2011; Lauche 2013; Oyang 2001; Teut 2012; Wu K 2013; Wu 2007). One study (Oyang 2001) looked at myofascial shoulder pain. Ouyang (2001) assessed the effectiveness of wet cupping targeting ashi points and retained for 10 minutes once every two days, in combination with physical rehabilitation (same as control) to a physical rehabilitation alone control, for 30 minutes once daily and a total of 30 days.

No individual data was provided within the review (only meta-analysis results), therefore, no conclusions can be made regarding the subgroup of myofascial shoulder pain. The review found moderate evidence that cupping is more efficacious than no treatment or other treatments (such as heat therapy, usual care, and conventional medications) in reducing pain over the short term (within 4 weeks), however, this was based on all pain conditions, including non-traumatic pain conditions. The review did find that wet cupping, mainly on ashi points, was the most commonly used method (68.75% trials) for treating pain.

Study	SIGN rating	Conclusions	Quality of Evidence
Cao et al. (2014)	Level 1 AQ (+)	The available evidence in this review is insufficient to draw conclusions on cupping for myofascial shoulder pain.	Based on one RCT with high risk of bias.

Boyles et al. (2015)

Boyles et al. (2015) (QS: AQ +) conducted a SR on the effectiveness of trigger point DN based on high-quality RCTs for all body regions. The review contained 13 relevant studies with six of those studies related to myofascial pain (Edwards & Knowles 2003; Ay et al. 2010; Tekin et al. 2013; Tsai et al. 2010; Irnich et al. 2002; Itoh et al. 2014). All studies scored between 6 and 10 on the PEDro score. All of the above studies that assessed myofascial pain were included in the review and results sections of Espejo-Antúnez et al. (2017) except for Itoh et al. (2014). Irnich et al.'s (2002) population had a mean age of 51.9 years and a duration of symptoms of 36.7 months. Edwards and Knowles (2003) had a mean age of 57 ± 12 years and a duration of symptoms of 16 ± 23 months. Ay et al. (2010) studied patients with a mean age of 38.1 ± 9.8 years and a duration of symptoms of 34.3 ± 40.9 months. Tekin et al. (2013) studied participants with a mean age of 42.9 ± 10.9 years and a duration of symptoms of 63.5 ± 50.7 months. Tsai et al. (2010) studied patients with a mean age of 46.4 ± 12.2 years and a duration of symptoms of 7.5 ± 3.9 months. Itoh et al. (2014) studied participants with a mean age of 62.3 ± 10.1 years and a duration of symptoms of 2.9 ± 2.7 years.

The individual RCT (Itoh et al., 2014) which was not included in the review by Espejo-Antúnez et al. (2017) compared TDN to TDN on non-trigger points, standard acupuncture and sham. Results showed decreased pain for TDN group as compared to baseline at 3 weeks and through end of study ($P<0.05$), decreased pain for TDN group as compared to all other groups at 9 and

12 weeks (P<0.01). The study also showed a decreased disability score on NDI for TDN group as compared to baseline at 3 weeks through end of study (P<0.01) and also a decreased disability score on NDI for TDN as compared to all other groups at 9 and 12 weeks (P < 0.01). The authors concluded that the majority of high-quality studies included in this review show measured benefit from TDN for MTrPs in multiple body areas, suggesting broad applicability of TDN treatment for multiple muscle groups. They reported that for MTrPs in muscles attaching to the cervical spine and shoulder, TDN appears to be effective in reducing pain and tenderness and improving ROM over time, with results being significantly better than sham and at least equivalent to other treatments such as manual MTrP release, pharmaceutical injections, acupuncture, and oral anti-inflammatories.

Study	SIGN rating	Conclusions	Quality of Evidence
Boyles et al. (2015)	Level 1 AQ (+)	The evidence in this review suggests that for MTrPs in muscles attaching to the cervical spine and shoulder, TDN appears to be effective in reducing pain and improving ROM in the short to medium term, with results being significantly better than sham and at least equivalent to other treatments such as manual MTrP release, pharmaceutical injections and oral anti-inflammatories.	Based on six RCTs of moderate to high quality with moderate risk of bias.

Yuan et al. (2015)

Yuan et al. (2015) (QS: HQ ++) conducted a SR on the evidence of TCM treatments for NP and LBP in regard to pain and disability. The review included 53 relevant RCTs of which 42 were classified as non-specific neck or low back pain and only two were classified into the myofascial pain analysis for the neck and low back (Itoh et al., 2004, Birch & Jamison, 1998). Both RCTs have been reported in previous results. Itoh et al.'s (2004) results were reported in Tough et al (2009), and Birch and Jamison's (1998) results were reported in Trinh et al (2016). All RCTs examined forms of acupuncture that adhered to the traditional acupuncture theory for treating neck and low back pain. Exclusion criteria included trials of neck or back pain caused by trauma, infection, cauda equina syndrome, bone rarefaction, compression fracture of a vertebral body, tumour, or fibromyalgia. Therefore, because a history of traumatic injury was an exclusion criterion for this evidence-based review, the results of Yuan et al. (2015) may limit the relevance of the findings for ACC. The authors reported finding moderate evidence that acupuncture is more effective than sham acupuncture in reducing pain immediately post-treatment for all CNP conditions and also that cupping could be more effective than wait list in VAS for all CNP conditions. Itoh et al. (2004) reported no between-group differences in regard to pain, while Birch and Jamison (1998) reported that the acupuncture group had significantly lower pain scores.

Study	SIGN rating	Conclusions	Quality of Evidence
Yuan et al. (2015)	Level 1+ HQ (++)	The available evidence in this review is insufficient to draw conclusions on the effect of acupuncture on myofascial pain.	Based on two RCTs which have been previously reported.

Randomised Controlled Trials

Three RCTs that were not included in the previously reported SRs were identified that investigated the effectiveness of acupuncture treatments on myofascial pain.

Intervention	Study	QS	Outcome measure	Result
Acupuncture: 5 sessions over 2 weeks compared to lidocaine injection	Jiang et al. 2013 (Chinese)	LQ (-)	VAS ODI	• No significance difference in VAS between groups at 3 or 5 treatments ($p > 0.05$). • No significance difference in ODI between groups at 3 or 5 treatments ($p > 0.05$).
• Appears to be no significant difference between acupuncture and lidocaine injection for pain and disability at treatments 3 and 5 for patients with lumbar myofascial pain syndrome at (1 x LQ RCT).				
Acupuncture + EA + stretching exercises: 8 sessions over 4 weeks for patients with myofascial pain syndrome > 3 months compared to TrP injection	Gazi et al. 2011	AQ (+)	NRPS SF-36 Functional S-36 Pain	• Both groups experienced a significant reduction in pain (NRPS and SF-36 pain) and improvement in functional capacity and QOL (SF-36 functional and SF-36 mental) 4 weeks after treatment. • No significant difference between groups at 4 weeks after treatment in regard to the outcomes of pain, QOL, and functional capacity.
• Appears to be no significant difference between acupuncture and trigger point injection, combined with cyclobenzaprine chlorhydrate and sodium dipyrone for pain, QOL, and function after 4 weeks for patients with myofascial pain syndrome (1 x AQ RCT).				
TrP DN: 3 sessions compared to strain-counterstain and sham strain-counterstain	Segura-Ortí et al. 2016	AQ (+)	VAS NDI	• No significant differences in VAS between all three groups following treatment. • No significant differences in NDI between all three groups following treatment.

• Appears to be no significant differences between the sham strain-counterstain, strain-counterstain and TrP DN groups in the outcomes of pain and disability for patients with upper trapezius myofascial trigger points (1 x AQ RCT).

Upper and Lower Limb Fractures

One SR was identified that reviewed the effectiveness of acupuncture treatments for upper and lower limb fractures. Two RCTs were identified that were not included in the SRs. The included studies investigated treatments using a TCM framework and included LA, EA, and traditional Chinese Tui Na massage. LA plus rehabilitation was compared to rehabilitation alone for patients with distal radius fracture, while EA was compared to splinting plus traditional Chinese herbal formula for patients with fractures of the middle and lower third of the tibiofibular. Traditional Chinese Tui Na massage was compared to surgery for patients with humeral and calcaneal fractures. The included studies were of low methodological quality and lacked primary and secondary outcomes of interest within this review including pain, function, and QOL.

Systematic Reviews

Lee et al. (2017)

Lee et al. (2017) (QS: AQ +) conducted a SR and meta-analysis on the effectiveness of Chuna (or Tui Na) manual therapy on pain and function for musculoskeletal disorders. Four relevant studies were identified by the review on upper and lower limb fractures (Xu 2016; Pan 2016; Yang 2004; Zhao et al. 2016). Xu (2016) looked at the effect of a 7-day treatment course of Tui Na therapy on humeral fractures in comparison to surgery. Pan (2016) and Yang (2016) also looked at the effect of Tui Na in comparison to surgery for humeral fractures, however, the treatment course was 76 weeks and 6 weeks, respectively. Zhao et al. (2016) looked at the effect of Tui Na therapy on calcaneal fractures over an unknown treatment period in comparison to surgery.

Xu (2016) measured the effectiveness of treatment using the Constant-Murley score subscales of pain, function, ROM, and muscle strength, with results being reported as positive. Pan (2016) also used the Constand-Murley score with the results reported as non-significant. Yang (2004) used ROM and incidence of complication as the outcome measures and found positive results for 2-, 4- and 6-weeks follow-up. Zhao et al. (2016) utilised incidence of complication, fracture healing time, AOFAS scale (pain, ADL, and X-ray), which reported non-significant results for all outcome measures except for incidence of complication. The authors concluded that given the low quality of the included studies and the diverse methods of intervention techniques, the available evidence is insufficient to determine the effects of Tui Na manual therapy for musculoskeletal conditions.

Study	SIGN rating	Conclusions	Quality of Evidence
Lee et al. (2017)	Level 1+ AQ (+)	Evidence in this review for Tui Na manual therapy as an evidence-based treatment option for upper	Based on four RCTs of low to moderate quality with moderate

		and lower limb fractures is insufficient and contradicting.	to high risk of bias.

Randomised Controlled Trials

Two RCTs that were not included in the previously reported SRs were identified that investigated the effectiveness of acupuncture on upper and lower limb fractures

Intervention	Study	QS	Outcome measure	Result
Acupuncture for upper and lower limb fractures				
LA plus rehabilitation exercises: 10 sessions over 4 weeks vs. rehabilitation exercises alone	Acosta-Olivo et al., (2017)	LQ -	VAS ROM Patient-Rated Wrist Evaluation (PRWE)	• VAS: Significant difference (p = 0.02) between groups in favour of LA at 1 week post-treatment follow-up. • ROM: Significant improvement in the treatment group at the final assessment for wrist flexion. Non-significant difference at the final assessment for wrist extension, pronation, supination, ulna deviation. • PRWE: Significant difference (p = 0.048) between groups in favour of LA at 1-week post-treatment follow-up.
• Appears that LA plus rehabilitation exercises are more beneficial than rehabilitation exercises alone in improving the outcomes of pain and disability in the short term for patients with a distal radius fracture managed with percutaneous pinning and a short cast (1 x LQ RCT).				
Electroacupuncture: 1 x daily for 7 days	Zhou et al. (2014)	LQ (-)	Healing days No. of delayed union No. of non-union	• EA showed improved clinical healing days and delayed healing status, compared to the warm needling moxibustion and splint group (P < 0.05). • EA reduced probability of delayed union and non-union, with the difference being statistically significant (P < 0.05).
• Significantly shorter clinical healing time for fractures of the middle and lower third of the tibiofibular after electroacupuncture in comparison to the warm needling and splinting plus traditional Chinese herbal formula groups.				

Sacrococcygeal Pain

One SR was identified that reviewed the effectiveness of acupuncture interventions on sacrococcygeal pain. No RCTs were identified that were not included in the SRs. The one included study investigated treatments which used a TCM framework and delivered Tui Na manual therapy. The Tui Na manual therapy was compared to oral medication. The number, duration, and frequency of treatment sessions was six sessions delivered over 2 weeks, however, the session times were not reported. The follow-up period was 3 months.

Systematic Reviews

Lee et al. (2017)

Lee et al. 2017 (QS: AQ +) conducted a SR and meta-analysis on the effectiveness of Chuna (or Tui Na) manual therapy on pain and function for musculoskeletal disorders. One relevant sacrococcygeal pain study was identified by the review (Wang et al., 2016). The study looked at the effect of six sessions of Tui Na manual therapy over 2 weeks on the outcome of pain (VAS) compared to external medicine. The authors did report that Wang et al. (2016) found positive results for VAS score, however, individual data was not reported. The authors concluded that given the low quality of the included studies and the diverse methods of intervention techniques, the available evidence is insufficient to determine the effects of Tui Na manual therapy for musculoskeletal conditions. More high-quality RCTs such as sham-controlled studies with standardised interventions are needed.

Study	SIGN rating	Conclusions	Quality of Evidence
Lee et al. (2017)	Level 1 AQ (+)	Insufficient evidence to make evidence-based treatment recommendations for the use of Tui Na manual therapy in the treatment of patients with sacrococcygeal pain.	Based on one RCT with moderate to high risk of bias.

Randomised Controlled Trials

No RCTs were identified that were not included in the previously reported SRs that investigated the effectiveness of acupuncture interventions on sacrococcygeal pain.

Hip Osteoarthritis

One SR which included three RCTs was identified that reviewed the effectiveness of acupuncture on hip OA. The included RCTs within the SR mainly investigated the effect of acupuncture compared to sham acupuncture. The included studies conducted between 6–10 sessions over a period of 3–6 weeks. The length of each session was between 20–30 minutes. Long term follow-up periods were collected by the studies, however, because the attrition rate for each of these trials was so high (almost 50% for at least one of the comparison groups), the data was not used within the meta-analysis of the SR. Studies were reported to be of low quality.

Manheimer et al. (2010)

Manheimer et al. (2010) (QS: AQ +) conducted a SR that looked at the effect of acupuncture on peripheral joint osteoarthritis. Only three studies were relevant to hip OA and this report (Fink et al., 2001, Haslam et al., 2001, and Stener-Victorin et al., 2004). Studies related to knee OA were not included due to the date the review was published. Fink et al. (2001) studied the effect of acupuncture compared to sham acupuncture with 10 20-minute treatments over 3 weeks. Haslam et al. (2001) also compared acupuncture to sham acupuncture, however, they conducted six 25-minute sessions over 6 weeks. Stener-Victorin et al. (2004) compared 10 30-minute sessions of EA to sham hydrotherapy and patient education. Fink et al. (2001) found

non-significant results between groups in VAS (SMD: -0.20 [-0.70, 0.30]) and function (SMD: -0.18 [-0.68, 0.32]). Haslam et al. (2001) also found non-significant results, reporting a SMD of -0.54 [-1.30, 0.22] for VAS. The results for Stener-Victorin et al. (2004) were not reported.

The authors of the SR identified that the three hip OA RCTs each had outcome data collected during the follow-up time relevant for their predefined long-term time point analysis. However, because the attrition rate for each of these trials was so high (almost 50% for at least one of the comparison groups), the authors made a post hoc decision to exclude the follow-up data from the meta-analyses. The authors concluded that for all 20 studies within the analysis, sham-controlled trials show statistically significant benefits; however, these benefits are small, do not meet the predefined thresholds for clinical relevance, and are probably due at least partially to placebo effects from incomplete blinding. Waiting list-controlled trials of acupuncture for peripheral joint osteoarthritis suggest statistically significant and clinically relevant benefits, much of which may be due to expectation or placebo effects.

Study	SIGN rating	Conclusions	Quality of Evidence
Manheimer et al. (2010)	Level 1+ AQ (+)	Limited evidence does not provide support for the effect of acupuncture for hip OA on the outcomes of pain and function when compared to sham acupuncture.	Based on three RCTs of low quality and moderate to high risk of bias.

Randomised Controlled Trials

No RCTs that were not included in the previously reported SR were identified that investigated the effect of acupuncture on hip OA.

Greater Trochanteric Pain Syndrome

No SRs and only one RCT was found, investigating the effectiveness of acupuncture treatments on Greater Trochanteric Pain Syndrome.

Randomised Controlled Trial

Intervention	Study	QS	Outcome measure	Result
Dry needling over 6 weeks vs. cortisone injection	Brennan et al. (2017)	AQ (+)	NPRS Patient specific functional scale (PSFS) Medication intake	• NPRS: No significant difference between the dry needling and injection groups at 6 week follow-up (MD: –1.12; 95% CI: –2.99, 0.74). • PSFS: No significant difference between groups at 6 week follow-up (MD: 0.2 (95% CI: –0.57, 0.96; P < 0.01)). • Medication intake for pain associated with the involved hip did not differ between the 2 groups at 6 weeks (P = 0.74) or at any other time (P = 0.19 at 1 week; P = 0.11 at 3 weeks).

- Appears to be no significant difference between dry needling and cortisone injection for pain, function and medication intake at short-term follow-up for patients with Greater Trochanteric Pain Syndrome (1 x AQ RCT).

Patellofemoral pain

Systematic Reviews

A total of one SR and one RCT were identified that reviewed the effectiveness of acupuncture for patellofemoral pain. The included study (Jensen et al., 1999) within the SR used a TCM framework and delivered traditional acupuncture, however, the RCT (Epsi-Lopez et al., 2017) used a Western medical framework and delivered TrP DN along with manual therapy and exercise in a multimodal therapy programme. The interventions were compared to no treatment, and manual therapy plus exercise alone, respectively. Patients were generally around the age of 30 years old and were experiencing chronic anterior knee pain of greater than 3 months and 4 years duration, respectively. The number, duration, and frequency of treatment sessions varied significantly between the studies with Jensen et al. (1999) delivering two 20-25 minute sessions per week for 4 weeks and Epsi-Lopez et al. (2017) delivering three 30-40 sessions over 3 weeks, which included 15 to 20 minutes of manual therapy, 10 to 15 minutes of exercises, and 2 to 5 minutes of TrP DN. Studies were of moderate to high quality.

Cox et al. (2016)

Cox et al. (2016) (QS: AQ +) completed a SR on the effectiveness and safety of acupuncture therapies for the management of musculoskeletal disorders of the upper and lower extremities. The review contained one patellofemoral pain syndrome related study (Jensen et al. 1999) which looked at the effect of two weekly sessions for 4 weeks of acupuncture compared to no treatment on patients with greater than a 4-year history of the condition.

Cox et al. (2016) reported that traditional needle acupuncture and no treatment for persistent patellofemoral pain syndrome may lead to simular outcomes. It was reported that there were no clinically important differences between groups at 5 months for pain and that the clinical importance of symptoms, function, and atrophy at 5 and 12 months is not known. Furthermore, Cox et al. (2016) highlighted that the results from the Jensen et al. (1999) trial are ambiguous, as there were insufficient data to compute the statistical significance of the between-group differences.

Study	SIGN rating	Conclusions	Quality of evidence
Cox et al. (2016)	Level 1- AQ (+)	No clinically important differences between acupuncture and no treatment when treating pain in patients with persistent PFPS.	Based on one RCT with a low risk of bias.

Randomised Controlled Trials

One RCT was identified that investigated the effectiveness of acupuncture for patellofemoral pain.

Intervention	Study	QS	Outcome measure	Result
TrP DN + manual therapy + exercise 1 x week for 3 weeks vs. manual therapy plus exercise	Epsi-lopez et al. (2017)	HQ (++)	KOOS pain subscale NPRS (0–10) IKDC KSS KOOS knee related QOL	• No statistical difference in the pain outcome measures of KOOS pain subscale and NPRS scores when TrP DN is added to manual therapy and exercise at 2 week and 3 month follow-up ($p > 0.391$). • No statistical difference in the functional outcome measures of IKDC and KSS when TrP DN is added to manual therapy and exercise ($p > 0.391$). • No statistical difference in the KOOS knee related QOL when TrP DN is added to manual therapy and exercise ($p > 0.391$).
• The trial suggested that the inclusion of 3 sessions of TrP DN in a manual therapy and exercise programme did not result in improved outcomes for pain and disability in individuals with patellofemoral pain at 3-month follow-up. (1 x HQ RCT)				

Knee Osteoarthritis

A total of 15 SRs and nine RCTs were identified that reviewed the effectiveness of acupuncture interventions for knee OA. Included studies mainly investigated treatments that used a TCM framework and delivered traditional acupuncture, trigger point acupuncture, or moxibustion. Acupuncture interventions were mainly compared with sham acupuncture, no treatment, or conservative therapies. Moxibustion was mainly compared with drug therapies such as diclofenac, or sham moxibustion. Patients were generally recruited from hospital clinics, were aged greater than 50 years old and suffered from knee OA of chronic duration and moderate severity, however, the included studies varied significantly. A history of traumatic injury was often an exclusion criterion so this may limit the relevance of the findings for ACC. The number, duration, and frequency of treatment sessions was not well-reported, but where it was, sessions were about 20–30 minutes long, with 5–20 sessions delivered over 5–9 weeks of treatment or daily treatments over a short period of 7–10 days. Length of follow-up was mostly short-term with few studies reporting long-term functional or pain outcomes. Studies were of low to moderate quality.

Systematic Reviews

Hou et al. (2015)

Hou et al. (2015) (QS: LQ -) conducted a SR on the effectiveness of TCM in treating OA of the knee. The review contained 10 acupuncture-related studies (Ng et al., 2003, Berman et al., 2004, Tukmachi et al., 2004, Vas et al., 2004, Witt et al., 2005, Scharf et al., 2006, Williamson et al., 2007, Jubb et al., 2008, Itoh et al., 2008, and Lu et al., 2010). These included studies varied significantly in regard to population, average time since diagnosis, style of acupuncture, and comparison group used. The styles of acupuncture used included traditional acupuncture (Berman et al., 2004, Tukmachi et al., 2004, Vas et al., 2004, Witt et al., 2005, Scharf et al., 2006, and Williamson et al., 2007), EA (Ng et al., 2003, Jubb et al., 2008, and Lu et al., 2010) and trigger point acupuncture (Itoh et al., 2008). The control group used included education

(Ng et al., 2003, and Berman et al., 2004), medication (Tukmachi et al,. 2004), placebo acupuncture (Vas et al., 2004, Scharf et al., 2006, Jubb et al., 2008, Itoh et al., 2008, and Lu et al., 2010), waiting list (Witt et al., 2005), and exercise (Williamson et al., 2007).

Ng et al. (2003) found a significant reduction in NRS of knee pain and improvement in TUGT scores after eight sessions of treatment. Berman et al. (2004) found non-statistically significant results in regard to (WOMAC) pain between the acupuncture and sham group, however, showed significantly greater results in regard to WOMAC function at week 8. Tukmachi et al. (2004) showed a significant improvement in pain score for the EA groups with and without medication. Vas et al. (2004) showed that the WOMAC index and VAS presented a greater and more significant reduction in the intervention group than in the control group.

Witt et al. (2005) found that for all WOMAC subscales (pain, stiffness, and physical function), the acupuncture group showed significant improvements compared with the minimal acupuncture and the waiting list groups. Scharf et al. (2006) showed statistically significant changes with respect to total WOMAC score and SF-12 physical subscale at week 26, with the changes in the acupuncture and sham acupuncture groups much more distinct than those measured in the conservative therapy group. Williamson et al. (2007) found no significant difference between the Oxford Knee Score, WOMAC, and timed walks between the acupuncture group and the physiotherapy group. Jubb et al. (2008) showed a statistically significant improvement in pain score for the acupuncture group ($p = 0.035$), however, found no significant difference between the groups for EuroQol and WOMAC stiffness or function either at the end of treatment at week 5 or at the final visit at week 9. Itoh et al. (2008) found that the VAS and WOMAC score of the TrP group was statistically significant when compared with sham group ($p = 0.025$ and $p = 0.031$), but no significant difference was detected between TrP and acupuncture for VAS ($p = 0.47$), and between acupuncture and sham groups for WOMAC. Lu et al. (2010) found that the VAS scores were decreased significantly after treatment in both the acupuncture and sham groups. The authors concluded that the initial findings of this review suggest that acupuncture is a promising intervention according to the primary outcome measure of pain, however based upon the GRADE criteria, the evidence was graded in the moderate quality band.

Study	SIGN rating	Conclusions	Quality of evidence
Hou et al. (2015)	Level 1 LQ (-)	Moderate evidence for the effectiveness of acupuncture on pain in the treatment of knee OA in the short term. Low quality evidence was found regarding the effects of acupuncture on physical function.	Based on 10 RCTs of low to moderate quality with a moderate to high risk of bias.

Choi et al. (2012)

Choi et al. (2012) (QS: AQ +) conducted a SR and meta-analysis on the effectiveness of moxibustion as a treatment for patients with osteoarthritis. Seven relevant knee OA studies were identified by the review (Cheng et al. 2008; Sun et al. 2008; Yang et al. 2008; Ren et al. 2010; Zhou at al 2010; Zhang 2009 (Thesis); He 2009). The studies looked at any type of

moxibustion and compared the intervention to types of drug therapy. Only two of the included studies (Cheng, 2008 and Zhou, 2010) used outcome measures relating to level of pain using the NRS 10-point Likert scale. The other studies used the primary outcome measure of response rate.

The results of the meta-analysis on the two studies that looked at the outcome of pain (NRS, Likert scale 0–10) showed a non-significant mean difference in effect between the intervention and control groups (MD: 0.16 (-0.11, 0.44) (p = 0.24)). The authors concluded that consistent results show that moxibustion may be effective in symptom management in patients with knee OA. However, they mentioned that because of the number of eligible RCTs and the high risk of bias in the assessment of the available RCTs, the evidence supporting this conclusion is limited. This conclusion is also based on the RCTs that use the primary outcome measure of response rate.

Study	SIGN rating	Conclusions	Quality of evidence
Choi et al. (2012)	Level 1 AQ (+)	No difference in the outcome of pain between moxibustion and drug therapy in the treatment of knee OA.	Based on two RCTs of low to moderate quality with a high risk of bias.

Zhang et al. (2017)

Zhang et al. (2017) (QS: AQ (+)) conducted a SR looking at effectiveness and safety of acupuncture for the treatment of chronic knee pain. A total of 18 studies were included in the review (Berman et al. 1999; Berman et al. 2004; Bernateck et al. 2008; Dong et al. 2011; Fu & Zhang 2011; Fu & Li 2013; Hinman 2014; Itoh et al. 2008; Lansdown et al. 2009; Mavommatis et al. 2012; Salekl et al. 2013; Sangdee et al. 2002; Tukmachi et al. 2004; Williamson et al. 2007; Witt et al. 2005; Witt et al. 2006; Christensen et al. 1992; Ng et al. 2003). Participants must have had knee pain for greater than 3 months. Participants' average age within the studies ranged from 57.7 years old to 85 years old. The style of acupuncture varied within studies with 14 studies using needle-based acupuncture, three studies using EA, and one study using AA. Co-interventions were used within the following studies: Dong et al. (2011): Sodium hyaluronate; Lansdown et al. (2009): usual care; Mavommatis et al. (2012): Etoricoxib. The number of treatment sessions within the study ranged from four (Dong et al., 2011, Mavommatis et al., 2012) to 23 (Berman et al., 2004) with most studies using between 10–15 treatments. Length of treatment ranged from 2 weeks (Ng et al. 2003) to 26 weeks (Berman et al. 2004), with most studies using 4–12 weeks.

Interventions and controls used within the studies are as follows: Berman et al. (1999) (intervention: acupuncture, control: Standard care–oral therapy), Berman et al. (2004) (intervention: acupuncture, control: education), Bernateck et al. (2008) (intervention: EA, control: autogenic training), Dong et al. (2011) (intervention: acupuncture plus sodium hyaluronate, control: sodium hyaluronate), Fu and Zhang (2011) (intervention: acupuncture, control: glucosamine hydrochloride capsules), Fu and Li (2013) (intervention: EA, control: ibuprofen), Hinman (2014) (intervention: acupuncture, control: no treatment), Itoh et al. (2008) (intervention: acupuncture, control: no treatment), Lansdown et al. (2009) (intervention:

acupuncture plus usual care, control: usual care), Mavommatis et al. (2012) (intervention: acupuncture plus etoricoxib, control: etoricoxib), Salekl et al. (2013) (intervention: acupuncture, control: isometric exercises), Sangdee et al. (2002) (intervention: EA, control: etoricoxib), Tukmachi et al. (2004) (intervention: acupuncture, control: no treatment), Williamson et al. (2007) (intervention: acupuncture, control: home exercises), Witt et al. (2005) (intervention: acupuncture, control: waiting list), Witt et al. (2006) (intervention: acupuncture, control: waiting list), Christensen et al. (1992) (intervention: acupuncture, control: waiting list), and Ng et al. (2003) (intervention: EA, control: TENs).

Results of meta-analysis for acupuncture versus no treatment found a significant reduction in chronic knee pain at 12 weeks on WOMAC pain subscale (Hinman 2014, Itoh et al., 2008, Witt et al., 2006) (MD: −1.12, 95% CI −1.98 to −0.26, I2 = 62%) and a significant reduction in chronic knee pain (VAS) at 12 weeks (Hinman 2014, Itoh et al., 2008) (MD: −10.56, 95% CI −17.69 to −3.44, I2 = 0%), however, conflicting results were found for QOL. Results for acupuncture versus standard care (Berman et al. 1999) found significant improvement in WOMAC pain subscale at 4, 8 and 12 weeks. Results from acupuncture plus usual care versus usual care (Lansdown et al. 2009) found a significant reduction in WOMAC pain subscale at 12 weeks (12 weeks: MD: −2.97, 95% CI −5.70 to −0.24), however, not a 1 year follow-up (1 year: MD: −0.60, 95% CI −2.89 to 1.69). No significant difference was found when looking at the SF-36 Physical and SF-36 Mental at 12 weeks or 1 year. Results from acupuncture versus exercise found that exercise was significantly better than acupuncture at 4 weeks (Salekl et al. 2013) and found no significant difference at 8 and 12 weeks (Williamson et al. 2007) when looking at the outcome of pain (VAS). Results from acupuncture versus education (Dong et al. 2011) found significant reduction in pain intensity (WOMAC pain subscale) at all times (4 weeks: MD: −1.38 (−2.07 to −0.69), 8 weeks: MD: −1.90 (−2.72 to −1.08), 12 weeks: MD: −2.09 (−3.01 to −1.17), and 26 weeks: MD: −2.10 (−3.01 to −1.19)). Results from EA versus etoricoxib found no significant difference in pain scores, however, EA versus ibuprofen found a significant reduction in favour of EA. Results of acupuncture plus etoricoxib versus etoricoxib (Mavommatis et al. 2012) found a significant difference in both VAS and WOMAC pain subscale at 4, 8, and 12 weeks. Acupuncture versus glucosamine hydrochloride capsules (Fu & Zhang, 2011, and Tukmachi et al., 2004) found no significant difference in WOMAC pain subscale and VAS, with both SF-36 components significantly improving at 8 weeks but not 4 weeks. The authors' conclusion was that acupuncture may be effective at relieving chronic knee pain 12 weeks after acupuncture administration, however, given the heterogeneity and methodological limitations of the included trials, we are currently unable to draw any strong conclusions regarding the effectiveness of acupuncture for chronic knee pain.

Study	SIGN rating	Conclusions	Quality of evidence
Zhang et al. (2017)	Level 1+ AQ (+)	Acupuncture was effective in reducing chronic knee pain when compared to no treatment at 12 weeks, however, not at 1 year. Acupuncture was effective in reducing chronic knee pain when compared to standard care at short- to medium-term follow-up.	Based on 18 RCTs of low to moderate quality with a moderate to high risk of bias.

		Acupuncture plus usual care was effective in reducing chronic knee pain when compared to usual care at 12 weeks, however, not a 1 year and was also not effective in improving QOL and function at 12 weeks and at 1 year.	
		Acupuncture was not effective in reducing chronic knee pain when compared to exercise at 4 weeks, 8 weeks, and 12 weeks.	
		Acupuncture was effective in reducing chronic knee pain when compared to education at 4, 8, 12, and 26 weeks.	
		Results of comparisons between EA and medicine regarding the outcome of pain were conflicting. EA was significantly different when compared to ibuprofen, however, was not significantly different compared to etoricoxib and glucosamine hydrochloride capsules.	

Madsen et al. (2009)

Madsen et al. (2009) (QS: AQ (+)) conducted a SR looking at the analgesic effect of acupuncture and placebo acupuncture, and to explore whether the type of the placebo acupuncture is associated with the estimated effect of acupuncture. A total of 13 studies were included in this review, with only six of them being relevant to musculoskeletal conditions (Scharf et al. 2007; Witt et al. 2006; Foster et al. 2007; Brinkhaus et al. 2006; Molsberger et al. 2002; Leibing et al. 2002). Of these six studies, three looked at knee OA (Scharf et al., 2007, Witt et al., 2006, and Foster et al., 2007). Scharf et al. (2007) assessed the effectiveness of acupuncture combined with a standard care intervention group treating osteoarthritis targeting local acupuncture points according to theory of Bi syndrome as obligatory points. Additionally, they compared placebo combined with standard care control (superficial needling at non-acupuncture points; depth up to 0.5 cm without Qi; no stimulation; same type of needles used) and a standard care only group involving 10 clinical visits (oral NSAID; up to six physiotherapy sessions). The study used a treatment duration of 6 weeks with a total of 10 sessions and an evaluation at 13 weeks. Witt et al. (2006) compared the effectiveness of acupuncture plus standard care (targeting local and distant points; additional points could be chosen; achievement of Qi and manual stimulation at least once per session) with a control group of placebo acupuncture plus standard care control (superficial needling at non-acupuncture points; fine needles and manual stimulation for a total of 12 sessions for 8 weeks duration) and additionally a standard care treatment only group (NSAID medication if required). Foster et al. (2007) looked at the efficacy of acupuncture plus standard care treatment (targeting 6–10 points from 16 local and distal points; manipulations to achieve Qi), compared to placebo acupuncture plus standard care, (targetted non-penetrative needling; no attempt to achieve Qi)and a standard care only group (advice and exercise by physiotherapist; fixed dose NSAID). This study had treatment duration of six sessions for 3 weeks and an evaluation at 6 weeks.

Scharf et al. (2007) showed insignificant results regarding the effectiveness of acupuncture (needling) treatment in comparison to the no acupuncture control (NSAIDs) and the superficial needling placebo control, using the WOMAC pain scale (0–10) (SMD: -0.13 (-0.28 to 0.02)). Witt

et al. (2006) showed that the results were insignificant for the acupuncture (needling) groups, compared to the no acupuncture control (NSAIDs) and the superficial needling control, using the WOMAC pain scale (0–10) (SMD: -0.52 (-0.80 to -0.23)). Foster et al. (2007) reported significant results regarding the acupuncture (needling) group in comparison to the no acupuncture group (advice and exercise by a physiotherapist; fixed dose of NSAID), and the non-penetrative needling control, using the WOMAC pain scale (0–10) (SMD: 0.09 (-0.16 to 0.35)).

Study	SIGN rating	Conclusions	Quality of evidence
Madsen et al. (2009)	Level 1+ AQ (+)	Acupuncture had a statistically significant analgesic effect following treatment which was not clinically significant when compared to placebo acupuncture. Placebo acupuncture had a statically significant analgesic effect following treatment when compared to no acupuncture. The effect of placebo acupuncture varied significantly between studies.	Based on three RCTs of moderate quality with a moderate risk of bias.

Law et al. (2015)

Law et al. 2015 (QS: HQ ++) completed a SR on LA for musculoskeletal pain. The review contained three knee OA studies (Zhao et al., 2009, Shen et al., 2008, and Yurtkuran et al., 2007). Zhao et al. (2009) compared LA to laser on sham points, while Shen et al. (2008) and Yurtkuran et al. (2007) compared LA to placebo. The treatment parameters differed between the studies. Zhao et al. (2009) had an average output of 36 and 200 Mw, power density of 36 and 200 Mw/cm2 and dose of 163.2 J. Yurtkuran et al. (2007) had an average output of 4 Mw, power density of 10 Mw/cm2 and dose of 0.48 J. Shen et al. (2009) did not report treatment parameters.

The study by Zhao et al. (2009) found that the laser group using acupuncture points showed significantly better improvement in the WOMAC score after 2 weeks (SMD: -0.88 [-1.57, -0.20]) of treatment when compared to the placebo group, however, no significant difference was observed after 4 weeks. In contrast, the study by Shen et al. (2008) reported that both groups showed significant improvement in all outcome measures after treatment but no significant difference between the two groups. The study by Yurtkuran et al. (2007) found that both groups showed significant improvement in all outcome measures after treatment and also found that the laser group showed a significant decrease in knee circumference after 2 weeks. No meta-analysis was conducted for the subgroup of knee OA in the SR by Law et al. (2015) due to the limited number of studies available for LA and knee OA, in comparison to the condition subgroups of lateral epicondylitis and TMJ disorders.

Study	SIGN rating	Conclusions	Quality of evidence
Law et al. (2015)	Level 1+ HQ (++)	Evidence in this review for LA as an evidence-based treatment option for knee OA is insufficient and contradicting.	Based on three RCTs of varying quality ranging from low to high.

Lee et al. (2017)

Lee et al. (2017) (QS: AQ +) conducted a SR and meta-analysis on the effectiveness of Chuna (or Tui Na) manual therapy on pain and function for musculoskeletal disorders. Four relevant knee OA studies were identified by the review (Chen 2015, Jin 2015, Li et al., 2016, and Xiao 2016). Chen (2015) and Jin (2015) compared 12 sessions of Tui Na therapy over 1 month to oral drugs. Li et al. (2016) also compared Tui Na therapy to oral drugs, however, they conducted 20 treatment sessions over the 1-month period. Xiao (2016) compared Tui Na therapy and rehabilitation to rehabilitation alone over a 4-week period. The authors reported that Chen (2015) found positive results for WOMAC, however, non-significant results for VAS. Jin (2015) found non-significant results for pain, however, found significant results for stiffness and physical function. Li et al. (2016) found positive results for both VAS and the Japanese Orthopaedic Association back pain evaluation questionnaire. Xiao (2016) found positive results for pain, function, ROM, and strength, however, found conflicting results for SF-36 subsections. The authors concluded that given the low quality of the included studies and the diverse methods of intervention techniques, the available evidence is insufficient to determine the effects of Tui Na manual therapy for musculoskeletal conditions. More high-quality RCTs such as sham-controlled studies with standardised interventions are needed.

Study	SIGN rating	Conclusions	Quality of evidence
Lee et al. (2017)	Level 1- AQ (+)	Tui Na manual therapy may have favourable effects on pain and function, however, the evidence is insufficient to make recommendations.	Based on four RCTs of low quality with a moderate to high risk of bias.

Boyles et al. (2015)

Boyles et al. (2015) (QS: AQ +) conducted a SR on the effectiveness of TP DN based on high-quality RCTs for all body regions. One RCT was relevant to knee OA (Mayoral et al., 2013). The study included participants with knee OA of unknown duration with a mean age of 71.65 ± 6.06 years. The intervention utilised was TDN and it was compared to sham. The regions treated were tensor fascia lata, hip adductors, hamstrings, quadriceps, gastrocnemius, and popliteus. Local twitch response was elicited.

The study reported: A significant change from baseline in the number of patients with pain below 40 on VAS at 1 month for the TDN group ($P < 0.05$), but not for sham group; Significantly different variation rates of VAS scores greater than 40 at 1 month favouring the TDN group ($P < 0.05$); A significantly greater number ($p = 0.042$, 9% difference) of pain free subjects at 1 month for the TDN group as compared to sham; No differences between groups for WOMAC or for ROM and strength; Significantly decreased use of analgesic medication in the TDN group (31.8%) compared to sham group (68.2%) ($P = 0.01$). The authors also reported that the TDN group achieved the same average degree of pain reduction on VAS in 1 month that the control group achieved in 6 months. The authors concluded that TDN appears to reduce myofascial pain, regardless of body region, at various points in time, however, they identified that there is limited evidence for TDN to the distal upper extremity, lumbar spine, and distal lower extremity.

Study	SIGN rating	Conclusions	Quality of evidence
Boyles et al. (2015)	Level 1 - AQ (+)	Limited evidence suggests that TDN may have favourable effects on pain and medication use in the short term but not on function, ROM, and strength for the treatment of knee OA, however, the evidence is insufficient to make recommendations.	Based on one RCT of high quality.

Shim et al. (2016)

Shim et al. (2016) (QS: AQ +) conducted a SR and meta-analysis on the effectiveness of EA treatment on osteoarthritis of the knee. The review contained 31 RCTs, however, only 20 were relevant to this review as the inclusion criteria also included trials that compared EA to needle-based acupuncture (Li & Li, 2015; Wu et al., 2015; Huang & Yang, 2014; Zhao et al., 2013; Zhu et al. 2013; Marvommatis et al. 2012; Ji & Ouyang 2011; Meng et al. 2011; Lu et al. 2010; Ahsin et al. 2009; Wu 2008; Jubb et al. 2008; Qiu et al. 2006; Berman et al. 2004; Tukmachi et al. 2004; Vas et al 2004; Ng et al. 2003; Sangdee et al. 2002; Berman et al. 1999; Yurtkuran 1999). Within the review, periods of EA treatments for experimental groups ranged from one day to 26 weeks. There were 20 trials involving more than 4 weeks of EA treatments for patients, while 11 studies involved fewer than 4 weeks of EA treatments for patients. Twenty-three studies exclusively used EA as an intervention, and eight other studies used both EA and drug therapies. The frequency of electrical stimulation was between 2 Hz and 100 Hz and was applied for a range of time between 20 and 60 minutes.

Li and Li (2015) looked at the effect of 15 30-minute treatments over 3 weeks; Wu et al. (2015) looked at 14 40-60 minute treatments over 4 weeks; Huang and Yang (2014) looked at 36 30-minute treatments over 6 weeks; Zhao et al. (2013) looked at 12 30-minute treatments over 4 weeks; Zhu et al. (2013) looked at 14 20-minute treatments over 4 weeks; Marvommatis et al. (2012) looked at 24 30-minute treatments over 8 weeks; Ji and Ouyang (2011) looked at 24 30-minute treatments over 8 weeks; Meng et al. (2011) looked at nine treatments over 3 weeks; Qiu et al. (2006) looked at eight 30-minute sessions over 4 weeks; Tukmachi et al. (2004) and Vas et al. (2004) looked at 12 20-minute sessions over 12 weeks; Ng et al. (2003) looked at eight 20-minute sessions over 2 weeks; and Yurtkuran (1999) conducted 10 20-minute sessions over 2 weeks.

Meta-analysis results found: A statistically significant difference in pain intensity in favour of EA when compared to control interventions (SMD: −1.86 [−2.33, −1.39]); a statistically significant difference in pain intensity in favour of EA when EA plus medication was compared to medication alone (SMD: −2.01 [−2.51, −1.52]) and when EA was compared to sham EA (SMD: −1.62 [−2.26, −0.97]); and a significant difference between both WOMAC and SF-36 physical scale scores in favour of EA when it was compared to control. The authors concluded that EA treatment can relieve the pain of osteoarthritis of the knees and improve comprehensive aspects of knee OA and the QOL of patients with knee OA.

Study	SIGN rating	Conclusions	Quality of evidence
Shim et al. (2016)	Level 1+ AQ (+)	EA treatment showed a significant reduction in pain due to knee OA in comparison to the control and sham groups following treatment. EA treatment showed a significant improvement in function and QOL in comparison with the control group following treatment.	Based on 20 RCTs of low to moderate quality with a moderate to high risk of bias.

Choi et al. (2017)

Choi et al. (2017) (QS: HQ ++) conducted a SR and meta-analysis on the effectiveness of moxibustion as a treatment for OA patients. The review contained 19 RCTs, however, only 15 were relevant to this review (Ren et al. 2015; Ren et al. 2011; Zhao et al. 2014; Yuan et al. 2015; Deng et al. 2015; Song et al. 2013; Cheng et al. 2008; Sun et al. 2008; Yang et al. 2008; Zhou et al. 2010; Zhang et al. 2015; Zhou et al. 2014; Chen et al. 2015; Wu et al. 2011; Kim et al. 2014). All of the RCTs were conducted in China, where it has previously been reported that few negative studies have been published (Vickers et al., 1998). Participants in the 19 studies were diagnosed with knee OA according to American College Rheumatology (ACR) criteria in seven trials, Chinese Medical Association (CMA) criteria in four trials, and the Guiding Principles of Clinical Research on New Drugs for Traditional Chinese Medicine (GP-TCM) in seven trials. All studies looked at the effect of indirect moxa from a TCM approach with treatment periods varying from 2 weeks to 6 weeks and for a total of 12 to 35 sessions. Ren et al. (2015), Ren et al. (2011), and Zhao et al. (2014) compared moxibustion to sham moxibustion. Yuan et al. (2015), Deng et al. (2015), Song et al. (2013), Cheng et al. (2008), Sun et al. (2008), Yang et al. (2008), and Zhou et al. (2010) compared moxibustion to the drug diclofenac sodium. Zhang et al. (2015) compared moxa plus celecoxib to celecoxib alone. Zhou et al. (2014) compared moxa to celecoxib. Chen et al. (2015) compared conventional moxibustion to heat sensitive moxibustion and also intra-articular injection (sodium). Wu et al. (2011) compared moxa to intra-articular injection (sodium) alone. Kim et al. (2014) compared to moxa to usual care.

The meta-analysis showed favourable effects of moxibustion on pain levels after the last session of treatment (n = 305; SMD, −0.46; 95% CI: −0.86 to −0.06, P = 0.02, I2 = 65%) and at follow-up (n = 305; SMD, −0.36; 95% CI: −0.70 to −0.01, P = 0.04, I2 = 54%) when comparing moxibustion to sham. The meta-analysis failed to show superior effects of moxibustion on physical function (n = 305; SMD, −0.23; 95% CI: −0.62 to 0.17, P = 0.26, I2 = 65) and follow-up (n = 305; SMD, −0.31; 95%CI: −0.69 to 0.07, P = 0.11, I2 = 62%). The meta-analysis showed superior effects of moxibustion on total symptom score compared with diclofenac sodium (n = 534; SMD, −0.46; 95% CI: −0.73 to −0.19; P = 0.0009, I2 = 58%) and also on pain reduction compared with diclofenac sodium (n = 628 knees; SMD, −0.42; 95% CI: −0.81 to −0.03, P = 0.03) with high heterogeneity (I2 = 83%). The authors concluded that the SR suggests that moxibustion may be an effective treatment for reducing pain and total symptoms of OA compared with sham moxa and conventional drug therapy, however, suggested that the level of evidence is moderate to low given the high risk of bias and small sample size.

Study	SIGN rating	Conclusions	Quality of evidence
Choi et al. (2017)	Level 1+ HQ (++)	Moxibustion showed favourable effects on pain in patients with knee OA in comparison to the sham moxa and conventional drug therapy following treatment and at short- to medium-term follow-up. Conflicting evidence regarding the effectiveness of moxibustion on physical function.	Based on 15 RCTs of low to moderate quality with a moderate to high risk of bias.

Li et al. (2017)

Li et al. (2017) (QS: AQ (+)) conducted a SR looking at the available evidence from RCTs of cupping therapy for treating patients with knee OA. A total of seven studies were included in the review with all studies being relevant to this evidence-based review (Wang et al 2016a; Tuet et al 2012; Zhang et al 2013; Gao et al 2014; Wang et al 2016b; Zhang et al 2012; Ma et al 2010). The included studies had a duration of intervention of mostly 4 weeks, and the site of cupping therapy varied according to TCM theory for six of the seven included RCTs. All studies assessed the effectiveness of dry cupping plus drug therapy compared to drug therapy alone. Wang et al. (2016a) conducted 8 sessions over 4 weeks, Tuet et al. (2012) 20 sessions over 4 weeks, Zhang et al. (2013) 12 sessions over 4 weeks, Gao et al. (2014) 20 sessions over 4 weeks, Wang et al. (2016b) 28 sessions over 4 weeks, Zhang et al. (2012) 28 sessions over 4 weeks, and Ma et al. (2010) who did not report the number of sessions but did report a duration of 15 minutes.

Wang et al. (2016a) and Tuet et al. (2012) found significant improvements in VAS and WOMAC scores. Zhang et al. (2013) did not find a significant difference in VAS scores. Gao et al. (2014), Wang et al. (2016b), Zhang et al. (2012), and Ma et al. (2010) all found a significant difference in Lequesne Algofunctional Index (LAI). Meta-analysis results found a non-significant difference between Western medicine plus dry cupping therapy, and Western medicine on VAS (SMD: -0.32 (-0.7, 0.05), P = 0.09). Significant differences were found for Western medicine plus dry cupping therapy compared to Western medicine on WOMAC pain, stiffness and physical function scales, and also LAI. The authors concluded that the combined use of cupping therapy and Western medicine therapy was considered to be superior to Western medicine therapy alone in terms of physical function (WOMAC, LAI). Nevertheless, considering the high risks of bias of included trials, those results should be interpreted with caution. In addition, the authors also concluded that the intervention group using cupping therapy was not superior to the intervention group that used Western medicine therapy alone in terms of decreasing the pain intensity (VAS).

Study	SIGN rating	Conclusions	Quality of evidence
Li et al. (2017)	Level 1 AQ (+)	Cupping plus drug therapy was effective in improving physical function (WOMAC, LAI) when compared to drug therapy alone post-treatment.	Based on seven RCTs of low quality with a moderate to high risk of bias.

		Cupping plus drug therapy was not shown to be superior to the drug therapy alone in terms of decreasing the pain intensity (VAS).	

Song et al. (2016)

Song et al. (2016) (QS: AQ (+)) conducted a SR looking at the evidence of the effectiveness of moxibustion in treating knee osteoarthritis. A total of 12 studies were included in the review, and seven were relevant to this evidence-based review (Kim 2014; Ren 2015; Wu 2011; Zhang 2011; Zhao 2014; Zhou 2014; Cheng 2008). Participants in all studies required a diagnosis of knee OA using definitive diagnostic criteria including the American College of Rheumatology (ACR) and guiding principles of clinical research on new drugs (GPCRND)-KOA. Kim (2014), Ren (2015), Zhang (2011), Zhao (2014), and Zhou (2014) looked at the intervention of conventional moxibustion, while Wu (2011) looked at heat sensitive moxibustion, and Cheng (2008) looked at sandwiched moxibustion. All studies compared moxibustion to drug therapy except for Zhou (2014). Kim (2014) conducted 12 sessions over 4 weeks, Ren (2015) 6 sessions over 6 weeks, Wu (2011) 21 sessions over 3 weeks, Zhang (2011) 6 sessions over 6 weeks, Zhao (2014) 18 sessions over 6 weeks, and Cheng (2008) 10 sessions over 2 weeks.

Due to the durations of treatment being different in all eligible studies, Song et al. (2016) purposely analysed the data using three terms: Short term (duration < 6 weeks), midterm (7 to 13 weeks duration), and long term (duration > 14 weeks). The included studies, Zhao (2014), Kim (2014), and Zhou (2014), presented physical function outcomes. These findings suggested that moxibustion effectively improved physical function of knee OA patients relative to usual care and sham moxibustion. However, it was not statistically superior to oral drugs. The included studies, Zhao (2014), Kim (2014), Cheng (2008), and Zhang (2011) reported on pain, in which oral drugs, usual care, or sham moxibustion was used in the control group. Meta-analyses indicated that, compared with oral drug, moxibustion did not significantly alleviate pain (SMD: -0.17; 95% CI: -0.39, 0.05; P = 0.12; heterogeneity: I2 = 1%, P = 0.39), whereas it significantly relieved pain compared to usual care and sham moxibustion at short-term, midterm and long-term. Kim et al. (2014) reported that, compared with usual care, moxibustion improved the status of physical function and social function but remaining indices did not at short-term. Moreover, their study revealed that moxibustion improved body pain at midterm. Ren et al. (2015) suggested that knee OA patients in the active moxibustion group experienced statistically greater improvement in mental health than sham moxibustion at short-term. They also found better mental health and vitality status in the moxibustion group at both short-term and midterm. The authors' conclusion was that for the treatment of knee OA, moxibustion is superior to usual care and sham moxibustion, but the effects of moxibustion on the target population are nearly equal to oral drugs and intra-articular injection. Consequently, it was concluded that moxibustion is an alternative of treating knee; however, more well-designed studies are warranted in order to further determine the effect of moxibustion on QOL.

Study	SIGN rating	Conclusions	Quality of evidence
Song et al. (2016)	Level 1	No statistical significance was found between moxibustion and usual care/sham moxibustion in physical function outcomes.	Based on seven RCTs of moderate quality with a

	AQ (+)		low to moderate risk of bias.
		Moxibustion did not significantly alleviate pain compared with oral drugs, however, it significantly relieved pain compared to usual care and sham moxibustion.	

Chen et al. (2017)

Chen et al. (2017) (QS: LQ (-)) conducted a SR on the evidence of the effectiveness and safety of EA in the management of patients with knee OA. A total of seven studies were included in the review with all studies being relevant to this evidence-based review (Bao et al 2013; Fu 2013; Gao 2013; Huang 2016; Miao et al 2014; Tukmachi et al 2004; Zhou et al 2015). Bao et al (2013) conducted 12 20-minute EA sessions over 4 weeks. Fu (2013) conducted 24 30-minute sessions, while Gao (2013) conducted 24 40-minute sessions over 4 weeks. Huang (2016) looked at 12 sessions over 4 weeks, Miao et al. (2014) 30 sessions over 30 days, Tukmachi et al. (2004) 10 20-minute sessions over 5 weeks, and Zhou et al. (2015) 28 sessions. Two studies compared EA to Celebrex (Huang, 2016, Miao et al., 2014) and the rest compared EA to oral medication (Tukmachi et al., 2004), diclofenac sodium (Zhou et al., 2015), physiotherapy (Bao et al., 2013), ibuprofen (Fu, 2013), and glucosamine sulfate capsules (Gao 2013).

The included studies found a significant difference (P < 0:05) in LKSS (Bao et al., 2013; Gao, 2013; Huang 2016; Miao et al 2014; Zhou et al 2015), VAS (Gao 2013; Miao et al 2014; Tukmachi et al 2004; Zhou et al 2015), SF-36 (Fu 2013), and WOMAC pain index (Tukmachi et al 2004). Only one study reported a follow-up evaluation. Otherwise all studies looked at immediate follow-up only and, therefore, did not provide evidence of medium- to long-term effects of EA. The authors concluded that the results indicate that EA alleviates pain and improves the physical function of knee OA patients. It was also highlighted that EA should last for at least 4 weeks and with 20–30 minute sessions. However, the low quality of included RCTs without rigorous methods of design, measurement, and evaluation need to be taken into account.

Study	SIGN rating	Conclusions	Quality of evidence
Chen et al. (2017)	Level 1 LQ (-)	EA showed significant advantages for relieving pain and improving function over pharmacological treatments at immediate post-treatment follow-up.	Based on seven RCTs of low to moderate quality with a moderate to high risk of bias.
		Limited evidence regarding the effectiveness of EA on medium- to long-term outcomes.	

Morihisa et al. (2016)

Morihisa et al. (2016) (QS: AQ (+)) completed a SR and meta-analysis on the effectiveness of DN as an intervention for lower quarter trigger points in patients with various orthopaedic conditions. The review contained one knee OA related study (Mayoral et al., 2013). The study

compared dry needling to sham dry needling. The study reported that subjects receiving dry needling had less pain at 1 month. It was also reported that there was a statistically significant difference in VAS scores (P = 0.294), but no significant difference at baseline in WOMAC (P = 0.837), pain (P = 0.805), stiffness (P = 0.149), and ROM (P = 0.539). The authors concluded that the literature suggests that dry needling is effective in reducing pain associated with lower quarter trigger points in the short term. However, the findings suggest that dry needling does not have a positive effect on function, quality of life, depression, range of motion, or strength.

Study	SIGN rating	Conclusions	Quality of evidence
Morihisa et al. (2016)	Level 1 AQ (+)	Limited evidence suggests that TDN may have favourable effects on pain in the short term but not on function and ROM for the treatment of knee OA, however, the evidence is insufficient to make recommendations.	Based on one RCT of moderate quality with a moderate risk of bias.

Cao et al. (2014)

Cao et al. (2014) (QS: AQ (+)) conducted a SR which assessed the available evidence for the effectiveness and safety of cupping for the treatment of different types of pain. A total of 16 studies were included in this review and out of these 11 were relevant to musculoskeletal conditions (Chen 2009; Cramer 2011; Farhadi 2009; Kim 2011; Kim 2012; Lauche 2011; Lauche 2013; Oyang 2001; Teut 2012; Wu et al. 2013; Wu 2007). Two studies (Teut et al. 2012; Wu et al. 2013) looked at knee OA. Teut et al. (2012) looked at the effectiveness of dry cupping administered by a cupping device to the knee joint for 10 minutes, along with plastic cups to the lower back for 5 minutes twice weekly and paracetamol when required (maximum dosage 2 g daily). This was compared to a wait list control with paracetamol on demand (maximum dosage of 2 g daily) for a total of 28 days in response to osteoarthritis. Wu et al. (2013) also looked at a wet cupping intervention, however, needles were inserted at Ex-LE4, Ex-LE5, ST34, SP10, SP9, and ashi points, with cups applied and retained for 3–4 minutes once every 2 days, in comparison to a drug-based control, consisting of diclofenac 50 mg for twice a day, total of 14 days.

No individual data was provided within the review (only meta-analysis results), therefore, no conclusions can be made regarding the subgroup of knee OA. The review found moderate evidence that cupping is more efficacious than no treatment or other treatments (such as heat therapy, usual care, and conventional medications) in reducing pain over the short term (within 4 weeks), however, this was based on all pain conditions including non-traumatic conditions. The review did find that wet cupping, mainly on ashi points, was the most commonly used method (68.75% trials) for treating pain.

Study	SIGN rating	Conclusions	Quality of evidence
Cao et al. (2014)	Level 1 AQ (+)	The available evidence in this review is insufficient to draw conclusions on cupping for knee OA.	Based on two RCTs of low to moderate quality with a moderate risk of bias.

Vickers et al. (2012)

Vickers et al. (2012) (QS: LQ-) conducted an individual patient data meta-analysis on the effectiveness of acupuncture for chronic pain. Four conditions were assessed individually (non-specific back and neck pain, osteoarthritis, shoulder pain, and headache). The review contained nine knee OA studies (Berman et al. 2004; Vas et al. 2004; Witt et al. 2005; Scharf et al. 2006; Witt et al. 2006; Foster et al. 2007; Williamson et al. 2007; Lansdown et al. 2009; Suarez-Almazor et al. 2001). Of these studies, only the study by Suarez-Almazor et al. (2001) had not been reported on by previous SRs in the above analysis. The study compared acupuncture to penetrating needle sham and also ancillary care in 296 patients. The primary outcome measure used was the WOMAC and was last recorded at 3 months. Details regarding the acupuncture treatment were not detailed within the Vickers et al. (2012) SR paper or supplementary appendices. Suarez-Almazor et al. (2001) found a significant difference between acupuncture and no acupuncture ($p = 0.0002$, (no estimate given)), but found no significant difference between acupuncture and sham acupuncture ($p > 0.20$ (no estimate given)).

Meta-analysis results found a significant difference in favour of acupuncture when compared to sham acupuncture for knee OA ((studies n = 5), 95% CI: 0.26 (0.17–0.34), $P < 0.001$). In regard to acupuncture versus non-sham acupuncture for knee OA studies, a significant difference was also found ((studies n = 6, 95% CI: 0.57 (0.50-0.64), $P < 0.001$). The authors concluded that acupuncture was superior to both no-acupuncture control and sham acupuncture for the treatment of chronic pain. This conclusion did fit with the results reported for the knee OA studies.

Study	SIGN rating	Conclusions	Quality of evidence
Vickers et al. (2012)	Level 1 LQ (-)	Acupuncture had a statistically significant effect on pain when compared to sham acupuncture in patients with chronic knee OA.	Based on nine RCTs of varying quality with moderate to high risk of bias.

Randomised Controlled Trials

Nine RCTs were identified that were not included in the previously reported SRs investigating the effectiveness of acupuncture for knee OA.

Intervention	Study	QS	Outcome measure	Result
Acupuncture for Knee OA				

Heat sensitive moxibustion versus conventional moxibustion: 35 sessions over 6 weeks versus conventional drugs	Chen et al. (2015)	AQ (+)	Guiding principle of clinical research on new drugs in the treatment of knee OA (GPCRND-KOA).	• All groups decreased significantly ($p < 0.01$) following treatment at 1 and 6 months. • Statistically significant difference between heat sensitive moxibustion and conventional moxibustion ($p = 0.023$). • Statistically significant difference between heat sensitive moxibustion and conventional drugs ($p = 0.0096$). • No statistical difference between conventional moxibustion and conventional drugs ($p = 0.091$).
• Heat sensitive moxibustion (defined Chen et al. (2015) as: A form of treatment that involves administering suspended moxibustion at heat sensitive acupuncture points) appears to have a statistically significant effect when compared to conventional moxibustion in treating knee OA at 1 and 6 months (1 x AQ RCT). • Heat sensitive moxibustion appears to have a statistically significant effect when compared to conventional drugs in treating knee OA at 1 and 6 months (1 x AQ RCT). • Appears to be no significant difference between conventional moxibustion and conventional drugs at 1 and 6 months (1 x AQ RCT).				
Moxibustion 5 x week for 4 weeks compared to Diclofenac sodium sustained release tablets	Huang & Song (2015)	LQ (-)	WOMAC	• Statistically significant difference ($p < 0.05$) between before-and-after scores for both moxibustion and medication groups. • Statistically significant difference ($p < 0.05$) between the moxibustion group and medication group change in scores.
• Herbal cake-partitioned moxibustion and oral administration of Diclofenac sodium sustained-release tablets appear to improve the knee functions of knee OA patients (1 x LQ RCT). • Herbal cake-partitioned moxibustion appears to have a statistically significant effect when compared to oral administration of Dicolofenac Sodium Sustained-release tablets in improving knee function of knee OA patients after 4 weeks of treatment (1 x LQ RCT)				
Needle acupuncture vs. laser acupuncture: 8 to 12 sessions over 12 weeks vs. no acupuncture vs. sham acupuncture	Hinman et al. (2014)	HQ (++)	NRS (0–10) WOMAC pain (0–20) WOMAC function (0–68) Pain on walking (NRS 0–10)	• NRS: Needle ($p = 0.002$) and laser ($p = 0.03$) groups statistically significant at 12 weeks compared to control, however, not at 1 year ($p = 0.14$ and $p = 0.19$ respectively). Neither needle nor laser significantly improved pain compared with sham at 12 weeks or 1 year ($p > 0.05$). • WOMAC pain: Needle compared with control group statistically different ($p = 0.05$) at 12 weeks and 1 year. No differences in the rest of the WOMAC pain outcomes ($p > 0.05$). • WOMAC function: Needle compared with control group statistically different ($p = 0.04$) at 12 weeks, however, not maintained at 1 year ($p = 0.11$). Nil other statistical differences ($p > 0.05$).

			Activity restriction (0–10) AQoL-6D	• Pain on walking: Statistically significant at 12 weeks when comparing needling to control groups (p = 0.003), however, no other significant differences at 12 weeks (p > 0.05). No statistical differences remain at 1 year follow-up for any comparisons (p > 0.05). • Activity restriction: No statistically significant difference when comparing any of the groups at 12 weeks (p > 0.05). Needling group when compared to control statistically significant at 1 year (p = 0.02). • AQoL-6D: Nil significant difference between groups (p > 0.05).
• Neither laser nor needle acupuncture significantly improved pain or function compared with sham at 12 weeks in patients older than 50 years with moderate or severe knee pain (1 x HQ RCT). • Appears to be no significant difference in pain or function between laser acupuncture, needle acupuncture, sham laser, and control (no treatment) at 1 year (1 x HQ RCT). **Study has been criticised for inadequate dose of LA**				
Warm needling moxibustion: 12 sessions vs. no treatment	Wang et al. (2017)	LQ (-)	WOMAC - Total - Pain - Stiffness - Difficulty in daily living	• WOMAC total: Reduced in the observation group after treatment (P < 0.01), but no significant change was observed in the control group (all P > 0.05). • The pain score, stiffness scores, and total score of WOMAC in the observation group were lower than those in the control group (P < 0.01, P < 0.05). • The score of daily function activities was declined in the observation group, but not significantly different from that in the control group (P > 0.05).
• Appears to be a significant difference in WOMAC total, pain, and stiffness scores in favour of the warm needling moxibustion group, however, no difference in daily functional activity scores compared to the no treatment group post-treatment (1 x LQ RCT).				
EA over 21 sessions compared to meloxicam	Gang et al. (2016)	LQ (-)	WOMAC - pain, stiffness, daily function, and total score 8-foot walking test	• No significant difference between groups in WOMAC scores (p > 0.05). • 8-foot walking test: Result in the EA group was significantly less than that in the meloxicam group (p < 0.05). • 5-time sit-to-stand test: Result in the EA group was significantly less than that in the meloxicam group (p < 0.05).

			5-time sit-to-stand test	
• Appears to be no significant difference in WOMAC pain, stiffness, daily function or total scores between EA and meloxicam post-6 weeks of treatment (1 x LQ RCT). • Appears to be a significant difference in the function tests of 8-foot walking test and 5-time sit-to-stand test in favour of EA compared to meloxicam post-6 weeks of treatment (1 x LQ RCT).				
Moxibustion 3 x week for 4 weeks + usual care	Kim et al. (2014)	HQ (+)	NRS (0–10) K-WOMAC pain Timed stand test 6-minute walk test K-WOMAC global	• NRS: Statistically significant difference between intervention and control at 5 weeks and 13 weeks ($p < 0.01$), however, small effect sizes at 5 weeks (0.0073) and 13 weeks (0.0075). • K-WOMAC pain: Statistically significant difference between intervention and control at 5 weeks and 13 weeks ($p < 0.01$) with comparatively large effect size at 5 weeks (0.0532) and 13 weeks (0.0595). • TST: Statistically significant difference at 5 weeks ($p = 0.0486$) and 13 weeks ($p = 0.0006$). • 6 min: No significant improvement at 5 weeks ($p = 0.51$) and at 13 weeks ($p = 0.68$). • All results of the physical performance tests showed relatively small effect sizes at 5 weeks (0.0021 in the timed-stand test and 0.0008 in 6-minute walk test) and 13 weeks (0.0307 and 0.0004 respectively). • K-WOMAC global: Significant difference between the two groups at 5 weeks and 13 weeks ($p < 0.01$) with a small to medium effect size observed at 5 weeks (0.0477) and 13 weeks (0.0518). However, when results were grouped by severity of OA the result was only statistically significant for mild severity ($p < 0.01$ at 5 and 13 weeks) and not moderate to severe severity ($p = 0.2554$ at 5 weeks and $p = 0.3021$ at 13 weeks).
• Moxibustion plus usual care appears to have a small to medium effect on improving pain and function at 5 and 13 weeks for patients suffering with mild severity knee OA (1 x HQ RCT). • Appears to be no significant difference in pain or function between moxibustion plus usual care and usual care alone at 5 and 13 weeks for patients suffering from moderate to severe severity knee OA (1 x HQ RCT).				

Cupping 2 x week for 4 weeks + paracetamol	Teut et al. (2012)	AQ (+)	VAS pain WOMAC pain WOMAC function SF-36 physical SF-36 mental	• VAS: Statistically significant at 4 weeks (p = 0.005). Statistically significant at 12 weeks (p = 0.036). • WOMAC pain: Statistically significant at 4 weeks (p = 0.041). Not statistically significant at 12 weeks (p = 0.086). • WOMAC function: Statistically significant at 4 weeks (p = 0.001). Statistically significant at 12 weeks (p = 0.031). • SF-36 physical: Statistically significant at 4 weeks (p = 0.030). Statistically significant at 12 weeks (p = 0.019). • SF-36 mental: Not statistically significant at 4 weeks (p = 0.233). Not statistically significant at 12 weeks (p = 0.831).
• Pulsatile cupping appears to have a statistically significant effect when compared to no intervention in improving knee pain and function of knee OA patients after 4 weeks of treatment at the 4 week and 12 assessments (1 x AQ RCT).				
Cupping therapy over 11 sessions compared to medication (acetaminophen 650 mg)	Khan et al. 2013	LQ (-)	5-point assessment scale - Pain - Morning stiffness - Disability	• Pain response: The effect of both the cupping and acetaminophen was statistically significant in relieving pain with P value in both the cases being < 0.0001. The percentage change in pain after treatment for cupping group was observed as 46.37% while the acetaminophen group had 43.055%. The comparable percentage change was 3.32% higher with the cupping group. • Morning stiffness: The effect of both the cupping and acetaminophen was significant with P value in both the cases being < 0.0001. • Disability: The effect of both the cupping and acetaminophen was significant with P value in cupping group < 0.0010, whereas in acetaminophen was = 0.0248.
• Cupping and acetaminophen both appear to significantly reduce pain, improve morning stiffness, and reduce disability in patients with knee OA, however, no acceptable between-group comparison was made (1 x LQ RCT).				
EA: 28 sessions over 4 weeks compared to physiotherapy (intermediate frequency therapy)	Zhang et al. 2016	AQ (+)	WOMAC - Total - Pain - Stiffness - Physical function	• WOMAC total: Significant difference at 4 weeks compared with physiotherapy group. • WOMAC subscales (pain, stiffness and physical function): Significant difference at 4 weeks compared with physiotherapy group.
• EA appears to have a statistically significant difference at the end of 4 weeks of treatment when compared to physiotherapy (intermediate frequency therapy) in improving WOMAC total, pain, stiffness, and physical function sub-scores (1 x AQ RCT).				

Ankle sprain

A total of three SRs were identified that investigated the effectiveness of acupuncture in treating ankle sprains. No RCTs were found that were not included in the SRs. Included studies mainly investigated treatments that used a TCM framework and delivered traditional acupuncture, AA, EA, and warm acupuncture. Acupuncture interventions were mainly compared with usual care/standard physiotherapy (bandage and/or ice pack), massage, topical NSAIDs, and oral medication. The included studies considered three main types of comparisons: Acupuncture versus no treatment or placebo, acupuncture versus another standard non-surgical intervention, and acupuncture used in conjunction with other treatments to assess its effectiveness as an add-on treatment. Patients were generally between 18 and 25 years of age and had suffered an acute ankle sprain with a duration of less than a week. Most studies within the SRs included ankle sprains of mixed severity or did not detail severity. The number, duration, and frequency of treatment sessions was commonly between five and 15 sessions over 1 to 2 weeks. Length of follow-up was mostly short-term. Studies were generally of low quality and lacked validated outcome measures for the primary and secondary outcomes of interest within this review including pain, function, and QOL.

Systematic Reviews

Kim et al. (2014)

Kim et al. (2014) (QS: HQ (++)) presented a SR regarding the effectiveness of acupuncture in treating acute ankle sprains in adults. Twenty studies were included in the SR, however, only ten of these were relevant to this report (Ge et al. 2000; Hao et al. 2006; Jian 2004; Paris 1983; Shi et al. 2013; Sun et al. 2011; Yu et al. 1996; Yu 1999; Zhang et al. 2011; Zhang 2012). The included studies used a wide range of randomised and quasi-randomised trials, which considered two main types of comparisons: Acupuncture versus no treatment or placebo, and acupuncture versus another standard non-surgical intervention. The populations were mixed and the studies including adults and children or people with acute and chronic injuries. The majority of participants were adults with acute ankle sprains.

Ge et al. (2000) assessed the effectiveness of acupuncture plus Chinese herbal medicine as treatments for ankle sprain within a 10 day follow-up. Hao et al. (2006) compared the effectiveness between acupuncture and Chinese herbal application using 11 acupuncture points, versus topical Chinese herbal application alone, with application twice a day for 30 minutes for 7 days. Jian (2004) assessed acupuncture plus Chinese complex non-surgical intervention, versus Chinese complex non-surgical intervention alone. Paris (1983) used EA points of stimulation and standard physical therapy versus standard physical therapy alone. Shi et al. (2013) compared individual acupuncture treatment targeting two main points with an external application of Voltaren emulsion (an NSAID) three times a day for 2 weeks.

Sun et al. (2011) looked at the effectiveness of standardised acupuncture using one main point, in comparison to immobilisation with an elastic bandage. Fixed acupuncture was used as the intervention in Yu et al. (1996) targeting four points, versus external Chinese herbal drug application, versus acupuncture paired with external herbal Chinese drug application offered for 7 days, versus an ice pack applied for 5 to 10 minutes, once a day. Yu (1999) also compared fixed acupuncture targeting four points, however compared it against Dolobene gel (an NSAID) application applied twice a day for 7 days, versus acupuncture plus Dolobene gel application.

Zhang et al. (2011) assessed semi-standardised manual acupuncture treatment using more than three points plus external herbal drug application, versus Chinese herbal drug application alone. Zhang (2012) compared standardised manual acupuncture with moxibustion with more than six points plus electro-physiotherapy, versus electro-physiotherapy alone for 20 minutes per day with a duration of 30 sessions.

Ge et al. (2000) found that the acupuncture group had a greater cure rate at 10 days compared with oral herbal drugs alone (48/50 versus 22/30; RR 1.31, 95%, CI 1.05 to 1.64). The Jian (2004) study showed that at 7 days follow-up the acupuncture plus Chinese complex non-surgical intervention group had better cure rates than the Chinese complex non-surgical control (48/48 vs. 42/48; RR 1.14, 95% CI 1.02 to 1.28). Paris (1983) showed that EA points stimulation with physical therapy was more effective than physical therapy alone in terms of the time to stop treatment (the recovery of the injured ankle took 3 days less with acupuncture: MD -3.00 days, 95% CI -5.48 to -0.52 days) and the time to recover plantar flexion-dorsiflexion range of movement (MD -7.25 days, 95% CI -10.41 to -4.09 days).

The difference between the two groups in the recovery times for three other characteristics of an injured ankle joint were not statistically significant: Time to recover, inversion-eversion, range of movement (MD -3.00 days, 95% CI -7.80 to 1.80 days), time to reduction of oedema (MD -0.12 days, 95% CI -5.51 to 5.27 days), and time to recovery from pain (MD -2.75, 95% CI -6.18 to 0.68). Shi et al. (2013) showed that after the 2 week follow-up the acupuncture intervention group had less pain in comparison to the external application of Voltaren emulsion (NSAID) control (MD -1.06, 95% CI -1.64 to -0.48). The Sun et al. (2011) study showed no significant difference in cure rate after the 2 week follow-up between the acupuncture intervention group and the control (immobilisation with elastic bandage) group (40/41 vs. 38/41; RR 1.05, 95% CI 0.95 to 1.16). However, it did show a significant difference in time for ankle pain to subside in the intervention group (MD -3.40 days, 95% CI -3.88 to -2.92 days). The Yu et al. (1996) study did not show any significant difference in cure rate at the 7 day follow-up between the acupuncture intervention and the ice pack control (15/30 vs. 16/29; RR 0.91, 95% CI 0.56 to 1.47). Having said this, Yu (1999) found a better cure rate at 7 days in the group allocated by a combination of acupuncture and topical NSAIDs (Dolobene gel) (47/50 versus 40/50; RR 1.18, 95% CI 1.01 to 1.37).

Hao et al. (2006) and Yu et al. (1996) both found higher cure rates within the acupuncture groups whereas all participants in both groups were cured in Zhang (2011) at follow-up. In addition, a significant difference in cure rate in favour of acupuncture was seen (177/183 vs. 141/163; RR 1.11, 95% CI 1.04 to 1.18). However, the results were significantly heterogeneous (I2 = 97%), and the results were no longer statistically significant when a sensitivity analysis using a random-effects model was performed (RR 1.17, 95% CI 0.78 to 1.78). Zhang (2012) showed a higher cure rate for the acupuncture plus electro-physiotherapy intervention group in comparison to the electro-physiotherapy control group, which was borderline statistically significant (32/34 vs. 26/34; RR 1.23, 95% CI 1.00 to 1.51).

Study	SIGN rating	Conclusions	Quality of evidence
Kim et al. (2014)	Level 1+ HQ (++)	The evidence does not provide reliable support for either the effectiveness or safety of acupuncture treatments, alone or in combination with other non-surgical interventions; or in comparison with other non-surgical interventions. The review lacked validated outcome measures for the primary and secondary outcomes of interest within this review.	Based on 10 RCTs of low quality and high risk of bias.

Cao et al. (2014)

Cao et al. (2014) (QS: AQ (+)) conducted a SR which assessed the available evidence for the effectiveness and safety of cupping for the treatment of different types of pain. A total of 16 studies were included in this review and out of these 11 were relevant to musculoskeletal conditions (Chen 2009; Cramer 2011; Farhadi 2009; Kim 2011; Kim 2012; Lauche 2011; Lauche 2013; Oyang 2001; Teut 2012; Wu et al. 2013; Wu et al. 2007). One study (Wu et al. 2007) looked at ankle sprains. Wu et al. (2007) assessed the effectiveness of wet cupping with cups applied and retained for 10 minutes once daily, in comparison to a wait list control for a total of 5 days.

No individual data was provided within the review (only meta-analysis results), therefore, no conclusions can be made regarding the subgroup of ankle sprains. The review found moderate evidence that cupping is more efficacious than no treatment or other treatments (such as heat therapy, usual care, and conventional medications) in reducing pain over the short term (within 4 weeks), however, this was based on a variety of pain conditions.. The review did find that wet cupping, mainly on ashi points, was the most commonly used method (68.75% trials) for treating pain.

Study	SIGN rating	Conclusions	Quality of evidence
Cao et al. (2014)	Level 1 AQ (+)	The available evidence in this review is insufficient to draw conclusions on cupping for ankle sprains.	Based on one RCT of low quality and high risk of bias.

Park et al. (2013)

Park et al. (2013) (QS: AQ (+)) presented a SR investigating the effectiveness of acupuncture in treating ankle sprains. Seventeen studies were included in the SR; 11 were relevant to the report (Sun et al. 2011; Zheng et al. 2010; Tang et al. 2010; Luo et al. 2009; Zhao 2005; Wang 2005; Li 2002; Ge et al. 2000; Yu 1999a; Yu 1999b; Yu et al. 1996). The included studies assessed both adults and children. Acupuncture was used as a comparison to a control, however, it was also used in conjunction with other treatments to assess its effectiveness as an add-on treatment.

Sun et al. (2011) assessed the effectiveness of a 14-session (once daily for 14 days) intervention, which was comprised of MA targeting a single point, plus functional exercise (elastic bandage), versus functional exercise as a stand-alone control. Zheng et al. (2010) investigated the efficacy of cotton pad pressure, plus bandage, plus ice pack and MA for a single acupoint, in a 15-session (once daily for 15 days) intervention. This was compared to a control, which included cotton pad pressure, plus bandage, plus ice pack, leaving out the acupuncture treatment. Tang et al. (2010) looked at the effectiveness of a 10-session (once daily for 3 days) EA targeting 10 points, plus massage and infrared radiation (IR) treatment interventions, in comparison to a massage and IR treatment control. Luo et al. (2009) also compared the effectiveness of EA, however, they used a 12-session regimen, which targeted four points and compared it with NSAIDs (diclofenac) as the control. Zhao (2005) studied the effectiveness of EA alone targeting 2 points for 14 sessions (once per 2 days for 4 weeks), versus medicine, including oral (indomethacin), topical (diclofenac) NSAIDs, and hot pack treatment. Wang (2005) also compared EA alone as its intervention, however, they used a five-session (once daily for 5 days) regime targeting six main points. This intervention was compared against IR as the control. Li (2002) assessed MA, which ran for eight sessions (once daily for 8 days) plus herbal medicine as the intervention versus oral and topical herbal medicine alone.

Ge et al. (2000) looked at a 10-session MA plus herbal medicine treatment as the primary intervention and assessed its effectiveness by comparing it to oral herbal medicine alone as the control. Yu (1999a) and Yu et al. (1996) had similar interventions, both assessing MA in combination with ice pack treatments. Yu et al. (1996) used a seven-session (once daily for 7 days) herbal medicine as its add-on treatment; Yu (1999a) used a 14 session (twice daily for 7 days) standard medicine. Yu et al. (1999a) used three control groups; group B used medicine in combination with ice pack treatment, group C received ice pack alone, and group D received MA alone. Yu et al. (1996) had similar control groups, with group B receiving herbal medicine along with ice pack treatment, group C receiving ice pack alone, and group D receiving MA alone. Both Yu (1999a) and Yu (1999b) used a 14-session (twice daily for 7 days) regime, however, Yu (1999b) assessed the effectiveness of MA along with medicine versus topical medicine, topical NSAIDs (ibuprofen) as well as MA.

Sun et al. (2011) showed that MA plus functional exercise was significantly better than the functional exercise control, with reference to the patient-reported global assessment ($P < 0.05$). However, the intervention group was significantly longer in time for pain to disappear than the control ($P < 0.05$). The intervention for Zheng et al. (2010) included cotton pad pressure, plus bandage, plus ice pack, plus MA and EA. This intervention group was significantly better than the control, which was determined using the patient-reported global assessment for cure rate ($P < 0.05$). The same result was seen using the patient-reported global assessment for efficacy rate ($P < 0.05$). Moreover, using the time to cure measure, the intervention was significantly lower than the control ($P < 0.05$). Tang et al. (2010) showed that the intervention group, which included EA, massage, and IR, was significantly better than the control group consisting of massage and IR measured using the patient-reported global assessment ($P < 0.05$). Having said this, in assessing the recurrence rate, the intervention was significantly lower than the control ($P < 0.01$). Luo et al. (2009) showed that the intervention of EA was significantly better than the control of medicine and topical NSAIDs (diclofenac) through using the patient-reported global assessment ($P < 0.05$). Zhao (2005) also proved the EA intervention to be successful, however, this study used medicine, hot pack, and oral and topical NSAIDs as its

control. This result was measured using the patient-reported global assessment for cure rate ($P < 0.05$).

Results for efficacy rate for the same study were equal to that of the cure rate with the intervention being significantly better than the control ($P < 0.05$). Results for Wang (2005) showed that the EA intervention was significantly better than the IR control ($P < 0.01$). Li (2002) showed that MA plus herbal medicine as an intervention was significantly better than the herbal medicine (oral and topical) control, according to the patient-reported global assessment for cure rate ($P < 0.05$). In assessing efficacy rate, the same patient-reported global assessment measure was used and the results resembled that of cure rate, with the intervention being significantly better than the control ($P < 0.05$).

The results for the Ge et al. (2000) study showed that the MA and herbal medicine intervention was significantly better than the herbal medicine (oral) alone control, which was assessed using the patient-reported global assessment ($P < 0.05$). Yu (1999a) showed that the MA and medicine intervention was significantly better than the control group of medicine (topical NSAIDs (ibuprofen)) according to the patient-reported global assessment measure ($P < 0.05$). The intervention was still significantly better for the other MA control group in this study ($P < 0.01$). These results were similar to that the Yu (1999b) study, were the MA plus medicine and ice pack intervention proved to be significantly better than the medicine and ice pack ($P < 0.05$). Having said this, the intervention also proved to be significantly better in comparison to the other ice pack control ($P < 0.01$) and the MA control ($P < 0.01$). Yu et al. (1996) showed similar results, with the MA, herbal medicine, and ice pack intervention being significantly better in comparison to the herbal medicine, ice pack: Topical control ($P < 0.05$), the ice pack alone control ($P < 0.01$) and the MA control ($P < 0.01$), using the patient-reported global assessment measurement.

Study	SIGN rating	Conclusions	Quality of evidence
Park et al. (2013)	Level 1+ AQ (+)	The available evidence in this review is insufficient to recommend acupuncture as an evidence-based treatment option for ankle sprain.	Based on 11 RCTs of low quality and high risk of bias.

Achilles Tendinopathy

One SR and one RCT were identified that reviewed the effectiveness of acupuncture for Achilles tendinopathy. Included studies investigated treatments which used a TCM framework and delivered EA and traditional acupuncture. Acupuncture interventions were compared with low frequency impulse treatment and eccentric exercise. Patients were all between 18 and 65 years of age and were generally over 40 years of age and suffering from chronic Achilles tendinopathy. The number of sessions ranged from 12 to 24, with one study utilising 12 sessions over 6 weeks, and the other utilising 24 sessions over 8 weeks. Length of follow-up was only in the short term and the study was of moderate quality.

Systematic Reviews

Cox et al. (2016)

Cox et al. (2016) (QS: AQ +) completed a SR on the effectiveness and safety of acupuncture therapies for the management of musculoskeletal disorders of the upper and lower extremities. The review contained one Achilles tendinopathy related study (Zhang et al. 2013), which looked at the effect of three weekly sessions for right weeks of acupuncture compared to strengthening and stretching exercises on patients with greater than a 2-month history of the condition.

Cox et al. (2016) reported that needle acupuncture is more effective than eccentric exercise in improving symptom severity for chronic Achilles tendinopathy. Statistically and clinically significant differences in symptom severity favoured needle acupuncture over exercise immediately post-intervention and at 16 weeks (mean difference in symptom severity post-intervention VISA-A: –19.5, 95% CI: –22.2, –16.8, and at 16 weeks –15.8, 95% CI: –18.0, –13.6). The differences were statistically but not clinically important at 24 weeks.

Study	SIGN rating	Conclusions	Quality of evidence
Cox et al. (2016)	Level 1 AQ (+)	Traditional needle acupuncture may be an effective therapeutic option in the short to medium term for patients with Achilles tendinopathy.	Based on one RCT of moderate quality with a low risk of bias.

Randomised Controlled Trial

Intervention	Study	QS	Outcome measure	Result
Electroacupuncture: 20 min treatment vs. low frequency impulse treatment	Yu et al. (2015)	LQ (-)	VAS pain score	• Pain in the EA group improved compared to that before treatment ($P < 0.01$). • Pain in the low frequency impulse treatment group had no obvious improvement when compared to before treatment.
• EA and low frequency impulse treatment post-treatment was not statistically significant ($P > 0.05$)				

Plantar Heel Pain

A total of seven SRs and one RCT was identified that reviewed the effectiveness of acupuncture for plantar heel pain. Included studies investigated treatments which used TCM or Western framework and delivered traditional acupuncture, TrP DN, EA, and warm needling acupuncture. Acupuncture interventions were mainly compared with exercise, sham acupuncture, insoles, or steroid injections. Patients were generally diagnosed with plantar fasciitis, however, a number of studies used the words 'plantar fasciitis' and 'plantar heel pain' interchangeably. Plantar fasciitis is a common cause of plantar heel pain, but plantar heel pain can also include wider issues, which may affect the relevancy of the results. The patients were commonly aged between 35 and 60 years old. The number, duration, and frequency of treatment sessions were often of two different treatment schedules, one of daily treatments

over a duration of 1–2 weeks, and the other of weekly sessions over 4–8 weeks. Studies were of low to moderate quality and mostly reported on follow-up times in the short and medium term.

Systematic Reviews

He and Ma (2017)

He and Ma (2017) (QS: AQ (+)) conducted a SR and meta-analysis on the effectiveness of TrP DN for plantar heel pain. Although the authors stated that the desired style of acupuncture was trigger point needling, the review also included RCTs that focused on warm needling, traditional acupuncture, and miniscalpal needling. The review identified seven RCTs (Zhang et al., 2011; Eftekharsadat et al., 2016; Li et al., 2014; Kumnerddee et al. 2012; Wang et al, 2016; Qian et al., 2015; Cotchett et al., 2014.

Pooled estimates of the included studies showed that TrP DN significantly reduced the VAS pain score (WMD = –15.50, 95% CI: –19.48, –11.53; P < 0.001) when compared with the control. The authors concluded that pain improvements were maintained throughout the 12-month follow-up (WMD = –24.10, 95% CI: –35.45, –12.75 95% CI; P < 0.001), which indicated that the intervention offered long-term effectiveness. However, the authors reported that the findings should be interpreted with caution due to the limitations in terms of substantial heterogeneity, poor quality, and small sample size.

Study	SIGN rating	Conclusions	Quality of evidence
He & Ma (2017)	Level 1 AQ (+)	Musculoskeletal trigger point needling effectively reduced plantar heel pain in the short term. Improvements in plantar heel pain were maintained at 6- and 12-month follow-up.	Based on seven RCTs of low to moderate quality with moderate risk of bias.

Salvioli et al. (2017)

Salvioli et al. (2017) (QS: AQ (+)) completed a SR and meta-analysis on the effectiveness of conservative, non-pharmacological treatment for plantar heel pain. The review contained one acupuncture-related study (Cotchett et al., 2014), which looked at the effect of six weekly sessions of TrP DN compared to placebo.

The study reported that there was a significant reduction in pain intensity (VAS) in the dry needling group compared to placebo at 3 month follow-up (MD: -18.20 (95% CI: -31.19; -51.21, P = 0.006)). Authors reported that moderate quality evidence resulted from this study because there was a moderate risk of performance bias.

Study	SIGN rating	Conclusions	Quality of evidence
Salvioli et al. (2017)	Level 1- AQ (+)	Moderate evidence was found in favour of dry needling being an effective treatment for pain in patients with plantar heel pain when compared to placebo at 3 month follow-up.	Based on one RCT of moderate quality with a moderate risk of bias.

Thiagarajah (2017)

Thiagarajah (2017) (QS: LQ (-)) undertook a SR to evaluate the effectiveness of acupuncture for reducing pain due to plantar fasciitis. The search was limited to RCTs that compared acupuncture with standard treatments, or real versus sham acupuncture. The study identified four studies (n = 144) (Zhang et al., 2011; Kumnerddee et al., 2012; Karagounis et al., 2011; Ebrahim et al., 2007). These included studies varied significantly in regard to population, style of acupuncture, and comparison group. The populations studied ranged from active amateur male recreational athletes in Karagounis et al. (2011), to predominately women from a rehabilitation outpatient department in Kumnerddee et al. (2012). EA was studied in Ebrahim et al. (2007) and Kumnerddee et al. (2012), while traditional acupuncture was studied in the remaining studies. The Zhang et al. (2011) comparator was sham acupuncture sites, while Kumnerddee et al. (2012), Karagounis et al. (2011), and Ebrahim et al. (2007) used standard treatment as the comparator including ice, stretching, strengthening exercises, and prefabricated insoles.

Ebrahim et al. (2007) found a significant difference in mean VAS pain reduction ($p < 0.001$) between the intervention of EA, stretching, and insoles compared to stretching and insoles only. Zhang et al. (2001) showed a significant difference in reduction in overall VAS scores in favour of real acupuncture compared to sham acupuncture at 1 month (20.3 ± 3.7 vs. 9.5 ± 3.6), however, there was no significant difference found at 3 months and 6 months. Karagounis et al. (2011) found a significant difference in reduction in the pain scale for plantar fasciitis scores in favour of the intervention group at 8 weeks ($p < 0.05$), but no significant difference after 4 weeks. Kumnerddee et al. (2012) showed a significant difference in reduction in VAS scores in favour of conservative therapy plus EA compared to conservative therapy only. The study concluded that acupuncture may be an effective treatment option for short-term management of plantar fasciitis. However, it should be noted that there is limited evidence regarding its overall effectiveness on a long-term basis.

Study	SIGN rating	Conclusions	Quality of evidence
Thiagarajah (2017)	Level 1	Acupuncture may provide short-term relief of pain in plantar fasciitis.	Based on four RCTs of moderate quality with

	LQ (-)	Limited evidence regarding the effectiveness of acupuncture and electroacupuncture on medium- to long-term outcomes.	moderate risk of bias.

Cox et al. (2016)

Cox et al. (2016) (QS: AQ (+)) completed a SR into the effectiveness and safety of acupuncture therapies for the management of musculoskeletal disorders of the upper and lower extremities. The review contained one plantar heel pain related study (Cotchett et al., 2014), which looked at the effect of six weekly sessions of TrP DN compared to placebo. The RCT by Cotchett et al. (2014) was also contained within the SR by Salvioli et al. (2017) as its only singular study on plantar heel pain, while the SR by He and Ma (2017) also examined this study.

Cox et al. (2016) reported that dry needling and placebo non-penetrating needle acupuncture have similar outcomes for recent onset plantar fasciitis. Statistically significant but not clinically important improvements in first-step pain and foot pain favoured needle acupuncture over placebo immediately post-intervention and at 12 weeks. No statistically significant differences between the groups' health-related QOL at 6 and 12 weeks was reported.

Study	SIGN rating	Conclusions	Quality of evidence
Cox et al. (2016)	Level 1 AQ (+)	Statistically significant but not clinically important improvements were found for dry needling when compared to placebo when treating pain in patients with recent onset heel pain. No statistically significant differences between dry needling and placebo groups' health-related QOL at 6 and 12 week follow-up.	Based on one RCT with low risk of bias.

Morihisa et al. (2016)

Morihisa et al. (2016) (QS: AQ (+)) completed a SR and meta-analysis on the effectiveness of dry needling as an intervention for lower quarter trigger points in patients with various orthopaedic conditions. The review contained one plantar heel pain related study (Cotchett et al., 2014), which looked at the effect of six weekly 30-minute sessions of trigger point dry needling compared to sham needling. The study reported a statistically significant difference in VAS ($p < 0.007$) and FHSQ ($P < 0.026$). Authors reported that moderate quality evidence resulted from this study and that overall, real DN was favoured over sham control.

Study	SIGN rating	Conclusions	Quality of evidence
Morihisa et al. (2016)	Level 1 AQ (+)	Moderate evidence was found in favour of DN being an effective treatment for pain in patients with	Based on one RCT of moderate quality with a

		plantar heel pain when compared to sham needling at 3-month follow-up.	high risk of bias.

Boyles et al. (2015)

Boyles et al. (2015) (QS: AQ +) conducted a SR on the effectiveness of trigger point DN based on high-quality RCTs for all body regions. The review contained 13 relevant studies with two of those studies related to plantar heel pain (Cotchett et al. 2014; Eftekharsadat et al. 2010). Cotchett et al. (2014) looked at the effect of TDN on plantar heel pain in comparison to sham DN. The patient population had a mean age of 54.4 ± 12.4 years and a mean duration of symptoms of 13.6 ± 12.2 months. The region treated was the distal lower extremity (soleus, gastrocnemius, quadratus plantae, flexor digitorum brevis, abductor hallicus, abductor digiti minimi, and flexor hallicus longus) and the outcome measures utilised were the VAS, FHSQ, SF-36, DASH 21, and Likert Scale. Eftekharsadat et al. (2012) looked at the effect of TDN in comparison to sham on trigger point plantar heel pain. The patient population was of mean age 50.3 ± 9.0 years and with a duration of symptoms greater than a month. The region treated was the gastrocnemius and "cuff muscles" relating to the leg and foot with the outcomes measures of interest being the VAS and ROM.

The results from Cotchett et al. (2014) showed a significantly greater decrease in VAS scores for the TDN group compared to the sham TDN group at 6 weeks ($p = 0.002$). There was also a significantly greater decrease in FHSQ pain scores for the TDN group compared to the sham TDN group at 6 week follow-up ($p = 0.029$). Eftekharsadat et al.'s (2010) results showed that mean VAS scores significantly improved when compared at baseline and when compared to the control group at 4 weeks post-intervention ($p < 0.001$), however, no significant change was shown in ankle ROM for TDN and control groups at any time period. The authors concluded that the majority of high-quality studies included in the review show measured benefit from TDN for MTrPs in multiple body areas, suggesting broad applicability of TDN treatment for multiple muscle groups. The two included studies on plantar heel pain both found a significant effect on VAS scores when compared to sham needling.

Study	SIGN rating	Conclusions	Quality of evidence
Boyles et al. (2015)	Level 1 AQ (+)	Limited evidence suggests that dry needling may be an effective treatment for pain in patients with plantar heel pain in the short term.	Based on two RCTs of high quality with a moderate risk of bias.

Clark and Tighe (2012)

Clark and Tighe (2012) (QS: AQ (+)) conducted a SR on the effectiveness of acupuncture for plantar heel pain. Five studies were included in the SR; three studies were deemed relevant to this report (Karagounis et al., 2011; Zhang et al., 2009; Vrchota et al., 1991). Zhang et al. (2009) assessed the specific efficacy of acupuncture point PC7, compared to the sham point LI4 for plantar fasciitis of over 3 months duration. Karagounis et al. (2011) compared acupuncture plus

standard treatment to standard treatment alone, while Vrchota et al. (1991) compared EA plus calf stretches plus insoles to two other groups: calf stretches and insoles only, and a sports medicine group which included the use of NSAIDs.

Karagounis et al. (2011) showed that both the intervention and comparison groups improved significantly. At week 8 follow-up the 'standard treatment' group 2 showed improvement in pain score with a reduction of 26%, while group 1 improved almost twice as much (47%) ($p < 0.05$). Zhang et al. (2009) found significantly greater improvement in the acupuncture group than the sham group at 1-, 3- and 6-month follow-ups. Significant decreases were also found in morning pain (from baseline) in the acupuncture group at all follow-ups ($p < 0.001$). Both of the groups showed significant decreases in activity pain and overall pain. Moreover, negative correlations were found between prior duration of plantar fasciitis and improvement. Vrchota et al. (1991) found that the pain score showed significantly more relief in the acupuncture plus calf stretches and insoles group compared to the sports medicine group ($p = 0.014$), however, not compared to the calf stretches and insoles only group.

Study	SIGN rating	Conclusions	Quality of evidence
Clark & Tighe (2012)	Level 1 AQ (+)	Acupuncture was effective in reducing plantar heel pain when it was combined with standard treatments. Negative correlation between prior duration of plantar fasciitis and improvement from treatment including electroacupuncture, calf stretches, insoles, and the use of NSAIDs.	Based on three RCTs of varying quality ranging from low to high with a moderate risk of bias.

Randomised Controlled Trials

One RCT that was not included in the previously reported SRs was identified that investigated the effectiveness of acupuncture interventions for plantar heel pain.

Intervention	Study	QS	Outcome measure	Result
Dry cupping therapy: 2 x week for 4 weeks vs. Electrical Stimulation Therapy	Ge, Leson & Vukovic (2017)	LQ (-)	VAS pain (0–10) FAAM LEFS Patient perceived function	• No statistical difference in VAS mean changes between intervention and control groups ($p = 0.39$). • No statistical difference in the functional outcome measures of FAAM ($p = 0.27$) and LEFS ($p = 0.08$) between intervention and control groups.
• No significant difference between dry cupping therapy vs. electrical stimulation therapy at 4-week follow-up (1 x LQ RCT).				

3.5 Findings – Safety and Risk

Safety and Risk

Although acupuncture is seen to have a relatively sound safety profile, adverse effects after and during treatment have been reported within the included studies of this evidenced-based review.

RCTs

Author	Treatment type	Practitioner qualifications & experience	Adverse events
Chen et al. (2015)	Moxi	Acupuncturists > 5 years training and experience; Licensed doctor	No adverse events in the 432 participants
Epsi-Lopez et al. (2017)	DN	Physical therapist with 10 years of clinical experience in TrP DN	Twelve (40%) patients experienced muscle soreness
Ge et al. (2017)	Cupping	Not reported	Not reported
Hinman et al. (2014)	Acu, LA	Eight family physicians registered as acupuncturists (mean, 33.3 years of clinical practice and 19.6 years of acupuncture experience)	Increased knee pain: Needling 10% of participants, laser 12%, sham 3%. Pain in other areas: All groups 2%. Tingling: All groups 2%. Nausea/dizziness: Needle 0%, laser and sham 2%. Tiredness: Needle 2%, laser 0%, sham 3%. Swelling: Needle 2%, laser and sham 0%. Sensitive skin: Laser 2%, needle and sham 0%.
Huang et al. (2015)	Moxi	Not reported	No adverse events occurred
Teut et al. (2012)	Cupping	Not reported	No adverse events were observed
Yu et al. (2015)	EA	Not reported	No obvious adverse reactions during and after treatment reported
Kim et al. (2014)	Moxi	Board-certified Korean medicine doctors or postgraduate traditional Korean medicine doctors with > 2 years of clinical experience following the standard 6 years of education in Korean medicine	From 1,158 moxibustion treatments there were 121 adverse reported events including first (n = 6) and second degree (n = 113) burns, pruritus and fatigue (n = 2). One severe adverse effect.
Zhou et al. (2014)	EA	Not reported	Not reported
Zhang et al. (2016a)	EA	Acupuncturists with practice experience of over 20 years	No adverse event reported
Khan et al. (2013)	Cupping	Not reported	Five patients experienced blister formation, seven experienced ecchymosis
Wang et al. (2017)	Moxi	Not reported	One patient experienced a minor burn

Gang et al. (2016)	EA	Not reported	Not reported
Gazi et al. (2011)	Acu, EA	Physician: Specialist in acupuncture in the pain clinic with > 15 years' experience	Adverse events were identified within the injection and acupuncture group: Local pain n = 1, lipothymia n = 1, epigastralgia n = 1
Seguru-Orti (2016)	DN	Not reported	Not reported
Glazov et al. (2014)	LA	All therapists were experienced GPs and members of AMAC	Flare-up of backpain in the week following 28% of treatments and some other adverse effect after 25% of treatments
McPherson et al. (2014)	TCM Acu	Practitioners were members of the British Acupuncture Council, with > 3 years post-qualification experience	80 adverse events were identified in 73 participants. Thirty events (37%) were classified as serious, and 50 (63%) were classified as non-serious
Wen et al. (2015)	Tui Na	Not reported	Not reported
Kizhakkeveettil et al. (2017)	Acu, moxi, EA, Tui Na, cupping	Licensed doctors of chiropractic and acupuncturists with more than 5 years of experience	Not reported
Carezo-Tellez et al. (2016)	DN	2 physical therapists with more than 10 years of experience	Soreness and local haemorrhages at the needling site occurred after DN in some cases
Li et al. (2009)	Tui Na	Not reported	Not reported
Michalsen et al. (2009)	Cupping	Not reported	No serious adverse events were reported. A regular minor adverse effect was a haematoma at the site of application of a cupping glass
Yang et al. (2009)	TCM Acu	License-certificated	No serious adverse events were reported. Side effects were reported by 5% of the patients. Most adverse effects were related to the local insertion of the needles, such as local pain after session, ecchymosis, and local paraesthesia during session
Johansson et al. (2011)	TCM Acu	Not reported	Minor adverse events were reported: Pain, bruise, tiredness, aggravation of existing symptoms
Rha et al. (2012)	DN	Not reported	No severe adverse events were reported
Yao et al. (2012)	TCM Acu	One acupuncturist was trained in medical acupuncture, and the other spent a full year at a Traditional Chinese Medicine Masters programme. Each had 3 years' experience.	No serious adverse events were reported
Hadianfard et al. (2014)	TCM Acu	Well trained physiatrist	No serious adverse events were reported. The adverse events of acupuncture were minimal and none of the patients required

			discontinuation of the sessions. Mild pain and bruises rarely occurred at the acupuncture sites and were transient.
Asheghan et al. (2016)	Acu	Not reported	Not reported
Rueda Garrido et al. (2016)	TCM Acu	Physician specialist in acupuncture with > 5 years of experience	No significant adverse events were reported. Two participants (2.9%) in the control group reported residual pain after a treatment session.
Zhong et al. (2013)	Not reported	Not reported	Not reported
Zhang et al. (2013b)	EA	Not reported	No severe adverse events noted. Neck pain – 1 x inv, 2 x control Headache – 2 x inv, 1 x control Dizziness – 1 x inv, 1 x control Bruise at acupoints – 2 x inv, 0 x control Pain at acupoint – 1 x inv, 0 control Chest discomfort – 1 x inv, 0 control Itching palm – 0 x inv, 1 x control Warm-feeling at the back – 0 x inv, 1 x control
Acosta et al. (2017)	LA	Not reported	Not reported, however, 10 patients dropped out either due to abandoning treatment or development of adverse reactions
Chung et al. (2016)	EA	Two Chinese medicine practitioners fully registered with the Chinese Medicine Council of Hong Kong. > 10 years of clinical experience and 5 years of full time training in Chinese medicine	Three patients (5.8%) from the DN group had complications: Two patients could not tolerate the pain during the intervention and one had a local haemorrhage
Arias et al. (2017)	DN	Physical therapist with 10 years of clinical experience	Minor adverse events were noted. Five patients assigned to the exercise plus TrP DN (25%) experienced muscle soreness after the first DN session.
Brennan et al. (2017)	DN	Certified in DN, had 17 years of clinical practice experience, and 4 years of experience in DN	No adverse events were reported. The typical side effects associated with needle penetration/injection, such as temporary pain, bruising, and post-treatment soreness, were not documented as adverse effects.
Hsu et al. (2017)	TCM Acu	Not reported	No serious adverse events were reported. Light haemorrhage or haematoma was the most common adverse event.
Kibar et al. (2017)	LA	Not reported	No adverse events were reported. Study reported: 6 patients, 2 from LA and 4 from control group discontinued intervention due to medical reasons
Lewis et al. (2017)	Acu, LA	All physiotherapists providing treatments had	No significant adverse events were reported

		completed a minimum of 80 hours training in acupuncture	
Perez et al. (2017)	DN	Physical therapists with > 5 years of experience	Not reported
Uygur et al. (2017)	DN	Study reported: All interventions were performed by a single, experienced physiotherapist	Mild adverse events were noted: 2 patients could not tolerate the pain during the intervention and 1 had a local haemorrhage
Jiang et al. (2013)	TCM Acu	Not reported	No adverse events reported

SRs

Author	Treatment type	Practitioner qualifications & experience	Adverse events
Choi et al. (2012)	Moxi	Not reported	One of the included eight studies reported adverse events in drug therapy, however, failed to report the details
Clark et al. (2012)	TCM Acu	Not reported	Minor adverse effects were noted within one of the included studies
He et al. (2017)	DN	Not reported	Three studies of seven studies reported adverse events relating to needle site pain
Park et al. (2013)	TCM Acu, EA, WA	Not reported	No reported adverse events for intervention group. Two studies reported on adverse events.
Salvioli et al. (2017)	DN	Not reported	Three studies reported adverse events: Local bruising, increased pain
Thiagarajah (2017)	EA, DN	3/4 reported: Experienced professional; Physiatrist 2-year course and 6 years' experience; Registered TCM practitioner 2 years' experience	Adverse events were reported in three of the four included studies. Headaches and dizziness; loss of strength in the legs and mild local oedema around the area of needling; post-treatment soreness; bruising; distressed sensation in the chest.
Cao et al. (2014)	Cupping	Not reported	5 of the relevant studies reported mild to moderate adverse events related to cupping: Tingling, increased pain, haematoma, muscle pain
Law et al. (2015)	LA	SR reported: LA was performed by trained health care professionals in most of the trials; however, half of the studies failed to report this clearly	Serious adverse events are noted, however, are not reported in this review
Hou et al. (2015)	EA, TA, TrP Acu	Not reported	Not reported
Lee et al. (2017)	Tui Na	Not reported	Not reported
Li et al. (2017)	Cupping	Not reported	Not reported

Madsen (2009)	Acu	Not reported	Not reported
Zhang et al. (2017)	Acu, EA, AA	5 studies reported duration of relevant training, 6 lengths of clinical experience, however, details not reported in SR	Four studies reported adverse events within this review
Song et al. (2016)	Moxi	Not reported	3 studies identified adverse events associated with intervention and the control
Morihisa et al. (2016)	DN	Not reported	Not reported
Boyles et al. (2015)	DN	Not reported	Not reported
Shim et al. (2016)	EA	Not reported	Not reported
Cox et al. (2016)	DN, TCM Acu	3/8 reported: Podiatrist; Licensed acupuncturist; Physiatrist; GP	No severe adverse events reported. Five studies reported minor adverse events: Fainting, dizziness, dyspepsia, anxiety, local pain, ecchymosis, local paraesthesia and bruising.
Kim et al. (2014)	TA, AA, EA	Not reported	One study reported on adverse events with no adverse events occurring in the acupuncture group
Chen et al. (2017)	EA	Not reported	One study reported on adverse events. Two patients in the EA group fainted
Choi et al. (2017)	Moxi	Not reported	Four studies reported adverse events within this review: Blisters, nausea, stomach pain, skin flushing, first and second degree burns
Kim et al. (2011)	Cupping	Not reported	Adverse events were reported in one of the two included studies:– Vaso-vagal shock
Asher et al. (2010)	AA	Not reported	29% (5 studies) reported some type of acupuncture-related adverse event
Lee et al. (2013)	Acu, EA	Not reported	One out of the ten included studies identified adverse events: Tiredness
Baxter et al. (2008)	EA	Not reported	Not reported
Cagnie et al. (2015)	DN	Not reported	Not reported
Gattie et al. (2017)	DN	Physiotherapists	Not reported
Hutchinson et al. (2012)	Acu	Not reported	Not reported
Liu et al. (2017)	DN	Not reported	Not reported
Yuan et al. (2015)	TCM Acu, cupping, Gua Sha, moxi, Tui Na	Not reported	8 studies reported on adverse events. Adverse events occurred in 5 of the 8: Local bleeding, numbness, aching, fainting, bruising
Liu et al. (2015)	DN	Not reported	Not reported

Lu et al. (2011)	Acu, EA	3/8 reported: > 140 hours, 3 years' experience; experienced medical acupuncturist; 4 years' training; physiotherapist; Accredited > 15 years' experience; senior physiotherapist > 10 years' experience; > 7 years' experience; > 140 hours training	Not reported
Vickers et al. (2012)	Acu	Not reported	Not reported
Lam et al. (2013)	Acu, AA, EA	Not reported	Not reported
Zhang et al. (2016)	Moxi	Not reported	Not reported
Manheimer et al. (2010)	TCM Acu	Not reported	No adverse events were reported; however, it was discussed
Chang et al. (2014)	Acu, LA	Not reported	Not reported
Jain et al. (2014)	Not reported	Not reported	Not reported
Moon et al. (2014)	EA, Acu, DN	Not reported	Adverse events were reported within 3 of the included studies: Bruising, fatigue, slight pain, sweating, low blood pressure
Qin et al. (2015)	Acu, EA	3/11 reported: Physician; professional acupuncturist; qualified acupuncturist	Reported within 3 of the included studies: Bleeding
Tough et al. (2009)	Acu, DN	Not reported	Not reported
Trinh et al. (2016)	Acu, EA, DN	Not reported	Adverse events were reported in 9 of the included studies: Pain, bruising, fainting, worsening of symptoms, local swelling, dizziness
Espejo-Antunez et al. (2017)	DN	7/13 reported: 8 years' experience; > 10 years' experience; > 5 years' experience; 12 years' experience; > 6 years' experience; completed TrP DN course; > 6 years' experience	Not reported
Tang et al. (2015)	Acu	Not reported	3 studies reported adverse events: Pain, no serious adverse events
Gadau et al. (2014)	Acu, moxi	3/5 reported	Adverse events reported in four studies: Blisters, scar tissue
Ji et al. (2015)	Acu, EA	Not reported	Adverse events reported in 3 of the included studies: Subcutaneous haemorrhage
Xu et al. (2013b)	TCM Acu	Not reported	Not reported

Sim et al. (2011)	Acu	Not reported	2 studies identified adverse events related to needle acupuncture
Li et al. (2014)	Acu, EA	Not reported	Not reported
Wang et al. (2017)	Cupping	Not reported	1 relevant study reported adverse events, however, details were not provided

Moxibustion

Choi et al. (2012) evaluated Zhang (2011) who assessed minor adverse events related to moxibustion intervention. This was in accordance with the Park et al. (2010) SR, which showed that moxibustion can cause several possible adverse events, including allergies, burns, and infection, meaning it is not entirely risk-free and should be monitored with a degree of caution.

Kim et al. (2014) attempted to evaluate safety by assessing the occurrence of adverse events that are associated with moxibustion using an RCT. One hundred and two participants were subjected to the moxibustion treatment and of these 121 adverse events were experienced at least once during the treatment periods. First degree burns, second degree burns, pruritus, and fatigue were all experienced. Roughly 47% of participants experienced at least one adverse event (mostly burn wounds) and the majority of the adverse events were second-degree burns.

Xu et al. (2013) identified four adverse events that were associated with moxibustion: Bruising, burns and cellulitis, spinal epidural abscess, infection caused spinal epidural abscess, and large superficial basal cell carcinoma. Of these, two of the treatments were self-administered, one was performed by an "untrained individual", and there was no information provided for the fourth.

Medication: Non-steroidal anti-inflammatory drugs (NSAIDs)

Park et al. (2013) noted mild adverse events. Yu (1999b) and Yu and Shou (1996) reported mild allergic responses to medication, which the patients did recover from at the end of the drug treatment. In addition, one RCT in the Choi et al. (2012) review, Zhang (2011), reported adverse events related to the drug therapy control (celecoxib 200 mg, one day for 6 weeks, n = 30), however, detail of the events and outcomes was not reported.

Extracorporeal shock wave therapy (ESWT)

Salvioli et al. (2017) reported adverse events in the Speed et al. (2003) study, involving syncope with active ESWT due to pain, which led to study withdrawal. Information regarding adverse effects was reported in Theodore et al. (2004), Rompe et al. (2003), Kudo et al. (2006), Haake et al. (2003), Gerdesmeyer et al. (2008), for ESWT, which included pain during treatment, oedema, skin redness, temporary paraesthesia, and one case of syncope for pain. Ye et al. (2015) showed adverse events related to pain after treatment, as well as sweating. Radford et al. (2006) was not able to be located for further investigation into these events.

Electroacupuncture (EA)

Zheng et al. (2012) looked at the effect of EA-related adverse events. The events were categorised into; seven cases of general adverse events reported in six articles, traumatic events that were reported in three articles with four cases, and two cases of other general events consisting of mainly fainting and a case of hyperventilation syndrome after EA

treatment for the first time. The adverse events, which were reported in nine articles, including 37 cases, were categorised into five subgroups:

- *Peripheral nerve irritation-related events* – four cases were reported, including aggravated Bell's palsy (n = 13) and oculomotor paresis accompanied by neuroparalytic keratitis (n = 1). All patients did, however, recover after 3 months of treatment, besides one case where a 65-year-old woman lost her eye sight permanently.
- *Cardiac-conduction block* – one article reported a total of 17 cases of atrioventricular block during the treatment of EA. All patients recovered besides one when the treatment was discontinued.
- *Electrical burn* – one case was reported of electrical burn with a patient who received EA on their leg. This sensation erupted 10 minutes post-treatment around the needle site. It is reported that this adverse event could be a result of intensified use of strong electric currents over a long-time period, however, there was not prognosis or treatment information and, therefore, the outcome of this adverse event can only be estimated.
- *Spasm* – three cases of spasms were reported within three articles, including a femoral neck fracture, a subluxation of the wrist joint, and a nape muscle spasm following EA treatment. Two patients made a recovery 1 week after treatment and the prognosis of the patient with the femoral neck fracture was not reported. It was reported that these adverse events were a combination of wrong operation of EA devices and strong electrical stimulation.
- *Irritable gastric ulcer* – two cases of irritable gastric ulcer were reported in two articles. Details surrounding the electric circuit was not reported. One patient experienced stomach pain, vomiting of blood, and unconsciousness at the time of maximum electric current level. The patient had a history of stomach bleeding and long-term use of anti-inflammatory analgesics, which was reported to have caused the reaction to the EA treatment. This patient was discharged from hospital. The other patient experienced pain under the xiphoid bone and had nausea accompanied with chest tightness 13 minutes later. This patient recovered after surgery and 10 days of treatment, however, the reason for this adverse event was not clear.

Two of the included cases in this review were relevant to musculoskeletal conditions and were, therefore, extracted and analysed. Gao (1989) reported adverse events that were associated with scorch as a result of EA. Treatment was administered due to leg pain and the causality of the treatment and adverse event in this case was reported as certain. The second case, Chen (2009) identified an adverse event of Tardive fainting as a result of acupuncture. Acupuncture was given to alleviate lumbar strain. It was reported that the adverse event was a direct result of the treatment, and the patient did recover.

Stretching

Salvioli et al. (2017), identified an included study (Radford et al. 2007) which reported patients experiencing mild to moderate adverse events within a stretching group, including heel pain (n = 4), calf pain (n = 4), and pain in the lower limbs (n = 2).

Acupuncture

Zhang et al. (2010) conducted a review of the available Chinese-language literature on adverse events related to acupuncture. Adverse events within this review were categorised into traumatic events, which consisted of; nine cases of arachnoid and spinal dura mater, 201 cases of thoracic organs and tissues, 16 patients with abdominal organs and tissues, six cases of neck injuries, five articles that reported injuries to the eye, three cases reporting peripheral nerves, vessels, and other tissues, and four cases of needling site pain and broken needles. Infectious events consisted of nine cases of bacterial infection and two associated with viral infection. Other adverse events made up a total of 172 acupuncture-related events that were neither due to trauma nor to infection.

Of these adverse events four cases were relevant to the scope of this study, looking at musculoskeletal conditions. Liu (1992) identified adverse events that were reported to have a probable link between acupuncture treatment and the adverse event of tetanus. The reason for the initial acupuncture treatment was due to leg pain and the outcome of the adverse event was stated as a recovery. Secondly, Liu (2001) identified adverse events that were reported to be "certainly" associated with acupuncture treatment. Fainting post-treatment was identified with the AE experienced due to treatment conducted due to low back and shoulder pain.

Additionally, Liu (2007) also reported adverse events of fainting as a direct result of acupuncture treatment. Treatment was administered due to shoulder pain and, therefore, acupuncture points were within the shoulder site. It was reported that the patients in this case made a recovery. Kang (1994) reported adverse events of stroke that were reported as "probably" caused by acupuncture treatment. The treatment was administered due to arm pain and rheumatoid arthritis, and the acupuncture points were LI4, LI10, LI11, SJ3 and the outcome was recovery. It should be considered that no quality assessment was conducted in the entirety of this review for the included cases or case reports, therefore, the results can only be used as a general guide.

Xu et al. (2013) investigated case reports that identified adverse events for the years of 2000–2011, associated with acupuncture, moxibustion, and cupping:

Infections

The majority of acupuncture complications were infections, with 239 reported cases. Of these 239 reported infections, 48 of them were individual isolated incidents and 191 were reported as outbreaks. With reference to the safety and risk of the treatment, most of the papers did not report on practitioner training and four cases were treated by individuals with no medical training or licence, which increases the likelihood of adverse events and reduces the safety of the treatment. As a result of this, one patient in the Simmons (2006) case report died due to renal failure. All of the other cases of infection were treated and the patients recovered successfully.

Mycobacterium infection

One hundred and ninety-three out of the 239 cases of infection were identified as mycobacterium infections. It was reported by Song et al. (2006) that patients got infections from an oriental medicine clinic in Korea. Patients were given disposable needles, however, they developed skin lesions at two or more sites in the body. All patients did recover after the use of antibiotics.

The conclusion to this outbreak of infection was related to improper sterilisation of acupuncture equipment on the skin. Other outbreak cases revealed developing patterns of mycobacteriosis after reviving acupuncture. It was reported that needles were reused and kept in a container of glutaraldehyde disinfectant prior to the insertion. It was assumed that the container was not properly diluted with tap water. This was similar for other outbreaks reported by Koh et al. (2012), which confirmed that soft tissue infection from skin lesions was not directly related to whether disposable acupuncture needles were used. More so, it was the diluted disinfectant that was contaminated with Mycobacterium abscesses, as it was prepared several months earlier.

In addition, Woo et al. (2009) reported cases of infection as a result of improper infection control guidelines and highlighted that the guidelines should be strictly implemented to improve safety of the treatment to prevent such complication.

Staphylococcus infection

Acupuncture was associated with 19 cases from 14 case reports presenting staphylococcus infection. Murray et al. (2008) reported outbreak cases associated with invasive methicillin-resistant Staphylococcus aureus (MRSA), with six cases being associated with acupuncture. These six cases were a result from a breakdown in sterilisation techniques following treatment procedures, with MRSA being transmitted from the practitioner to the patients.

Other infections associated with acupuncture treatment included septic arthritis, necrotising fasciitis, pneumoretroperitoneum, facial erysipelas, HIV, *Listeria monocytogenes*-caused arthritis, and infections by *Enterococcus faecalis* and *Pseudomonas*. The possible causes of the infections were not reported, however, it was noted that reusable needles were only used in a few cases (Xu et al. 2013).

Organ and tissue injuries

Of the 38 cases of injuries, 13 of them were pneumothoraxes, nine were central nervous system injuries, four were peripheral nerve injuries, five were heart injuries, and seven were other organ and tissue injuries (Xu et al., 2013). Most of the paper failed to report on practitioner training or background and in three cases, patients were treated by practitioners with no medical training or licence.

Pneumothorax

Thirteen cases were noted. Pneumothorax was determined through X-ray. Most of the patient complaints from the acupuncture treatment were dyspnoea and chest pain. All the active 12 patients did recover, however, a 72-year-old woman died 90 minutes after an acupuncture treatment due to needle penetration of the thoracic cavity (Xu et al., 2013).

Central Nervous System Injury

Nine cases were noted, which were inclusive of five spinal cord and four brain injuries. Spinal related injuries were a result of migrating broken needles and the others were said to be a result of needling too deeply (Xu et al., 2013). Brain injuries were mostly due to needle insertion and the medulla injury was a result of a broken needle. However, as reported, three of the patients recovered from the injuries and the fourth was unknown as no information was provided upon the treatments completion (Xu et al., 2013).

Peripheral nerve injury

Four cases reported peripheral nerve injury as a result of acupuncture treatment, one of which (Lee et al., 2008) had a complication of median nerve neuropathy shortly after acupuncture treatment. Details for the other complications were not provided, however, it was noted that all of these cases including Lee et al. (2008), did recover (Xu et al., 2013).

Heart injury

Five cases experienced heart injury: Two of cardiac tampinade, one of the hemopericardium, one ventricular embolism and one myocardial injury. It was reported that two of these injuries were due to migration of embedded needles and two were caused by needle insertion (Xu et al. 2013). Two of the injuries were reported to be caused by an acupuncturist or TCM practitioner and one by an unauthorised acupuncturist (Xu et al. 2013). Three of the patients managed to recover, however, the outcomes of the other cases were not reported (Xu et al., 2013).

Other organ and tissue injuries

Overall, seven cases of other organ and tissue injuries were found, which included pseudoaneurysm of the abdominal aorta, a pseudoaneurysm of the popliteal artery, acute traumatic pancreatitis, an aortoduodenal fistula (which resulted in direct communication between the aorta and the GI tract), a rectus sheath haematoma, ear haematomas, and a popliteal arteriovenous fistula (Xu et al., 2013). Patient condition did improve with fasting and intravenous fluids, however, one patient died, but details of the death were not provided (Xu et al., 2013).

Other complications associated with acupuncture

Xu et al. (2013) reported seven other complications associated with acupuncture. Bilateral hand enema, epithelioid granuloma at needling sites, pseudolymphoma, localised argyria, pustules, pancytopenia, and scars at needling sites. These complications were predominantly caused by needles embedded 20 and 17 years earlier. Additionally, epithelioid granulomas were a result of the silicone coating on the needles and the scar resulted from a hot needle technique in which the needles were heated with fire before insertion.

In addition to this, Lee (2013) identified adverse events within the review, including Kittang et al. (2001), which highlighted one patient reporting more energy and three others reporting tiredness at 1 week and 2 weeks, respectively in the acupuncture group. Sixteen patients reported GI problems at 1 week, and 12 patients did so at 2 weeks in the medication group. Araki et al. (2001), Liu and Li (2010), Lan (2009), and Kennedy et al. (2008) did not report any adverse events.

Adverse reactions associated with acupuncture

Xu et al. (2013) reports a total of ten cases that identified acupuncture as being responsible for adverse reactions; three of syncope from two reports; two of galactorrhoea (spontaneous milk flow); one of bilateral nystagmus; one of pyoderma gangrenosumdue to immune reaction, in which the tissue became necrotic and deep ulcers formed; one of hepatotoxicity; one of eruptive lichen planus; one of spontaneous needle migration. The cases were uncommon to regular acupuncture practice. It is reported that these adverse reactions were a result of a rare physiological reaction the acupuncture needle (Xu et al., 2013).

Authors cautioned that if the needles had been placed near a vital organ, it could have resulted in further complication as a result of needle depth. The syncope cases occurred immediately or several minutes after a first acupuncture treatment and patients were reportedly sitting or semi-recumbent during treatment (Xu et al., 2013).

Clark et al. (2012) noted minor adverse effects within the Karagounis et al. (2011) study. Details of these adverse events are not reported in the review, however, are explained in the Thiagarajah et al. (2017) review. The Thiagarajah et al. (2017) review included four studies, of which three reported adverse events, which were all associated with the intervention. Karagounis et al. (2011) reported that three patients in the acupuncture treatment group had headaches and dizziness, while one had loss of strength in the legs and mild local oedema around needle area. Kumnerddee et al. (2012) noted that three patients had post-treatment soreness as a result from EA treatment. Zhang et al. (2011) reported several adverse reactions other than pain from the acupuncture treatment, such as mild oedema around the area of needling, bruising, and one patient with a "distressed sensation" in the chest.

MacPherson et al. (2014) reported a total of 80 adverse events in 73 participants. Thirty events (37%) were classified as serious, and 50 (63%) were classified as non-serious. No reported serious adverse events were considered probably or related to either intervention. Serious or non-serious adverse events categorised as possibly related to acupuncture were bruising, swelling, or numbness; muscle spasms; pain; and respiratory problems. Pain and incapacity, knee injury, and muscle spasms were possibly related to Alexander lessons; pain and incapacity, and complications after surgery were considered to be possibly related to usual care. There were three withdrawals each due to serious adverse events within the acupuncture and Alexander technique groups, with the usual care group having no withdrawals. Yang et al. (2009) reported no serious adverse effects. In the acupuncture treatment group, side effects were reported by 5% of the patients. Most adverse effects were related to the local insertion of the needles, such as local pain after session, ecchymosis, and local paraesthesia during session. Acupuncture was well tolerated by patients and no one discontinued prematurely because of needle-related side effects. In the steroid treatment group, the most frequently noted adverse effects were nausea and epigastralgia. Side effects from steroids were reported by 18% of the patients. Four patients dropped out due to intolerance of severe epigastralgia with nausea.

Gadau et al. 2014 reported adverse events in four studies (Irnich et al., 2003; Grau et al., 1999; Xu 2010; Jin et al., 2005). The studies by Irnich et al. (2003) and Grua et al. (1999) stated that no adverse event was observed during acupuncture treatment. The studies by Jin et al. (2005) and Xu et al. (2010) both reported that blister-forming ginger moxibustion resulted in permanent scar tissue. However, it is unknown if the subjects of the latter two studies were informed in advance that scarring might result after the course of treatment, in which case the permanent scar tissue might not be considered an adverse event.

Dry needling

Epsi-Lopez et al. (2017) identified 12 patients that were assigned to the manual therapy and exercise plus trigger point, dry needling (TrP DN) group (40%) who experienced muscle soreness after TrP DN, which resolved spontaneously within 36 to 48 hours. No other adverse events were reported by the participants.

He et al. (2017) considered the likelihood of steroid injection leading to serious adverse events such as recognised risk of subsequent plantar fascia rupture (Landorf et al., 2008, Acevedo et

al., 1998). In addition, three studies within this review reported adverse events (Cotchett et al., 2014, Zhang et al., 2011, Kumnerddee et al., 2012), which related to needle site pain, however, which studies exhibited these events was not reported in this review. Although TrP DN effectively reduced heel pain due to plantar fasciitis, dry needling was considered responsible for adverse events (needle site pain or subcutaneous bleeding). The incidence of adverse events was similar between intervention and control.

Ji et al. (2015) reported adverse events associated with the included studies (Chen 2010; Zhang 2012; Lui 2012; Dong et al. 2008; Ye et al. 2015). Chen (2010) had two cases where subcutaneous haemorrhage occurred after needling in the treatment group. The symptom of blood stasis disappeared after three or four days of hot pack. The remainder of the included studies did not report adverse events associated with either the intervention or control groups (Zhang 2012; Liu 2012; Dong et al. 2008; Ye et al. 2015).

Acupuncture/laser/sham laser

Hinman et al. (2014) reported adverse events relating to an increase in knee pain for 10% of participants as a result of needling, 12% for laser, and 3% for sham laser treatment. Pain in other areas and a reaction of tingling was experienced by 2% of all three groups. Nausea and dizziness was not noticed in the needle group, however, 2% of the laser and sham groups experienced dizziness. Two percent of participants receiving needles experienced tiredness, 0% for laser, and 3% for sham. Two percent of participants had swelling from the needle and laser and 0% from the sham laser. Two percent of participants were identified with sensitive skin in conjunction with laser and needle, and 0% for sham.

Dry cupping

Cao et al. (2014) identified five relevant studies that experienced adverse events as a result of cupping therapy. Cramer et al. (2011), Kim et al. (2012), Lauche et al. (2011), Lauche (2013), and Teut et al. (2012) all experienced mild to moderate adverse events (10.3% reporting haematoma at the treated site, 10.3% reporting increased pain in the original location after cupping or pain at the targeted area, and 7.5% reporting muscle soreness or tingling in the original site of pain after treatment). Just over 10% reported cupping and were related to ecchymoses, which are regarded as normal reactions after cupping treatment and tend to automatically disappear within a few days. It is also recorded that treatment is often more successful when ecchymoses occurs, due to a higher level of qi and blood circulation. Other mild adverse events including pain and tingling were reported, however, it can be concluded that these adverse events do not discount the safety of the treatment. In addition, the other two relevant studies (Wu et al. 2007 and Kim et al. 2011) experienced no adverse events among cupping groups.

Teut et al. (2012) recorded mild haematomas in three of the patients at the cupping location on the skin, self-limiting light tingling sensations for a few minutes in the legs after cupping the knee in two patients, and an increase of chronic lower back pain in one patient. The study reported that no severe adverse events were noted. Xu et al. (2013) identified 10 adverse events associated with cupping. Most of the adverse events were minor: Keloid scarring, burns, and bullae. Several were serious: Acquired haemophilia A and stroke 14 hours after cupping on the back and neck, factitious panniculitis, reversible cardiac hypertrophy, and iron deficiency anaemia. These last two cases involved cupping with bleeding. In six cases, there was no

information on practitioner training; in the other four, treatment was self-administered, adding to the uncertainty for safe administration.

Incidence rates for major adverse events of acupuncture are best estimated from large prospective surveys of practitioners. There were four recent surveys of acupuncture safety among regulated, qualified practitioners. Within these four, two were conducted in Germany, (Melchart 2004, Witt et al., 2009) and two in the United Kingdom (MacPherson et al., 2001, White et al., 2009). These surveys confirm that serious adverse events after acupuncture are uncommon or are usually resolved shortly after treatment. The surveys covered more than 3 million acupuncture treatments all together and there were no deaths or permanent disabilities, and all those with adverse events fully recovered (Kim & Hsu, 2004). Therefore, in conjunction with the available evidence used to inform this report, acupuncture appears to have a very low rate of adverse events when conducted among licensed and qualified practitioners in the West (Xu et al. 2013; MacPherson et al. 2001; Melchart 2004; Witt et al. 2009).

Kim (2011) identified adverse events involved with cupping that were scarce and those that were reported were mild. Adverse effects of cupping were reported in one study (Farhadi 2008) within the reviewed RCTs. Within this study, three cases of fainting (vaso-vagal syncope) were reported as a result of wet cupping. Hing et al. (2006) did not report any adverse events.

Auriculotherapy

Asher et al. (2010) reported that of the total 17 studies, only five (29%) identified adverse events related to acupuncture treatment. The most common adverse events associated with acupuncture treatment were ear pain, tiredness, local minor bleeding, dizziness, nausea, and headache. This review did not report which particular studies reported these events. No other serious adverse events associated with auriculotherapy were reported.

A total of 13 RCTs that were included in this evidenced-based review reported adverse events. Gazi et al. (2011) did not provide details of the potential events experienced in the injection and acupuncture groups. Michalsen et al. (2009) reported no serious adverse events in either study group, however, stated that haematoma at the site of application of a cupping glass was a regular minor adverse effect. All scarified wounds healed without complication. None of the patients rated the cupping procedure as painful, and all patients in both groups perceived their study treatment as very tolerable. Glazov et al. (2014) reported that one subject pulled out due to an exacerbation of pain. Across the whole cohort a flare-up of back pain was experienced in the week following 28% of treatments and some other adverse effect after 25% of treatments. However, there was no significant difference in the frequency of flare of pain or other adverse effects between treatment groups.

Johansson et al. (2011) reported minor complications associated with needle penetration, however, mentioned that if pain or a bruise occurred, it resolved in a couple of days. Tiredness and aggravation of existing symptoms for a few days was defined as a common response to acupuncture treatment. Rueda Garrido et al. (2016) reported that no significant adverse effects related to the treatments were registered. Only two participants (2.9%) in the control group reported residual pain after a treatment session. This pain disappeared spontaneously in the following 24 hours.

Arias et al. (2017) reported that within the patients assigned to the exercise plus TrP DN group, five (25%) experienced muscle soreness after the first DN session, which resolved

spontaneously within 24 to 36 hours. No clinical adverse events were reported by the participants. Brennan et al. (2017) reported no adverse events through observations by the clinicians and self-reports from any subject members in either group. The typical side effects associated with needle penetration/injection, such as temporary pain, bruising, and post-treatment soreness, were not documented as adverse effects.

Within the study by Uygur et al. (2017) three patients (5.8%) from the DN group had complications: Two patients could not tolerate the pain during the intervention and one had a local haemorrhage. Moon et al. (2014) reported adverse events in three studies (Kwak et al. 2012; Cameron et al. 2011; Tough et al. 2010), but no serious adverse events were reported. Most of the reported mild adverse events occurring with acupuncture were bruising, fatigue, slight pain, sweating, and low blood pressure. Qin et al. (2015) reported adverse events, however, did not provide sufficient detail. Trinh et al. (2016) showed that acupuncture appears to be a safe treatment modality, as adverse effects were minor. Reported adverse effects included increased pain, bruising, fainting, worsening of symptoms, local swelling, and dizziness. These studies reported no life-threatening adverse effects.

Within the Tang et al. (2015) SR, three studies out of the four (Fink et al. 2002; Irnich et al. 2003; Li et al. 2014) reported adverse events. It was noted that these events were not serious, however, further detail was not provided. Heo et al. (2013) reported on three adverse events associated with acupuncture; of those only one was relevant to this study. Minimal adverse events were reported for Dyson-Hudson (2007), however, no details were provided. Sim et al. (2011) reported on two studies that described adverse events related to needle acupuncture: Weinstein et al. (2003) noted that 56 of 173 total adverse events were related to needle acupuncture, and Yang et al. (2009) found an adverse event rate of 5% in the needle acupuncture group. Both studies reported no serious adverse events resulting from needle acupuncture.

The following studies did not report any adverse events and, therefore, were not included within the analysis above:

Seguru-Orti (2016)	Kizhakkeveettil et al. (2017)	Hadianfard et al. (2014)
Zhou et al. (2014)	Carezo-Tellez et al. (2016)	Asheghan et al. (2016)
Gang et al. (2016)	Li et al. (2009)	Zhong et al. (2013)
Zhang et al. (2016a)	Rha et al. (2012)	Zhang et al. (2013)
Ge et al. (2017)	Yao et al. (2012)	Baxter et al. (2008)
Khan et al. (2013)	Jiang et al. (2013)	Hutchinson et al. (2012)
Liu et al. (2017)	Lee et al. (2017)	Ma et al. (2015)
Liu et al. (2015)	Lu et al. (2011)	Manheimer et al. (2010)
Chang et al. (2014)	Shim et al. (2016)	Xu et al. (2013)
Jain et al. (2014)	Tough et al. (2009)	Zhang et al. (2016)
Law et al. (2015)	Wang et al. (2017)	Lam et al. (2013)
Li et al. (2014)	Acosta et al. (2017)	Kibar et al. (2017)
Cagnie et al. (2015)	Perez et al. (2017)	Lewis et al. (2017)
Zhang et al. (2013)		

4. Evidence Statements

4.0

Summary of Evidence Statements

Arthritic Neck Pain

1. **Limited low to moderate quality evidence is available on traditional Chinese medicine acupuncture and Tui Na massage for treating pain and disability associated with arthritic neck pain in the short to long term.**
2. **There is conflicting evidence regarding the benefits of traditional acupuncture on the outcomes of pain and function over the short-term in patients with arthritic neck pain when compared to sham interventions.** Based on two HQ++ SRs of level 1 and 1+ evidence and one AQ+ SR of level 1 evidence. The SRs included four relevant RCTs.
3. **The evidence suggests that acupuncture may have little to no effect in improving pain and disability in the long term for patients with arthritic neck pain when compared to sham interventions.** Based on two HQ++ SRs of level 1 and 1+ evidence and one AQ+ SR of level 1 evidence. The SRs included four relevant RCTs.
4. **The evidence suggests that Tui Na massage provides mostly positive effects on pain and disability for patients with arthritic neck pain when compared to manual therapy and traction.** Based on one AQ+ SR of level 1+ evidence. The SR included six relevant RCTs.
5. **Insufficient evidence is available on dry needling and other acupuncture therapies including electroacupuncture, auricular acupuncture, laser acupuncture, moxibustion, cupping, and Gua Sha scraping for patients with arthritic neck pain.**
6. **The length, number, and duration of treatment sessions were most commonly 20 to 30 minutes long, with 7 to 9 sessions over a period of 2 to 4 weeks.**

Non-Specific Neck Pain

7. **Moderate quality evidence is available on treatments using a traditional Chinese medicine framework and delivering traditional acupuncture and electroacupuncture for patients with non-specific neck pain.**
8. **The evidence indicates that traditional acupuncture and electroacupuncture are more effective than sham/placebo control in the short term for reducing pain and improving function for patients with non-specific neck pain, however, there is conflicting evidence regarding the long-term effect.** Based on two HQ++ SRs of level 1+ evidence, one AQ+ SR of level 1- evidence, and one LQ- SR of level 1 evidence. The SRs included six relevant RCTs.
9. **Limited low-quality evidence is available on treatments delivering dry needling, laser acupuncture and Gua Sha scraping for patients with non-specific neck pain.**
10. **The evidence suggests that dry needling may be more effective than sham dry needling in reducing pain in patients with non-specific neck pain at short-term follow-up.** Based on two AQ+ SRs of level 1 evidence and one AQ+ RCT. The SRs included one relevant RCT.
11. **The evidence indicates that laser acupuncture may be more effective than placebo for reducing pain in the short to medium term in patients with non-specific neck pain, but does not improve function.** Based on one HQ++ SR of level 1+ evidence. The SRs included two relevant RCTs.

12. **The evidence suggests that Gua Sha scraping may be effective in improving pain in patients with non-specific neck pain when compared to waiting list or heat pack.** Based on one HQ++ SR of level 1+ quality. The SR included two relevant RCTs.
13. **The evidence indicates that acupuncture interventions may be effective in reducing pain and improving function for patients with non-specific neck pain in the short term, however, there is little evidence supporting its sustained effect over the long term.**
14. **Insufficient evidence is available on other acupuncture therapies including auricular acupuncture, moxibustion, cupping, and traditional Chinese Tui Na massage for patients with non-specific neck pain.**
15. **The length, number, and duration of treatment sessions were most commonly 20 to 45 minutes long, with 5 to 10 sessions delivered over 3 to 5 weeks.**

Mechanical Neck Pain

16. **Limited low to moderate quality evidence is available on treatments using traditional Chinese acupuncture, electroacupuncture and dry needling for patients with mechanical neck pain.**
17. **There is conflicting evidence suggesting that traditional acupuncture may be more effective at reducing pain and improving disability in the short term for patients with mechanical neck pain when compared to sham acupuncture, however, the evidence does not provide support for a long-term effect.** Based on two HQ++ SRs of level 1+ evidence and one LQ- SR of level 1- evidence. The SRs included four relevant RCTs.
18. **There is conflicting evidence regarding the benefits of dry needling and electroacupuncture on the outcome of pain over the short term in patients with arthritic neck pain when compared to control interventions.** Based on one HQ++ SR of level 1+ evidence, three AQ+ SRs of level 1 evidence and one HQ++ RCT. The SRs included three relevant RCTs, two on dry needling and one on EA.
19. **Insufficient evidence is available on other acupuncture therapies including auricular acupuncture, laser acupuncture, moxibustion, cupping and Gua Sha scraping for patients with mechanical neck pain.**
20. **The length, number and duration of treatment sessions were most commonly 15 to 30 minutes long, with 5 to 15 sessions over a period of 4 to 5 weeks.**

Cervicogenic Headache

21. **Insufficient evidence is available on the outcomes of pain, function and quality of life using needle-based and other acupuncture therapies for patients with cervicogenic headaches.** Based on one LQ- RCT.

Radicular Neck Pain

22. **Limited low-quality evidence is available on treatments using traditional Chinese acupuncture and Tui Na massage for patients with radicular neck pain.**
23. **The evidence suggests that Tui Na massage provides mostly positive effects on pain, function and disability for patients with radicular neck pain when compared with traction.** Based on one AQ+ SR of level 1 evidence. The SR included nine relevant RCTs.

24. **The evidence indicates that traditional acupuncture interventions may be more effective than wait list or sham interventions for reducing pain at immediate to short-term follow-up for patients with radicular neck pain.** Based on two HQ++ SRs of level 1 + evidence. The SRs included two relevant RCTs.
25. **Insufficient evidence is available on dry needling and other acupuncture therapies including auricular acupuncture, laser acupuncture, moxibustion, electroacupuncture, cupping and Gua Sha scraping for patients with radicular neck pain.**
26. **The length, number and duration of treatment sessions were most commonly 15 to 30 minutes long, with 8 to 20 sessions over a period of 2 to 4 weeks.**

Whiplash Associated Disorders

27. **Limited low to moderate quality evidence is available on needle-based acupuncture therapies including dry needling, Chinese traditional acupuncture and electroacupuncture for patients with whiplash associated disorder.**
28. **The evidence indicates that acupuncture and electroacupuncture, alone or in combination with standard treatments, may be effective in reducing pain in the short to medium term when compared with usual care, sham electroacupuncture/acupuncture or medication for patients with whiplash associated disorders. However, the evidence does not provide support for improving function and disability.** Based on one HQ++ SR of level 1+ evidence and one AQ+ SR of level 1- evidence. The SRs included four relevant RCTs.
29. **The evidence indicates that acupuncture and electroacupuncture interventions may be effective in reducing pain in the short term, however, there is little evidence supporting its sustained effect over the long term and its effect on improving function and disability.**
30. **The evidence suggests that there is little or no difference between dry needling and sham interventions for the outcomes of pain and function in patients with whiplash associated disorders in the short and long term.** Based on one HQ++ SR of level 1+ evidence and three AQ+ SRs, two of level 1 and one of level 1- evidence. The SRs included two relevant RCTs.
31. **Insufficient evidence is available on other acupuncture therapies including auricular acupuncture, laser acupuncture, moxibustion, cupping, Gua Sha scraping, and traditional Chinese Tui Na massage for patients with whiplash associated disorders.**
32. **The length, number, and duration of treatment sessions were most commonly 15 to 30 minutes long, with 6 to 12 sessions over a period of 2 to 6 weeks.**

Rotator Cuff Pathology +/- Bursitis

33. **Limited low to moderate quality evidence is available on treatments delivering traditional acupuncture, electroacupuncture, laser acupuncture and dry needling for patients with rotator cuff pathology.**
34. **The evidence indicates that the addition of traditional acupuncture or electroacupuncture to an exercise programme may have little or no effect on outcomes for function, disability, and range of motion in patients with rotator cuff pathology.** Based on one HQ++ RCT.

35. **The evidence suggests that acupuncture and electroacupuncture may be more effective than sham/placebo acupuncture in reducing pain and improving function and quality of life in the short and long term for patients with rotator cuff pathology.** Based on one AQ+ SR of level 1+ evidence, one LQ- SR of level 1 evidence and one LQ- RCT. The SRs included four relevant RCTs.
36. **The evidence indicates that there is no significant difference between treatment with acupuncture and cortisone injection for the outcomes of pain and function in patients with rotator cuff pathology, but that acupuncture may not be as effective as platelet rich plasma injections.** Based on two AQ+ RCTs, one on acupuncture and one on dry needling.
37. **There is conflicting evidence regarding the benefits of dry needling in combination with exercise/physiotherapy on the outcomes of function and disability in patients with rotator cuff pathology when compared to exercise/physiotherapy alone. The evidence suggests that there is little or no effect on the reduction of pain.** Based on two AQ+ RCTs.
38. **There is limited and conflicting evidence regarding the benefits of laser acupuncture when compared to sham/placebo on the outcomes of pain, range of motion, disability, and function in patients with rotator cuff pathology.** Based on one HQ++ SR and one LQ- RCT. The SR included one relevant RCT.
39. **Insufficient evidence is available for other acupuncture therapies including moxibustion, cupping, Gua Sha scraping, and traditional Chinese Tui Na massage for patients with rotator cuff pathology.**
40. **The length, number, and duration of treatment sessions were most commonly 15 to 30 minutes long, with 4 to 10 sessions over a period of 4 to 7 weeks.**

Frozen Shoulder

41. **Limited low-quality evidence is available on treatments delivering traditional acupuncture or electroacupuncture for patients with Frozen Shoulder.**
42. **The evidence suggests that acupuncture or electroacupuncture, alone or in combination with physiotherapy or electrotherapy, may be effective for reducing pain, improving range of motion and function in patients with frozen shoulder when compared to physiotherapy or electrotherapy alone.** Based on one LQ- SR of level 1- evidence containing three RCTs and one LQ- RCT.
43. **Insufficient evidence is available on other acupuncture therapies including auricular acupuncture, laser acupuncture, dry needling, moxibustion, cupping, Tui Na massage, and Gua Sha scraping for patients with Frozen Shoulder.**
44. **The length, number, and duration of treatment sessions were most commonly 30 to 40 minutes long, with 8 to 10 sessions delivered over 4 to 6 weeks.**

Lateral Epicondylitis/Lateral Elbow Pain

45. **Low to moderate quality evidence is available on treatments using a traditional Chinese medicine framework and delivering traditional acupuncture and laser acupuncture for patients with lateral epicondylitis/lateral elbow pain.**
46. **The evidence suggests that traditional acupuncture provides short-term reductions of pain and improvements in strength and function in patients with lateral**

epicondylitis/lateral elbow pain when compared to placebo, sham, and ultrasound, however, there is conflicting evidence regarding the medium- to long-term effect. Based on one HQ++ SR of level 1 evidence and two AQ+ SRs of level 1 evidence. The SRs included 14 relevant RCTs.

47. **The evidence indicates that there is little or no difference between treatment with laser acupuncture and placebo/sham for the outcomes of pain and strength in patients with lateral epicondylitis/lateral elbow pain.** Based on one HQ++ SR of level 1+ evidence, one AQ+ SR of level 1 evidence and one LQ- SR of level 1- evidence. The SRs included eight relevant RCTs.
48. **Insufficient evidence is available on other acupuncture therapies including auricular acupuncture, electroacupuncture, dry needling, moxibustion, cupping, Gua Sha scraping, and traditional Chinese Tui Na massage for patients with lateral epicondylitis/lateral elbow pain.**
49. **The length, number, and duration of treatment sessions were most commonly 20 to 30 minutes long, with around 10 sessions delivered over 2 to 6 weeks.**

Carpal Tunnel Syndrome

50. **Limited low to moderate quality evidence is available for treatments using a traditional Chinese medicine framework and delivering traditional acupuncture for patients with carpal tunnel syndrome.**
51. **There is limited and conflicting evidence regarding the benefits of acupuncture on patients' symptoms and nerve conduction study results in patients with mild to moderate carpal tunnel syndrome when compared to placebo and conventional medication.** Based on two AQ+ SRs of level 1 and 1+ evidence and one AQ+ RCT. The SRs included six relevant RCTs.
52. **Insufficient evidence is available for dry needling and other acupuncture therapies including auricular acupuncture, laser acupuncture, moxibustion, Gua Sha scraping, and traditional Chinese Tui Na massage for patients with carpal tunnel syndrome.**
53. **The length, number, and duration of treatment sessions were most commonly 30 minutes long, with 8 to 10 sessions delivered over 4 to 6 weeks.**

De Quervain's Tenosynovitis

54. **Limited low-quality evidence is available on traditional acupuncture for patients with De Quervain's Tenosynovitis.**
55. **The evidence indicates that there may be little or no difference between treatment with traditional Chinese acupuncture and injection in the short term for the outcomes of pain and disability in patients with De Quervain's Tenosynovitis.** Based on one AQ+ RCT.
56. **Insufficient evidence is available on dry needling and other acupuncture therapies including electroacupuncture, auricular acupuncture, laser acupuncture, moxibustion, cupping, Gua Sha scraping, and traditional Chinese Tui Na massage for patients with De Quervain's Tenosynovitis.**

Non-Specific Low Back Pain

57. **Moderate quality evidence is available on treatments using a traditional Chinese medicine framework and delivering traditional acupuncture for patients with non-specific low back pain.**
58. **The evidence suggests that traditional acupuncture is probably effective in reducing pain in the short term for patients with non-specific low back pain when compared to a waiting list/no treatment control, however, its effect on function and quality of life remains unclear and conflicting.** Based on four AQ+ SRs of level 1 (1) and 1+ (3) evidence, and two LQ- SR of level 1 and 1- evidence. The SRs included 15 relevant RCTs.
59. **There is conflicting evidence suggesting that acupuncture may be more effective at reducing pain in the short term for patients with non-specific low back pain when compared to sham acupuncture, placebo, and conventional medication. However, acupuncture may have little or no effect on function and quality of life or when compared to transcutaneous electrical nerve stimulation.** Based on one HQ++ SR of level 1+ evidence, four AQ+ SRs of level 1 (2) and 1+ (2) evidence, and two LQ- SRs of level 1 and 1- evidence. The SRs included 26 relevant RCTs.
60. **Limited evidence suggests that the addition of acupuncture to usual care or medication may improve outcomes for pain and function in the short term for patients with non-specific low back pain when compared with those who received usual care or medication alone.**
61. **Limited low to moderate quality evidence is available for electroacupuncture and cupping for patients with non-specific low back pain.**
62. **The evidence indicates that electroacupuncture may be effective in reducing pain immediately post-intervention and in the short term when compared with conventional medication and exercise.** Based on two AQ+ SRs of level 1 and 1+ evidence. The SRs included six relevant RCTs.
63. **The evidence suggests that cupping may be effective in reducing pain in the short term compared with conventional medications for patients with non-specific low back pain.** Based on one HQ++ SR of level 1+ evidence and two AQ+ SR of level 1 and 1- evidence. The SRs included nine relevant RCTs.
64. **The evidence suggests that the effectiveness of acupuncture treatments on non-specific low back pain is affected by the patient's age and duration of the condition, with the evidence indicating a relationship between increased patient age or increased chronicity of condition (> 3 months) and reduced treatment outcomes.**
65. **Insufficient evidence is available on dry needling and other acupuncture therapies including auricular acupuncture, laser acupuncture, moxibustion, Gua Sha scraping, and traditional Chinese Tui Na massage for patients with non-specific low back pain.**
66. **The length, number, and duration of treatment sessions were most commonly 20 to 30 minutes long, with 10 to 20 sessions delivered over 3 to 7 weeks.**

Lumbar Disc Herniation

67. **Limited low-quality evidence is available on treatments delivering traditional acupuncture and Tui Na massage for patients with lumbar disc herniation.**
68. **The evidence indicates that traditional acupuncture plus traction may be effective in reducing pain post-treatment for patients with lumbar disc herniation when compared to traction alone.** Based on one LQ- SR of level 1- evidence. The SR included five relevant RCTs.
69. **The evidence suggests that Tui Na massage may be effective in improving pain and function for patients with lumbar disc herniation when compared to conventional medication and traction, however, the evidence for functional improvement was not as strong as that for pain relief.** Based on one AQ+ SR of level 1+ evidence. The SR included eight relevant RCTs.
70. **Insufficient evidence is available on other acupuncture therapies including electroacupuncture, auricular acupuncture, laser acupuncture, dry needling, moxibustion, cupping, and Gua Sha scraping for patients with lumbar disc herniation.**
71. **The length, number and duration of treatment sessions were most commonly 20 to 30 minutes long, with 3 to 15 sessions delivered over 2 to 5 weeks.**

Sciatica

72. **Moderate quality evidence is available on traditional Chinese acupuncture and electroacupuncture for treating the pain associated with sciatica in the short term.**
73. **The evidence indicates that traditional acupuncture and electroacupuncture are probably effective in reducing pain in the short term when compared with conventional medication. However, there is little evidence on its sustained effect over the medium and long term and its effect on function and quality of life.** Based on two SRs of HQ++ and one SR of AQ+, all of level 1 evidence. The SRs included 13 relevant RCTs.
74. **Insufficient evidence is available on other acupuncture therapies including dry needling, auricular acupuncture, laser acupuncture, moxibustion, cupping, Gua Sha scraping, and traditional Chinese Tui Na massage for patients with sciatica.**
75. **The length, number, and duration of treatment sessions were most commonly 20 to 45 minutes long, with 5 to 20 sessions over a period of 1 to 3 weeks.**

Myofascial Pain

76. **Numerous high and moderate quality systematic reviews are available on treatments using dry needling for patients with myofascial pain.**
77. **The evidence suggests that dry needling improves pain intensity and range of motion post-intervention and at short-term follow-up when compared with no intervention, sham, or placebo for patients with myofascial pain. However, the improvement was not sustained over the long term.** Based on two HQ++ SRs of level 1 and 1+ evidence, six AQ+ SRs (two of level 1+ and four of level 1 evidence), and one LQ- SR of level 1- evidence. The SRs included 32 relevant RCTs.
78. **The evidence indicates that there is little or no difference between treatment with dry needling or acupuncture and other treatments such as manual therapy, pharmaceutical**

injections, and conventional medication for the outcomes of pain and function in patients with myofascial pain. Based on three HQ++ SRs (one of level 1 and two of level 1+ evidence); six AQ+ SRs (two of level 1+ and four of level 1 evidence) one LQ- SR of level 1- evidence, and three RCTs (two of AQ+ and one of LQ). The SRs included 32 relevant RCTs.

79. **There is conflicting evidence about the benefits of dry needling on the outcomes of quality of life and function over the short term in patients with myofascial pain.** Based on two HQ++ SRs of level 1 and 1+ evidence, five AQ+ SRs (two of level 1+ and three of level 1 evidence), and one LQ- SR of level 1- evidence. The SRs included 31 relevant RCTs.
80. **Low to moderate quality evidence is available for traditional acupuncture and laser acupuncture for patients with myofascial pain.**
81. **The evidence indicates that traditional acupuncture may be more effective than control or placebo for reducing pain and improving function at immediate to short-term follow-up for patients with myofascial pain.** Based on two HQ++ SRs of level 1+ evidence. The SRs included six relevant RCTs.
82. **The evidence suggests that laser acupuncture may be more effective than placebo in reducing pain in patients with myofascial pain at short- to long-term follow-up.** Based on one SR of HQ++ and level 1+ evidence, and one LQ- SR of level 1- evidence. The SRs included 17 relevant RCTs.
83. **Insufficient evidence is available on other acupuncture therapies including auricular acupuncture, moxibustion, Gua Sha scraping, and traditional Chinese Tui Na massage for patients with myofascial pain.**
84. **The length, number, and duration of treatment sessions were most commonly 30 minutes long, with 4 to 20 sessions delivered over 3 to 10 weeks.**

Upper and Lower Limb Fractures

85. **There is insufficient evidence for acupuncture therapies for patients with upper and lower limb fractures based on the primary and secondary outcomes of interest within this review including pain, function, and quality of life.** Based on one SR of AQ+ with level 1- evidence, and two LQ- RCTs. The SR included four relevant RCTs.
86. **There is insufficient and conflicting evidence for traditional Chinese Tui Na massage for the treatment of upper and lower limb fractures.**

Sacrococcygeal Pain

87. **Insufficient evidence is available on the outcomes of pain, function, and quality of life on needle-based and other acupuncture therapies for patients with sacrococcygeal pain.** Based on one SR of AQ+ with level 1 evidence. The SR included one relevant RCT.

Hip Osteoarthritis

88. **Low quality evidence is available on traditional Chinese acupuncture for patients with hip osteoarthritis.**
89. **The evidence indicates that treatment with TCM acupuncture may have little or no effect compared with sham acupuncture for the outcomes of pain and function in**

patients with hip osteoarthritis. Based on one AQ+ SR of level 1+ evidence, which included three relevant RCTs.

90. **Insufficient evidence is available on other acupuncture therapies including electroacupuncture, dry needling, auricular acupuncture, laser acupuncture, moxibustion, cupping, Gua Sha scraping, and traditional Chinese Tui Na massage for patients with hip osteoarthritis.**
91. **The length, number, and duration of treatment sessions were most commonly 20 to 30 minutes long, with six to 10 sessions over a period of 3 to 6 weeks.**

Greater Trochanteric Pain Syndrome

92. **Limited low-quality evidence is available on dry needling in the short term for patients with Greater Trochanteric Pain Syndrome. However, there was insufficient medium- to long-term evidence.**
93. **The evidence suggests that there may be little or no difference between treatment with dry needling and cortisone injection for the outcomes of pain, function, and medication intake in the short term for patients with Greater Trochanteric Pain Syndrome.** Based on one AQ+ SR.
94. **Insufficient evidence is available on acupuncture therapies including traditional acupuncture, electroacupuncture, laser acupuncture, auricular acupuncture, moxibustion, cupping, Gua Sha scraping, and traditional Chinese Tui Na massage for patients with Greater Trochanteric Pain Syndrome.**

Patellofemoral Pain

95. **A small quantity of moderate- to high-quality evidence is available on traditional Chinese acupuncture and dry needling within a multimodal programme for patients with patellofemoral pain.**
96. **The evidence indicates that there is probably little or no difference between treatment with traditional Chinese acupuncture and no treatment for patients with patellofemoral pain in the short or long term.** Based on one AQ+ SR of level 1 evidence, which included one relevant RCT.
97. **The evidence indicates that the addition of dry needling to a manual therapy and exercise programme makes little or no difference to pain and function in patients with patellofemoral pain.** Based on one HQ++ RCT with level 1+ evidence.
98. **Limited evidence suggests that traditional Chinese acupuncture or the inclusion of dry needling to a manual therapy and exercise programme may make little or no difference to pain and function in individuals with chronic patellofemoral pain. However, insufficient evidence is available during the acute stage of the condition.**
99. **Insufficient evidence is available on other acupuncture therapies including electroacupuncture, auricular acupuncture, laser acupuncture, moxibustion, cupping, Gua Sha scraping, and traditional Chinese Tui Na massage for patients with patellofemoral pain.**
100. **The length, number, and duration of treatment sessions were most commonly 20 to 40 minutes long, with three to eight sessions over a period of 3 to 4 weeks.**

Knee Osteoarthritis

101. **Numerous low to moderate quality systematic reviews and randomised controlled trials are available on treatments using the traditional Chinese medicine framework and delivering traditional acupuncture, trigger point acupuncture, or moxibustion for patients with knee osteoarthritis.**

102. **Limited moderate quality evidence is available for laser acupuncture and pulsatile cupping for patients with knee osteoarthritis.**

103. **The evidence suggests that acupuncture and electroacupuncture probably reduces pain in the short term when compared to the controls of medication, placebo, and waiting list, however, their effects on function and quality of life remain unclear and conflicting.** Based on three AQ+ SRs and three LQ- SRs (three of level 1+ evidence and three of level 1 evidence), and two RCTs (one of LQ- evidence and one of AQ+ evidence). The SRs included 43 relevant RCTs.

104. **The evidence suggests that the effectiveness of acupuncture treatments depends on the age of the patient and severity of their osteoarthritis. Specifically, the evidence suggests that laser acupuncture, needle acupuncture, and moxibustion are probably not effective in improving pain and function in older patients with moderate or severe knee pain.** Based on one HQ++ RCT of level 1+ evidence quality on laser and needle acupuncture, and one HQ++ RCT of 1+ evidence quality on moxibustion.

105. **There is conflicting evidence about the benefits of moxibustion on the outcomes of pain and function over the short term in patients with knee osteoarthritis.** Based on one HQ++ SR, two AQ+ SRs of level 1 evidence, and four RCTs of HQ++ (1), AQ+ (1) and LQ- (2) of level 1 and 1- quality. The SRs included 21 relevant RCTs.

106. **The evidence indicates that pulsatile cupping may be effective in improving knee pain and function in patients with knee osteoarthritis in the short and medium term when compared to no intervention.** Based on one AQ+ SR and one AQ+ RCT both of level 1 evidence quality, and one LQ- RCT of level 1- evidence. The SR included seven relevant RCTs.

107. **Insufficient evidence is available for other acupuncture therapies including Gua Sha scraping and traditional Chinese Tui Na massage for patients with knee osteoarthritis.**

108. **The length, number, and duration of treatment sessions were most commonly 20 to 30 minutes long, with 5 to 20 sessions delivered over 5 to 9 weeks, or daily treatments delivered over a short period of 7 to 10 days.**

Ankle Sprain

109. **Insufficient evidence is available for the outcomes of pain, function, and quality of life using needle-based and other acupuncture therapies for patients with ankle sprains. The available evidence lacks validated outcome measures for the primary and secondary outcomes of interest within this review including pain, function, and quality of life.** Based on three HQ++ and AQ+ SRs with level 1+ and 1 evidence. The SRs included 18 relevant RCTs.

110. **The length, number, and duration of treatment sessions were most commonly 30 minutes long, with 5 to 15 sessions delivered over a short period of 1 to 2 weeks.**

Achilles Tendinopathy

111. **Low to moderate quality evidence is available on treatments using a traditional Chinese medicine framework and delivering traditional acupuncture and electroacupuncture for patients with Achilles tendinopathy.**

112. **The evidence suggests that needle acupuncture may be effective in reducing symptom severity in comparison to stretching and exercise in the short term, but not long term, for patients with chronic Achilles tendinopathy.** Based on one AQ+ SR of level 1 evidence which contained one relevant RCT.

113. **The evidence indicates that needle acupuncture interventions may be effective in reducing symptom severity for patients with chronic Achilles tendinopathy in the short term (up to 6 weeks), however, there is little evidence supporting its sustained effect over the long term.**

114. **Insufficient evidence is available on other acupuncture therapies including auricular acupuncture, laser acupuncture, dry needling, moxibustion, cupping, Gua Sha scraping, and traditional Chinese Tui Na massage for patients with Achilles tendinopathy.**

115. **Insufficient evidence is available on acute Achilles tendinopathy, as most studies were of patients with chronic Achilles Tendinopathy.**

116. **The length, number, and duration of treatment sessions were most commonly 30 minutes long, with 12 to 24 sessions delivered over 6 to 8 weeks.**

Plantar Heel Pain

117. **Low to moderate quality evidence is available on needle-based acupuncture therapies including Western, Chinese traditional, and electroacupuncture for patients with plantar heel pain.**

118. **The evidence suggests that acupuncture and electroacupuncture may be effective in the short term reduction of pain in patients with plantar fasciitis; however, the improvement is not sustained over the medium to long term.** Based on one AQ+ SR and one LQ- SR, both of level 1 evidence. The SRs included five relevant RCTs.

119. **The evidence indicates that dry needling may be more effective than control or placebo for reducing pain but not improving quality of life in the short and long term when treating patients with plantar heel pain.** Based on five AQ+ SRs, four of level 1 evidence and one of 1- evidence. The SRs included eight relevant RCTs.

120. **The evidence indicates that acupuncture interventions may be effective in reducing pain in the short term (up to 6 weeks), however, there is little evidence supporting its sustained effect over the medium and long term and its effect on improving quality of life in the short and long term.**

121. **The evidence suggests that as the duration of plantar fasciitis increases, the improvement from treatment including electroacupuncture decreases.** Based on one LQ- SR of level 1 evidence, containing one relevant RCT.

122. **Insufficient evidence is available on other acupuncture therapies including auricular acupuncture, laser acupuncture, moxibustion, cupping, Gua Sha scraping, and traditional Chinese Tui Na massage for patients with plantar heel pain.**

	123. **The length, number, and duration of treatment sessions were most commonly 20 to 30 minutes long and of two different treatment schedules; one of daily treatments over a duration of 1 to 2 weeks, and the other of weekly sessions over 4 to 8 weeks.**
	Safety and Risk 1. **Serious adverse events associated with needling practices such as acupuncture and dry needling are rare and usually resolve after treatment, however, these practices are not risk-free.** Based on three LQ- SRs of level 1- and 2- evidence on adverse events, 26 acupuncture and dry needling intervention SRs, and 14 RCTs. 2. **Needle-based acupuncture interventions have a very low rate of adverse events when conducted among licensed and qualified practitioners.** Based on three LQ- SRs of level 1- and 2- evidence on adverse events, 26 acupuncture and dry needling intervention SRs, and 14 RCTs. 3. **Several possible adverse events including allergies, burns, and infection are associated with moxibustion, meaning it is not entirely risk-free and should be monitored with a degree of caution.** Based on one LQ- SR of 2- evidence on adverse events, four moxibustion intervention SRs, and four RCTs. 4. **Minor complications such as scarring, burns, and bullae associated with cupping are not uncommon. Most adverse events associated with cupping are minor.** Based on one LQ- SR of 2- evidence on adverse events, four cupping intervention SRs, and two cupping intervention RCTs.

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5. Appendices

Appendix 1: Search Strategy, MEDLINE

All musculoskeletal conditions search - Medline
1 Achilles Tendon/
2 Calcaneus/
3 peroneal nerve/
4 tibial nerve/
5 sural nerve/
6 Hallux/
7 Subtalar Joint/
8 exp foot joints/
9 exp knee joint/
10 fibula/
11 patella/
12 tibia/
13 exp Foot/
14 foot bones/
15 metatarsal bones/
16 tarsal bones/
17 talus/
18 toe phalanges/
19 Ankle/
20 Femur/
21 Patella/
22 Meniscus/
23 Menisci, Tibial/
24 anterior cruciate ligament/
25 patellar ligament/
26 posterior cruciate ligament/
27 (Achilles or Calcan* or Tibialis or Peroneal or Hallucis or hallux or Subtalar or Talo-crural or Talocrural or Tibia or Fibula or Malleolus or Metatarsal or Tibio-fibula or Tarsal or Os trigonum or Metatars* or sural nerve*).ti,ab,kw.
28 ((Phalanges or sesamoid) and (foot or feet)).ti,ab,kw.
29 (Toe or toes or Interphalangeal or Inter-phalangeal or Interdigital neuroma or Inter-digital neuroma or Morton* neuroma or Ankle or Prepatellar or patella or patellar or patello* or intrapatella or Meniscus or menisci or meniscal).ti,ab,kw.
30 (Digit$1 or hallucis or pollicis or Interossei or lumbrical$1).ti,ab,kw.
31 (Baker* cyst* or Ilio-tibial band or itb or Plica or Cruciate or Femur).ti,ab,kw.
32 knee/
33 leg/
34 Lower Extremity/
35 (Hamstrings or semimembranosus or semi-membranosus or semitendinosus or semi-tendinosus or rectus femoris or politeus or gastrocnemius or quadriceps or plantaris or soleus or Peroneus or tibialis or halluces or digitorum or gastrocnemius).ti,ab,kw.

36 Hamstring Muscles/
37 hamstring tendons/
38 or/1-37
39 exp Osteoarthritis/
40 Spinal Osteophytosis/
41 complex regional pain syndromes/
42 brachial plexus neuropathies/
43 brachial plexus neuritis/
44 causalgia/
45 reflex sympathetic dystrophy/
46 peripheral nerve injuries/
47 Peripheral Nervous System Diseases/
48 (degenerative arthriti* or osteoarthr* or pns disease$1 or peripheral nervous system disease$1 or peripheral nerve disease$1 or peripheral nervous system disease$1 or peripheral nervous system disorder$1 or peripheral neuropath*).ti,ab,kw.
49 (complex regional pain syndrome$1 or regional pain syndrome$1).ti,ab,kw.
50 exp Arm Injuries/
51 exp Back Injuries/
52 exp Joint Dislocations/
53 Fractures, Cartilage/
54 exp Hand Injuries/
55 exp Hip Injuries/
56 Fractures, Multiple/
57 exp Neck Injuries/
58 exp Shoulder Injuries/
59 exp "Strains and Sprains"/
60 exp Tendon Injuries/
61 Leg Injuries/
62 femoral fractures/
63 hip fractures/
64 femoral neck fractures/
65 contusion/
66 (fracture* or strain* or sprain* or tendinop* or dislocat* or contusion*).ti,ab,kw.
67 or/39-66
68 spine/
69 cervical vertebrae/
70 coccyx/
71 exp intervertebral disc/
72 lumbar vertebrae/
73 sacrum/
74 exp spinal canal/
75 exp Back Muscles/
76 neck muscles/
77 atlanto-axial joint/
78 atlanto-occipital joint/
79 sacroiliac joint/
80 exp Spinal Cord/

81 spinal nerves/
82 exp cervical plexus/
83 exp lumbosacral plexus/
84 exp spinal nerve roots/
85 Polyradiculopathy/
86 spondylosis/
87 spondylolysis/
88 spondylolisthesis/
89 piriformis muscle syndrome/
90 sciatica/
91 exp Neck/
92 Neck Muscles/
93 Zygapophyseal Joint/
94 Whiplash Injuries/
95 Back Pain/
96 Low Back Pain/
97 Headache Disorders, Secondary/
98 Radiculopathy/
99 (spine or spinal or vertebra* or coccygeal or lumbar or sacral or cervical or lumbarsacral).ti,ab,kw.
100 (cauda equine or polyradiculopath* or polyradiculitides or polyradiculitis or spondylosis deformans or tentorium cerebell*).ti,ab,kw.
101 (Interspinale* or intertransversale* or intertransversarii* or intertransversarius or longissimus or sacrospinalis or multifidus or paraspinal or rotatore* or iliocostali* or semispinalis* or splenius).ti,ab,kw.
102 piriformis muscle*.ti,ab,kw.
103 nerve compression syndrome*.ti,ab,kw.
104 (zygapophysial or zygapophyseal or apophyseal or Z-joint*).ti,ab,kw.
105 (low* back or lumbago or suboccipital* or cervicogenic headache* or erector spinae or quadratus lumborum or thoracolumbar or sternocleidomastoid or scalene or facet joint* or radiculopath* or secondary headache*).ti,ab,kw.
106 or/68-105
107 Hip/
108 Thigh/
109 exp Femur/
110 hip joint/
111 sacroiliac joint/
112 Buttocks/
113 gracilis muscle/
114 hamstring muscles/
115 hamstring tendons/
116 exp Pelvis/
117 exp Pelvic Bones/
118 Quadriceps Muscle/
119 Psoas Muscles/
120 Fascia Lata/
121 Pubic Symphysis/

122 Gracilis Muscle/
123 Obturator Nerve/
124 Sacroiliitis/
125 Iliotibial Band Syndrome/
126 Pelvic pain/
127 (Hip or hips or hip-joint* or cox or coxa or coxas or coxae or coxal or innominate bone* or thigh or thighs or femur* or femor* or ischiofemoral or ischio-femoral or pubofemoral or pubo-femoral or trochanter* or acetabul* or sacroil* or buttock or buttocks or gluteal* or gluteus* or gracilis or graciles or hamstring or hamstrings or semimembranos* or semitendinos* or pelvis or pelvic or pelvises or pelves or piriformis or quadriceps* or vastus or vasti or psoa or psoas or ilopsoas or fascia* lata* or ilium or ilia or iliac or iliacus or iliofemoral or ilio-femoral or ischium or ischia or ischial or pubic symphys* or pubic bone* or pubis or ligamentum teres or coxarthr* or HOA or sacrum or sacra* or coccyx or tailbone* or tail bone* or obturator* or pectineus or adductor* or ligamentum teres or sartori* or sacroili* or iliotibial*).ti,ab,kw.
128 or/107-117
129 exp Hand/
130 exp Hand Joints/
131 exp Hand Bones/
132 exp Hand Injuries/
133 Carpal Tunnel Syndrome/
134 Wrist Injuries/
135 Tenosynovitis/
136 exp Tendon Entrapment/
137 (digit or digits or hand or hands or finger? or forefinger? or fore-finger? or thumb? or metacarp* or carpal* or carpus* or wrist? or carpometacar* or triangular fibrocartilage? or triangular fibro-cartilage? or phalange* or thenar eminence or pollicis or hypothenar eminence or digiti minimi or palmar* or palm? or volar interossei or interossei volares or tenosynoviti* or lumbrical* or deep flexor? or intermetacarp* or inter-metacarp* or inter-carp* or intercarp* or radiocarp* or radio-carp* or midcarp* or mid-carp* or trapezio-metacarp* or trapeziometacarp* or interphalang* or phalange* or volar plate? or captitate? or os capitatum or hamate? or "os hamatum" or lunate? or "os lunatum" or semilunar or semi-lunar or pisiform? or scaphoid* or scapholunate or scapho-lunate or "os naviculare manus" or trapezium? or trapezoid? or triquetral? or triquetrum? or "de quervain*" or stenosing tendovaginiti* or stenosing tenosynoviti* or flexor retinaculum or palmar ulnocarpal or pisohamate or pisometacarp* or piso-metacarp* or carpi or extensor digitorum or extensor indicis or flexor digitorum superficialis or flexor digitorum profundus).ti,ab,kw.
138 129 or 130 or 131 or 132 or 133 or 134 or 135 or 136 or 137
139 Elbow/
140 elbow joint/
141 radius/
142 ulna/
143 Olecranon Process/
144 median nerve/
145 musculocutaneous nerve/
146 Forearm/
147 (membrum superius or upper extremit* or upper arm or upper arms or forearm$1 or elbow$1 or radial or radius or epicondyl* or pronator or ulna$2 or radiohumeral or radio-ulna$1

or humerus or capitulum or olecranon or brachialis or bicep$1 or tricep$1 or palmaris or supinator or anconeus or carpi or pollicis or brachioradialis or digiti or digitorum or coronoid or anconeus).ti,ab,kw.
148 (semilunar notch$2 or trochlear notch$2 or ulnar coronoid process$2 or ulnar trochlear groove$1 or radial tuberosit*).ti,ab,kw.
149 (quadrate ligament$1 or annular ligament$1 or ulnar collateral ligament$1 or superficial flexor or antebrachium$1).ti,ab,kw.
150 or/139-149
151 Shoulder/
152 Acromioclavicular Joint/
153 Sternoclavicular joint/
154 Rotator Cuff/
155 Coracoid Process/
13/12/17 13:46
156 Clavicle/
157 Scapula/
158 Acromion/
159 Humerus/
160 Arm/
161 Axilla/
162 Upper Extremity/
163 Shoulder Joint/
164 (shoulder* or acromioclavicular or sternoclavicular or rotator cuff or coracoid process or clavicle* or scapula* or acromion or humerus or upper arm or upper arms or axilla or upper extremit* or upper limb* or glenohumeral or acromioclavicular or coracoclavicular or brachial plexus or humerus or humeral or sterno clavicular or sternoclavicular or glenoid or bicep or biceps or supraspinatus or infraspinatus or teres minor or teres major or pectoralis or deltoid or levator scapulae or rhomboid or serratus anterior or subscapularis or "sub acromial" or subacromial or scapulathoracic).ti,ab,kw.
165 Rotator Cuff Injuries/
166 Shoulder Impingement Syndrome/
167 Shoulder Pain/
168 Shoulder Dislocation/
169 brachial plexus neuropathies/
170 brachial plexus neuritis/
171 Glenoid Cavity/
172 Polymyalgia Rheumatica/
173 Bursitis/
174 (polymyalgia rheumat* or adhesive capsulitis or brachial plexus neuropath* or brachial plexus neuritis or forestier certonciny syndrome or forestier-certonciny syndrome or peri-extra-articular rheumatism or polymyalgia rheumat* or rhizomelic pseudopolyarthritides or rhizomelic pseudopolyarthritis or adhesive capsulitides or adhesive capsulitis or bursitides or bursitis or capsulitides or capsulitis or frozen shoulder* or supraglenoid tubercle).ti,ab,kw.
175 or/151-174
176 acupuncture/
177 acupuncture therapy/
178 acupuncture, ear/

179 electroacupuncture/
180 moxibustion/ (1584)
181 (Acupuncture* or Pharmacoacupuncture* or Dry needling or Electro-acupuncture* or Electroacupuncture* or Auriculotherap*).ti,ab,kw.
182 ((trigger point* or meridian* or acupoint*) and needling).ti,ab,kw.
183 (acupuncture and (Laser or LLLT or Low level laser therapy)).ti,ab,kw.
184 (Moxibustion or Moxabustion or mugwort or moxa or cupping or Hijama or Gua-Sha or guasha or cao gio or scraping or spooning therap* or coining therap* or tribo-effleurage or tui-na or tuina or chinese massage therap* or Chinese Meridian Massage).ti,ab,kw.
185 or/176-184
186 exp randomized controlled trial/
187 randomized controlled trials as topic/
188 controlled clinical trial/
189 exp clinical trial/
190 exp clinical trials as topic/
191 controlled clinical trials as topic/
192 non-randomized controlled trials as topic/
193 Random Allocation/
194 Double-Blind Method/
195 Single-Blind Method/
196 Placebo effect/
197 (random* or sham or placebo*).ti,ab.
198 ((singl* or doubl*) adj (blind* or dumm* or mask*)).ti,ab,kw.
199 ((tripl* or trebl*) adj (blind* or dumm* or mask*)).ti,ab,kw.
200 (clinical trial* or randomized controlled trial* or randomised controlled trial* or controlled trial* or placebo or blind$3 or controlled clinical trial or random* allocate* or non randomized or non-randomised or pseudo-randomised or pseudo randomized).ti,ab,kw.
201 or/186-200
202 or/38,67,106,128,138,150,175
203 and/185,201-202
204 limit 203 to yr="2006 -Current"

Appendix 2: SIGN Checklists

SIGN Critical Appraisal Tool for systematic reviews and Meta-analyses

SIGN

Methodology Checklist 1: systematic reviews and Meta-analyses

SIGN gratefully acknowledges the permission received from the authors of the AMSTAR tool to base this checklist on their work: *Shea BJ, Grimshaw JM, Wells GA, Boers M, Andersson N, Hamel C, et al. Development of AMSTAR: a measurement tool to assess the methodological quality of systematic reviews. BMC Medical Research Methodology 2007, **7**:10 doi:10.1186/1471-2288-7-10. Available from http://www.biomedcentral.com/1471-2288/7/10 [cited 10 Sep 2012]*

Study identification (*Include author, title, year of publication, journal title, pages*)	
Guideline topic:	Key Question No:

Before completing this checklist, consider:

Is the paper relevant to key question? Analyse using PICO (Patient or Population Intervention Comparison Outcome). IF NO reject. IF YES complete the checklist.

Checklist completed by:

Section 1: Internal validity

	In a well conducted systematic review:	***Does this study do it?***
1.1	The research question is clearly defined and the inclusion/ exclusion criteria must be listed in the paper.	Yes □ No □ **If no reject**
1.2	A comprehensive literature search is carried out.	Yes □ No □ Not applicable □ **If no reject**
1.3	At least two people should have selected studies.	Yes □ No □ Can't say □
1.4	At least two people should have extracted data.	Yes □ No □ Can't say □
1.5	The status of publication was not used as an inclusion criterion.	Yes □ No □
1.6	The excluded studies are listed.	Yes □ No □
1.7	The relevant characteristics of the included studies are provided.	Yes □ No □
1.8	The scientific quality of the included studies was assessed and reported.	Yes □ No □
1.9	Was the scientific quality of the included studies used appropriately?	Yes □ No □

1.10	Appropriate methods are used to combine the individual study findings.	Yes □ No □ Can't say □ Not applicable □
1.11	The likelihood of publication bias was assessed appropriately.	Yes □ No □ Not applicable □
1.12	Conflicts of interest are declared.	Yes □ No □
SECTION 2: OVERALL ASSESSMENT OF THE STUDY		
2.1	What is your overall assessment of the methodological quality of this review?	High quality (++) □ Acceptable (+) □ Low quality (-)□ Unacceptable – reject 0 □
2.2	Are the results of this study directly applicable to the patient group targeted by this guideline?	Yes □ No □
2.3	**Notes:**	

SIGN Critical Appraisal Tool for Controlled trials

Methodology Checklist 2: Controlled Trials

SIGN

Study identification (*Include author, title, year of publication, journal title, pages*)

Guideline topic:	Key Question No:	Reviewer:

Before completing this checklist, consider:

1. Is the paper a **randomised controlled trial** or a **controlled clinical trial**? If in doubt, check the study design algorithm available from SIGN and make sure you have the correct checklist. If it is a **controlled clinical trial** questions 1.2, 1.3, and 1.4 are not relevant, and the study cannot be rated higher than 1+
2. Is the paper relevant to key question? Analyse using PICO (Patient or Population Intervention Comparison Outcome). IF NO REJECT (give reason below). IF YES complete the checklist.

Reason for rejection: 1. Paper not relevant to key question ☐ 2. Other reason ☐ (please specify):

SECTION 1: INTERNAL VALIDITY

In a well conducted RCT study…		***Does this study do it?***
1.1	The study addresses an appropriate and clearly focused question.	Yes ☐ No ☐ Can't say ☐
1.2	The assignment of subjects to treatment groups is randomised.	Yes ☐ No ☐ Can't say ☐
1.3	An adequate concealment method is used.	Yes ☐ No ☐ Can't say ☐
1.4	The design keeps subjects and investigators 'blind' about treatment allocation.	Yes ☐ No ☐ Can't say ☐
1.5	The treatment and control groups are similar at the start of the trial.	Yes ☐ No ☐ Can't say ☐
1.6	The only difference between groups is the treatment under investigation.	Yes ☐ No ☐ Can't say ☐
1.7	All relevant outcomes are measured in a standard, valid and reliable way.	Yes ☐ No ☐ Can't say ☐
1.8	What percentage of the individuals or clusters recruited into each treatment arm of the study dropped out before the study was completed?	
1.9	All the subjects are analysed in the groups to which they were randomly allocated (often referred to as intention to treat analysis).	Yes ☐ No ☐ Can't say ☐ Does not apply ☐

1.10	Where the study is carried out at more than one site, results are comparable for all sites.	Yes ☐ No ☐ Can't say ☐ Does not apply ☐
SECTION 2: OVERALL ASSESSMENT OF THE STUDY		
2.1	How well was the study done to minimise bias? *Code as follows:*	High quality (++)☐ Acceptable (+)☐ Low quality (-)☐ Unacceptable – reject 0 ☐
2.2	Taking into account clinical considerations, your evaluation of the methodology used, and the statistical power of the study, are you certain that the overall effect is due to the study intervention?	
2.3	Are the results of this study directly applicable to the patient group targeted by this guideline?	
2.4	**Notes.** Summarise the authors' conclusions. Add any comments on your own assessment of the study, and the extent to which it answers your question and mention any areas of uncertainty raised above.	

Appendix 3: Critical Appraisal Scores for Systematic Reviews

Q.	Reference (Author, year)	Clark et al 2012	He et al 2017	Salvioli et al 2017	Thiagarajah 2017	Choi et. al 2012	Kim et al 2014	Park et al 2013	Cox 2016	Hou 2015	Xu et al 2013
1.1	The research question is clearly defined and the inclusion/exclusion criteria must be listed in the paper. Does this study do it?	Y	Y	Y	Y	Y	Y	N	Y	CS	Y
1.2	A comprehensive literature search is carried out	Y	Y	Y	Y	Y	Y	Y	Y	N	Y
1.3	At least two people should have selected studies	CS	N	CS	N	Y	Y	Y	Y	N	CS
1.4	At least two people should have extracted the data	CS	CS	Y	N	Y	Y	Y	Y	N	CS
1.5	The status of publication was not used as an inclusion criterion	CS	N	N	N	N	N	N	CS	N	CS
1.6	The excluded studies are listed	N	N	N	N	N	Y	N	N	N	N
1.7	The relevant characteristics of the included studies are provided	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
1.8	The scientific quality of the included studies was assessed and reported	Y	Y	Y	Y	Y	Y	Y	Y	Y	N
1.9	Was the scientific quality of the included studies used appropriately?	Y	Y	Y	Y	Y	Y	Y	Y	CS	N
1.10	Appropriate methods are used to combine the individual study findings	N	Y	Y	Y	Y	Y	Y	Y	N	Y
1.11	The likelihood of publication bias was assessed appropriately	Y	Y	N	N	Y	Y	Y	Y	Y	N
1.12	Conflicts of interest are declared	Y	Y	Y	N	Y	Y	N	N	Y	N
2.1	What is your overall assessment of the methodological quality of this review?	AQ (+)	AQ (+)	AQ (+)	LQ (-)	AQ (+)	HQ (+)	AQ (+)	AQ (+)	LQ (-)	LQ (-)
2.2	Are the results of this study directly applicable to the patient group targeted by this guideline?	CS	Y	Y	CS	CS	Y	Y	Y	CS	CS

Q.	Reference (Author, year)	Zhang et al 2017	Tring et al 2016	Law et al 2015	Moon et al 2014	Qin et al 2015	Lee et al 2013	Ji et al 2015	Baxter et al 2008	Liu et al 2015	Liu et al 2017
1.1	The research question is clearly defined and the inclusion/exclusion criteria must be listed in the paper. Does this study do it?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
1.2	A comprehensive literature search is carried out	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
1.3	At least two people should have selected studies	Y	Y	Y	Y	CS	Y	Y	N	Y	Y
1.4	At least two people should have extracted the data	Y	Y	Y	Y	Y	Y	N	N	Y	Y
1.5	The status of publication was not used as an inclusion criterion	N	N	N	N	N	N	Y	N	CS	N
1.6	The excluded studies are listed	N	Y	N	N	N	N	N	N	N	N
1.7	The relevant characteristics of the included studies are provided	Y	Y	Y	Y	Y	Y	Y	Y	N	Y
1.8	The scientific quality of the included studies was assessed and reported	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
1.9	Was the scientific quality of the included studies used appropriately?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
1.10	Appropriate methods are used to combine the individual study findings	Y	Y	Y	N	Y	Y	Y	Y	Y	Y
1.11	The likelihood of publication bias was assessed appropriately	N	N	Y	N	N	N	Y	N	Y	Y
1.12	Conflicts of interest are declared	Y	Y	Y	Y	Y	Y	Y	N	Y	Y
2.1	What is your overall assessment of the methodological quality of this review?	AQ (+)	HQ (++)	HQ (++)	AQ (+)	AQ (+)	AQ (+)	HQ (++)	LQ (-)	AQ (+)	HQ (++)
2.2	Are the results of this study directly applicable to the patient group targeted by this guideline?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Q.	Reference (Author, year)	Hutchinson et al 2012	Lam et al 2013	Xu et al 2013	Lu et al 2011	Lee et al 2010	Lee et al 2017	Gattie et al 2017	Madsen 2009	Kim et al 2011	Cagnie et al 2015
1.1	The research question is clearly defined and the inclusion/exclusion criteria must be listed in the paper. Does this study do it?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
1.2	A comprehensive literature search is carried out	N	Y	Y	Y	Y	Y	N	Y	Y	N
1.3	At least two people should have selected studies	CS	Y	Y	N	CS	Y	Y	CS	CS	Y
1.4	At least two people should have extracted the data	CS	CS	Y	N	CS	CS	N	Y	Y	Y
1.5	The status of publication was not used as an inclusion criterion	CS	N	N	N	Y	N	N	N	N	N
1.6	The excluded studies are listed	N	N	N	N	N	N	N	N	N	N
1.7	The relevant characteristics of the included studies are provided	Y	Y	N	Y	Y	Y	Y	Y	Y	Y
1.8	The scientific quality of the included studies was assessed and reported	N	Y	Y	Y	Y	Y	Y	Y	Y	Y
1.9	Was the scientific quality of the included studies used appropriately?	N	Y	Y	Y	CS	Y	Y	Y	Y	Y
1.10	Appropriate methods are used to combine the individual study findings	N	Y	Y	Y	Y	Y	Y	Y	Y	N
1.11	The likelihood of publication bias was assessed appropriately	N	N	Y	N	N	N	Y	Y	N	N
1.12	Conflicts of interest are declared	Y	Y	N	N	Y	Y	Y	Y	N	Y
2.1	What is your overall assessment of the methodological quality of this review?	LQ (-)	AQ (+)	AQ (+)	LQ (-)	LQ (-)	AQ (+)	AQ (+)	AQ (+)	AQ (+)	LQ (-)
2.2	Are the results of this study directly applicable to the patient group targeted by this guideline?	N	Y	Y	Y	Y	Y	Y	CS	Y	Y

Q.	Reference (Author, year)	Asher et al 2010	Cao et al 2014	Manheimer et al. 2010	Zheng et al 2012	Tough et al 2009	Zhang et al 2010	Vickers et al. 2012	Espejo et al 2017	Boyles et al 2015	Yuan et al 2015
1.1	The research question is clearly defined and the inclusion/exclusion criteria must be listed in the paper. Does this study do it?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
1.2	A comprehensive literature search is carried out	Y	Y	Y	Y	Y	Y	N	Y	Y	Y
1.3	At least two people should have selected studies	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
1.4	At least two people should have extracted the data	CS	Y	N	CS	Y	Y	CS	Y	CS	Y
1.5	The status of publication was not used as an inclusion criterion	N	N	N	Y	N	CS	N	N	N	Y
1.6	The excluded studies are listed	N	N	N	N	N	N	N	N	N	N
1.7	The relevant characteristics of the included studies are provided	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
1.8	The scientific quality of the included studies was assessed and reported	Y	Y	Y	N	Y	N	Y	Y	Y	Y
1.9	Was the scientific quality of the included studies used appropriately?	Y	Y	Y	N	Y	N	N	Y	Y	Y
1.10	Appropriate methods are used to combine the individual study findings	Y	Y	Y	N	Y	N	N	Y	Y	Y
1.11	The likelihood of publication bias was assessed appropriately	Y	CS	N	N	N	N	Y	N	N	Y
1.12	Conflicts of interest are declared	Y	Y	N	Y	Y	Y	Y	Y	Y	Y
2.1	What is your overall assessment of the methodological quality of this review?	AQ (+)	AQ (+)	AQ (+)	LQ (-)	AQ (+)	LQ (-)	LQ (-)	AQ (+)	AQ (+)	HQ (++)
2.2	Are the results of this study directly applicable to the patient group targeted by this guideline?	Y	Y	Y	Y	Y	Y	CS	Y	Y	Y

Q.	Reference (Author, year)	Wang et al 2017	Sim et al 2011	Chang et al 2014	Gadau et al 2014	Tang et al 2015	Shim et al 2016	Morihisa 2016	Choi et al 2017	Li et al 2017	Song et al 2016
1.1	The research question is clearly defined and the inclusion/exclusion criteria must be listed in the paper. Does this study do it?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
1.2	A comprehensive literature search is carried out	Y	Y	N	Y	Y	Y	Y	Y	Y	Y
1.3	At least two people should have selected studies	Y	CS	CS	Y	Y	Y	Y	Y	CS	Y
1.4	At least two people should have extracted the data	Y	CS	CS	Y	Y	CS	N	Y	Y	CS
1.5	The status of publication was not used as an inclusion criterion	N	N	N	Y	Y	Y	Y	Y	Y	N
1.6	The excluded studies are listed	N	N	N	N	N	N	N	N	N	N
1.7	The relevant characteristics of the included studies are provided	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
1.8	The scientific quality of the included studies was assessed and reported	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
1.9	Was the scientific quality of the included studies used appropriately?	Y	Y	Y	Y	Y	Y	Y	Y	Y	CS
1.10	Appropriate methods are used to combine the individual study findings	Y	Y	Y	Y	N	Y	Y	Y	Y	Y
1.11	The likelihood of publication bias was assessed appropriately	N	N	Y	N	N	N	Y	N	N	N
1.12	Conflicts of interest are declared	Y	Y	N	Y	Y	Y	N	Y	N	N
2.1	What is your overall assessment of the methodological quality of this review?	AQ (+)	AQ (+)	AQ (+)	HQ (++)	AQ (+)	AQ (+)	AQ (+)	HQ (++)	AQ (+)	AQ (+)
2.2	Are the results of this study directly applicable to the patient group targeted by this guideline?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Q.	Reference (Author, year)	Chen et al 2017	Jain et al 2014								
1.1	The research question is clearly defined and the inclusion/exclusion criteria must be listed in the paper. Does this study do it?	Y	Y								
1.2	A comprehensive literature search is carried out	Y	Y								
1.3	At least two people should have selected studies	Y	CS								
1.4	At least two people should have extracted the data	Y	CS								
1.5	The status of publication was not used as an inclusion criterion	N	N								
1.6	The excluded studies are listed	N	N								
1.7	The relevant characteristics of the included studies are provided	Y	N								
1.8	The scientific quality of the included studies was assessed and reported	Y	Y								
1.9	Was the scientific quality of the included studies used appropriately?	N	Y								
1.10	Appropriate methods are used to combine the individual study findings	Y	Y								
1.11	The likelihood of publication bias was assessed appropriately	N	N								
1.12	Conflicts of interest are declared	N	N								
2.1	What is your overall assessment of the methodological quality of this review?	LQ (-)	LQ (-)								
2.2	Are the results of this study directly applicable to the patient group targeted by this guideline?	Y	Y								

Appendix 4: Critical Appraisal Scores for Controlled Trials

Q.	Reference (Author, year)	Ge et al 2017	Hinman et al 2014	Espi-Lopez et al 2017	Kim et al 2014	Teut et al 2012	Haung et al 2015	Yu et al 2015	Chen et al 2015	Zhou et al 2014
1.1	The study addresses an appropriate and clearly focused question	Y	Y	Y	Y	Y	Y	Y	Y	Y
1.2	The assignment of subjects to treatment groups is randomised	Y	Y	Y	Y	Y	Y	Y	Y	Y
1.3	An adequate concealment method is used	N	Y	Y	Y	Y	Y	Y	Y	CS
1.4	The design keeps subjects and investigators 'blind' about treatment allocation	N	Y	Y	N	N	CS	Single blind	N	N
1.5	The treatment and control groups are similar at the start of the trial	N	CS	Y	CS	Y	CS	Y	Y	Y
1.6	The only difference between groups is the treatment under investigation	CS	Y	Y	Y	Y	CS	CS	Y	Y
1.7	All relevant outcomes are measured in a standard, valid and reliable way	Y	Y	Y	Y	Y	Y	CS	Y	CS
1.8	What percentage of the individuals or clusters recruited into each treatment arm of the study dropped out before the study was completed?	CS	(17.7%)	(3.3%)	(20%)	(0%)	CS	CS	(1.2%)	CS
1.9	All the subjects are analysed in the groups to which they were randomly allocated (intention to treat analysis)	CS	Y	Y	Y	Y	CS	CS	Y	Y
1.10	Where the study is carried out at more than one site, results are comparable for all sites	CS	CS	CS	CS	CS	CS	N/A	CS	CS
2.1	How well was the study done to minimise bias?	LQ (-)	HQ (++)	HQ (++)	AQ (+)	AQ (+)	LQ (-)	LQ (+)	AQ (+)	LQ (+)
2.2	Taking into account clinical considerations, your evaluation of the methodology used, and the power of the study, are you certain that the overall effect is due to the study intervention?	CS	Y	Y	CS	Y	CS	CS	CS	CS
2.3	Are the results of this study directly applicable to the patient group targeted by this guideline?	CS	CS	Y	CS	Y	CS	CS	N	CS
***3.1**	Was the treatment rationale (or differential diagnosis for TCM approaches) explained and followed through?	Y	Y	Y	Y	Y	Y	Y	Y	Y
***3.2**	Did the acupuncture practitioners administrating the intervention meet one of the following criteria (a) registered with a regulatory authority (b) met the minimum WHO standards for acupuncturists	N	Y	N	N	N	N	N	N	N

Q.	Reference (Author, year)	Gazi et al 2011	Glazov et al 2014	MacPherson et al 2015	Zhang et al 2013	Wen et al 2015	Carezo et al 2016	Kizhakkev eettil 2017	Seguru-orti 2016	Khan et al 2013
1.1	The study addresses an appropriate and clearly focused question	Y	Y	Y	Y	Y	Y	Y	Y	Y
1.2	The assignment of subjects to treatment groups is randomised	Y	Y	Y	Y	CS	Y	Y	Y	Y
1.3	An adequate concealment method is used	Y	Y	Y	Y	N	Y	N	Y	CS
1.4	The design keeps subjects and investigators 'blind' about treatment allocation	CS	Y	N	Y	CS	N	N	Y	N
1.5	The treatment and control groups are similar at the start of the trial	Y	N	Y	Y	Y	Y	Y	Y	Y
1.6	The only difference between groups is the treatment under investigation	Y	Y	N	Y	Y	Y	Y	Y	Y
1.7	All relevant outcomes are measured in a standard, valid and reliable way	Y	Y	Y	Y	Y	Y	y	Y	N
1.8	What percentage of the individuals or clusters recruited into each treatment arm of the study dropped out before the study was completed?	0%	10%	15%	18.4%	0%	1.5%	19.2%	25%	25.9%
1.9	All the subjects are analysed in the groups to which they were randomly allocated (intention to treat analysis)	Y	Y	Y	Y	Y	N	Y	CS	N
1.10	Where the study is carried out at more than one site, results are comparable for all sites	NA	CS	CS	NA	NA	CS	CS	CS	NA
2.1	How well was the study done to minimise bias?	AQ (+)	HQ (++)	AQ (+)	HQ (++)	LQ (-)	AQ (+)	LQ (-)	AQ (+)	LQ (-)
2.2	Taking into account clinical considerations, your evaluation of the methodology used, and the power of the study, are you certain that the overall effect is due to the intervention?	CS	Y	CS	CS	CS	Y	CS	CS	N
2.3	Are the results of this study directly applicable to the patient group targeted by this guideline?	N	Y	Y	Y	Y	Y	Y	Y	Y
***3.1**	Was the treatment rationale (or differential diagnosis for TCM approaches) explained and followed through?	Y	Y	Y	N	Y	Y	N	CS	N
***3.2**	Did the acupuncture practitioners administrating the intervention meet one of the following criteria (a) registered with a regulatory authority (b) met the minimum WHO standards for acupuncturists	CS	Y	Y	CS	CS	CS	CS	CS	CS

Q.	Reference (Author, year)	Zhang et al 2016a	Li et al 2009	Michalsen et al 2009	Yang et al 2009	Johansson et al 2011	Rha et al 2012	Asheghan et al 2016	Hadianfard et al 2014	Yao et al 2012
1.1	The study addresses an appropriate and clearly focused question	Y	Y	Y	Y	Y	Y	Y	Y	Y
1.2	The assignment of subjects to treatment groups is randomised	Y	Y	Y	Y	Y	Y	Y	Y	Y
1.3	An adequate concealment method is used	CS	CS	Y	Y	Y	Y	CS	Y	Y
1.4	The design keeps subjects and investigators 'blind' about treatment allocation	CS	N	N	N	N	N	N	N	Y
1.5	The treatment and control groups are similar at the start of the trial	Y	Y	Y	Y	Y	Y	Y	Y	Y
1.6	The only difference between groups is the treatment under investigation	Y	Y	Y	N	N	Y	Y	N	Y
1.7	All relevant outcomes are measured in a standard, valid and reliable way	Y	Y	Y	Y	Y	Y	Y	Y	Y
1.8	What percentage of the individuals or clusters recruited into each treatment arm of the study dropped out before the study was completed?	6%	0%	0%	9%	26%	25%	0%	8.5%	20%
1.9	All the subjects are analysed in the groups to which they were randomly allocated (intention to treat analysis)	N	N/A	N/A	Y	Y	N	N/A	N	N
1.10	Where the study is carried out at more than one site, results are comparable for all sites	N/A	N/A	N/A	N/A	CS	N/A	N/A	N/A	N/A
2.1	How well was the study done to minimise bias?	AQ (+)	LQ (-)	AQ (+)	AQ (+)	AQ (+)	AQ (+)	LQ (-)	AQ (+)	AQ (+)
2.2	Taking into account clinical considerations, your evaluation of the methodology used, and the power of the study, are you certain that the overall effect is due to the intervention?	CS	N	CS	Y	Y	CS	N	CS	CS
2.3	Are the results of this study directly applicable to the patient group targeted by this guideline?	Y	Y	N	Y	Y	N	Y	Y	Y
***3.1**	Was the treatment rationale (or differential diagnosis for TCM approaches) explained and followed through?	Y	Y	N	Y	Y	N	N	Y	Y
***3.2**	Did the acupuncture practitioners administrating the intervention meet one of the following criteria (a) registered with a regulatory authority (b) met the minimum WHO standards for acupuncturists	Y	CS	CS	CS	CS	N	N	N	Y

Q.	Reference (Author, year)	Rueda et al 2016	Zhang et al 2016b	Acosta et al 2017	Arias et al 2017	Brennan et al 2017	Hsu et al 2017	Kibar et al 2017	Lewis et al 2017	Perez et al 2017
1.1	The study addresses an appropriate and clearly focused question	Y	Y	Y	Y	Y	Y	Y	Y	Y
1.2	The assignment of subjects to treatment groups is randomised	Y	Y	Y	Y	Y	Y	N	Y	Y
1.3	An adequate concealment method is used	N	Y	Y	Y	Y	Y	N	Y	Y
1.4	The design keeps subjects and investigators 'blind' about treatment allocation	N	N	Y	N	N	N	Y	N	N
1.5	The treatment and control groups are similar at the start of the trial	Y	Y	Y	Y	N	Y	Y	Y	Y
1.6	The only difference between groups is the treatment under investigation	Y	Y	Y	Y	Y	CS	Y	Y	Y
1.7	All relevant outcomes are measured in a standard, valid and reliable way	Y	Y	Y	Y	Y	Y	Y	Y	Y
1.8	What percentage of the individuals or clusters recruited into each treatment arm of the study dropped out before the study was completed?	8.7%	20%	27%	6%	4%	8%	15%	27%	10%
1.9	All the subjects are analysed in the groups to which they were randomly allocated (intention to treat analysis)	N	Y	N	Y	N	CS	N	Y	Y
1.10	Where the study is carried out at more than one site, results are comparable for all sites	N/A	N/A	N/A	N/A	N/A	N/A	N/A	CS	CS
2.1	How well was the study done to minimise bias?	LQ (-)	AQ (+)	LQ (-)	AQ (+)	AQ (+)	LQ (-)	LQ (-)	HQ (+)	AQ (+)
2.2	Taking into account clinical considerations, your evaluation of the methodology used, and the power of the study, are you certain that the overall effect is due to the intervention?	N	N	CS	Y	Y	N	N	Y	Y
2.3	Are the results of this study directly applicable to the patient group targeted by this guideline?	Y	CS	Y	Y	N	Y	Y	Y	Y
***3.1**	Was the treatment rationale (or differential diagnosis for TCM approaches) explained and followed through?	Y	Y	N	N	Y	N	Y	Y	Y
***3.2**	Did the acupuncture practitioners administrating the intervention meet one of the following criteria (a) registered with a regulatory authority (b) met the minimum WHO standards for acupuncturists	Y	CS	N	N/A	N/A	CS	CS	Y	Y

Q.	Reference (Author, year)	Uygur et al 2017	Chung et al 2016						
1.1	The study addresses an appropriate and clearly focused question	Y	Y						
1.2	The assignment of subjects to treatment groups is randomised	Y	Y						
1.3	An adequate concealment method is used	CS	Y						
1.4	The design keeps subjects and investigators 'blind' about treatment allocation	N	N						
1.5	The treatment and control groups are similar at the start of the trial	CS	Y						
1.6	The only difference between groups is the treatment under investigation	CS	Y						
1.7	All relevant outcomes are measured in a standard, valid and reliable way	Y	Y						
1.8	What percentage of the individuals or clusters recruited into each treatment arm of the study dropped out before the study was completed?	20%	9.6%						
1.9	All the subjects are analysed in the groups to which they were randomly allocated (intention to treat analysis)	N	Y						
1.10	Where the study is carried out at more than one site, results are comparable for all sites	N/A	NA						
2.1	How well was the study done to minimise bias?	LQ (-)	AQ (+)						
2.2	Taking into account clinical considerations, your evaluation of the methodology used, and the power of the study, are you certain that the overall effect is due to the study intervention?	N	Y						
2.3	Are the results of this study directly applicable to the patient group targeted by this guideline?	CS	Y						
***3.1**	Was the treatment rationale (or differential diagnosis for TCM approaches) explained and followed through?	N	Y						
***3.2**	Did the acupuncture practitioners administrating the intervention meet one of the following criteria (a) registered with a regulatory authority (b) met the minimum WHO standards for acupuncturists	CS	Y						

N/A = Not applicable (only one site)

Appendix 5: List of Randomised Controlled Trials Reported in the Systematic Reviews

List of RCTs	RCT Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	
Ankle Sprain																																																									
Paris et al	1983						1																																																			1
Yu	1999						1	1																																																	2
Ge & Ma	2000						1	1																																																2
Hao & Wang	2006						1																																																	1
Yu & Yuan	1996						1	1																																																2
Zhang & Zhang	2011						1																																																1
Zhang	2012						1																																																	1
Jian & Wang	2004						1																																																1
Shi	2013						1																																																1
Sun & Ju	2011						1	1																																															2
Zheng & Wang	2010							1																																															1
Tang et al	2010							1																																															1
He & Xu	2006							1																																															1
Li	2002							1																																															1
Luo et al	2009							1																																															1
Zhao	2005							1																																															1
Wang	2005							1																																															1
Wu et al	2007																																1																						1
Plantar Heel Pain																																																									
Cotchett et al	2014	1		1	1																																1							1												5
Ebrahim et al	2007		1																																																				1
Karagounis et al	2011		1						1																																														2
Kumnerddee et al	2012		1	1																																																		2
Zhang et al	2011		1	1					1																																														3
Eftekharsadat et al	2016			1																																																		1
Li et al	2014			1																																																			1
Wang et al	2016			1																																																		1
Qian et al	2015			1																																																		1
Vrchota et al	1991								1																																														1
Eftekharsadat et al	2010																																					1																1
Achilles Tendinopathy																																																									
Zhang et al	2013				1																																																			1
Patellofemoral Pain Syndrome																																																								
Jensen et al	1999				1																																																		1
Knee Osteoarthritis																																																								
Ng et al	2003					1						1																																										2
Berman et al	1999											1																																											1
Bernateck et al	2008											1																																											1
Berman et al	2004					1						1																		1																							1		4
Tukmachi et al	2004					1						1																																									1		1	4
Vas et al	2004					1																								1																								2
Dong et al	2011											1																																											1
Witt et al	2005					1						1																		1																								3
Fu & Zhang	2011											1																																											1
Fu & Li	2003											1																																											1
Scharf et al	2006					1						1																		1																								3
Williamson et al	2007					1																								1																								2
Jubb et al	2008					1																																																	2
Hinman	2014											1																																											1
Itoh et al	2008					1						1																																										2
Lu et al	2010					1																																																	2
Lansdown et al	2009											1																		1																								2
Marvommatis et al	2012											1																																											2
Cheng et al	2008									1																																													2
Sun et al	2008									1																																													2

List of RCTs	RCT Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	
Knee Osteoarthritis																																																									
Salekl et al	2013											1																																														1
Sangdee et al	2002											1																																												1				2
Witt et al	2006											1																		1				1																								3
Christensen et al	1992											1																																															1
Yang et al	2008										1																																															2
Ren et al	2010										1																																															1
Zhou et al	2010										1																																															2
Zhang et al	2011										1																																															2
Zhang	2009										1																																															1
He et al	2009										1																																															1
Zhou et al	2009																1																																								1
Shen et al	2008																1																																								1
Yurtkuran et al	2007																1																																								1
Chen et al	2015																										1																														2
Jin	2015																										1																														1
Li et al	2016																										1																														1
Xiao	2016																										1																														1
Teut et al	2012																																1																								1
Scarf et al	2007																																	1																								1
Foster et al	2006																													1				1																								2
Wu et al	2013																																1																								1
Mayoral et al	2013																																					1																			2
Li & Li	2015																																																								1
Wu et al	2015																																																							1
Huang & Yang	2014																																																						1
Fu	2013																																																							1
Zhao et al	2013																																																						1
Zhu et al	2013																																																						1
Ji & Ouyang	2011																																																						1
Wu	2008																																																							1
Meng et al	2011																																																						1
Ahsin et al	2009																																																						1
Qiu et al	2006																																																						1
Ng et al	2003																																																						1
Yurtkuran e	1999																																																					1
Ren et al	2015																																																						2
Ren et al	2011																																																					1
Zhao et al	2014																																																					2
Yuan et al	2015																																																					1
Deng et al	2015																																																					1
Song et al	2013																																																					1
Zhou et al	2014																																																					2
Wu et al	2011																																																					1
Kim et al	2014																																																					2
Wang et al a	2016																																																					1
Wang et al b	2016																																																					1
Tuet et al	2012																																																					1
Zhang et al	2013																																																					1
Gao et al	2014																																																					1
Zhang et al	2012																																																					1
Ma et al	2010																																																					1
Chen et al	2008																																																					1
Bao et al	2013																																																					1
Gao et al	2013																																																					1
Huang	2016																																																					1
Miao et al	2014																																																					1
Zhou et al	2015																																																				1
Suarez-Almazor et al	2010																													1																										1

List of RCTs	RCT Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	
Hip Osteoarthritis																																																								
Fink et al	2001																																															1								1
Haslam et al	2001																																															1								1
Stener-Victrorin et al	2004																																															1								1
Sciatica																																																								
Wang and La	2004													1																										1																		2
Chen et al	2009													1																																										1
Zeng	2012													1																																									1
Zhang et al	2008													1																																									1
Hu et al	2010													1																																									1
Du et al	2009													1																																									1
Chen	2010													1											1																															2
Wang	2008													1																																									1
Meng	2014													1																																									1
Ren	2013													1																																									1
Zhao	2004													1																																									1
Dong et al	2008																								1																														1
Ye et al	2015																								1																														1
Non Specific Low Back Pain																																																								
Liu & Li	2010															1																																								1
Lan	2009															1																																								1
Kennedy et al	2008															1			1											1										1															4
Kittang et al	2001															1																																							1
Araki et al	2001															1																																							1
Lin et al	2012																1			1																																			2
Glazov et al	2009																1																																						1
Grant et al	1999																	1		1	1																																	4
Leibing et al	2002																	1		1														1																				3
Molsberger et al	2002																	1		1										1				1																				5
Kerr et al	2003																	1	1	1	1									1																								5
Meng et al	2003																	1		1																																			3
Yeung et al	2003																	1																																					2
Kazunori et al	2006																	1																																					1
Brinkhaus et al a	2006																	1	1		1									1				1																				6
Brinkhaus et al b	2006																		1																																				1
Thomas et al	2006																	1		1	1									1																								4
Haake et al	2007																	1		1	1									1																								5
Szczurko et al	2007																	1																																					1
Cherkin et al	2009																	1		1	1									1																								5
Itoh et al	2009																	1		1																																			3
Zaringhalam et al	2010																	1		1																																			3
Itoh et al	2006																		1																																				2
Witt et al	2006																		1	1	1									1																								4
Itoh et al	2005																			1																																			1
Coan et al	1980																			1																																			2
MacDonald et al	1983																			1																																			2
Carlsson & Sjolund	2001																			1										1																								2
Muller & Giles	2005																			1																																			2
Hunter et al	2012																			1																																			2
Yun et al	2012																			1																																			2
Giles & Muller	1999																			1																																			2
Tsui & Cheing	2004																			1																																			2
Shankar et al	2012																			1																																			2
Zhang et al	2005																										1																											1
Xue	2016																										1																											1
Perez-Palmares et al	2010																										1												1														2
Hong et al	2006																															1								1														3

List of RCTs	RCT Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	
Farhadi et al	2009																															1	1						1																		3
Kim et al	2011																																1						1			1															3
Sator-Katzenshlager et al	2004																																		1				1																		2
Miyazaki et al	2009																																						1																		1
Hasegawa et al	2013																																						1																		1
Giles et al	2003																																						1																		1
Cho et al	2013																																						1																		1
Vas et al	2012																																						1																		1
Xu et al	2009																																						1																		1
Li et al	2009																																						1			1															2
Liu et al	2008																																						1			1															2
Lauche et al	2012b																																						1																		1
Akbarzadeh et al	2014																																									1															1
AlBedah et al	2015																																									1															1
Itoh et al	2004																																											1													1
Cherkin et al	2001																													1																											1
Lumbar Disc Herniation																																																										
Chen et al	2006																										1																															1
Wang	2010																										1																															1
Zhou et al	2012																										1																															1
Luo et al	2013																										1																															1
Deng et al	2012																										1																															1
Dong & Wang	2014																										1																															1
Song et al	2015																										1																															1
Yin et al	2015																										1																															1
Wu et al	2016																										1																															1
Wang	2007																																																										1
Guan	2010																																																									1
Tuo et al	2011																																																								1
Wu et al	2012																																																								1
Zhong et al	2013																																																								1
Saacrococcygeal Pain																																																									
Wang et al 2016	2016																										1																															1
Non Specific Spinal Pain																																																									
Giles et al	2003																																																									1
Eroglu et al	2013																																																									1
Myofasical Low Back Pain																																																									
Chen	2014																				1																																					1
Itoh and Katsumi	2005																				1																																			1
Mahmoudzadeh et al	2016																				1																																			1
Shen and Ding	2015																				1																																			1
Yang and Zhou	2010																				1																																			1
Tellez-Garcia et al	2015																				1																																			1
Itoh et al	2004																																			1					1															2

List of RCTs	RCT Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	
Myofasical Pain																																																									
Kannan	2012																1																																											1
Lee & Han	2011																1																																										1
Rayegani et al	2011																1						1																																				2
Oz et al	2010																1																																									1
Carasco	2009																1																																									1
Dundar et al	2007																1																																									1
Kiralp et al	2006																1																																									1
Altan et al	2005																1							1																																		2
Ceylan et al	2004																1																																									1
Gur et al	2004																1							1																																		2
Hakguder et al	2003																1							1																																		2
Chen et al	1997																1																																									1
Laaksо et al	1997																1							1																																		2
Logberg-Andersson et al	1997																1																																									1
Ceccherelli et al	1989																1							1																																		2
Snyder-Mackler et al	1986																1							1																																		2
Santos	2014																											1																														1
Edwards & Knowles	2003																											1										1																			3
Couto et al	2014																																				1																				1
Huguenin et al	2005																																			1			1																		3
Myofascial Shoulder Pain																																																										
Oyang et al	2001																																1																										1
DiLorenzo et al	2004																																			1																				1
Myofasical Neck Pain																																																										
Birch & Jamison	1998														1																																												2
Ilbuldu et al	2004														1		1						1														1	1																				5
Sun et al	2010														1																																												1
Itoh et al	2007														1														1								1																				3
Ay et al	2010																						1						1									1	1																			4
Byeon et al	2003																						1																																				1
Chou et al	2009																						1																																				1
Chou et al	2011																						1																																				1
DiLorenzo et al	2004																						1																																				1
Ga et al a	2007																						1						1									1																			3
Ga et al b	2007																						1																																				1
Hong	1994																						1						1																													2
Kamanli et al	2005																						1															1																			2
Ma et al	2010																						1						1																													2
Tekin et al	2013																						1															1	1																			3
Tsai et al	2010																						1															1	1																			3
Ziaeifar et al	2014																						1					1										1																			3
Campa-Moran et al	2015																											1																														1
Eroglu et al	2013																												1									1																			2
Chu	1997																																			1																						1
Irnich et al	2002																																						1	1																		2
Itoh et al	2014																																						1																				1

List of RCTs	RCT Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	
Arthritic Neck Pain																																																								
Fu et al	2009														1																								1																			2
Liang et al	2009														1																																										1
Thomas et al	1991														1																								1																			2
White et al	2004														1				1										1										1																			4
Zhu et al	2009																										1																															1
Yan et al	2014																										1																															1
Gao et al	2011																										1																															1
Zeng	2015																										1																															1
Wang	2012																										1																															1
Yang et al	2014																										1																															1
Non-Specific Neck Pain																																																										
He et al	2004														1																																													1
He et al	2005														1																																												1
Nabeta et al	2002														1																								1																			2
Vas et al	2006														1				1										1										1																			4
Chow et al	2006																1																																											1
Chow et al	2004																1																																											1
Pecos-Martin et al	2015																											1									1																			2
Cramer et al	2011																																1						1																	2
Lauche et al	2011																																1						1																	2
Lauche et al	2013																																1						1																	2
Sator-Katzenshlager et al	2003																																		1																					1
Liang et al	2011																																						1																			1
Itoh et al	2007																																						1																			1
Zhang et al	2003																																						1																			1
Li et al	2006																																						1																			1
Bruan et al	2011																																						1																			1
Lauche et al	2012a																																						1																			1
Salter et al	2006																													1																											1
Hutchinson et al	2012																													1																											1
Mechanical Neck Pain																																																									
Irnich et al	2001														1				1											1									1																			4
Liang et al	2011														1																																											1
Petrie & Hazelman	1986														1																								1																			2
Sahin et al	2010														1																																											1
Seidel & Uhlemann	2002														1																																											1
Llamas-Ramos et al	2014																											1									1	1																			3
Mejuto-Vazquez et al	2014																											1									1	1																			3
Kim et al	2012																																1																							2
Radicular Neck Pain																																																									
Coan et al	1982														1																																												2
Petrie & Langley	1983														1																																											1
Zhu et al	2007																										1																															1
Wang et al	2009																										1																															1
Huang et al	2010																										1																															1
Jiang et al	2012																										1																															1
Xu	2013																										1																															1
Xue	2015																										1																															1
Yang	2015																										1																															1
Liu	2015																										1																															1
Cheng & Tang	2013																										1																															1

List of RCTs	RCT Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	
Whiplash Associated Disorders																																																								
Kwak et al	2012												1		1																																										2
Cameron et al	2011												1		1																																									2
Han et al	2011												1																																										1
Tough et al	2010												1		1								1																																3
Aigner et al	1998												1				1																																						2
Sterling et al	2015																											1																												1
Lateral Epicondylitis/Lateral Elbow Pain																																																								
Skorupska et al	2012																1																																								1
Emanet et al	2010																1																																							1
Lam & Cheing	2007																1																																							1
Papadopulous et al	1996																1																																							1
Haker & Lundeberg	1991																1							1																																2
Haker & Lundeberg	1990																1							1																																2
Lundeberg et al	1987																1							1																																3
Ding et al	2010																										1																													1
Wu	2011																										1																													1
Wang	2011																																									1															1
Gu & Shan	2007																																									1														1
Fink et al	2002a																																									1		1				1								3
Fink et al	2002b																																									1															1
Molsberger & Lundeberg	1991																																									1															1
Molsberger & Lundeberg	1990a																																									1															1
Molsberger & Lundeberg	1990b																																									1															1
Irnich et al	2003																																																								1
Molsberger et al	1994																																																								2
Davidson et al	2001																																																								1
Grua et al	1999																																																								1
Jiang et aal	2003																																																								1
Li et al	2014																																																								1
Carpal Tunnel Syndrome																																																								
Wong et al	2001																1																																								1
Khosrawi et al	2012				1																																																			1
Kumnerddee & Kaewtong	2010				1																																																		1
Yang et al	2011				1																																																			1
Weinstein et al	2003																																									1															1
Yang et al	2009																																									1															1
Shi et al	2006																																									1															1
Frozen Shoulder																																																								
Tam	2005																1																																								1
Chen et al	2014																										1																													1
Chen et al	2009																																1																						1
Cheing et al	2008																																																						1
Ma et al	2006																																																							1
Sun et al	2001																																																							1

List of RCTs	RCT Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	
Whiplash Associated Disorders																																																									
Rotator Cuff Pathology +/- Bursitis																																																									
Guerra de Hoyos et al	2004				1																								1																													2
Vas et al	2008				1																								1																													2
Al-Shenqiti & Oldgam	2003																1																																										1
Vecchio et al	1993																1																																									1
Kleinhenz et al	1999																												1																													1
Molsberger et al	2010																												1																													1
Humeral Fracture																																																											
Xu	2016																1										1																															2
Pan	2016																										1																															1
Yang	2004																										1																															1
Calcaneal Fracture																																																											
Zhao et al	2016																1										1																															2
Adverse Events																																																											
Woo et al	2001									1																																																		1
Saw et al	2004									1																																																1
Simmons et al	2006									1																																															1
Tien et al	2008									1																																															1
Woo et al	2009									1																																															1
Nakajima et al	2010									1																																														1
Castro-Silva et al	2011									1																																														1
Kuo et al	2010									1																																														1
Kung et al	2005									1																																														1
Weng et al	2008									1																																														1
Chau et al	2006									1																																														1
Gao et al	1989																																																								1		1
Chen et al	2009																																																						1		1
Liu	1992																																																					1		1
Liu	2001																																																				1		1
Liu	2007																																																				1		1
Kang	1994																																																				1		1
		1	4	7	8	10	10	11	3	11	8	18	5	11	22	5	38	14	8	23	7	6	16	9	3	0	39	8	6	28	0	2	11	6	2	6	13	13	54	3	8	6	4	14	6	7	5	3	3	7	5	19	4	2	7	**549**

List of SRs: 1. Salvioli et al. 2017, 2. Thiagarajah et al. 2017, 3. He & Ma 2017, 4. Cox et al. 2016, 5. Hou et al. 2015, 6. Kim et al. 2014, 7. Park et al. 2013, 8. Clark & Tighe 2012, 9. Xu et al. 2013a, 10. Choi et al. 2012, 11. Zhang el al. 2017, 12. Moon et al. 2014, 13. Qin et al. 2015, 14. Trinth et al. 2016, 15. Lee et al. 2016, 16. Law et al. 2015, 17. Xu et al. 2013b, 18. Lu et al. 2011, 19. Lam et al. 2013, 20. Hutchinson et al. 2012, 21. Liu et al. 2017, 22. Liu et al. 2015, 23. Baxter et al. 2008, 24. Ji et al. 2015, 25. Lee et al. 2010, 26. Lee et al 2017, 27. Gattie et al. 2017, 28. Cagnie et al. 2015, 29. Vickers et al. 2012, 30. Yang et al. 2016, 31. Kim et al. 2011, 32. Cao et al. 2014, 33. Madsen et al. 2009, 34. Asher et al. 2010, 35. Tough et al. 2009, 36. Espejo-Antunez et al. 2017, 37. Boyles et al. 2015, 38. Yuan et al. 2015, 39. Sim et al. 2011, 40. Chang et al. 2014, 41. Wang et al. 2017, 42. Tang et al. 2015, 43. Choi et al. 2017, 44. Morihisa et al. 2016, 45. Li et al. 2017, 46. Gadau et al. 2014, 47. Manheimer et al. 2010, 48. Jain et al. 2014, 49. Song et al. 2016, 50. Li et al. 2014, 52. Shim et al. 2016, 52. Zhang et al. 2010, 53. Zheng et al. 2012, 54. Chen et al. 2017.

Appendix 6: Data Extraction Tables SRs

Study	Methodology	Results	Comments and evidence level
Thiagarajah, A **How effective is acupuncture for reducing pain due to plantar fasciitis?** **2017** Databases **PubMed, Cochrane Library** Included Studies **Zhang et al. 2011** **Kumnerddee et al. 2012** **Karagounis et al. 2011** **Ebrahim et al. 2007** Research question **How effective is acupuncture for reducing pain due to plantar fasciitis?** Funding **Not reported**	**Participants** n=144 Age: 32-62 years Karagounis et al. 2011: Active amateur male recreational athletes ages 32-41 years Kumnerddee et al. 2011 & Ebrahim et al. 2007: Predominately women, aged 31-61 from their respective rehabilitation outpatient and orthopaedic departments Zhang et al.: Predominately women, aged 44-52 years **Inclusion:** - RCTs that compared acupuncture with standard treatments or had real versus sham acupuncture **Exclusion:** - Non-randomised and uncontrolled trials - Interventions that included other forms of acupuncture, such as laser acupuncture - Controls that included corticosteroid injections **Limits:** - English language **Style of acupuncture:** 2 studies - Electro-acupuncture 2 studies - Dry needling **- Treatment rationale:** Variable **Length of treatment:** Not reported **Comparison (placebo):** Zhang - sham acupuncture sites Kumnerddee et al. 2011, Karagounis et al. 2011, Ebrahim et al. 2007, included standard treatment including ice, stretching, strengthening exercises and prefabricated insoles **Co-interventions:** Variable **Intervention** **- Number of needles inserted per subject per session:** Zhang 1 x needle, Kumnerddee et al. 2011, 2-6 needles, Ebrahim et al. 2007, not reported, Karagournis et al. 2011 up to 12 needles, **- Names of points used:** Not reported **- Depth of insertion:** Not reported **- Response sought:** 2 x Dry needling studies looked for 'Deqi' sensation **- Needle stimulation:** Not reported **- Needle retention time:** Not reported **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** Not reported **- Frequency and duration:** 4-8 weeks	**Ebrahim et al. 2007:** Intervention A: EA + stretching + insoles. Control B: Stretching + insoles Control C: Insoles only Reduction in VAS scores compared to baseline: Intervention group A: 3.872 ($p < 0.0001$) Control group B: 0.84 ($p < 0.05$) Control group C: 0.08 ($p > 0.05$) Comparison of mean VAS score reduction between groups: A vs. B: 3.425 ($p < 0.001$) A vs. C: 4.063 ($p < 0.001$) B vs. C: 0.638 ($p > 0.05$) **Zhang et al. 2011:** Intervention: Real acupuncture at the PC7 acupoint Control: Sham acupuncture at the LI4 acupoint Significant difference in reduction in VAS scores in favour of the intervention group at 1 month Morning pain: 22.6 ± 4.0 vs. 12.0 ± 3.0 Overall pain: 20.3 ± 3.7 vs. 9.5 ± 3.6 Pressure pain threshold: 145.5 ± 32.9 vs. −15.5 ± 39.4 No significant difference found at 3 months and 6 months **Karagounis et al. 2011** Intervention: Conservative therapy (ice therapy, NSAIDs, stretching and strengthening) + Acupuncture Control: Conservative therapy only Significant difference in reduction in PFPS scores in favour of the intervention group at 8 weeks Comparison of PFPS after 4 weeks: Control group: 55.1 Intervention group: 54.2 ($p > 0.05$) Comparison of PFPS after 8 weeks: Control group: 46.2 Intervention group: 34.3 ($p < 0.05$) **Kumnerddee et al. 2012** Intervention: Conservative therapy (oral analgesics and stretching) + EA Control: Conservative therapy only Significant difference in reduction in VAS scores in favour of the intervention group Intervention group: 6.00 ± 1.69 vs. 1.89 ± 1.59 Control group: 6.27 ± 2.34 vs. 5.40 ± 2.26	**Reviewer comments** Insufficient search strategy, only two databases used and limited to English language only. Only one reviewer selected and extracted studies introducing the possibly of bias. Sufficient reporting in most sections. Online supplementary appendices useful and thorough. Types of controlled varied considerably. Only two of the included studies indicated their criteria for the achievement of adequate acupuncture therapy. Appropriate methods used to combine individual study findings. Nil conflicts of interests declared. **Quality scores:** Using Delphi List Zhang et al. 2011, 88.9% - Good quality Kumnerddee et al. 2011, 66.7% - Fair quality Karagounis et al. 2011, 66.7% - Fair quality Ebrahim et al. 2007, 44.4% - Poor quality **Grade:** LQ (-) **Quality:** 1

Study	Methodology	Results	Comments and evidence level
	Practitioner qualifications and background Karagounis et al. 2011: Well-trained and experienced professional Kumnerddee et al. 2012: A physiatrist who had completed a two-year training course from China with an additional six years of experience in acupuncture Ebrahim et al. 2007: Not reported Zhang et al. 2011: A registered Chinese medicine practitioner with two years of clinical experience	**Adverse effects:** Karagounis et al. 2011, reported that three patients in the treatment group had headaches and dizziness, while one had loss of strength in the legs and mild local oedema around the area of needling. Kumnerddee et al. 2012, noted that three patients had post-treatment soreness. Zhang et al. 2011, reported several adverse reactions other than pain, such as mild oedema around the area of needling, bruising and one patient with a 'distressed sensation' in the chest	
Salvioli, S, Guidi, M **Marcotulli, G** **The effectiveness of conservative, non-pharmacological treatment for plantar heel pain: A systematic review with meta-analysis** **2017** Databases **Medline, PEDro, Cochrane Central Register of Controlled Trials, Cinahl and Embase** Acupuncture Related Included Studies **Cotchett et al. 2014** Research question **How effective is conservative, non-pharmacological treatment for plantar heel pain?** Funding **None**	**Participants** n=84 Age: Not reported **Inclusion:** - RCTs which investigated the efficacy of a conservative non-pharmacological treatment compared to a placebo, no treatment or sham treatment - Studies that reported pain intensity, assessed by NRS or VAS - Age limit to adults > 18 years - Clinical or instrumental (ultrasound or MRI) diagnosis of plantar heel pain or plantar fasciitis - Symptomatic at the time of enrolment **Exclusion:** - Studies that reported patients with fascial plantar fibromatosis, tarsal tunnel syndrome, lesion of plantar nerve, Morton's syndrome, fracture, tumour, osteoarthritis, diabetic pathologies as ulcers, rheumatic pathologies, neurological pathologies, acute or chronic infections - Studies that considered pharmacological treatments and surgery - Studies that did not report outcome data required for the meta-analysis (mean difference and standard deviation) **Limits:** - English language **Style of acupuncture:** Dry needling **- Treatment rationale:** Western **Length of treatment:** Not reported **Comparison:** Placebo **Co-interventions:** Not reported **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** TrP in soleus, short flexors of the toes, and abductor halluces muscles **- Depth of insertion:** Not reported **- Response sought:** Not reported	**Cotchett et al. 2014:** Intervention: TrP DN Control: Placebo Outcome: VAS (0-100) at 3 months Intervention group: Mean change -46.8 ± 28.52 Control group: Mean change -28.6 ± 30.38 Mean difference -18.20 (-31.19; -51.21). Significant reduction in pain intensity in the intervention group (P=0.006) **Adverse effects:** Cotchett et al. 2014 reported adverse effects of local bruising and increased pain between 1 and 7 days posttreatment	**Reviewer comments** Wide range of interventions studied. Only one relevant RCT for dry-needling/acupuncture adversely affected the quality of evidence. Insufficient search strategy which may not have found all the studies of interest. Study selection, data collection and risk of bias assessment appropriately conducted independently by two authors with consensus reached with a third author. Results quantitatively summarised in meta-analyses by separating homogeneous subgroups of trials by type of intervention. Good methodology appraisal. Inadequate detail of reporting regarding the acupuncture treatment given and control used. SR reported that the interpretation of the results were helped by experienced physiotherapists, however, limited clinically relevant information can be taken from the study. **Quality scores:** Using GRADE Cotchett et al. - Moderate **Grade:** AQ (+) **Quality:** 1-

Study	Methodology	Results	Comments and evidence level
	- Needle stimulation: Not reported **- Needle retention time:** Not reported **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** 6 **- Frequency and duration:** 6 weeks **Practitioner qualifications and background** Not reported		
He, C & Ma, H **Effectiveness of trigger point dry needling for plantar heel pain: a meta-analysis of seven randomized controlled trials** **2017** Databases **PubMed, Embase, Web of Science, SinoMed and CNKI** Included Studies **Zhang et al. 2011** **Eftekharsadat et al. 2016** **Li et al. 2014** **Kumnerddee et al. 2012** **Wang et al. 2016** **Qian et al. 2015** **Cotchett et al. 2014** Research question **What are the effects of MTrP dry needling in patients with heel pain due to plantar fasciitis?** Funding **Not reported**	**Participants** n=417 Age: Mean age of participants in the included studies varies from 47 to 61.25 years Duration of heel pain: Mean duration varies from 6.04 to 44.9 months. **Inclusion:** - Study design: RCTs - Adult patients aged 18 years or older who were diagnosed with plantar heel pain (plantar fasciitis) - Intervention: Dry needling /acupuncture of the musculoskeletal trigger points - Control: placebo or other treatment - Outcome measure: changes VAS score, success rate for pain, and adverse events. **Exclusion:** - If the needles in the active treatment group were inserted superficially over the site of an MTrP or into traditional acupuncture points **Limits:** - Human subjects - No language restriction was imposed **Style of acupuncture:** 2 studies - Dry needling 2 studies - Warm needling 2 studies - Acupuncture 1 study - Miniscalpal needle **- Treatment rationale:** Western **Length of treatment:** Not reported **Comparison (placebo):** Zhang et al. 2011 - Acupuncture (L14) Eftekharsadat et al. 2016 - Not reported Li et al. 2014 - Steroid injection Kumnerddee et al. 2012 - Conventional treatment Wang et al. 2016 - Chinese herb fumigation	**Zhang et al. 2011** Intervention: Acupuncture (PC7) Control: Acupuncture (L14) WMD: –6.90 (–15.83, 2.03 95% CI) **Eftekharsadat et al. 2016** Intervention: Dry needling Control: Not reported WMD: –20.00 (–31.91, –8.09 95% CI) **Li et al. 2014** Intervention: Miniscalpel-needle Control: Steroid injection Subgroup 1: WMD: –24.20 (–35.54, –12.86 95% CI) Subgroup 2: WMD: –20.20 (–31.42, –8.98 95% CI) Subgroup 3: WMD: –24.10 (–35.45, –12.75 95% CI) **Kumnerddee et al. 2012** Intervention: Acupuncture Control: Conventional treatment WMD: –15.10 (–29.08, –1.12 95% CI) **Wang et al. 2016** Intervention: Warm needling Control: Warm needling + Chinese herb fumigation WMD: –11.87 (–14.14, –9.60 95% CI) **Qian et al. 2015** Intervention: Warm needling Control: Warm needling + Chinese herb fumigation WMD: –21.10 (–37.25, –14.95 95% CI) **Cotchett et al. 2014** Intervention: Real TrP DN Control: Sham TrP DN Subgroup 1: WMD: –9.70 (–19.17, –0.23 95% CI) Subgroup 2: WMD: –9.00 (–18.15, 0.15 95% CI)	**Reviewer comments** Adequate search strategy with a wide range of databases used, which increases reliability of search results. Language bias limited due to no language restriction imposed during search strategy. Difficult to tell if two researchers independently selected studies and extracted the data. Likelihood of publication bias assessed appropriately. Mismatch present between exclusion criteria and included studies - Example: Zhang et al. 2011 includes needling into traditional acupuncture points. Included RCTs are of small sample size, poor quality and of substantial heterogeneity which limits the conclusions that can be drawn from the review. Good assessment of bias conducted for the included studies. Lack of reporting of the dry needling intervention used within individual included studies limits the clinical utility of the review. **Quality scores:** Using GRADE Li et al. 2014: Low risk of bias Kumnerddee et al. 2012: Low risk of bias Zhang et al. 2011: Unclear risk of bias Wang et al. 2016: Unclear risk of bias Qian et al. 2015: Unclear risk of bias Cotchett et al. 2014: High risk of bias

Study	Methodology	Results	Comments and evidence level
	Qian et al. 2015 - Chinese herb fumigation Cotchett et al. 2014 - Sham TrP DN **Co-interventions:** Variable **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Not reported **- Depth of insertion:** Not reported **- Response sought:** Not reported **- Needle stimulation:** Not reported **- Needle retention time:** Not reported **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** Not reported **- Frequency and duration:** Not reported **Practitioner qualifications and background** Not reported	**Combined results:** Overall: WMD: –15.50 (–19.48, –11.53 95% CI) (p=0.013) 1 month follow up: WMD: –15.04 (–20.14, –9.94 95% CI) (P<0.001) 6 month follow up: WMD: -18.20 (–26.95, –9.45 95% CI) (P<0.001) 12 month follow up: WMD: –24.10 (–35.45, –12.75 95% CI) (P<0.001) **Adverse effects:** 3 of the 7 included studies reported adverse events. The adverse events were related to needle site pain and were reported as transient in nature. Aggregated results suggest that the incidence of adverse events was similar between the needling and control groups (RR=1.89, 95% CI: 0.38, 9.39; P=0.438)	Eftekharsadat et al. 2016: High risk of bias **Grade:** AQ (+) **Quality:** 1
Cox, J, Varatharajan, S & Cote, P **Effectiveness of acupuncture therapies to manage musculoskeletal disorders of the extremities: A systematic review** **2016** Databases **Medline, Embase, CINAHL, PsycINFO, and Cochrane Library** Relevant Included Studies **Cotchett et al 2014** **Jensen et al 1999** **Zhang et al 2013** **Guerra de Hoyos et al 2004** **Khosrawi et al 2012** **Kumnerddee & Kaewtong 2010** **Vas et al 2008** **Yang et al 2011**	**Participants** Cotchett et al 2014 Plantar heel pain > 1 month (n=84) Jensen et al 1999 Patellofemoral pain syndrome > 4 years (n=70) Zhang et al 2013 Chronic Achilles Tendinopathy > 2 months (n=64) Guerra de Hoyos et al 2004 Soft tissue injuries to the shoulder, including cuff tendinitis, capsulitis, bicipital tendinitis, and bursitis with shoulder pain, decreased movement, local tenderness, and no swelling signs (n=130) Khosrawi et al 2012 Mild/moderate carpal tunnel syndrome (n=64) Kumnerddee and Kaewtong 2010 Mild/moderate carpal tunnel syndrome (n=60) Vas et al 2008 Persistent unilateral subacromial syndrome (rotator cuff tendinitis or subacromial bursitis, in some cases associated with capsulitis for ≥3 months (n=425) Yang et al 2011 Mild to moderate carpal tunnel syndrome (n=77) Haker and Lundeberg 1990 Lateral epicondylalgia > month (n=86)	**Cotchett et al 2014** Intervention: TrP DN Control: Placebo acupuncture: non-penetrating needles 6-week adjusted difference in mean change: - First-step pain (VAS): –14.4 (95% CI: –23.5, –5.2) - Pain (FHSQ): 10.0 (95% CI: 1.0, 19.1) 12-week adjusted difference in mean change: - First-step pain (VAS): –12.5 (95% CI: –21.6, –3.4) - Pain (FHSQ): 9.1 (95% CI: 1.1, 17.0) No statistically significant differences between groups health-related quality of life at 6 and 12 weeks **Jensen et al 1999** Intervention: Acupuncture Control: No treatment 5 month difference in mean change: - CKRS global score (0-100): 3.9 - CKRS pain (0-20): 2.4 - Pain after testing (VAS): 11.5 - Pain in the evening (VAS): 14.4 - Stairs hopple test: 2.3 12 month difference in mean change:	**Reviewer comments** Search strategy ensured accuracy and completeness, however, limits were placed on language and year of publication. Two independent reviewers used throughout. 3 relevant knee, ankle and foot articles looking at anterior knee pain, plantar fasciitis and Achilles Tendinopathy were included. Appropriate and standardised critical appraisal using SIGN. Reviewers qualitatively evaluated the impact of selection bias, information bias, and confounding on study results. No assessment of publication bias No meta-analysis conducted. Clinical relevance enhanced due to stratification of types of acupuncture and musculoskeletal conditions. **Quality scores:** Using SIGN criteria Cotchett et al 2014 - Low risk of bias Jensen et al 1999 - Low risk of bias

Study	Methodology	Results	Comments and evidence level
Haker & Lundeberg 1990 Research question **What is the effectiveness and safety of acupuncture therapies for the management of musculoskeletal disorders of the upper and lower extremities?** Funding **Ontario Ministry of Finance and the Financial Services Commission of Ontario (RFP number OSS_00267175)**	**Inclusion:** - Adults and children with musculoskeletal disorders of the extremities - RCTs, cohort studies, case control studies - Musculoskeletal disorders were defined as injuries or disorders of the muscles, nerves, tendons, joints, cartilage, and supporting structures, based on the Centers for Disease Control and Prevention definition - Acupuncture intervention including including traditional, medical, modern, dry needling, moxibustion, electroacupuncture, laser acupuncture, microsystem acupuncture, and acupressure - Studies that compared acupuncture to other interventions (eg, manipulation, exercise, or multimodal care), placebo/sham interventions, or no intervention - Outcomes: self-rated recovery, functional recovery, pain, health-related quality of life or adverse events **Exclusion:** - Studies of extremity pain due to major structural pathology (eg, fractures, dislocations, spinal cord injury, infection, neoplasms, or systemic disease) - Studies solely of patients with grade III sprains or strains, arthritides and osteoarthritis **Limits:** - English - 1990-2015 **Style of acupuncture:** TrP DN: Cotchett et al Acupuncture: Jensen et al, Zhang et al **- Treatment rationale:** TCM Theory - Zhang et al & Jensen et al Western medical - Cotchett et al **Intervention** <u>Cotchett et al 2014:</u> **- Details:** 1 x 30-min treatment per week for 6 weeks **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Inserted at MTrPs **- Depth of insertion:** Not reported **- Response sought:** To elicit aching, soreness, pressure, and twitch sensations **- Needle stimulation:** Needle withdrawn partially after insertion and advanced repeatedly **- Needle retention time:** 5 minutes **- Needle type:** 0.30-mm diameter <u>Jensen et al 1999</u>	- CKRS global score (0-100): 11.6 - CKRS pain (0-20): 4.1 **<u>Zhang et al 2013</u>** Intervention: Acupuncture Control: Eccentric exercise 2-3 reps of 15 + stretching and strengthening exercises for the calf Postintervention difference in mean change: - Symptom severity (VISA-A): –19.5 (95% CI: –22.2, –16.8) - Pain after activity (VAS): 1.7 - Pain at rest (VAS): 1.7 16 week difference in mean change: - Symptom severity (VISA-A): –15.8 (95% CI: –18.0, –13.6) 24 week difference in mean change: - Symptom severity (VISA-A): –11.8 (95% CI: –14.2, –9.4) **<u>Guerra de Hoyos et al 2004</u>** Intervention: Acupuncture Control: Placebo acupuncture Postintervention difference in mean change - Pain intensity (VAS), 1.5 (95% CI: 0.8, 2.3) - Lattinen index, 2.2 (95% CI: 1.1, 3.3) - ROM, 27.2° (95% CI: 16.9°, 37.5°) - SPADI global index, 17.0 (95% CI: 8.6, 25.4) - SPADI pain index, 6.4 (95% CI: 3.1, 9.7) - SPADI disability index, 11.7 (95% CI: 6.2, 17.2) 3-mo difference in mean change - Pain intensity (VAS), 1.5 (95% CI: 0.6, 2.5) - Lattinen index, 2.6 (95% CI: 1.3, 3.8) - ROM, 33.9°(95% CI: 22.8°, 45.0°) - SPADI global index, 18.3 (95% CI: 9.7, 26.9) - SPADI pain index, 6.9 (95% CI: 3.5, 10.4) - SPADI disability index, 11.9 (95% CI: 6.4, 17.3) 6-mo difference in mean change - Pain intensity (VAS), 2.0 (95% CI: 1.2, 2.9) - Lattinen index, 3.0 (95% CI: 1.6, 4.3) - ROM, 38.1° (95% CI: 26.5°, 49.7°) - SPADI global index, 22.1 (95% CI: 13.2, 13.2) - SPADI pain index, 8.1 (95% CI: 4.4, 11.2) - SPADI disability index, 13.4 (95% CI: 7.8, 19.0) - QOL (COOP/WONCA charts), 2.6 (95% CI: 1.2, 3.9) **<u>Khosrawi et al 2012</u>** Intervention: Acupuncture	Zhang et al 2013 - Low risk of bias Guerra de Hoyos et al 2004 - Low risk of bias Khosrawi et al 2012 - Low risk of bias Kumnerddee & Kaewtong 2010 - Low risk of bias Vas et al 2008 - Low risk of bias Yang et al 2011 - Low risk of bias Haker & Lundeberg 1990 - High risk of bias **Grade:** AQ (+) **Quality:** 1+

Study	Methodology	Results	Comments and evidence level
	- Details: 2 x sessions per week for 4 weeks 20-25 minute sessions **- Number of needles inserted per subject per session:** Varied **- Names of points used:** Needled locally at ST34 and SP10; needled either at ExLE5 and ST35 or SP9 and ST36; other points used were BL17, BL18, BL20, BL23, LI4, and CV4 **- Depth of insertion:** Not reported **- Response sought:** needled until deqi sensation achieved **- Needle stimulation:** Not reported **- Needle retention time:** Not reported **- Needle type:** Not reported Zhang et al 2013 **- Details:** 3 x week for 8 weeks **- Number of needles inserted per subject per session:** 4 **- Names of points used:** Not reported **- Depth of insertion:** 20 mm deep at an angle of 15° between the needle and skin **- Response sought:** Not reported **- Needle stimulation:** Not reported **- Needle retention time:** 30 minutes **- Needle type:** Stainless filiform needles (0.35-mm diameter) Guerra de Hoyos et al 2004 **- Details:** 1 x week for 7 weeks **- Number of needles inserted per subject per session:** 5 **- Names of points used:** LI15, TE14, and distal points GB34, and an extra point 1 to 2 cm below ST36 **- Depth of insertion:** Not reported **- Response sought:** Elicit light muscular twitching at local points **- Needle stimulation:** EA using 5 to 10 Hz and intensity to elicit light muscular twitching **- Needle retention time:** 15 minutes **- Needle type:** Not reported Khosrawi et al 2012 **- Details:** 2 x week for 4 weeks **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Not reported **- Depth of insertion:** Not reported **- Response sought:** Not reported **- Needle stimulation:** Not reported **- Needle retention time:** 60 minutes **- Needle type:** 0.25 × 40- mm gauge Kumnerddee & Kaewtong 2010	Control: Placebo acupuncture Postintervention difference in mean change - GSS, 8.3 (95% CI: 5.64, 10.96) - DML, 0.2 (95% CI: 0.02, 0.38) - NCV, 2.9 (95% CI: 0.66, 5.14) No statistically significant differences between groups for DSL **Kumnerddee & Kaewtong 2010** Intervention: EA Control: Night wrist splint Difference in mean change - VAS, 9.63 (95% CI: 1.07, 18.20) No statistically significant differences between groups for the BCTQ Symptom Severity Scale and Functional Status Scale **Vas et al 2008** Intervention: Acupuncture + physiotherapy Control: Mock TENs + physiotherapy 1-mo difference in mean change - Pain and disability (CMS), 6.0 (95% CI: 4.2, 7.8) - Daytime NRS, 1.3 (95% CI: 1.1, 1.5) - Night-time (NRS), 1.7 (95% CI: 1.4, 2.0) **Yang et al 2011** Intervention: Needle acupuncture Control: Oral steroids Postintervention difference in mean change - Nocturnal wakening (GSS subscale, 0-10) - DML, 0.7 (95% CI: 0.39, 1.00). - No statistically significant difference between groups for the outcomes of GSS score, numbness, pain, paresthesia, weakness, nocturnal wakening, MNCV, DSL, CMAP, SNAP, and W-PSNCV 7-mo difference in mean change - GSS score (0-50), 5.6 (95% CI: 3.33, 7.87) 13-mo difference in mean change - GSS score (0-50), 8.25 (95% CI: 4.04, 12.46) - DML, 1.26 (95% CI: 0.78, 1.74) - DSL, 0.59 (95% CI: 0.28, 0.89) - No statistically significant difference between groups for the outcomes of CMAP, MNCV, SNAP, and W-PSNCV **Haker & Lundeberg 1990** Intervention: Acupuncture Control: Superficial acupuncture Postintervention: self-perceived improvement	

Study	Methodology	Results	Comments and evidence level
	- Details: 2 x week for 5 weeks **- Number of needles inserted per subject per session:** 6 **- Names of points used:** Hegu/LI4, Quchi/ LI11, Daling/PC7, Laogong/PC8) and 2 Baxie points (ExUE9) **- Depth of insertion:** Not reported **- Response sought:** Not reported **- Needle stimulation:** Not reported **- Needle retention time:** 30 minutes **- Needle type:** Not reported Vas et al 2008 **- Details:** 3 x week for 3 weeks **- Number of needles inserted per subject per session:** 6 **- Names of points used:** single acupuncture point (ST38) needled toward the BL57 point, using the tiao-shan technique **- Depth of insertion:** Not reported **- Response sought:** deqi sensation **- Needle stimulation:** needle manipulated for 1 min every 5 min **- Needle retention time:** 20 minutes **- Needle type:** Not reported Yang et al 2011 **- Details:** 2 x week for 4 weeks **- Number of needles inserted per subject per session:** 2 **- Names of points used:** fixed and classic acupuncture points on affected side: PC7 (Daling), PC6 (Neiguan) **- Depth of insertion:** Not reported **- Response sought:** Deqi sensation **- Needle stimulation:** Not reported **- Needle retention time:** 30 minutes **- Needle type:** Not reported Haker & Lundeberg 1990 **- Details:** 2-3 x week for 10 sessions **- Number of needles inserted per subject per session:** 2 **- Names of points used:** LI10, LI11, LI12, LU5, and SJ50 **- Depth of insertion:** Not reported **- Response sought:** Deqi sensation **- Needle stimulation:** Not reported **- Needle retention time:** 30 minutes **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** varied from 4 to	- Statistically significant difference favouring traditional Chinese acupuncture group in median pain threshold on gripping and the number of participants suffering pain in 3-kg lifting test - No statistically significant difference between groups in the combined pain replication tests during resisted wrist extension and local tenderness on palpation of the lateral epicondyle, and the remaining individual tests **Adverse effects:** Cotchett et al 2014 No serious adverse events. Minor and transient adverse events were reported in 32% of the needle acupuncture appointments compared with <1% in the placebo appointments. Absolute risk ratio = 29% (95% CI: 23%, 35%). The most common delayed adverse events were bruising and exacerbation of symptoms. Jensen et al 1999 Not reported Zhang et al 2013 Not reported Guerra de Hoyos et al 2004 No serious adverse events reported. Minor adverse effects reported in acupuncture group included fainting (3%), dizziness (5%), dyspepsia (2%), anxiety (5%), and bruising (8%). Minor adverse effects reported in placebo group included dyspepsia (6%) Khosrawi et al 2012 Not reported Kumnerddee & Kaetong 2010 No serious adverse events reported; 20% of subjects in the acupuncture group had temporary bruising (small vessel damage). No adverse events reported in the night splint group. One subject required occasional dose of 500 mg of acetaminophen Vas et al 2008 No severe adverse events; 2% of patients in the acupuncture and physical therapy group reported intense pain during intervention and residual pain after 24 h. Both groups reported gastralgia due to pharmacological treatment (3% in acupuncture and physical therapy group and 5% in mock TENS plus physical therapy). Both groups also reported pain after the physical therapy sessions (2% in acupuncture and physical therapy group and 1% in mock TENS plus physical therapy group) Yang et al 2011 No severe adverse events reported. In the short term, 5% of participants in the acupuncture group reported minor adverse effects such as local pain after session, ecchymosis, and local paresthesia during session. In the steroid group, 18% of participants reported minor adverse effects such as nausea and epigastralgia. No long-term side effects were reported Haker & Lundeberg 1990 Not reported	

Study	Methodology	Results	Comments and evidence level
	8 weeks. **- Frequency and duration:** The number of treatment sessions ranged from 6 to 24. The number of sessions per week varied from 1 to 3 **Practitioner qualifications and background** Cotchett et al 2014: Provided by a Podiatrist Jensen et al 1999: Not reported Zhang et al 2013: Not reported Guerra de Hoyos et al 2004: Provided by licensed acupuncturist Khosrawi et al 2012: Not reported Kumnerddee & Kaewtong 2010: Provided by a physiatrist Vas et al 2008: Provided by GP Yang et al 2011: Not reported Haker & Lundeberg 1990: Not reported		
Hou, P, Fu, P, Hsu, H, Hsieh, H **Traditional Chinese medicine in patients with osteoarthritis of the knee** **2015** Databases **PubMed, Medline** Included Studies **Ng et al. 2003** **Berman et al. 2004** **Tukmachi et al. 2004** **Vas et al. 2004** **Witt et al. 2005** **Scharf et al. 2006** **Williamson et al. 2007** **Jubb et al. 2008** **Itoh et al. 2008** **Lu et al. 2010** Research question	**Participants** *N = participants, age* Ng et al. 2003 – n=24 Berman et al. 2004– n=570, age ≥50 years Tukmachi et al. 2004– n=30, age ≥18 years Vas et al. 2004 - n=97, age ≥45 years Witt et al. 2005 - n=300, age 50-75 years Scharf et al. 2006 - n=1039, age ≥40 years Williamson et al. 2007 - n=181 Jubb et al. 2008 - n=68, age >18 years Itoh et al. 2008 - n=30, age >60 years Lu et al. 2010 - n=20 **Inclusion:** - Age >18 years - Patients with at least three of the following characteristics: (A) morning stiffness lasting fewer than 30 min; (B) a crackling or grating sensation; (C) bony tenderness of the knee; (D) bony enlargement of the knee; and (E) no detectable warmth of the joint to the touch **Exclusion:** - OA secondary to other etiologies such as trauma, infection, and rheumatoid arthritis - OA located at multiple sites, and inability of the treatment to target specific joints **Limits:** - English only - RCTs	**Ng et al. 2003** Intervention: EA treatment: ST-35 and EX-LE-4 with De-Qi, EA TENS Group: the procedures were the same as EA group except surface electrodes were used instead of needle insertion Control group: Subjects received general education on osteoarthritic knee care only Outcome assessment: Pain: NRS of pain, Function: passive ROM of the OA knee; the Timed Up-and-Go test (TUGT) Results: NRS of knee pain: EA group significant reduction of mean knee pain (229%) after eight sessions of treatment (p = 0.01), and the effect was well maintained (231%) at the 2- week follow-up evaluation (p = 0.01) The total passive knee ROM was not significantly different among the three groups across the period of study There was a significant improvement (11%) in the TUGT scores in the EA group after eight sessions of treatment **Berman et al. 2004** Intervention: True acupuncture group: acupoints (5 local and 4 distal points) by TCM theory EA Sham control: No needle insertion Education group: 6 two hour group sessions based on the Arthritis Self-Management Program Outcome assessment: Pain: WOMAC pain score, Function: WOMAC function score; SF-36; the 6- min walk time; the patient global assessment	**Reviewer comments** Limited databases were sourced during the search process. The Inclusion/exclusion criteria is poorly reported. The review fails to report whether two authors, or any authors in fact, selected, searched or data extracted. Information of selected included studies is well reported, within tables. It is unclear as to how many and which studies were directly included in the review. Some of the interpretation and language is also unclear. Both of these points could just be a translation issue. The included studies were mostly of poor quality, with high risk of bias, which can impact on the results of this review. Having said this, the author does identify the fact that the included studies are of quite poor quality. Appropriate methods were not used to combine the individual included study findings. **Quality scores:** Cochrane tools for assessing risk of bias H = High/ L = Low/ U = Unclear Overall Quality assessment:

Study	Methodology	Results	Comments and evidence level
What is the effectiveness of Traditional Chinese Medicine in treating osteoarthritis of the knee? Funding **Not reported**	**Style of acupuncture:** Ng et al. 2003 – Electro-acupuncture Berman et al. 2004– acupuncture Tukmachi et al. 2004– Acupuncture Vas J et al. 2004– Acupuncture Witt C et al. 2005 – Acupuncture Scharf et al. 2006 – Acupuncture Williamson et al. 2007 – Acupuncture Jubb et al. 2008 – Electro-acupuncture Itoh et al. 2008 – Trigger point acupuncture Lu et al. 2010 – Electro-acupuncture **Treatment rationale:** TCM **Length of treatment:** Not reported **Control:** Ng et al. – General education Berman et al. – Education Tukmachi et al. – Acupuncture/ Medication Vas et al. – Placebo acupuncture Witt et al. – Waiting list Scharf et al. – Sham + conservative therapy Williamson L et al. – Exercise group (circuit) Jubb et al. – Sham group (no needle) Itoh et al. – Sham group no needle (simulation of needle) Lu et al. – Sham EA group **Intervention** **- Details of needling:** Ng et al. – Surface electrodes instead of needle insertion Berman et al. – No needle insertion Tukmachi et al. – Not reported Vas et al. – No needle penetration Witt et al. – Superficial insertion at non-acupuncture point Scharf et al. – Minimal depth needling without stimulation Williamson et al. – Not reported Jubb et al. – Needle not inserted into the skin Itoh et al. – Stimulation of needle insertion and extraction was performed Lu et al. – Needle into the skin at points from 1 cm left to the acupoints **Number of needles inserted per subject per session:** Not reported **Names of points used:** TCA, *Ashi*, non-acupuncture point, distal acupoints, ST-35 and EX-LE-4,	Results: WOMAC pain: No statistically significant difference among participants who were receiving true acupuncture than in the sham group at all of the post baseline assessments WOMAC function: The true acupuncture group's improvement from baseline was significantly greater than that of the sham control group at weeks 8. Changes in overall physical component score did not statistically significantly differ between the true versus sham acupuncture groups **Tukmachi et al. 2004** Intervention: Group A: EA alone, stop NSAIDs and analgesic drugs Group B: Acupuncture and their existing analgesic and anti-inflammatory medication Group C: week 1-5: current medications, week6-10: acupuncture plus medications Outcome assessment: Pain: VAS(10-cm) Function: WOMAC; global assessment Results: Group C showed no change in pain score during the first five weeks while waiting for acupuncture. After acupuncture there was a large and statistically significant drop in the VAS pain score for all three treated groups. In groups A and B the significant improvement in pain score was maintained when the patients attended for the final visit **Vas et al. 2004** Intervention: Intervention group: acupuncture plus diclofenac EA Control group: placebo acupuncture + Diclofenac Outcome assessment: Pain: WOMAC pain scale, VAS (100-mm) Function: WOMAC stiffness and function scale, Others: the dosage of diclofenac accumulated; the profile of quality of life in the chronically ill (PQLC) Results: The WOMAC index and VAS presented a greater, and significant reduction in the intervention group than in the control group. A reduction of 53.9 was observed in the total accumulated number of diclofenac tablets for the intervention group compared with the control group. The PQLC results indicate that acupuncture treatment produces significant changes in physical capability and psychological functioning **Witt et al. 2005** Intervention: Acupuncture group: 6 local and 2 distal acupoints Minimal acupuncture group: superficial insertion at non-acupuncture point Waiting list: No acupuncture for 8 weeks after randomization, receive 12 sessions of acupuncture from week 9 Outcome assessment: Pain and function: WOMAC Pain Disability Index (PDI) SF-36 Results: On all WOMAC subscales (pain, stiffness, and physical function), the acupuncture group showed significant improvements compared with the minimal acupuncture and the waiting list groups.	Ng et al. 2003– Low quality, Berman Bet al. 2004 – Low quality Tukmachi et al. 2004– Average quality Vas et al. 2004 – Low quality Witt et al. 2005– Low quality Scharf et al. 2006– Low quality Williamson et al. 2007 – Low quality Jubb et al. 2008 – Average quality Itoh et al. 2008 – Average quality Lu et al. 2010 – Average quality **Grade:** LQ (-) **Quality:** 1

Study	Methodology	Results	Comments and evidence level
	Depth of insertion: Not reported **Response sought:** Not reported **Needle stimulation:** Not reported **Needle retention time:** Not reported **Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions/ Frequency and duration:** Ng et al. – 8 sessions/ 2 week follow up Berman et al. – Not reported Tukmachi et al. – Unclear Vas et al. – Not reported Witt et al. – Not reported Scharf et al. – Not reported Williamson et al. – / 9 weeks, 50 mins Jubb et al. – / 5-9 weeks Itoh et al. – Not reported Lu et al. – Not reported **Other components of treatment:** Not reported **Practitioner qualifications and background** Not reported	**Scharf et al. 2006** Intervention: Conservative therapy: diclofenac, up to 150 mg/d, or rofecoxib, 25 mg/d, 6 Physiotherapy sessions TCA Conservative therapy: 10 acupuncture sessions, 2 of 16 defined points were chosen and 4 Ashi points, Sham conservative therapy: minimal-depth needling without stimulation Outcome assessment: Pain: WOMAC pain scale, Function: WOMAC function scale SF-12 physical subscale Results: - Statistically significantly increased success rates in the acupuncture and sham acupuncture groups compared with the conservative therapy group ($p < 0.001$ for both comparisons) and no difference between the acupuncture and sham acupuncture groups ($p = 0.48$) - Statistically significant changes with respect to total WOMAC score. The changes in the acupuncture and sham acupuncture groups were much more distinct than those measured in the conservative therapy group - The SF-12 physical subscale at week 26 was also greater with acupuncture and sham acupuncture than with conservative therapy **Williamson et al. 2007** Intervention: Acupuncture group Physiotherapy group: exercise circuit once a week, for 6 weeks Outcome assessment: Pain: VAS(10-cm) Function: Oxford Knee Score (OKS); WOMAC; a 50-m timed walk Results: The acupuncture group had a lower OKS than the other two groups at 7 weeks. During the 50-m timed walk, the physiotherapy group had a lowest mean walking time but no significant difference **Jubb et al. 2008** Intervention: Standard management group: exercise and advice by consensus Acupuncture group: distal and local acupoints, EA to anterior part for 10 min and then posterior part 10 min Sham group: needle not inserted into skin Outcome assessment: Pain: VAS, Function: WOMAC, EuroQol Results: Acupuncture vs sham: showed a statistically significant improvement (pain score) in the acupuncture group ($p = 0.035$) No significant difference between the groups for EuroQol and WOMAC stiffness or function either at the end of treatment at week five or at the final visit at week nine **Itoh et al. 2008**	

Study	Methodology	Results	Comments and evidence level
		Intervention: Standard acupuncture: traditional acupoints for knee pain Trigger point acupuncture: Trigger points, local twitch by stimulation Sham group: non-penetrating needle Outcome assessment: Pain: VAS (100-mm), Function: WOMAC Results: VAS: The VAS of the TrP group was the lowest of the three, and the difference was statistically significant when compared with sham group (p ¼ 0.025), but no significant difference was detected between TrP and acupuncture (p = 0.47). WOMAC: The lowest WOMAC score was found in the TrP group, and a statistically significant difference was detected between TrP and sham groups (p = 0.031). No significant difference was detected between acupuncture and sham groups. **Lu et al. 2010** Intervention: Experimental group: Electroacupuncture, 5 acupoints Sham group: sham EA (line connected to needle but no power) Outcome assessment: Pain: VAS (10-cm) Results: The VAS scores were decreased significantly after acupuncture treatment in both groups (the mean change of experimental group was 2 times than that of sham group) **Adverse effects:** Not reported	
Kim, T, Lee, M, Kim, K, Kang, J, Choi, T, Ernst E **Acupuncture for treating acute ankle sprains in adults** **2014** Databases **Cochrane Library, Medline, Embase, China National Knowledge Infrastructure databases, the Cumulative Index to Nursing and Allied Health Literature, the Allied and Complementary Medicine Database, Science Links Japan, several Korean medical**	**Participants (All 20 included studies in the SR)** n=2012 Mean number of participants per study: 110 Age: ranges from 13 to 63 years Symptoms duration: most < 1 week Severity of ankle sprain: most studies included ankle sprains of mixed severity or did not detail severity. **Inclusion:** - RCTs and Quasi RCTs involving adults with acute ankle sprains - All types of acupuncture practices - Comparison: no treatment or placebo or another standard non-surgical intervention **Exclusion:** - Cross over studies - Studies involving majority children **All Studies:**	Ge 2000 Intervention: Acupuncture + Chinese herbal medicine Control: Chinese herbal medicine 10 days follow up: Intervention group had a greater cure rate (48/50 versus 22/30; RR 1.31, 95% CI 1.05 to 1.64) 'cure rate' - the number of participants who had recovered at follow up Jian 2004 Intervention: Acupuncture plus Chinese complex non-surgical intervention Control: Chinese complex non-surgical intervention alone Follow up 7 days: The intervention group had better cure rates (48/48 vs 42/48; RR 1.14, 95% CI 1.02 to 1.28) Paris 1983 Intervention: EA + standard physiotherapy Control: Standard physiotherapy Follow up unsure of time:	**Reviewer comments** Comprehensive and well conducted search strategy. Two review authors independently screened the search results, assessed trial eligibility, assessed risk of bias and extracted data from the included trials. Sufficient follow-up of the included studies missing data by authors. Comprehensive assessment of the risk of bias in included studies. Meta-analyses conducted using the fixed-effect method or, where appropriate, the random-effects method. The included trials are very heterogeneous. Small sample sizes may have contributed to the imprecision of the review. Result may have been

Study	Methodology	Results	Comments and evidence level
databases & the World Health Organization International Clinical Trials Registry Platform Relevant Included Studies **Ge 2000** **Hao 2006** **Jian 2004** **Paris 1983** **Shi 2013** **Sun 2011** **Yu 1996** **Yu 1999** **Zhang 2011** **Zhang 2012** Research question **What are the effects (benefits and harms) of acupuncture for the treatment of ankle sprains in adults?** Funding **No external funding was received. Korea Institute of Oriental Medicine, Korea, South. Provision of salaries to MS Lee and T-Y Choi (K14281 and K14400)**	<u>Style of acupuncture</u> 12 studies: Needling acupuncture - Cho 1977; Hao 2006; Jian 2004; Jiang 2011; Ni 2010; Ruan 1995; Shi 2013; Sun 2011; Wei 2004; Wu 2007; Yu 1999; Yu 1996 2 studies: Ear acupuncture - Hao 2006; Paris 1983 1 study: EA - Zhang 2011 3 studies: Warm needle therapy - burning dried mugwort was added to the handle of the inserted acupuncture needle - Wu 2006; Zhang 2012; Zhou 2008 1 study: Fire needle acupuncture - thermal stimulation was applied to the body of the acupuncture needle - Wu 2006 2 studies: no detailed description of acupuncture method used - Ge 2000; Wang 2009) 1 study: Acupressure - Chen 2012 <u>Most frequently selected acupuncture points</u> BL60 (10 times); GB40 (9), KI3 and Ashi points (8); ST41, ST36 (7); and BL62, KI6 and GB39 (6). BL40, BL59, BL63, GB34, GB42, GB41, LI4, LR4, LR3, KI2, SP4, SP5, SP6, SP9, ST4, ST42, ST43 & ST44 were also used <u>Needle retention time:</u> Primarily 20 to 30 minutes (Range 1 minute to 40 minutes) <u>Number of sessions:</u> ranged from 5 to 10 in most of the studies (Range 1 session to 30 sessions) **Relevant included studies:** <u>Ge 2000</u> N=80 **Intervention** **- Number of needles inserted per subject per session:** not reported **- Names of points used:** unilateral (no details) **- Depth of insertion:** not reported **- Response sought:** not reported **- Needle stimulation:** not reported **- Needle retention time:** not reported **- Needle type:** not reported **Treatment Regimen** **- Number of treatment sessions:** 2 treatment courses **- Frequency and duration:** one session for 5 days **Practitioner qualifications and background**	Statistically significant in favour of intervention group - Time to stop treatment (the recovery of the injured ankle took three days less with acupuncture: MD -3.00 days, 95% CI -5.48 to -0.52 days) - Time to recover plantar flexion/dorsiflexion ROM (MD -7.25 days, 95% CI -10.41 to -4.09 days) Non statistically significant: - Time to recover inversion/eversion ROM (MD -3.00 days, 95% CI -7.80 to 1.80 days) - Time to recovery from pain (MD -2.75, 95% CI -6.18 to 0.68) <u>Shi 2013</u> Intervention: Acupuncture Control: External application of Voltaren emulsion, an NSAID Follow up 2 weeks: VAS (0-6) intervention group had less pain in comparison (MD -1.06, 95% CI -1.64 to -0.48) <u>Sun 2011</u> Intervention: Acupuncture Control: Immobilisation with an elastic bandage Follow up 2 weeks: - No significant difference in cure rate (40/41 vs 38/ 41; RR 1.05, 95% CI 0.95 to 1.16) - Significant difference in time for ankle pain to subside in the intervention group (MD -3.40 days, 95% CI -3.88 to -2.92 days) <u>Yu 1999</u> Intervention: Acupuncture Control 1: Dolobene gel (an NSAID) application Control 2: Acupuncture + Dolobene gel application Follow up 7 days: No statistically significant differences between intervention group and control 1 (33/50 vs 40/50; RR 0.82, 95% CI 0.65 to 1.05) <u>Zhang 2012</u> Intervention: Acupuncture + Electro-physiotherapy Control: Electro-physiotherapy Follow up 30 days: Cure rate in the intervention group higher. Borderline statistically significant (32/34 vs 26/34; RR 1.23, 95% CI 1.00 to 1.51) **<u>Joint analysis:</u>** Hao 2006, Yu 1996 & Zhang 2011 – Acupuncture + Chinese herbal drug vs herbal drug alone <u>Hao 2006</u> Intervention: Acupuncture + topical Chinese herbal application Control: Topical Chinese herbal application Follow up 7 days <u>Yu 1996</u> Intervention: Acupuncture	affected by selection bias due to 5 of the included studies being quasi-RCTs and 12 studies giving no information on their method of randomisation. High risk of performance and detection bias within included studies due to no studies adopting sham controls to blind the participants and practitioners **Risk of Bias:** Overall (20 RCTs) Sequence generation: Unclear risk of bias Allocation concealment: Unclear risk of bias Blinding of participants and personnel: High risk of bias Blinding of outcome assessment: High risk of bias Incomplete outcome data: Low risk of bias Selective outcome reporting: High risk of bias Other sources of bias: Low risk of bias - All of the included studies had a high or unclear risk of bias in almost all domains **Quality of evidence relating to cure rate using GRADE:** Very low **Grade:** HQ (++) **Quality:** 1+

Study	Methodology	Results	Comments and evidence level
	Not reported Hao 2006 N=126, Int: mean 23.6 years, Con: mean 22.8 years **Intervention** **- Number of needles inserted per subject per session:** body acupuncture points: 3 to 5 points; ear acupuncture points: 3 points in both ears **- Names of points used:** body acupuncturist points: GB39, GB40, ST41, BL60, BL59, SP6, KI3, KI6, SP5, LR4, LR3, GB34, ST36, BL62 and Ashi points, and ear acupuncture points: ankle, subcortex and lumbar vertebra **- Depth of insertion**: not reported **- Response sought**: de-qi sensation **- Needle stimulation:** manual stimulation for body acupuncture and pressing attached ear acupunctures 5 times per day **- Needle retention time:** 20 minutes for body acupuncture and 2 days for ear acupuncture **- Needle type:** body acupuncture: not reported; ear acupuncture: Semen Vaccariae seeds **Treatment Regimen** **- Number of treatment sessions:** 7 **- Frequency and duration:** 1 x daily for 7 days **Practitioner qualifications and background** Not reported Jian 2004 N=96, Age: 17-38 years **Intervention** **- Number of needles inserted per subject per session:** 3 **- Names of points used:** ST36, GB39, BL60 and Ashi-points **- Depth of insertion**: Not reported **- Response sought**: de-qi sensation **- Needle stimulation:** Manual **- Needle retention time:** 10 minutes **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** 7 **- Frequency and duration:** 1 x daily for 7 days **Practitioner qualifications and background** Not reported Paris 1983 N= 16, Age: College students **Intervention:** Electrical acupuncture **- Number of needles inserted per subject per session:** 24	Control 1: External Chinese herbal drug application Control 2: Acupuncture + external herbal Chinese drug application Control 3: Ice pack Follow up 7 days Zhang 2011 Intervention: Acupuncture + external Chinese herbal drug application Control: External Chinese herbal drug application Follow up 10 days Hao 2006 & Yu 1996 found higher cure rates in the acupuncture group, whereas all participants in both groups were cured in Zhang 2011 at follow-up. Pooled results using the fixed-effect model showed a significant difference in cure rate in favour of acupuncture (177/183 vs 141/163; RR 1.11, 95% CI 1.04 to 1.18). However, the results were significantly heterogeneous (I2 = 97%), and the results were no longer statistically significant when a sensitivity analysis using a random-effects model was performed (RR 1.17, 95% CI 0.78 to 1.78) Yu 1996 Intervention: Acupuncture Control 3: Ice pack Follow up 7 days: no significant difference between the two interventions in cure rate (15/30 vs 16/29; RR 0.91, 95% CI 0.56 to 1.47) **Patient reported assessment of function** No study reported on patient-reported assessment of function **Adverse effects:** Only 1 of the 20 included studies within the systematic review reported on adverse events with no adverse events occurring within the acupuncture group	

Study	Methodology	Results	Comments and evidence level
	- Names of points used: Ear acupuncture points (Shen men, Ankle, Vertebral Innervation, Thalamus, Tragus and Endocrine) and body acupuncture points (SP6, BL59, ST41, BL60, KI3 and SP5) **- Depth of insertion**: Not inserted **- Response sought**: Pain within subjective tolerance **- Needle stimulation:** Electrical stimulation **- Needle retention time:** 1 minute **- Needle type:** Neuroprobe systems 2 NP 200 by Medical Research Labs, Inc **Treatment Regimen** **- Number of treatment sessions:** Not reported **- Frequency and duration:** 5 x week for 1 week then 3 days a week for 5 days Concomitant treatment: Cryotherapy, pressure wrap **Practitioner qualifications and background** Not reported <u>Shi 2013</u> N= 87, Age: 19-46 years **Intervention** **- Number of needles inserted per subject per session:** 2 **- Names of points used:** Ashi points around the affected ankle joint **- Depth of insertion**: Not reported **- Response sought**: Not reported **- Needle stimulation:** Manual acupuncture (rapid rotation of acupuncture needle - 80 to 120 times/minute) **- Needle retention time:** 20 minutes **- Needle type:** 0.3 mm x 25 mm (diameter x length) **Treatment Regimen** **- Number of treatment sessions:** 7 **- Frequency and duration:** Every second day for 2 weeks **Practitioner qualifications and background** Not reported <u>Sun 2011</u> N=80, Age: Inv: mean 25, Con: mean 26 **Intervention** **- Number of needles inserted per subject per session:** 1 **- Names of points used:** Ankle joint point (non-classic acupuncture point - Huaiguanjie xue) **- Depth of insertion**: 0.4 cm **- Response sought**: De-qi sensation **- Needle stimulation:** Manual acupuncture (rotating needles) **- Needle retention time:** 30 minutes **- Needle type:** 0.25 mm x 40 mm (diameter x length)		

Study	Methodology	Results	Comments and evidence level
	Treatment Regimen **- Number of treatment sessions:** 14 sessions **- Frequency and duration:** 1 x daily for 14 days **Practitioner qualifications and background** Yu 1996 N=120, Age: 16-22 years **Intervention** **- Number of needles inserted per subject per session:** 4 **- Names of points used:** ST36, GB39, KI3 and BL60 **- Depth of insertion**: Not reported **- Response sought**: Not reported **- Needle stimulation:** Manual acupuncture (not reported in detail) **- Needle retention time:** 5-10 minutes **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** 7 **- Frequency and duration:** 1 x daily for 7 days **Practitioner qualifications and background** Not reported Yu 1999 N=150, Age: mean 20.6 years **Intervention** **- Number of needles inserted per subject per session:** 4 **- Names of points used:** ST36, GB39, KI3 and BL60 **- Depth of insertion**: Not reported **- Response sought**: Not reported **- Needle stimulation:** Not reported **- Needle retention time:** 5-10 minutes **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** 7 **- Frequency and duration:** 1 x daily for 7 days **Practitioner qualifications and background** Not reported Zhang 2011 N=160, Age: 15-23 years **Intervention** **- Number of needles inserted per subject per session:** > 3 **- Names of points used:** SP6, KI3, KI6 and Ashi points for medial ankle ligaments injury, and GB40, BL60, GB41 and Ashi points for lateral ankle ligaments injury		

Study	Methodology	Results	Comments and evidence level
	- Depth of insertion: 1 to 1.5 Cun **- Response sought**: De-qi stimulation **- Needle stimulation:** EA (non-painful intensity) **- Needle retention time:** 30 minutes **- Needle type:** 28 numbered acupuncture needle **Treatment Regimen** **- Number of treatment sessions:** 10 **- Frequency and duration:** 1 x daily for 10 days **Practitioner qualifications and background** Not reported Zhang 2012 N=68, Age: > 14 years **Intervention**: Standardised manual acupuncture with moxibustion **- Number of needles inserted per subject per session:** > 6 **- Names of points used:** GB34, SP5, GB40, ST4, BL60, ST36 and Ashi points **- Depth of insertion**: Not reported **- Response sought**: De-qi stimulation **- Needle stimulation:** Moxibustion around GB34 and ST36 **- Needle retention time:** 30 minutes **- Needle type:** 2 Cun acupuncture needle **Treatment Regimen** **- Number of treatment sessions:** 30 **- Frequency and duration:** 1 x daily for 30 days **Practitioner qualifications and background** Not reported		
Park, J, Hahn, S, Park, Y, Park H & Lee, H **Acupuncture for ankle sprain: systematic review and meta-analysis** **2013** Databases **PubMed, Ovid EMBASE, CINAHL, SPORTDiscus, AMED, Rehabilitation and Sports Medicine Source, CNKI, Korean databases including the Oriental Medicine Advanced Searching**	**Participants** *No. participants, age, M/F%* Sun 2011: n=82, age-21-30yrs (62/20) Zheng 2010: n=73, age 14-57yrs (40/33) He 2010: n=261, age 51-68yrs Wei 2010: n=60, age 24-58yrs, (41/19) Ni 2010: n=123, age 13-63yrs (53/70) Tang 2010: n=60, age 18-23yrs, (38/22) Luo 2009: n=46, age 15-59yrs, (28/18) Zhou 2008: n=49, age 17-45yrs, (21/28) He 2006: n=79, age 16-70yrs, (28/51) Zhao 2005: n=76, age 16-53yrs, (43/33) Wang 2005: n=57, age 13-60yrs, (45/12) Li 2002: n=46	**Sun 2011** Intervention (A) Acupuncture + functional exercise Control: (B) Functional exercise + elastic bandage, Outcome measure/evaluation time: 1) Patient-reported global assessment 2) Time for pain to disappear (d) Main result: 1) (A) significantly better than (B) (P<0.05) 2) (A) significantly lower than (B) (P<0.05) **Zheng 2010** Intervention (A) Cotton pad pressure + bandage + ice pack + Acupuncture Control: B) Cotton pad pressure + bandage + ice pack Outcome measure/evaluation time: 1) Patient-reported global assessment (cure rate)	**Reviewer comments** A good amount of databases were sourced, along with a large amount (17) RCT's included in this systematic review. However, a number of the included studies were not relevant to this evidence based review. Study characteristics of the included studies are reported extremely well in a supplementary file. Two reviewers searched for the available evidence and extracted data, however it is not reported whether two reviewers selected the included studies. Reviews also rated risk of bias using

Study	Methodology	Results	Comments and evidence level
Integrated System, the Korean Studies Information Service System, RISS4U, Korea Institute of Science and Technology Information, KOREAMED, DBPIA, and the Korea National Assembly Library Included Studies **Sun 2011** **Zheng 2010** **He 2010** **Wei 2010** **Ni 2010** **Tang 2010** **Luo 2009** **Zhou 2008** **He 2006** **Zhao 2005** **Wang 2005** **Li 2002** **Ge 2000** **Yu 1999** **Yu 1999** **Yu 1996** **Ruan 1995** Relevant included studies **Sun 2011** **Zheng 2010** **Tang 2010** **Luo 2009** **Zhao 2005** **Wang 2005** **Li 2002** **Ge 2000** **Yu 1999** **Yu 1999** **Yu 1996** Research question	Ge 2000: n=80, age 15-25yrs, (55/25) Yu 1999: n=150, age 18-23yrs, (95/55) Yu 1999: n=120, age 18-23yrs, (70/50) Yu 1996: n=120, age 16-22yrs, (64/56) Ruan 1995: n=338, age 15-52yrs (252/86) **Inclusion:** - Mixed population studies including adults and children were included **Exclusion:** - Studies that compared different acupuncture styles - Studies of acupuncture vs. Chinese herbal medicine or bee venom - Trials where acupuncture was given with other therapies so that the effect of acupuncture per se could not be isolated - Trials comparing the effect of another therapy given with acupuncture with that of acupuncture alone **Limits:** - English **Treatment rationale/ type of acupuncture** Sun 2011 – Modern/Acupuncture (Hand) Zheng 2010 – Clinical experience/ Acupuncture He 2010 – TCM theory/ Warm acupuncture Wei 2010 - TCM theory/ Warm acupuncture Ni 2010 – TCM theory/ Acupuncture Tang 2010 – TCM theory/ EA Luo 2009 - TCM theory/ EA Zhou 2008 - TCM theory/ Warm acupuncture He 2006 – TCM theory/ Warm acupuncture Zhao 2005 – TCM theory/ EA Wang 2005 – Modern/ EA Li 2002 – Not reported/ Acupuncture Ge 2000 – Not reported/ Acupuncture Yu 1999 – TCM theory/ Acupuncture Yu 1999 – Not reported/ Acupuncture Yu 1996 – Not reported/ Acupuncture Ruan 1995 – Not reported/ Acupuncture **Details of needling:** Not reported **Number of needles inserted per subject per session:** Not reported **Names of points used:** Ex-UE205, LI15, Tender points, Selected points from ST36, LR3 etc., E-UE140 + additional points (pain sensitive points on the contralateral wrist joint), Tender points, MA, WA: GB34 EA:GB39, BL62, GB43, Penetrating needling (GB40 and KI6), ST41, GB40, BL62, BL60, GB39, ST36,	2) Patient-reported global assessment (efficacy rate) 3) Time to cure Main result: 1) (A) significantly better than (B) (P<0.05) 2) (A) significantly better than (B) (P<0.05) 3) (A) significantly lower than (B) (P<0.05) **Tang 2010** Intervention: (A) EA + massage + Infrared radiation Control: (B) Massage + Infrared radiation Outcome measure/evaluation time: 1) Patient-reported global assessment 2) Recurrence rate (6 months after the sessions, %) outcomes measured at the end of the sessions and 6 months after Main result: 1) (A) significantly better than (B) (P<0.05) 2) (A) significantly lower than (B) (P<0.01) 1 participant in the acupuncture group and 5 in the control group had suffered a re-injury at 6-month follow-up (RR 0.17, 95% CI 0.02–1.33). **Luo 2009** Intervention: (A) EA Control: (B) topical NSAIDs (diclofenac) Outcome measure/evaluation time: 1) Patient-reported global assessment Main result: 1) (A) significantly better than (B) (P<0.05) **Zhao 2005** Intervention: (A) EA Control: (B) Medicine + hot pack, oral NSAIDs (indometacin) 50mg, topical NSAIDs (diclofenac) Outcome measure/evaluation: 1) Patient-reported global assessment (cure rate) 2) Patient-reported global assessment (efficacy rate): Main result: 1) (A) significantly better than (B) (P<0.05) 2) (A) significantly better than (B) (P<0.05) **Wang 2005** Intervention: (A) EA Control: (B) Infrared radiation Outcome measure/evaluation: 1) Patient-reported global assessment Main result: 1) (A) significantly better than (B) (P<0.01) **Li 2002** Intervention: (A) Acupuncture + herbal medicine Control: (B) Herbal medicine Outcome measure/evaluation:	Cochrane collaborations risk of bias assessment tool. No clear reporting of an inclusion criteria, only a brief description of mixed populations. Reasons for exclusion are reported poorly. Moreover, the included studies are of relatively poor quality with high risk of bias which is reported in this review and can impact results of the review. **Quality scores:** Cochrane tools for assessing risk of bias *H = High/ L = Low/ U = Unclear* Overall Quality assessment: Sun 2011 – Average quality Zheng 2010 – Low quality He 2010 – Average quality Wei 2010 – Low quality Ni 2010 – Low quality Tang 2010 – Low quality Luo 2009 – Low quality Zhou 2008 – Low quality He 2006 – Low quality Zhao 2005 – Low quality Wang 2005 – Low quality Li 2002 – Average quality Ge 2000 – Low quality Yu 1999 – Low quality Yu 1999 – Low quality Yu 1996 – Low quality Ruan 1995 – Low quality **Grade:** AQ (+) **Quality:** 1+

Study	Methodology	Results	Comments and evidence level
How effective is acupuncture in treating ankle sprains? Funding **Supported by Basic Science Research Program through the National Research Foundation of Korea funded by the Korean Ministry of Education, Science and Technology**	GB39, additional points (pain sensitive points on the contralateral Triple energizer meridian of wrist), BL60, ST36, GB39, KI3, ST36, GB39, KI3, Ex-LE8, Ex-LE9, KI6, SP6, KI2, ST41, ST36, GB34, SP9, ashi points **Depth of insertion:** Not reported **Response sought:** Not reported **Needle stimulation:** Not reported **Needle retention time:** Not reported **Needle type:** He 2010 - Silver needle, small needle-knife therapy **Treatment Regimen** **Number of treatment sessions/ Frequency and duration:** Sun 2011 – 14 sessions (once daily for 14 d) Zheng 2010 – 15 sessions (once daily for 5 d x 3) He 2010 – Not reported Wei 2010 - 10 sessions (once daily for 10 d) Ni 2010 – 3 sessions (once daily for 3 d) Tang 2010 – 10 sessions (once daily for 5 d X 2) Luo 2009 - 12 sessions (six times per 2 weeks X 2) Zhou 2008 - 5 sessions (once daily for 5 d) He 2006 – 5 sessions (once daily for 5 d) Zhao 2005 – 14 sessions (once per 2 days for 2 weeks x 2) Wang 2005 – 5 sessions (once daily for 5 d) Li 2002 – 8 sessions (once daily for 8 d) Ge 2000 – 10 sessions Yu 1999 – 14 sessions (twice daily for 7 d) Yu 1999 – 14 sessions (twice daily for 7 d) Yu 1996 – 7 sessions (once daily for 7 d) Ruan 1995 – Once daily **Other components of treatment:** Not reported **Practitioner qualifications and background** Not reported	1) Patient-reported global assessment (cure rate) 2) Patient-reported global assessment (efficacy rate): Main result: 1) (A) significantly better than (B) (P<0.05) 2) (A) significantly better than (B) (P<0.05) **Ge 2000** Intervention: (A) Acupuncture + herbal medicine Control: (B) Herbal medicine: oral Outcome measure/evaluation: 1) Patient-reported global assessment Main result: 1) (A) significantly better than (B) (P<0.05)) **Yu 1999a** Intervention: (A) Acupuncture + medicine Control 1: (B) Medicine: topical NSAIDs (ibuprofen) Control 2: (C) Acupuncture Outcome measure/evaluation: 1) Patient-reported global assessment Main result: 1) (A) significantly better than (B) (P<0.05) (A) significantly better than (C) (P<0.01) **Yu 1999b** Intervention: (A) Acupuncture + medicine + ice pack Control 1: (B) Medicine + ice pack: topical NSAIDs (ibuprofen) Control 2: (C) Ice pack Control 3: Acupuncture Outcome measure/evaluation: 1) Patient-reported global assessment Main result: 1) (A) significantly better than (B) (P<0.05) (A) significantly better than (C) (P<0.01) (A) significantly better than (D) (P<0.01) **Yu 1996** Intervention: (A) Acupuncture + herbal medicine + ice pack Control 1: (B) Herbal medicine + ice pack: topical Control 2: (C) Ice pack Control 3: (D) Acupuncture Outcome measure/evaluation: 1) Patient-reported global assessment Main result: 1) (A) significantly better than (B) (P<0.05) (A) significantly better than (C) (P<0.01) (A) significantly better than (D) (P<0.01) **Adverse effects:** Yu (2) (1999) and Yu (1996) are the only studies which reported adverse events such as mild allergic response to medication, from which the patients (three participants) recovered after the drug was stopped. This was reported within this systematic review.	

Study	Methodology	Results	Comments and evidence level
Clark, R & Tighe, M **The effectiveness of acupuncture for plantar heel pain: a systematic review** **2012** Databases **PubMed, AMED (EBSCO), British Nursing Index, CINAHL plus (EBSCO), EMBase, MEDLINE (EBSCO), MEDLINE (Ovid), Oxford Journals, PsychARTICLES, ScienceDirect, SocINDEX (EBSCO), SwetsWise, Taylor & Francis Online and Wiley Online Library** Included Studies **Karagounis et al.** **Zhang et al.** **Liu et al.** **Orellana Molina et al.** **Vrchota et al.** Relevant Included Studies **Karagounis et al.** **Zhang et al.** **Vrchota et al.** Research question **What is the effectiveness of acupuncture for plantar heel pain?** Funding **The research received no specific grant from any funding agency in the public, commercial or not-for-profit sectors**	**Participants: age/Gender** Karagounis et al. – 100% male (mean age 37.1) Zhang et al. – 26.4% male (mean age 48.5) Liu et al. – 37.9% male (age 31-64) Orellana Molina et al. – 30.8% male (age 40-60) Vrchota et al. – Gender and age not stated **Inclusion:** - Must describe the use of acupuncture, acupuncture points, Traditional Chinese Medicine (TCM) or moxibustion - The use of MTPs were included if the treatment was (dry) needling, whether or not an acupuncture-related rationale was used - Laser therapy or transcutaneous electrical nerve stimulation (TENS) was included only if the treatment was applied specifically to acupuncture points, or if an acupuncture-related rationale was used - RCTs and nonrandomised comparative studies were included. **Exclusion:** - Case series, single case studies and secondary reports **Treatment rationale:** TCM Theory **Length of treatment:** Not reported **Style of acupuncture:** Karagounis et al. – TCM Zhang et al. – TCM Liu et al. – TCM Orellana Molina et al. – TCM Vrchota et al. – 'true acupuncture', electro acupuncture **Details of needles:** Not reported **Number of needles inserted per subject per session:** Not reported **Names of points used:** KI1, KI3, ah shi, BL40, BL60, KI3, KI6, de qi, GB39, PC7 **Depth of insertion:** Karagounis et al. – Not reported Zhang et al. – 10mm Liu et al. – Not reported Orellana Molina et al. – Not reported Vrchota et al. – Not reported **Response sought:** Not reported **Needle stimulation**: Not reported Karagounis et al. – Slight rotation and thrusting to elicit de qi (dull, numb or heavy). Zhang et al. – Not reported Liu et al. – Not reported Orellana Molina et al. – Not reported	Relevant studies: **Karagounis et al.** Intervention**:** Group 1: standard treatment including: ice, extensive stretching programme and NSAID drug Comparison intervention(s): Group 1: standard treatment including: ice, extensive stretching programme and NSAID drug Outcome measures: PF pain scale; Willis et al.42 Result: Both groups improved significantly, group 2 more so. At week 8 improvement=group 1 26%, group 2 47%; p<0.05 Minor adverse effects noted. **Zhang et al.** Intervention: Group 1: LI4, contralateral to pain Comparison intervention(s): Group 2: LI4, contralateral to pain. Outcome measures: VAS for morning pain (MP), Activity pain (AP) & Overall pain (OP) at each daily session and follow-up at 1, 3 and 6 months Result: Significantly greater improvement in group 1 than group 2 at all follow-ups. Significant decrease in MP (from baseline) seen in group 1 at 1, 3 and 6 month follow-up (p<0.001). Both groups showed significant decreases in AP and OP. Group 2 non-significant improvement in MP. Negative correlation found between prior duration of issue and improvement. **Vrchota et al.** Intervention: Group 1, 'true acupuncture': EA to KI1, KI3, ah shi; 5/80 Hz, to tolerance. Retained 20 min, plus calf stretches, footwear advice, insoles. Comparison intervention(s): Group 2, 'sham acupuncture': sham points on sole, minimal depth, subthreshold electrostimulation + calf stretches, footwear advice, insoles. Group 3, 'sports medicine therapy', including reduced training, stretches, ice and NSAID + footwear advice, insoles. Outcome measures: Pain score, tenderness score, decided by doctor with patient, each on a four-point scale. Pain log, daily until 3 weeks after last treatment. Activity log (data not used) Result: Mean pain score >50% less. Significant difference. True>sham>sports medicine (including NSAID drug) Pain log showed more relief in group 1 than group 3 at week 4 (p=0.010) and follow-up (p=0.016). Pain score showed more relief in group 1 than group 3 at week 4 (p=0.014). Tenderness scores changed little. **Adverse effects:** Not reported	**Reviewer comments** Publication bias is clearly identified and explained. However, it is not clear whether two authors' have been involved in the data extraction process, although it can be confirmed that two authors rated (not selected) each paper. Some of the included studies are well reported and their results are reported well. Inclusion/exclusion criteria is included, however poorly reported. A wide range of databases were sourced in the search process, which increases reliability of search results. Having said this, the research received no grants/funding which adds to publication bias and can reduce the findings credibility. Overall this review has acceptable reporting, however, a number of the included RCT's do not quite fit within the projects scope, because they do not use suitable methods of study design. **Quality scores: STRICTA** Karagounis et al. 78.1% - Good quality Zhang et al. 94.1% - Great quality Liu et al. 64.7% - Fair quality Orellana Molina et al. 52.9% - Fair quality Vrchota et al. 46.9% - Poor quality **Grade:** AQ (+) **Quality:** 1

Study	Methodology	Results	Comments and evidence level
	Vrchota et al. – Not reported **Needle retention time:** Karagounis et al. – 20-30 mins Zhang et al. – 30 mins Liu et al. – 20 mins Orellana Molina et al. – 20 mins Vrchota et al. – 20 mins **Needle type:** Not reported **Treatment Regimen** - Number of treatment sessions/ frequency and duration Karagounis et al. – 16 sessions, 2 weeks Zhang et al. – daily x 10 Liu et al. – 30 sessions during 3 courses of 10 Orellana Molina et al. – Daily x 10 Vrchota et al. – Not reported **Other components of treatment:** Not reported **Practitioner qualifications and background** Not reported		
Choi, T, Choi, L, Hyung, K, Lee, K **Moxibustion for the treatment of osteoarthritis: a systematic review and meta-analysis** 2012 Databases **Medline, AMED, EMBASE, CINAHL, PsycInfo, The Cochrane Library, CNKI + 6 Korean databases - Korean Studies Information, DBPIA, the Korean Institute of Science and Technology Information, KERIS, KoreaMed and the Korean National Assembly Library** Included Studies **Cheng 2008** **Sun 2008**	**Participants** *Number of participants (M/F)* Cheng - 120 (27/93) Sun - 56 (23/33) Yang - 64 (25/39) Ren - 100 (37/63) Zhou - 70 (27/43) Zhang - 60 (22/38) Zhang - 60 (25/35) He - 60 (31/29) **Inclusion:** - Dissertations and abstracts were included - Studies that concerned patients with osteoarthritis in any joint - Studies that included a mixture of different rheumatic patients were included only if it was possible to extract the data concerning each patient population separately - Studies that used any type of moxibustion (direct or indirect) - Studies were included if moxibustion was used as the sole intervention or as an adjunct therapy in conjunction with another standard treatment for OA therapy in conjunction with another standard treatment for OA - Trials in which the control group received the same concomitant treatments as the moxibustion group	**Cheng 2008** Intervention: (A) Moxa Control group: (B) Drug therapy oral: diclofenac sodium, 75 mg, 1/d, 15 days Main outcomes: Response rate, NRS (10-point Likert scale) VRS (5-point Likert scale) Intergroup differences: RR: 2.32(1.71,3.14), P<0.00001 MD: -0.15(- 0.46,0.16), NS MD, 0.12(-0.03,0.27) **Zhou 2010** Intervention: (A) Moxa Control group: (B) Drug therapy (oral: diclofenac sodium, 75 mg, 1/d, 20 days Main outcomes: Response rate (2-month follow-up), Knee symptom and sign score, Knee symptom and sign score (2- month follow-up), NRS (10-point Likert scale) Intergroup differences: RR, 1.11(0.94,1.31), NS/RR: 1.11[(0.93,1.33), NS/ MD: -4.41 (-7.86, -0.96), P = 0.01/ MD: -7.96 (-11.42, -4.50), P(0.00001) MD: 0.22 (-0.38,0.82) **Combined results:** Meta-analysis Valid outcome measures: Pain (NRS, Likert scale 0-10) 2 studies: Cheng 2008 & Zhou 2010 Mean difference: 0.16 (-0.11, 0.44) p=0.24. Non-significant **Sun 2008**	**Reviewer comments** A large range of databases were used within the search process of this review. Acceptable inclusion/exclusion criteria. Two researchers selected studies, which minimises selection bias, however whether or not two reviewers extracted data from the selected studies is unknown, as it is not reported. Included studies contained trials published in the form of dissertations and abstracts which may not have undergone peer review. Good reporting and assessment of bias within the selected RCTs is shown. Assessment highlighted the high risk of bias within all included trials. Inadequate detail regarding the intervention and control limits the amount of clinically relevant information that can be taken from the study.

Study	Methodology	Results	Comments and evidence level
Yang 2008 **Ren 2010** **Zhou 2010** **Zhang 2011** **Zhang 2009 (Thesis)** **He 2009** Research question **How effective is moxibustion as a treatment for patients with osteoarthritis?** Funding **Not reported**	- Controls of no treatment, sham moxibustion or relevant standard therapies for OA, including conventional drug, exercise and rehabilitation therapies **Exclusion:** - Trials in which moxibustion was part of a complex intervention - Case studies, case series, qualitative studies and uncontrolled trials - Trials that failed to provide detailed results - Trials that had designs that did not allow for an evaluation of the effectiveness of moxibustion (e.g. by using a treatment for unproven efficacy in the control group or a comparison of two different forms of moxibustion) or if they adopted comparisons between treatments or groups that were expected to have similar effects to moxibustion (e.g. acupuncture) **Limits:** No restrictions on years or publication status was imposed **Style of acupuncture:** Moxibustion (direct/indirect) *Cheng* – Indirect (ginger, panax, notoginsengs cake-separated moxa or aconite cake-separated moxa) *Sun* - Indirect (aconite cake-separated moxa) *Yang* - Indirect (panax notoginsengs cake-separated moxa) *Ren* - Indirect (herbal cake-separated moxa containing musk, olibanum, myrrh, clematis root, rhizoma chuanxiong, cinnamon, herba speranskiae tuberculatae, etc.) *Zhou* - Indirect (notoginseng cake-separated moxa) *Zhang* - Indirect (moxa stick) *Zhang* - Indirect (thin wood-separated moxa) *He* - Indirect (thin wood-separated moxa) **- Treatment rationale:** TCM Theory **Intervention** **- Details of needling:** Not reported **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** GV14, SP10, BL23, EX-LE4, EX-LE5, EX-LE2, SP9, GB34, EX-LE4, ST35, SP9, GB34, SP10, ST34, EX-LE2, BL18, BL23, EX-LE5, EX-LE2, SP9, GB34, SP10, ST36, EX-LE4, EX-LE5, ST34, SP10, ST35, SP9, GB34, EX-LE5, *Ashi* point, EX-LE2, SP9, GB34, SP10 and ST36, SP10, ST34, BL40, GB34, EX-LE5, GB33 and GV3, ST36, EX-LE4, EX-LE5 **- Depth of insertion:** N/A **- Response sought:** Not reported **- Needle stimulation:** Not reported **- Needle retention time:** Not reported **Treatment Regimen** **- Number of treatment sessions:** *Cheng* - 20 *Sun* - 10 *Yang* - 20	Intervention: (A) Moxa Control group: (B) Drug therapy oral: diclofenac sodium, 75 mg, 1/d, 20 days, Main outcomes: Response rate Intergroup differences: RR, 1.06 (0.93,1.20) **Yang 2008** Intervention: (A) Moxa Control group: (B) Drug therapy (oral: diclofenac sodium, 75 mg, 1/d, 20 days Main outcomes: Response rate, response rate (2-month follow-up) Intergroup differences: RR, 1.03 (0.90,1.17]) NS RR: 1.09 (0.92,1.29) **Ren 2010** Intervention: (A) Moxa Control group: (B) Drug therapy (oral: diclofenac sodium, 75 mg, 1/d, 20 day Main outcomes: Response rate Intergroup differences: RR, 1.24(1.04,1.47), P = 0.01 **Zhang 2011** Intervention: (A) Moxa Control group: (B) Drug therapy celecoxib 200 mg, 1/d, weeks Main outcomes: Response rate Intergroup differences: RR, 0.96(0.78,1.19) **Zhang 2009** Intervention: (A) Moxa Control group: (B) Drug therapy (topical: diclofenac diethylamine emulgel, 1 g, 1/d, 2 weeks Main outcomes: Response rate, Lequesne score Intergroup differences: RR: 1.04(0.82,1.32), NS/MD: 0.13(- 1.65,1.39) **He 2009** Intervention: (A) Moxa plus (B) Control group: (B) Drug therapy oral: diclofenac sodium, 25 mg, 3/d, 20 days Main outcomes: Response rate Intergroup differences: RR: 1.35(1.02,1.79), P = 0.04 **Adverse effects:** Zhang 2011 is the only RCT that assessed adverse effects while the other 7 RCT's did not. This study reported adverse events from drug therapy but failed to report the details.	The review lacks valid and reliable outcome measures. The primary outcome measure used was 'response rate' which needs further clarification and definition to determine its validity and usefulness. Only two of the included studies measured level of pain using the NRS 10 points Likert scale and were included in the meta-analysis. **Quality scores:** Cochrane tools for assessing risk of bias H = High/ L = Low/ U = Unclear Overall Quality assessment: Cheng – Unclear Sun - Unclear Yang - Unclear Ren - Unclear Zhou - Unclear Zhang - Unclear Zhang - Unclear He - Unclear **Grade:** AQ (+) **Quality:** 1

Study	Methodology	Results	Comments and evidence level
	Ren - 20 *Zhou* - 20 *Zhang* - 42 *Zhang* - 14 *He* - 18 **- Frequency and duration:** *Cheng* - 1 x every 2 days for 10 times, rest for 10 days then repeat *Sun* - 1 x daily 5 times, rest for 1 or 2 days then repeat *Yang* - 1x daily 10 times then repeat *Ren* - 1 x daily, 5 times/week, 1 month *Zhou* - 1 x daily 10 times and repeat *Zhang* - (1 x daily, 7 days week for 6 weeks *Zhang* - 1 x daily for 7 days, rest a day then repeat *He* 1 x daily for 6 days, rest a day repeat 2 more times **Other components of treatment:** Not reported **Practitioner qualifications and background** Not reported		
Zhang, Q, Yue, J, Golianu, B, Sun, Z & Lu, Y **Updated systematic review and meta-analysis of acupuncture for chronic knee pain** **2017** Databases **MEDLINE, EMBASE, CENTRAL, CINAHL, the Chinese Biomedical Literature Database (CBM), CNKI, VIP Information and Wanfang** Included Studies **Berman et al 1999** **Berman et al 2004** **Bernateck et al 2008** **Dong et al 2011** **Fu & Zhang 2011** **Fu & Li 2013**	**Participants** n= 2419 Varied from 20 to 712 in individual RCTs Age: Avg participant age per study varies from 57.7 y.o to 85 y.o **Inclusion:** - RCTs of chronic knee pain (defined as more than 3 months prior to study randomisation) - RCTS examining the effectiveness, comparative effectiveness and safety of acupuncture relative to a non-acupuncture intervention or usual care - Control group to receive the same baseline interventions as the acupuncture group for those trials in which acupuncture was being evaluated as an adjunctive therapy. - Acceptable outcome measures - VAS, WOMAC pain or NRS for pain and also SF-36 for QOL **Exclusion:** - Non-randomised and uncontrolled trials - Cluster-randomised trials and crossover studies **Limits:** - Nil language restriction **Style of acupuncture:** 14 studies – Acupuncture 3 studies – EA 1 study – Auricular Acupuncture **Co-interventions:**	***Acupuncture vs no treatment*** **WOMAC pain subscale** **Itoh et al 2008** 4 weeks: MD: −0.78, 95% CI −1.71 to 0.15 Non-significant **Witt et al 2005** 8 weeks: MD: −2.05, 95% CI −2.55 to −1.55 Significant improvement **Hinman 2014** 1 year: MD: 2.10, 95% CI 0.89 to 3.31 Significant worsening of scores **VAS** **Itoh et al 2008** 4 weeks: MD: −3.70, 95% CI −18.82 to 11.4251 Non-significant **Hinman 2014** 1 year: MD: −6.00, 95% CI −15.45 to 3.45 Non-significant **Quality of life:** SF-36 Physical Component Summary: **Witt et al 2005**	**Reviewer comments** SR was prospectively registered in an openly accessible trial registry, therefore, helps to reduce selective reporting, incomplete outcome reporting or other limitations. Sufficient search strategy with multiple databases and no language restrictions. Study selection, data collection and risk of bias assessment appropriately conducted independently by two authors with consensus reached with a third author. Overall methodological quality of the included trials was not satisfactory. Planned for assessment of reporting bias but does not look like it was conducted. Online supplementary appendices useful, however, raw RCT data not supplied. Inadequate detail of reporting regarding the acupuncture treatment given and control used. Quality outcome measures used. Meta-analyses

Study	Methodology	Results	Comments and evidence level
Hinman 2014 **Itoh et al 2008** **Lansdown et al 2009** **Mavommatis et al 2012** **Salekl et al 2013** **Sangdee et al 2002** **Tukmachi et al 2004** **Williamson et al 2007** **Witt et al 2005** **Witt et al 2006** **Christensen et al 1992** **Ng et al 2003** Research question **How effective and safe is acupuncture for the treatment of chronic knee pain?** Funding **QHZ is supported by the Foundation of Heilongjiang University of Chinese Medicine (grant no. 2012RCQ64), and Project of Young Innovative Talents of Heilongjiang Province Undergraduate College (UNPVSCT-2015119). JHY is funded by the Foundation of Graduate Innovative Plan of Heilongjiang Province (grant no. YJSCX2012-357HLJ).**	Dong et al 2011 – Sodium hyaluronate Lansdown et al 2009 – Usual care Mavommatis et al 2012 – Etoricoxib **Treatment rationale:** Not reported **Treatment Regimen** **- Number of treatment sessions:** Berman et al 1999 – 16 Berman et al 2004 – 23 Bernateck et al 2008 –6 Dong et al 2011 – 4 Fu & Zhang 2011 – 20 Fu & Li 2013 – 20 Hinman 2014 – 8-12 Itoh et al 2008 – 5 Lansdown et al 2009 – 10 Mavommatis et al 2012 – 4 Salekl et al 2013 – 12 Sangdee et al 2002 – 12 Tukmachi et al 2004 – 10 Williamson et al 2007 – 6 Witt et al 2005 – 12 Witt et al 2006 – 15 Christensen et al 1992 – 6 Ng et al 2003 – 8 **- Length of treatment:** Berman et al 1999 – 12 weeks Berman et al 2004 – 26 weeks Bernateck et al 2008 – 6 weeks Dong et al 2011 – 4 weeks Fu & Zhang 2011 – 4 weeks Fu & Li 2013 – 3 weeks Hinman 2014 – 12 weeks Itoh et al 2008 – 5 weeks Lansdown et al 2009 – 10 weeks Mavommatis et al 2012 – 8 weeks Salekl et al 2013 – 4 weeks Sangdee et al 2002 – 4 weeks Tukmachi et al 2004 – 5 weeks Williamson et al 2007 – 6 weeks Witt et al 2005 – 12 weeks	8 weeks: MD: 4.40, 95% CI 2.28 to 6.52 Significant improvement **Hinman 2014 & Witt et al 2006** 12 weeks: MD: 5.40, 95% CI 4.01 to 6.79 Non-significant **Hinman 2014 & Witt et al 2006** 1 year: MD: 5.40, 95% 4.01 to 6.79 Non-significant SF-36 Mental Component Summary: **Witt et al 2006** 8 weeks: MD: 2.90, 95% CI 0.51 to 5.29 Significant improvement **Hinman 2014 & Witt et al 2006** 12 weeks: MD: −1.10, 95% CI −6.97 to 4.76 Non-significant **Hinman 2014 & Witt et al 2006** 1 year: MD: −3.30, 95% CI −7.08 to 0.4850 Non-significant **Results of Meta-analysis of 3 above studies:** WOMAC pain subscale 3 RCTs – Hinman 2014, Itoh 2008, Witt 2006 n=608 MD: −1.12, 95% CI −1.98 to −0.26, I2=62% Significant reduction in chronic knee pain at 12 weeks on WOMAC pain subscale VAS 2 RCTs – Hinman 2014, Itoh 2008 n=145 MD: −10.56, 95% CI −17.69 to −3.44, I2=0% Significant reduction in chronic knee pain (VAS) at 12 weeks ***Acupuncture vs standard care:*** **WOMAC pain subscale** **Berman et al 1999** 4 weeks: MD: −3.21 (−4.81 to −1.61) 8 weeks: MD: −4.12 (−5.77 to −2.47) 12 weeks: MD: −3.95 (−5.43 to −2.47) 4, 8 and 12 weeks significant ***Acupuncture plus usual care versus usual care*** **WOMAC pain subscale** **Lansdown et al 2009** 12 weeks: MD: −2.97, 95% CI −5.70 to −0.24	conducted using the fixed-effect method or, where appropriate, the random-effects method. **Quality scores:** Risk of bias summary - Random sequence generation: 14 of 18 studies - Allocation concealment: 9 of 18 studies - Blinding of participants and personnel: 0 of 18 - Blinding of outcome assessment: 6 of 9 studies - Incomplete outcome data: 6 of 18 studies - Selective reporting: 10 of 18 studies - Other bias: 3 of 18 studies **Grade:** AQ (+) **Quality:** 1+

Study	Methodology	Results	Comments and evidence level
	Witt et al 2006 – 12 weeks Christensen et al 1992 – 9 weeks Ng et al 2003 – 2 weeks **Intervention** **- Number of needles inserted per subject per session:** Not reported in SR **- Names of points used:** Not reported in SR **- Depth of insertion:** Not reported in SR **- Response sought:** Not reported in SR **- Needle stimulation:** Not reported in SR **- Needle retention time:** Not reported in SR **- Needle type:** Not reported in SR **Practitioner qualifications and background** 5 studies reported the duration of relevant Training – Not reported in SR 6 studies reported the length of clinical Experience – Not reported in SR 1 study reported the therapists' expertise in the specific condition – Not reported in SR **Intervention/controls** Berman et al 1999 Intervention: Acupuncture Control: Standard care – oral therapy Berman et al 2004 Intervention: Acupuncture Control: Education Bernateck et al 2008 Intervention: EA Control: Autogenic training Dong et al 2011 Intervention: Acupuncture + sodium hyaluronate Control: Sodium hyaluronate Fu & Zhang 2011 Intervention: Acupuncture Control: Glucosamine hydrochloride capsules Fu & Li 2013 Intervention: EA Control: Ibuprofen Hinman 2014 Intervention: Acupuncture	Significant reduction 1 years: MD: −0.60, 95% CI −2.89 to 1.69 No significant difference **SF-36 Physical** 12 weeks: MD: 12.71 (−1.60 to 27.02) 1 years: MD: 5.30 (−4.40 to 15.00) No significant difference at 12 weeks or 1 year **SF-36 Mental** 12 weeks: MD: 5.00 (−8.37 to 18.37) 1 years: MD: 8.10 (−4.85 to 21.05) No significant difference at 12 weeks or 1 year ***Acupuncture vs exercise*** **VAS** **Salekl et al 2013** 4 weeks: MD: 8.03, 95% CI 2.46 to 13.60 Exercise significantly better than acupuncture **Williamson et al 2007** 8 weeks: MD: −5.60, 95% CI −14.14 to 2.94 12 weeks: MD: −6.60, 95% CI −14.38 to 1.18 No significant difference at 8 and 12 weeks ***Acupuncture vs education*** **WOMAC pain subscale** **Dong et al 2011** 4 weeks: MD: −1.38 (−2.07 to −0.69) 8 weeks: MD: −1.90 (−2.72 to −1.08) 12 weeks: MD: −2.09 (−3.01 to −1.17) 26 weeks: MD: −2.10 (−3.01 to −1.19) Significantly reduction in pain intensity at all times ***Electro-acupuncture vs etoricoxib*** **WOMAC pain subscale** **Sangdee et al 2002** 4 weeks: MD: −0.75, 95% CI−2.30 to 0.80 **VAS** **Sangdee et al 2002** 4 weeks: MD: −15.25, 95% CI−25.70 to −4.80 No significant difference in both outcome measures	

Study	Methodology	Results	Comments and evidence level
	Control: No treatment Itoh et al 2008 Intervention: Acupuncture Control: No treatment Lansdown et al 2009 Intervention: Acupuncture + Usual care Control: Usual care Mavommatis et al 2012 Intervention: Acupuncture + Etoricoxib Control: Etoricoxib Salekl et al 2013 Intervention: Acupuncture Control: Isometric exercises Sangdee et al 2002 Intervention: EA Control: Etoricoxib Tukmachi et al 2004 Intervention: Acupuncture Control: No treatment Williamson et al 2007 Intervention: Acupuncture Control: Home exercises Witt et al 2005 Intervention: Acupuncture Control: Waiting list Witt et al 2006 Intervention: Acupuncture Control: Waiting list Christensen et al 1992 Intervention: Acupuncture Control: Waiting list Ng et al 2003 Intervention: EA Control: TENS	***Electro-acupuncture vs iboprofen*** **VAS** **Fu and Li 2013** 4 weeks: MD: −3.70, 95% CI −6.08 to −1.32 Significant reduction in pain scores with EA ***Acupuncture plus etoricoxib vs etoricoxib*** **Mavommatis et al 2012** **WOMAC pain subscale** 4 weeks: MD: −4.01 (−5.76 to −2.26) 8 weeks: MD: −7.08 (−8.53 to −5.63) 12 weeks: MD: −7.59 (−9.22 to −5.96) **VAS** 4 weeks: MD: −16.30 (−21.65 to −10.95) 8 weeks: MD: −24.30 (−28.19 to −20.41) 12 weeks: MD: −25.90 (−30.39 to −21.41) **SF-36 Physical** 8 weeks: MD: 10.50, 95% CI 7.95 to 13.05 **SF-36 mental** 8 weeks: MD: 1.50, 95% CI −1.88 to 4.88 SF-36 physical and mental component significant ***Acupuncture vs glucosamine hydrochloride capsules*** **WOMAC pain subscale** **Fu & Zhang 2011 and Tukmachi et al 2004** 4 weeks: MD: −3.13, 95% CI −9.50 to 3.25 No significant difference **Fu & Zhang 2011** 8 weeks: MD: -1.87 (-2.19, -1.56) No significant difference **VAS** **Tukmachi et al 2004 & Dong et al 2011** 4 weeks: MD: −13.32, −58.49 to 31.85, No significant difference **SF-36 Physical** **Fu & Zhang 2011** 4 weeks: MD: 1.83 (-0.86, 4.52) 8 weeks: MD: 4.99 (1.83, 8.15) **SF-36 Mental** **Fu & Zhang 2011**	

Study	Methodology	Results	Comments and evidence level
		4 weeks: MD: 2.88 (-0.90, 6.66) 8 weeks: MD: 6.22 (3.33, 9.11) Both SF-36 components significantly improved at 8 weeks but not 4 weeks **Adverse effects:** Four studies reported adverse events associated with acupuncture treatment of chronic knee pain. One study examining the use of acupuncture as adjunctive therapy reported that seven minor adverse events occurred in the acupuncture group. The other three trials compared the safety of acupuncture with other interventions. The results of the meta-analysis showed that there was no significant difference in the rate of adverse events between acupuncture and control groups (RR 1.08, 95% CI 0.54 to 2.17, I2=29%)	
Law, D, McDonough, S, Bleakley, C, Baxter, G D & Tumilty, S **Laser Acupuncture for Treating Musculoskeletal Pain: A Systematic Review with Meta-analysis** **2015** Databases **MEDLINE, AMED, EMBASE, CINAHL, SPORTSDiscus, Cochrane Library, PubMed, Current Contents Connect,** **Web of Science, Google scholar and SCOPUS** Relevant Included Studies **Kannan 2012** **Lin et al 2012** **Skorupska et al 2012** **Lee & Han 2011** **Rayegani et al 2011** **Emanet et al 2010** **Glazov et al 2009** **Katsoulis et al 2010** **Oz et al 2010** **Zhao et al 2009** **Carrasco 2009**	**Participants** n=2360 Age: > 18 years Participants received from 3 to 15 Laser Acupuncture treatment sessions over a 1 to 12-week period **Inclusion:** - RCTs and controlled clinical trials published in peer-reviewed journals - Studies evaluating Laser acupuncture as the primary intervention. Active low-level laser therapy to traditional Chinese medicine acupuncture points, trigger points, or tender points - Human participants with musculoskeletal diseases or injuries, and presenting with pain - Studies were included that compared laser acupuncture with one of the following as a control intervention: placebo or sham laser, no treatment, or other treatments, such as medication, exercise therapy, or other electrotherapy modalities - Outcome measures: Pain level (VAS), global assessment of participants' improvement (subjective improvement, proportion of objective measures improvement, overall improvement), or a functional outcome measure (validated questionnaire or functional scale specific to the presenting condition) **Exclusion:** - Non-English-language publications - Systemic illness and headache - Studies involving a primary intervention using needling or other forms of stimulation on acupuncture points, or those involving application of laser therapy to nonacupuncture points **Limits:** - English language - Nil restrictions on age, gender or physical activity status **Style of acupuncture:** Laser Acupuncture <u>Kannan 2012</u> **Diagnosis** Myofascial pain **Intervention** LA	**Individual Studies** **Kannan 2012** All groups showed significant improvement after Rx. Laser group had a significant reduction in pain compared to other two groups Pain - After intervention SMD: 0.52 [-0.11, 1.15] **Lin et al 2012** Both groups showed significantly less pain after Rx but no between group differences Pain - After intervention SMD: -0.05 [-0.66, 0.55] **Skorupska et al 2012** All groups showed significantly less pain after Rx. Ultrasound group using trigger point application showed a more significant improvement in grip strength comparing to other three groups *No quantitative data reported in SR including supplementary appendices **Lee & Han 2011** There was a significant higher PPT after 5 minutes Rx in laser group but not after 1 minute or 2 minutes Rx *Pressure pain threshold data only **Rayegani et al 2011** Laser group showed significant less pain and improved NDI score after Rx comparing to other two groups Pain – 6 to 26 week follow up (1): -2.69 [-3.66, -1.71] Pain – 6 to 26 week follow up (2): -4.85 [-6.27, -3.43] NDI – 6 to 26 week follow up (1): -0.87 [-1.59, -0.15] NDI – 6 to 26 week follow up (2): -0.70 [-1.40, 0.01] **Emanet et al 2010** Both groups showed significant improvement in all outcome measures after Rx. Improvement retained in laser group at 12-week later Pain – After intervention SMD: 0.32 [-0.25, 0.90] Pain – 6 to 26-week follow-up SMD: -0.42 [-1.00, 0.16] DASH – After intervention SMD: -0.55 [-1.13, 0.04] DASH – 6 to 26-week follow-up SMD: -0.95 [-1.56, -0.34]	**Reviewer comments** Comprehensive search strategy with a wide range of databased used. Possibility of language bias due to language restrictions imposed during search strategy. Two independent reviewers used throughout. Nil use of pre-registered study protocol to help reduce selective reporting, incomplete outcome reporting or other limitations. No follow up of unpublished data. Appropriate and standardised critical appraisal using PEDro scale. Comprehensive reporting. Online supplementary appendices useful and thorough. Adequate assessment of publication bias. Included RCTs introduced potential bias's related to heterogeneity and methodological quality. Heterogeneous studies included in meta-analysis. Subgroup analyses initiated to address these limitations. Random effects model used. **Quality scores:** PEDro scale **/10** Kannan 2012 4/10 Lin et al 2012 4/10 Skorupska et al 2012 8/10 Lee & Han 2011 5/10

Study	Methodology	Results	Comments and evidence level
Glazov et al 2009 **Shen et al 2009** **Shirani et al 2009** **Shen et al 2008** **Dundar et al 2007** **Lam & Cheing 2007** **Yurtkuran et al 2007** **Aigner et al 2006** **Chow et al 2006** **Kiralp et al 2006** **Altan et al 2005** **Tam 2005** **Ceylan et al 2004** **Chow et al 2004** **Gur et al 2004** **Ilbuldu et al 2004** **Al-Shenqiti & Oldgam 2003** **Hakguder et al 2003** **Wong et al 2001** **Chen et al 1997** **Laaskso et al 1997** **Logdberg-Andersson et al 1997** **Papadopoulos et al 1996** **Vecchio et al 1993** **Haker & Lundeberg 1991** **Haker & Lundeberg 1990** **Ceccherelli et al 1989** **Snyder-Mackler et al 1986** **Lundeberg et al 1987** **Snyder-Mackler et al 1986** Research question **How effective is laser acupuncture for relieving pain and improving functional outcomes when used for treating musculoskeletal conditions?** Funding **Nil reported**	**Comparison** U/S, compression **Average output (Mw)** 2.4 **Power density (Mw/cm2)** 2.4 **Dose (J)** 0.074 Lin et al 2012 **Diagnosis** Low back pain **Intervention** LA **Comparison** Placebo **Average output (Mw)** 40 **Power density (Mw/cm2)** 50 **Dose (J)** 12 Skorupska et al 2012 **Diagnosis** Lateral epicondylitis **Intervention** LLLT **Comparison** U/S – Trigger point vs anatomical site **Average output (Mw)** 0-400 **Power density (Mw/cm2)** ? **Dose (J)** ? Lee & Han 2011 **Diagnosis** Myofascial pain **Intervention** Laser **Comparison** Placebo **Average output (Mw)** 450 **Power density (Mw/cm2)** 6428 **Dose (J)** 27 or 54 or 135 Rayegani et al 2011 **Diagnosis** Myofascial pain **Intervention** Laser **Comparison** Placebo **Average output (Mw)** 1100 **Power density (Mw/cm2)** ? **Dose (J)** ? Emanet et al 2010 **Diagnosis** Lateral epicondylitis **Intervention** Laser **Comparison** Placebo **Average output (Mw)** ? **Power density (Mw/cm2)** ? **Dose (J)** ? Glazov et al 2009	**Glazov et al 2010** After adjustment for covariates, laser group showed significant less pain at 6-week follow up compared with placebo group Pain – 6 to 26-week follow-up SMD (1):-0.50 [-0.92, -0.07] Pain – 6 to 26-week follow-up SMD (2):-0.43 [-0.85, -0.00] **Katsoulis et al 2010** All groups showed significantly less pain after Rx Pain – 6 to 26-week follow-up SMD: 0.29 [-0.95, 1.53] **Oz et al 2010** Both groups showed significant improvement in all parameter after Rx but no significant difference between the two groups *Pressure pain threshold data only **Zhao et al 2009** Laser group using acupuncture points showed significantly better improvement in WOMAC score after 2-week Rx comparing with placebo group. No significant difference observed after 4-week Pain – After intervention SMD: -0.88 [-1.57, -0.20] **Carrasco 2009** Both groups showed significant less pain after Rx but no significant between two groups Pain - After intervention SMD: 1) -0.01 [-0.89, 0.86] Pain - After intervention SMD: 2) -0.19 [-1.07, 0.69] Pain - After intervention SMD: 3) 0.62 [-0.29, 1.52] Pain – 6 to 26 week follow up SMD: 1) 0.15 [-0.73, 1.02] Pain – 6 to 26 week follow up (2): 2) 0.09 [-0.79, 0.96] Pain – 6 to 26 week follow up (2): 3) 1.01 [0.06, 1.95] **Glazov et al 2009** Both groups showed significant less pain and improvement in ODI score after Rx but no between group differences seen Pain – After intervention SMD: 0.04 [-0.38, 0.46] Pain – 6 to 26-week follow-up SMD: -0.06 [-0.48, 0.36] ODI – After intervention SMD: 0.22 [-0.22, 0.67] ODI – 6 to 26-week follow-up SMD: 0.38 [-0.07, 0.83] **Shen et al 2009** Laser group using acupuncture point showed significant better improvement in WOMAC score after 2-week Rx compared with placebo group Pain – After intervention SMD: -0.72 [-1.41, -0.03] WOMAC – After intervention SMD: 0.41 [-0.26, 1.09] **Shirani et al 2009** Laser group showed significant less pain compared with placebo group Pain – After intervention SMD: -1.89 [-3.13, -0.66] **Shen et al 2008**	Rayegani et al 2011 6/10 Emanet et al 2010 5/10 Glazov et al 2009 9/10 Katsoulis et al 2010 2/10 Oz et al 2010 7/10 Zhao et al 2009 6/10 Carrasco 2009 6/10 Glazov et al 2009 9/10 Shen et al 2009 7/10 Shirani et al 2009 6/10 Shen et al 2008 5/10 Dundar et al 2007 9/10 Lam & Cheing 2007 7/10 Yurtkuran et al 2007 8/10 Aigner et al 2006 4/10 Chow et al 2006 10/10 Kiralp et al 2006 5/10 Altan Let al 2005 7/10 Tam 2005 6/10 Ceylan et al 2004 3/10 Chow et al 2004 10/10 Gur et al 2004 8/10 Ilbuldu et al 2004 8/10 Al-Shenqiti & Oldgam 2003 8/10 Hakguder et al 2003 6/10 Wong et al 2001 5/10 Chen et al 1997 2/10 Laaskso et al 1997 5/10 Logdberg-Andersson et al 1997 5/10 Papadopoulos et al 1996 6/10 Vecchio et al 1993 9/10 Haker & Lundeberg 1991 5/10 Haker & Lundeberg 1990 7/10 Ceccherelli et al 1989 8/10 Snyder-Mackler et al 1986 6/10 Lundeberg et al 1987 5/10 Snyder-Mackler et al 1986 5/10 **Grade:** HQ (++)

Study	Methodology	Results	Comments and evidence level
	Diagnosis Low back pain **Intervention** Laser **Comparison** Placebo **Average output (Mw)** 10 **Power density (Mw/cm2)** 50 **Dose (J)** 0.2 Katsoulis et al 2010 **Diagnosis** Tendomyopathy **Intervention** Laser **Comparison** Placebo **Average output (Mw)** 40 **Power density (Mw/cm2)** 1000 **Dose (J)** 1.6-2.4 Oz et al 2010 **Diagnosis** Myofascial pain **Intervention** Laser **Comparison** Occlusal splint **Average output (Mw)** 300 **Power density (Mw/cm2)** 1071 **Dose (J)** 3 Zhao et al 2009 **Diagnosis** Knee OA **Intervention** LA **Comparison** Laser on sham point **Average output (Mw)** 36 and 200 **Power density (Mw/cm2)** 36 and 200 **Dose (J)** 163.2 Carrasco 2009 **Diagnosis** Myofascial pain **Intervention** Laser **Comparison** Placebo **Average output (Mw)** 50, 60 or 70 **Power density (Mw/cm2)** ? **Dose (J)** ? Glazov et al 2009 **Diagnosis** Low back pain **Intervention** Laser **Comparison** Placebo **Average output (Mw)** 10 **Power density (Mw/cm2)** 50	Both groups showed significant improvement in all outcome measures after Rx but no significant between two groups *No quantitative data reported in SR including supplementary appendices **Dundar et al 2007** Both groups showed significant improvement in all outcome measures after Rx but no significant between two groups Pain - After intervention SMD: 0.00 [-0.49, 0.49] NDI – After intervention SMD: -0.41 [-0.90, 0.09] **Lam & Cheing 2007** Laser group showed a greater improvement from all outcome measures after Rx compared to placebo group Pain - After intervention SMD -1.18 [-1.87, -0.49] Pain – 6 to 26 week follow up SMD: -1.57 [-2.30, -0.84] **Yurtkuran et al 2007** Both groups showed significant improvement in all outcome measures after Rx. Laser group showed a significant decrease in knee circumference after 2-weeks **Aigner et al 2006** No significant difference observed at any time point between two groups *No quantitative data reported in SR including supplementary appendices **Chow et al 2006** Laser group showed a greater improvement from most of the outcome measures after Rx compared to placebo group Pain – 6 to 26 week follow up SMD: -1.49 [-1.96, -1.02] SF-36 Mental – 6 to 26 week follow up SMD: -0.30 [-0.71, 0.12] SF-36 Physical– 6 to 26 week follow up SMD: 0.22 [-0.20, 0.63] **Kiralp et al 2006** Both groups showed significant improvement in all outcome measures after Rx but no significant between two groups Pain – After intervention SMD: -0.36 [-0.97, 0.24] **Altan Let al 2005** Both groups showed significant improvement in all outcome measures after Rx but no significant between two groups Pain – After intervention – SMD: 0.41 [-0.16, 0.98] Pain – 6 to 26 week follow up SMD: -1.14 [-1.75, -0.52] **Tam 2005** Corticosteroid injection group showed better improvement for all outcome measures at week 6 compared with the other two groups. Beyond week 26, LLLT group showed better result than the other two groups *No quantitative data reported in SR including supplementary appendices **Ceylan et al 2004** Laser group showed significant less pain after Rx comparing with placebo group Pain – After intervention SMD -0.81 [-1.46, -0.15]	**Quality:** 1+

Study	Methodology	Results	Comments and evidence level
	Dose (J) 0.2 Shen et al 2009 **Diagnosis** Knee OA **Intervention** LA **Comparison** Placebo **Average output (Mw)** ? **Power density (Mw/cm2)** ? **Dose (J)** ? Shirani et al 2009 **Diagnosis** Myofascial pain **Intervention** LA **Comparison** Placebo **Average output (Mw)** 17.3 or 1.76 **Power density (Mw/cm2)** 17.3 or 1.76 **Dose (J)** 7.2 Shen et al 2008 **Diagnosis** Knee OA **Intervention** LA **Comparison** Placebo **Average output (Mw)** 36 and 200 **Power density (Mw/cm2)** ? **Dose (J)** ? Dundar et al 2007 **Diagnosis** Myofascial pain **Intervention** LA **Comparison** Placebo **Average output (Mw)** 58 **Power density (Mw/cm2)** 58 **Dose (J)** 7 Lam & Cheing 2007 **Diagnosis** Lateral epicondylitis **Intervention** Laser **Comparison** Placebo **Average output (Mw)** 25 **Power density (Mw/cm2)** 208 **Dose (J)** 0.275 Yurtkuran et al 2007 **Diagnosis** Knee OA **Intervention** Laser **Comparison** Placebo	**Chow et al 2004** Laser group showed a greater improvement from pain related outcome measures after Rx comparing to placebo group. No significant difference observed from the result of SF-36 Pain – 6 to 26 week follow up SMD: -1.02 [-1.96, -0.07] SF-36 Mental – 6 to 26 week follow up SMD: 0.33 [-0.56, 1.21] SF-36 Physical– 6 to 26 week follow up SMD: 0.34 [-0.54, 1.23] **Gur et al 2004** Laser group showed a greater improvement from all outcome measures after Rx. Only SAI and VAS score were significant comparing to placebo group Pain – After intervention SMD -0.97 [-1.54, -0.40] Pain – 6 to 26 week follow up SMD: -0.67 [-1.22, -0.12] **Ilbuldu et al 2004** Laser group showed significant improvement in VAS and NHP score at end of intervention but not at 6-month Pain – After intervention 1 SMD -0.89 [-1.55, -0.24] Pain – After intervention 2 SMD -0.84 [-1.49, -0.19] Pain – 6 to 26 week follow up 1 SMD: -0.23 [-0.85, 0.40] Pain – 6 to 26 week follow up 2 SMD: -0.33 [-0.95, 0.30] **Al-Shenqiti & Oldgam 2003** Laser group showed a greater improvement from all outcome measures after Rx comparing to placebo group *No quantitative data reported in SR including supplementary appendices **Hakguder et al 2003** Laser group showed significant less pain after Rx comparing with placebo group. Other outcome measures were not significant but favorable to laser group Pain – After intervention SMD -1.17 [-1.71, -0.62] **Wong et al 2001** Laser group showed a greater improvement from all outcome measures except pinch test after one stage of Rx comparing to placebo group. *No quantitative data reported in SR including supplementary appendices **Chen et al 1997** All groups showed significantly less pain after Rx. Both laser groups showed more significant improvement in PPT and ROM compared to placebo group Pain – After intervention 1 SMD -0.68 [-2.03, 0.67] Pain – After intervention 2 SMD -1.66 [-3.54, 0.21] **Laasko et al 1997** All groups showed significantly less pain after Rx. Between group differences were not significant *No quantitative data reported in SR including supplementary appendices **Logdberg-Andersson et al 1997** Laser group showed a greater improvement from all outcome measures after Rx *No quantitative data reported in SR including supplementary appendices	

Study	Methodology	Results	Comments and evidence level
	Average output (Mw) 4 **Power density (Mw/cm2)** 10 **Dose (J)** 0.48 Aigner et al 2006 **Diagnosis** Whiplash **Intervention** LA **Comparison** Placebo **Average output (Mw)** 5 **Power density (Mw/cm2)** 5 **Dose (J)** 0.8 Chow et al 2006 **Diagnosis** Chronic neck pain **Intervention** Laser **Comparison** Placebo **Average output (Mw)** 300 **Power density (Mw/cm2)** 670 **Dose (J)** 9 Kiralp et al 2006 **Diagnosis** Myofascial pain **Intervention** LA **Comparison** Trigger point injection **Average output (Mw)** ? **Power density (Mw/cm2)** ? **Dose (J)** ? Altan Let al 2005 **Diagnosis** Myofascial pain **Intervention** Laser **Comparison** Placebo **Average output (Mw)** ? **Power density (Mw/cm2)** ? **Dose (J)** ? Tam 2005 **Diagnosis** Periarthritis of the shoulder **Intervention** LLLT **Comparison** Cortisone injection, wait and see **Average output (Mw)** 27 **Power density (Mw/cm2)** 135 **Dose (J)** 3 to 4 Ceylan et al 2004 **Diagnosis** Myofascial pain	**Papadopoulos et al 1996** No significant difference observed at any time point between two groups *No quantitative data reported in SR including supplementary appendices **Vecchio et al 1993** Both groups showed improvement in all outcome measures after Rx but not significant between groups Pain – After intervention SMD: -0.47 [-1.15, 0.20] **Haker & Lundeberg 1991** No significant difference observed at any time point between groups *No quantitative data reported in SR including supplementary appendices **Haker & Lundeberg 1990** No significant difference observed at any time point between groups *No quantitative data reported in SR including supplementary appendices **Ceccherelli et al 1989** Laser group showed significant less pain after Rx and at 3-month comparing with placebo group. Pain – After intervention SMD -1.80 [-2.72, -0.89] Pain – 6 to 26 week follow up SMD: -1.74 [-2.64, -0.83] **Snyder-Mackler et al 1986** Laser group showed significant less pain and increase in skin resistance after Rx *No quantitative data reported in SR including supplementary appendices **Lundeberg et al 1987** No significant difference observed at any time point between groups Pain – 6 to 26 week follow up SMD: Ga-As Laser -1.96 [-2.75, -1.17] Pain – 6 to 26 week follow up SMD: He-Ne Laser -0.98 [-1.66, -0.30] **Snyder-Mackler et al 1986** Laser group showed significant increase in skin resistance after Rx *No quantitative data reported in SR including supplementary appendices **Meta-analysis results** Myofascial pain/MTrP pain: Positive effect of LA on pain Short term (SMD: -0.49; -0.83 to -0.16) – 14 studies Long term (6 to 26 weeks) (SMD -0.95; -1.68 to -0.23) – 6 studies Lateral epicondylitis The overall effects did not suggest any favourable result of LA at any time point Short term (SMD: -0.42; -1.89 to 1.06) – 2 studies Long term (6-26 weeks) (-0.97; -2.10 to 0.15) – 2 studies	

Study	Methodology	Results	Comments and evidence level
	Intervention Laser **Comparison** Placebo **Average output (Mw)** 8 **Power density (Mw/cm2)** 40 **Dose (J)** 1.44 Chow et al 2004 **Diagnosis** Chronic neck pain **Intervention** Laser **Comparison** Placebo **Average output (Mw)** 300 **Power density (Mw/cm2)** 670 **Dose (J)** 9 Gur et al 2004 **Diagnosis** Myofascial pain **Intervention** LA **Comparison** Placebo **Average output (Mw)** 11.2 **Power density (Mw/cm2)** 11.2 **Dose (J)** 2 Ilbuldu et al 2004 **Diagnosis** Trigger point pain **Intervention** Laser **Comparison** Placebo laser, dry needling **Average output (Mw)** ? **Power density (Mw/cm2)** ? **Dose (J)** 2 Al-Shenqiti & Oldgam 2003 **Diagnosis** Rotator cuff tendinitis **Intervention** Laser **Comparison** Placebo **Average output (Mw)** 100 **Power density (Mw/cm2)** 800 **Dose (J)** 4 Hakguder et al 2003 **Diagnosis** Myofascial pain **Intervention** Laser **Comparison** No laser **Average output (Mw)** **Power density (Mw/cm2)** **Dose (J)**	**Adverse effects:** Results of included studies showed that serious adverse events have seldom been reported for laser acupuncture	

Study	Methodology	Results	Comments and evidence level
	Wong et al 2001 **Diagnosis** Carpal tunnel syndrome **Intervention** Laser **Comparison** Placebo **Average output (Mw)** 5 **Power density (Mw/cm2)** 25.5 **Dose (J)** 0.98 Chen et al 1997 **Diagnosis** Myofascial pain **Intervention** Continuous laser, pulsed laser **Comparison** Placebo **Average output (Mw)** 15 or 1.5 **Power density (Mw/cm2)** ? **Dose (J)** 18 or 1.8 Laaksko et al 1997 **Diagnosis** Myofascial trigger point pain **Intervention** Red laser, Infrared laser **Comparison** Placebo **Average output (Mw)** 10 or 25 **Power density (Mw/cm2)** 278 or 893 **Dose (J)** 1 or 5 Logdberg-Andersson et al 1997 **Diagnosis** Tendonitis and myofascial pain **Intervention** Laser **Comparison** Placebo **Average output (Mw)** 8 **Power density (Mw/cm2)** 8 **Dose (J)** 0.5 to 1 Papadopoulos et al 1996 **Diagnosis** Lateral epicondylitis **Intervention** Laser **Comparison** Placebo **Average output (Mw)** 50 **Power density (Mw/cm2)** 400 **Dose (J)** 3 Vecchio et al 1993 **Diagnosis** Rotator cuff tendinitis **Intervention** Laser **Comparison** Placebo **Average output (Mw)** 30		

Study	Methodology	Results	Comments and evidence level
	Power density (Mw/cm2) 429 **Dose (J)** 3 Haker & Lundeberg 1991 **Diagnosis** Lateral epicondylitis **Intervention** Laser **Comparison** Placebo **Average output (Mw)** ? **Power density (Mw/cm2)** ? **Dose (J)** 0.6 Haker & Lundeberg 1990 **Diagnosis** Lateral epicondylitis **Intervention** Laser **Comparison** Placebo **Average output (Mw)** 12 **Power density (Mw/cm2)** ? **Dose (J)** 0.6 Ceccherelli et al 1989 **Diagnosis** Myofascial pain **Intervention** Laser **Comparison** Placebo **Average output (Mw)** 5 **Power density (Mw/cm2)** ? **Dose (J)** 0.1 or 1 Snyder-Mackler et al 1986 **Diagnosis** Myofascial trigger point pain **Intervention** Laser **Comparison** Placebo **Average output (Mw)** 0.95 **Power density (Mw/cm2)** 0.95 **Dose (J)** 0.014 Lundeberg et al 1987 **Diagnosis** Lateral epicondylitis **Intervention** HeNe Laser, GaAs laser **Comparison** Placebo **Average output (Mw)** 1.56 or 0.07 **Power density (Mw/cm2)** ? **Dose (J)** 0.09 or 0.004 Snyder-Mackler et al 1986 **Diagnosis** Myofascial trigger point pain **Intervention** Laser		

Study	Methodology	Results	Comments and evidence level
	Comparison Placebo **Average output (Mw**) 0.95 **Power density (Mw/cm2)** 0.95 **Dose (J)** 0.02 **Practitioner qualifications and background** Laser acupuncture was performed by physiotherapists or other trained health care professionals in most of the trials; however, half of the studies failed to report this clearly		
Lee, M, Kim, G, Heo, I, Kim, K, Ha, I, Lee, J, Hwang, E & Shin, B **Chuna (or Tuina) Manual Therapy for Musculoskeletal Disorders: A Systematic Review and Meta-Analysis of Randomized Controlled Trials** **2017** Databases **PubMed, Ovid, Medline, EMBASE, Cochrane Library, CNKI, Wanfang, VIP, J-stage, Korean Medical Database, KISS, National Discovery for Science Leaders, Database Periodical Information Academic, Korean National Assembly Digital Library, OASIS & Korean Traditional Knowledge Portal** Relevant Included Studies **Zhu et al 2007** **Wang et al 2009** **Huang et al 2010** **Jiang et al 2012** **Xu 2013** **Xue 2015** **Yang 2015** **Liu 2015** **Zhu et al 2009**	**Participants** – All 66 studies n=6170 **Inclusion:** - Parallel or crossover RCTs that evaluated the effects of Chuna (or Tuina) manual therapy on pain and function for musculoskeletal diseases - Studies with a low-risk bias for randomization and/or allocation concealment - Patients who reported any kind of musculoskeletal disorders - Studies that assessed the combined effects of Chuna (or Tuina) plus other interventions considered when the identical intervention was administered to both the Chuna (or Tuina) group and the control group - Control groups: sham treatment or other active interventions, except other kinds of Chuna (or Tuina). Other interventions included traction, physical therapy, drug therapy, and surgery - Pain and function outcome measurements for musculoskeletal conditions **Exclusion:** - Quasi-RCTs - RCTs that did not clearly report that a random method was used and those that adopted inappropriate methods - Studies that employed other kinds of manual treatments, or those in which there was no clear description of methods - Trials comparing different types of Chuna (or Tuina) - Patients with musculoskeletal disorders found to be caused by psychogenic and neurologic conditions, or other reasons, except for musculoskeletal aetiologies **Limits:** - RCTs - Nil gender, age, or race limits All 66 studies: Number of sessions: 11.3 ± 8.1 sessions (range 1–36) Length of each session was 25.3 ± 5.7 minutes (range 15–30) Follow-up time ranged from 1 day to 60 weeks Spine disorders (n = 42) - 24 cervical spine	**Meta-analysis** *Effect estimates for pain and function on musculoskeletal conditions* **VAS or NRS:** Chuna (or Tuina) manual therapy vs sham 1 study, n=69 SMD −3.09 [−3.59, −2.59] p= 0.00001 Chuna (or Tuina) manual therapy vs traction 9 studies, n=829 SMD −0.64 [−0.87, −0.40] p= 0.00001 Chuna (or Tuina) manual therapy vs physical therapy 3 studies, n=214 WMD −0.44 [−0.85, −0.02] p= 0.04 Chuna (or Tuina) manual therapy vs drug 5 studies, n=848 WMD −0.97 [−1.46, −0.48] p= 0.0001 Chuna (or Tuina) manual therapy + traction vs traction 3 studies, n=190 WMD −1.08 [−1.81, −0.35] p= 0.004 Chuna (or Tuina) manual therapy + drug vs drug 6 studies, n=442 WMD −0.99 [−1.70, −0.28] p=0.006 Chuna (or Tuina) manual therapy + surgery vs surgery 2 studies, n=92 WMD −0.47 [−1.60, 0.66] p=0.41	**Reviewer comments** Complete search strategy incorporating 15 English, Chinese, Japanese, and Korean databases. Comprehensive inclusion/exclusion criteria. Two independent reviewers screened the title and abstracts for potentially eligible studies identified by the primary search and then reviewed the full texts to evaluate their final eligibility. Unable to determine if two reviewers independently extracted data. Study adhered to the PRISMA reporting guidelines. Meta-analysis was based mainly on small-sized experiments and diverse interventions. Most of the included studies had methodological weaknesses. Outcome data from these studies may have been overestimated. Clinical heterogeneities of the meta-analyses may limit the translation of results. **Quality scores:** Cochrane risk of bias criteria tool Random sequence generation (selection bias) - low risk of bias Allocation concealment (selection bias) - Unclear risk of bias Blinding of participants and personnel (performance bias) – High risk of bias Blinding of outcome assessment (detection bias)

Study	Methodology	Results	Comments and evidence level
Gao et al 2011 **Zeng 2015** **Wang 2012** **Yang et al 2014** **Chen et al 2006** **Wang 2010** **Zhou et al 2012** **Luo et al 2013** **Deng et al 2012** **Zhang et al 2005** **Xue 2016** **Wang et al 2016** **Chen et al 2014** **Xu 2016** **Pan 2016** **Yang 2004** **Ding et al 2010** **Tian 2010** **Chen 2015** **Jin 2015** **Li et al 2016** **Zhao et al 2016** **Cheng and Tang 2013** **Dong and Wang 2014** **Song et al 2015** **Yin et al 2015** **Wu et al 2016** **Wu 2011** **Xiao 2016** Research question **What is the effectiveness of Chuna (or Tuina) manual therapy on pain and function for musculoskeletal disorders?** **Funding** **Supported by the Traditional Korean Medicine R&D program funded by the Ministry of Health & Welfare through the Korea**	- 14 Thoracolumbar spine - 4 other: including scoliosis, sacrococcygeal pain and ankylosing spondylitis Upper Extremity (n = 13) - 5 shoulder lesions - 8 arm and hand disorders Lower extremity (n = 11) - 8 knee disorders - 3 leg and foot disorders All studies Practitioner qualifications and background - Not reported Zhu et al 2007 Condition: Cervical spondylotic radiculopathy Intervention: Chuna (or Tuina) manual therapy - Duration: 4 weeks - Sessions: 8 Control: Traction – 30 mins, 8 sessions Outcome measures: VAS Wang et al 2009 Condition: Cervical spondylotic radiculopathy Intervention: Chuna (or Tuina) manual therapy - Duration: 2 weeks - Sessions: 7 sessions Control: Traction – 30 mins, 14 sessions Outcome measures: VAS, ROM Huang et al 2010 Condition: Cervical spondylotic radiculopathy Intervention: Chuna (or Tuina) manual therapy - Duration: 4 weeks - Sessions: 20 mins, 28 sessions Control: Traction – 30 mins, 28 sessions Outcome measures: VAS Jiang et al 2012 Condition: Cervical spondylotic radiculopathy Intervention: Chuna (or Tuina) manual therapy - Duration: 2 weeks - Sessions: 7 sessions Control: Traction – 20 mins, 14 sessions Outcome measures: VAS	**NDI:** Chuna (or Tuina) manual therapy vs traction 3 studies, n=226 SMD −1.45 [−2.92, 0.02] p=0.05 **ODI – low back function:** Chuna (or Tuina) manual therapy vs traction 3 studies, n=184 SMD −1.79 [−3.54, −0.04] p=0.04 **Constant Morley Score - Shoulder** Chuna (or Tuina) manual therapy vs surgery 2 studies, n=158 WMD 3.33 [−4.59, 11.25] p=0.41 **Subgroup analysis: Pain** Chuna (or Tuina) manual therapy vs traction **Cervical spine** 6 studies, n=474 SMD: −0.70 [−1.02, −0.37] p=0.0001 **Lumbar spine** 3 studies, n=255 SMD: −0.51 [−0.83, −0.20] p=0.001 Chuna (or Tuina) manual therapy vs drug **Spine** 3 studies, n=728 SMD: −0.46 [−1.05, 0.13] p=0.13 **Extremity** 2 studies, n=120 SMD: −0.41 [−0.90, 0.08] p=0.1 **Adverse effects:** Not reported	- Unclear risk of bias Incomplete outcome data (attrition bias) - Low risk of bias Selective reporting - Low risk of bias **Grade:** AQ (+) **Quality:** 1+

Study	Methodology	Results	Comments and evidence level
Health Industry Development Institute (Grant no. HI15C0103)	Xu 2013 Condition: Cervical spondylotic radiculopathy Intervention: Chuna (or Tuina) manual therapy - Duration: 4 weeks - Sessions: 12 sessions Control: Traction – 20-30 mins, 12 sessions Outcome measures: VAS Xue 2015 Condition: Cervical spondylotic radiculopathy Intervention: Chuna (or Tuina) manual therapy - Duration: 2 weeks - Sessions: Not reported Control: Traction – 15 mins, 14 sessions Outcome measures: VAS, NDI Yang 2015 Condition: Cervical spondylotic radiculopathy Intervention: Chuna (or Tuina) manual therapy - Duration: 2 weeks - Sessions: 30 mins, 6 sessions Control: Traction – 20 mins, 6 sessions Outcome measures: VAS, NDI, SF-36 Liu 2015 Condition: Cervical spondylotic radiculopathy Intervention: Chuna (or Tuina) manual therapy - Duration: Not reported - Sessions: 30 mins, 4 sessions Control: Traction – 4 sessions : Manual therapy – 4 sessions Outcome measures: VAS, NDI Zhu et al 2009 Condition: Cervical spondylosis Intervention: Chuna (or Tuina) manual therapy - Duration: 2 weeks - Sessions: 7 sessions Control: Traction – 30 mins, 7 sessions Outcome measures: VAS Yan et al 2014 Condition: Cervical spondylosis Intervention: Chuna (or Tuina) manual therapy - Duration: 2 weeks		

Study	Methodology	Results	Comments and evidence level
	- Sessions: 20 mins, 6 sessions Control: Traction – 30 mins, 7 sessions Outcome measures: VAS Gao et al 2011 Condition: Cervical spondylosis (vertebral artery type) Intervention: Chuna (or Tuina) manual therapy - Duration: 14 days - Sessions: 7 sessions Control: Traction – 30 mins, 14 sessions Outcome measures: ROM Zeng 2015 Condition: Cervical spondylosis (vertebral artery type) Intervention: Chuna (or Tuina) manual therapy - Duration: 4 weeks - Sessions: 30 mins, 8 sessions Control: Microcurrent therapy, 8 sessions Outcome measures: VAS Wang 2012 Condition: Low cervical degenerative instability Intervention: Chuna (or Tuina) manual therapy - Duration: 2 weeks - Sessions: Not reported Control: Traction – 20 mins, 10 sessions Outcome measures: VAS, NDI Yang et al 2014 Condition: Low cervical degenerative instability Intervention: Chuna (or Tuina) manual therapy - Duration: 2 weeks - Sessions: 6 sessions Control: Traction – 20 mins, 10 sessions Outcome measures: NDI Chen et al 2006 Condition: Lumbar disc herniation Intervention: Chuna (or Tuina) manual therapy - Duration: 4 weeks - Sessions: 15 mins, 8 sessions Control: Traction – 20 mins, 15 sessions Outcome measures: VAS, ROM, M-JOA Wang 2010 Condition: Lumbar disc herniation		

Study	Methodology	Results	Comments and evidence level
	Intervention: Chuna (or Tuina) manual therapy - Duration: 3 weeks - Sessions: 9 sessions Control: Traction – 21 sessions Outcome measures: VAS, JOA Zhou et al 2012 Condition: Lumbar disc herniation Intervention: Chuna (or Tuina) manual therapy - Duration: 12 days - Sessions: 20 mins, 6 sessions Control: Traction – 20 mins, 10 sessions Outcome measures: VAS, ODI Luo et al 2013 Condition: Lumbar disc herniation Intervention: Chuna (or Tuina) manual therapy - Duration: 4 weeks - Sessions: 8 sessions Control: Traction – 30 mins, 14 sessions Outcome measures: VAS, JOA, SF-36 Deng et al 2012 Condition: Lumbar disc herniation Intervention: Chuna (or Tuina) manual therapy - Duration: 2 weeks - Sessions: 6 sessions Control: Oral drugs Outcome measures: VAS Zhang et al 2005 Condition: Lumbar muscle strain Intervention: Chuna (or Tuina) manual therapy - Duration: 5-7 days - Sessions: 30 mins, 5 sessions Control: Oral drugs Outcome measures: ALBP clinical score Xue 2016 Condition: Lumbar muscle strain Intervention: Chuna (or Tuina) manual therapy - Duration: 3-4 weeks - Sessions: 30 mins, 10 sessions Control: Oral drugs Outcome measures: VAS		

Study	Methodology	Results	Comments and evidence level
	Wang et al 2016 Condition: Sacrococcygeal Intervention: Chuna (or Tuina) manual therapy - Duration: 2 weeks - Sessions: 6 sessions Control: External medicine Outcome measures: VAS Chen et al 2014 Condition: Periarthritis of the shoulder Intervention: Chuna (or Tuina) manual therapy - Duration: 4 weeks - Sessions: 24 sessions Control: EA 24 sessions : TENs Outcome measures: VAS, ROM Xu 2016 Condition: Humeral fracture Intervention: Chuna (or Tuina) manual therapy - Duration: 7 days - Sessions: Not reported Control: Surgery Outcome measures: CMS – pain, function, ROM, muscle strength Pan 2016 Condition: Humeral fracture Intervention: Chuna (or Tuina) manual therapy - Duration: 76 weeks - Sessions: Not reported Control: Surgery Outcome measures: CMS Yang 2004 Condition: Humeral fracture Intervention: Chuna (or Tuina) manual therapy - Duration: 6 weeks - Sessions: Not reported Control: Surgery Outcome measures: ROM Ding et al 2010 Condition: Lateral epicondylitis Intervention: Chuna (or Tuina) manual therapy - Duration: 2 weeks		

Study	Methodology	Results	Comments and evidence level
	- Sessions: Not reported Control: Physiotherapy – interferential therapy – 14 sessions Outcome measures: VAS, Mayo score Chen 2015 Condition: Knee OA Intervention: Chuna (or Tuina) manual therapy - Duration: 1 month - Sessions: 12 sessions Control: Oral drugs Outcome measures: WOMAC, VAS Jin 2015 Condition: Knee OA Intervention: Chuna (or Tuina) manual therapy - Duration: 1 month - Sessions: 12 sessions Control: Oral drugs Outcome measures: WOMAC Li et al 2016 Condition: Knee OA Intervention: Chuna (or Tuina) manual therapy - Duration: 1 month - Sessions: 20 sessions Control: Oral drugs Outcome measures: JOA, VAS Zhao et al 2016 Condition: Calcaneal fracture Intervention: Chuna (or Tuina) manual therapy - Duration: Not reported - Sessions: Not reported Control: Surgery Outcome measures: AOFAS scale – pain, ADL, X-RAY Cheng and Tang 2013 Condition: Cervical spondylotic radiculopathy Intervention: Chuna (or Tuina) manual therapy + Traction - Duration: 3 weeks - Sessions: 15 sessions Control: Traction, 15 sessions Outcome measures: VAS Dong and Wang 2014 Condition: Lumbar disc herniation		

Study	Methodology	Results	Comments and evidence level
	Intervention: Chuna (or Tuina) manual therapy + oral drugs + injection - Duration: 30 days - Sessions: Not reported Control: Oral drugs + injection Outcome measures: VAS, JOA, ODI Song et al 2015 Condition: Lumbar disc herniation Intervention: Chuna (or Tuina) manual therapy + Traction - Duration: 10 days - Sessions: Not reported Control: Traction Outcome measures: VAS, JOA Yin et al 2015 Condition: Lumbar disc herniation Intervention: Chuna (or Tuina) manual therapy + injection - Duration: 2 weeks - Sessions: Not reported Control: injection Outcome measures: VAS, ODI Wu et al 2016 Condition: Lumbar disc herniation Intervention: Chuna (or Tuina) manual therapy + Traction - Duration: 10 days - Sessions: 10 Control: Traction Outcome measures: VAS Wu 2011 Condition: Lateral epicondylitis Intervention: Chuna (or Tuina) manual therapy + Physiotherapy + Interferential therapy - Duration: 9 days - Sessions: 5 sessions Control: Physiotherapy + Interferential therapy Outcome measures: VAS Xiao 2016 Condition: Knee OA Intervention: Chuna (or Tuina) manual therapy + Rehabilitation treatment - Duration: 4 weeks - Sessions: Not reported Control: Rehabilitation treatment Outcome measures: HSS, SF-36		

Study	Methodology	Results	Comments and evidence level
Cao, H, Li, X, Yan, X, Wang, N, Bensousan, A & Liu, J **Cupping therapy for acute and chronic pain management: a systematic review of randomized clinical trials** **2014** Databases **Cochrane Central Register of Controlled Trials (CENTRAL), PubMed, EMBASE, Cumulative Index of Nursing and Allied Health Literature (CINAHL), Scopus, Science Direction, Biomed Central, Current Content, Health and Medical Complete, China Network Knowledge Infrastructure (CNKI), Chinese Scientific Journals Database (VIP), Wan Fang Database and CBM, metaRegister of Controlled Trials, the U.S. National Institutes of Health Ongoing Trials Register, the Australian New Zealand Clinical Trials Registry, and the World Health Organization International Clinical Trials Registry Platform** Relevant Included Studies **Chen 2009** **Cramer 2011** **Farhadi 2009** **Kim 2011** **Kim 2012** **Lauche 2011** **Lauche 2013** **Oyang 2001** **Teut 2012** **Wu K 2013**	**Studies** – 12 out of a total of 16 studies were relevant **Chen 2009 –** Condition: Frozen shoulder Gender (male/female): Treatment 16/14; Control 15/13 Age (yrs, MD ± SD): Treatment 52 ± 1.6; Control 53 ± 1.3 **Cramer 2011 –** Condition: neck pain Gender (male/female): Treatment 4/20; Control 6/18 Age (yrs, MD ± SD): Treatment 44.5 ± 10.8; Control 47.9 ± 13.5 **Farhadi 2009 –** Condition: Non-specific low back pain**,** Gender (male/female): Treatment 30/18; Control 37/13 Age (yrs, MD ± SD): Treatment 44.9 ± 14.8; Control 41.8 ± 13.9 **Kim 2011 -** Condition: Non-specific low back pain Gender (male/female): Treatment, 5/16; Control, 3/8, Age (yrs, MD ± SD): Treatment, 44.2 _ 9.4; Control, 48 _ 5.4 **Kim 2012 -** Condition: Neck pain Gender (male/female): Treatment, 7/13; Control, 11/9, Age (yrs, MD, range): Treatment, 25.5 (22.5-40.5); Control, 28 (25-31.5) **Lauche 2011 -** Condition: Non-specific neck pain, Gender (male/female): Treatment, 7/15; Control, 4/20, Age (yrs, MD _ SD): Treatment 48.6 _ 11.2; Control, 53.0 _ 11.4 **Lauche 2013 -** Condition: Chronic neck pain Gender (male/female): Treatment, 6/24; Control, 10/21, Age (yrs, MD ± SD): Treatment, 54.5 _ 12.3; Control, 53.7 ±13.4 **Oyang 2001 -** Condition: Shoulder pain Gender (male/female): Treatment, 18/8; Condition 22/8, Age (yrs, MD, range): Treatment, 58.2 (27-75); Control, 56.8 (29-71) **Teut 2012 -** Condition: Osteoarthritis Gender (male/female): Treatment, 5/16; Control, 8/11, Age (yrs, MD ± SD): Treatment, 68.1 ±7.2; Control, 69.3 ± 6.8 **Wu K 2013 -** Condition: Osteoarthritis Gender (male/female): Treatment, 8/22; Control, 7/23, Age (yrs, MD ± SD): Treatment, 56.7 ± 6.6; Control, 57.4 ± 5.8 **Wu 2007 -** Condition: Acute ankle sprain Gender (male/female): Treatment 10/21; Control, 11/19, Age (yrs, MD ± SD): Not reported **Inclusion:** - Parallel-group RCTs that used any form of cupping (dry cupping, wet cupping, flash cupping, moving cupping, medicinal cupping, needling cupping, or water cupping) compared with no treatment or other active therapies) - Participants had to be 18 years or older and could be of any gender - Pain conditions, known or idiopathic, including musculoskeletal pain, neurologic pain, or pain caused by infection or other disease with at least moderate pain (e.g. baseline visual analog scale, or VAS, pain intensity score in excess of 3 cm) **Exclusion:** - Trials used combined therapy employing cupping therapy with other TCM therapy (such as acupuncture or herbal medicine) compared with other interventions were excluded	*No individual data provided within review (only meta-analysis results) **Cupping therapy versus waiting list/no treatment** <u>Pain intensity measure by VAS: 3 studies</u> - Dry cupping versus wait-list 2 studies: 86 participants, Mean Difference (IV, Fixed, 95% CI) -1.85 [-2.66, -1.04] <0.00001 - Wet cupping versus wait-list 1 study: 61 participants, Mean Difference (IV, Fixed, 95% CI) -7.07 [-7.45, -6.69] <u>Quality of life measured by SF36-physical score: 2 studies</u> Dry cupping versus waiting list 2 studies, 86 participants, Mean Difference (IV, Fixed, 95% CI) 3.77 [1.27, 6.26] 0.003 <u>Quality of life measured by SF36-mental score: 2 studies</u> - Dry cupping versus waiting list 2 studies, 86 participants Mean Difference (IV, Random, 95% CI) 5.90 [0.16, 11.64] 0.04 **Cupping therapy versus conventional drugs** <u>Pain intensity measured by VAS: 3 studies</u> - Wet cupping versus flunarizine 1 studies, 90 participants, Mean Difference (IV, Fixed, 95% CI) -1.40 [-2.08, -0.72] <0.0001 - Wet cupping versus diclofenac 1 study, 60 participants, Mean Difference (IV, Fixed, 95% CI) -0.50 [-0.80, -0.20] <u>Pain intensity measured by SF-MPQ: 1 study</u> - Medicinal cupping plus ibuprofen versus mecobalamin injection plus ibuprofen, 1 study, 38 participants, Mean Difference (IV, Fixed, 95% CI) -5.47 [-8.41, -2.53] **Cupping therapy versus other treatment** <u>Pain intensity measured by VAS/NRS/PPI: 5 studies</u> - Wet cupping versus usual care 1 study, 98 participants, Mean Difference (IV, Fixed, 95% CI) -2.10 [-2.54, -1.66] <0.00001 - Wet cupping versus heat therapy 2 92 Mean Difference (IV, Fixed, 95% CI) _2.05 [-2.93, -1.17] <0.00001 - Moving and dry cupping versus usual care 1 study, 48 participants Mean Difference (IV, Fixed, 95% CI) -1.72 [-2.74, -0.70] 0.0009 - Moving cupping versus progressive muscle relaxation 1 study, 61 participants Mean Difference (IV, Fixed, 95% CI) -0.54 [-1.90, 0.82] <u>Pain intensity measured by SF-MPQ: 1 study</u> - Medicinal cupping plus ibuprofen versus medicinal heat therapy plus ibuprofen, 1 study, 38 participants Mean Difference (IV, Fixed, 95% CI) -3.10 [-6.83, 0.63]	**Reviewer comments** A comprehensive search strategy was undertaken, which looked at a wide range of databases. Two authors both selected studies and extracted data from the included study, however excluded studies are not listed in the review. The review does well in the reporting of participant characteristics. Potential bias within the included studies is considered, using the Cochrane handbook for systematic reviews of interventions, highlighting each study and its level of quality in accordance with each risk of bias item. Performance bias was deemed as unavoidable in this review and therefore low risk of bias was given to the majority of the cupping studies, which may have impacted on the reliability of the results. In addition, no individual study results were reported within the review. This reduced the overall result significance, but also made it harder to extract the relevant data/ determine the effectiveness of each relevant study. Furthermore, only English and Chinese databased were searched, however cupping is a common therapy in other Asia countries, therefore the evidence in this review may be limiting. **Quality scores:** Quality scores: Cochrane handbook for systematic reviews of intervention, risk of bias tool All 10 RCTs Random sequence generation (selection bias) - Low risk of bias Allocation concealment (selection bias) - Low risk of bias Blinding of participants and personnel (performance bias) - Unclear risk of bias

Study	Methodology	Results	Comments and evidence level
Wu 2007 Research question **What is the evidence for the effectiveness and safety of cupping for the treatment of different types of pain?** Funding **Hui-Juan Cao, Xun Li and Jian-Ping Liu are supported by the Research Capacity Establishment Grant (No. 201207007) from the State Administration of Traditional Chinese Medicine, and by the Innovative Research Team (No. 2011-CXTD-09) from Beijing University of Chinese Medicine**	- Trials that used inappropriate or spurious randomization or trials that authors were unable to provide information on randomization methodology **Limits:** Nil Language > 18 y.o **Chen 2009** n=58 Mean age intervention: (yrs, MD ± SD): Treatment 52 ± 1.6; Control 53 ± 1.3 Duration of LBP: Not reported **Intervention –** Wet cupping **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Ashi points around shoulder joint **- Depth of insertion:** Not reported **- Response sought:** Not reported **- Needle stimulation:** Not reported **- Needle retention time:** Not reported **- Needle type:** plum-blossom needles **Treatment Regimen** **- Number of treatment sessions:** Not reported **- Frequency and duration:** 10 minutes, once every two days for 60 days **Practitioner qualifications and background** Not reported **Control** – Electro-acupuncture **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** LI15, SJ14, SI9, GB21, Ex-UE, SI11, LI11 **- Depth of insertion:** Not reported **- Response sought:** Not reported **- Needle stimulation:** Not reported **- Needle retention time:** Not reported **- Needle type:** plum-blossom needles **Treatment Regimen** **- Number of treatment sessions:** Not reported **- Frequency and duration:** 30 minutes, once daily for 60 days **Practitioner qualifications and background** Not reported **Cramer 2011** n=48	Quality of life measured by SF36-mental scores: 2 studies - Moving and dry cupping versus usual care 1 study, 48 participants, Mean Difference (IV, Fixed, 95% CI) 1.76 [-4.83, 8.35] 0.60 - Moving cupping versus progressive muscle relaxation 1 study 61 participants, Mean Difference (IV, Fixed, 95% CI) -0.70 [-6.84, 5.44] Quality of life measured by SF36-physical scores: 2 studies - Moving and dry cupping versus usual care 1 study, 48 participants, Mean Difference (IV, Fixed, 95% CI) 7.11 [2.59, 11.63] 0.002 - Moving cupping versus progressive muscle relaxation 1 study, 61 participants, Mean Difference (IV, Fixed, 95% CI) 3.70 [-0.90, 8.30] **Cupping therapy plus other treatments versus other treatments alone** Pain intensity measured by VAS/NRS: 4 studies - Wet cupping plus acupuncture versus acupuncture 2 studies, 138 participants, Mean Difference (IV, Fixed, 95% CI) -1.18 [-1.68, -0.68] <0.00001 - Wet cupping plus exercise versus exercise alone 1 study, 56 participants, Mean Difference (IV, Fixed, 95% CI) -0.53 [-1.18, 0.12] 0.11 - Wet cupping plus exercise/acetaminophen versus exercise/acetaminophen alone - 1 study, 32 participants, Mean Difference (IV, Fixed, 95% CI) -0.16 [-1.32, 1.00] Difference in pain intensity measured by VAS - Wet cupping plus acupuncture versus acupuncture alone 2 studies, 82 participants, Mean Difference (IV, Random, 95% CI) 0.16 [-0.54, 0.87] 0.65 - Wet cupping plus exercise versus exercise alone 1 study, 56 participants, Mean Difference (IV, Random, 95% CI) 0.64 [0.07, 1.21] **Adverse effects:** Cramer et.al 2011, Kim et.al 2012, Lauche et.al 2011, Lauche 2013, Teut et.al 2012, experienced mild to moderate adverse events (10.3% reporting hematoma at the treated site, 10.3% reporting increased pain in the original location after cupping or pain at the targeted area and 7.5% reporting muscle soreness or tingling in the original site of pain after treatment. Wu et al 2007 and Kim et al 2011, experienced none amongst cupping groups.	Blinding of outcome assessment (detection bias) - Unclear risk of bias Incomplete outcome data (attrition bias) - Unclear risk of bias Selective reporting (reporting bias) - Unclear risk of bias Other bias - Unclear risk of bias **Grade:** AQ (+) **Quality**: 1+

Study	Methodology	Results	Comments and evidence level
	Mean age intervention: Age (yrs, MD ± SD): Treatment, 44.5 ± 10.8; Control, 47.9 ± 13.5 Duration of LBP: Not reported **Intervention –** Moving and dry cupping **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Not reported **- Depth of insertion:** Not reported **- Response sought:** Not reported **- Needle stimulation:** sweeping movements **- Needle retention time:** Not reported **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** Not reported **- Frequency and duration:** glass cup applied to painful region for 10-15 mins, the 4 cups over the trapezius for 5-10 mins, once every 3-4 days for a total of 14 days **Practitioner qualifications and background** Not reported **Control –** Usual care **Number of needles inserted per subject per session:** Not reported **- Names of points used:** Not reported **- Depth of insertion:** Not reported **- Response sought:** Not reported **- Needle stimulation:** Not reported **- Needle retention time:** Not reported **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** Not reported **- Frequency and duration:** 14 day treatment duration **Practitioner qualifications and background** General practitioner or orthopaedist **Farhadi 2009** n=95 Mean age intervention: Age (yrs, MD ± SD): Treatment44.9 ± 14.8; Control 41.8 ±13.9 Duration of LBP: 16.5 +/- 21.0 months **Intervention –** Wet cupping **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Not reported **- Depth of insertion:** Not reported **- Response sought:** Not reported **- Needle stimulation:** Not reported		

Study	Methodology	Results	Comments and evidence level
	- Needle retention time: 3-5 mins **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** 6 **- Frequency and duration:** treatment duration a total of 6 days **Practitioner qualifications and background** Not reported **Control** – Usual care **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Not reported **- Depth of insertion:** Not reported **- Response sought:** Not reported **- Needle stimulation:** Not reported **- Needle retention time:** not reported **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** 6 **- Frequency and duration:** treatment duration a total of 6 days **Practitioner qualifications and background** Not reported **Kim 2011** n=32 Mean age intervention: Age (yrs, MD, range): Treatment 25.5 (22.5-40.5); Ccontrol 28 (25-31.5) Duration of LBP: Not reported **Intervention** – Wet cupping **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Bilateral BL23, BL24, BL25 **- Depth of insertion:** 2 mm **- Response sought:** Not reported **- Needle stimulation:** Not reported **- Needle retention time:** 5 mins **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** Not reported **- Frequency and duration:** Three time weekly for 14 days **Practitioner qualifications and background** Not reported		

Study	Methodology	Results	Comments and evidence level
	Control – Waitlist/ exercise **Number of needles inserted per subject per session:** Not reported **- Names of points used:** Not reported **- Depth of insertion:** Not reported **- Response sought:** Not reported **- Needle stimulation:** Not reported **- Needle retention time:** Not reported **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** Not reported **- Frequency and duration:** Three time weekly for a total of 14 days **Practitioner qualifications and background** Not reported **<u>Kim 2012</u>** n=40 Mean age intervention: Age (yrs, MD ±SD): T 48.6 ± 11.2; C 53.0 ± 11.4 Duration of LBP: Not reported **Intervention** – Wet cupping **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Not reported **- Depth of insertion:** 2 mm **- Response sought:** Not reported **- Needle stimulation:** Not reported **- Needle retention time:** 5-10 mins **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** Not reported **- Frequency and duration:** Three time weekly for 14 days **Practitioner qualifications and background** Not reported **Control** – Heat therapy **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Not reported **- Depth of insertion:** Not reported **- Response sought:** Not reported **- Needle stimulation:** Not reported **- Needle retention time:** Not reported **- Needle type:** Not reported		

Study	Methodology	Results	Comments and evidence level
	Treatment Regimen **- Number of treatment sessions:** Not reported **- Frequency and duration:** 10 mins three times weekly for 14 days **Practitioner qualifications and background** Not reported **Lauche 2011** n=46 Mean age intervention: Age (yrs, MD ± SD): T 48.6 ± 11.2; C 53.0 ± 11.4 Duration of LBP: Not reported **Intervention –** Dry cupping **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Not reported **- Depth of insertion:** Not reported **- Response sought:** Not reported **- Needle stimulation:** Not reported **- Needle retention time:** 10-20 mins **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** Not reported **- Frequency and duration:** treatment every 3-4 days for a total of 25 days **Practitioner qualifications and background** Not reported **Control** - Waitlist **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Not reported **- Depth of insertion:** Not reported **- Response sought:** Not reported **- Needle stimulation:** Not reported **- Needle retention time:** 10-20 mins **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** Not reported **- Frequency and duration:** treatment every 3-4 days for a total of 25 days **Practitioner qualifications and background** Not reported **Lauche 2013** n=51		

Study	Methodology	Results	Comments and evidence level
	Mean age intervention: Age (yrs, MD ± SD): T 54.5 ± 12.3; C 53.7 ± 13.4 Duration of LBP: Not reported **Intervention –** Moving cupping **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Not reported **- Depth of insertion:** Not reported **- Response sought:** Not reported **- Needle stimulation:** Not reported **- Needle retention time:** Not reported **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** Not reported **- Frequency and duration:** treatment 10-15 mins twice weekly for a total of 84 days **Practitioner qualifications and background** Not reported **Control –** Progressive muscle relaxation **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Not reported **- Depth of insertion:** Not reported **- Response sought:** Not reported **- Needle stimulation:** Not reported **- Needle retention time:** Not reported **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** Not reported **- Frequency and duration:** 20 mins at home twice daily for 84 days **Practitioner qualifications and background** Not reported **Oyang 2001** n=56 Mean age intervention: Age (yrs, MD, range): T 58.2 (27e75); C 56.8 (29e71) Duration of LBP: Not reported **Intervention –** Wet cupping **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Ashi points around shoulder joint **- Depth of insertion:** Not reported **- Response sought:** Not reported		

Study	Methodology	Results	Comments and evidence level
	- Needle stimulation: Not reported **- Needle retention time:** 10 mins **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** Not reported **- Frequency and duration:** Once every two days for 30 days **Practitioner qualifications and background** Not reported **Control** – Physical rehabilitation **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Not rpeorted **- Depth of insertion:** Not reported **- Response sought:** Not reported **- Needle stimulation:** Not reported **- Needle retention time:** Not reported **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** Not reported **- Frequency and duration:** 30 mins once daily **Practitioner qualifications and background** Not reported **Teut 2012** n=40 Mean age intervention: Age (yrs, MD ± SD): T 68.1 ± 7.2; C 69.3 ± 6.8 Duration of LBP: Not reported **Intervention –** Dry cupping (pulsatile cupping) **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Not reported **- Depth of insertion:** Not reported **- Response sought:** Not reported **- Needle stimulation:** Not reported **- Needle retention time:** Not reported **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** Not reported **- Frequency and duration:** 5-10 mins twice weekly. Paracetamol on demand with max dosage of 2g daily for a total of 28 days **Practitioner qualifications and background**		

Study	Methodology	Results	Comments and evidence level
	Not reported Control – Waitlist **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Not reported **- Depth of insertion:** Not reported **- Response sought:** Not reported **- Needle stimulation:** Not reported **- Needle retention time:** Not reported **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** Not reported **- Frequency and duration:** paracetamol max dosage 2g daily for a total of 28 days **Practitioner qualifications and background** Not reported **Wu K 2013** n=60 Mean age intervention: Age (yrs, MD ± SD): T 56.7 ± 6.6; C 57.4 ± 5.8 Duration of LBP: Not reported **Intervention –** Wet cupping **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Ex-LE4, Ex-LE5, ST34, SP10, SP9, and ashi points; **- Depth of insertion:** 3-4 mm **- Response sought:** Not reported **- Needle stimulation:** Not reported **- Needle retention time:** 3-4 mins **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** Not reported **- Frequency and duration:** once every 2 days for a total of 14 days **Practitioner qualifications and background** Not reported **Control** – Drugs: Diclofenac **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Not reported **- Depth of insertion:** Not reported **- Response sought:** Not reported **- Needle stimulation:** Not reported **- Needle retention time:** Not reported		

Study	Methodology	Results	Comments and evidence level
	- Needle type: Not reported **Treatment Regimen** **- Number of treatment sessions:** Not reported **- Frequency and duration:** 50mg twice daily for a total of 14 days **Practitioner qualifications and background** Not reported **Wu 2007** n=60 Mean age intervention: Age (yrs, MD ± SD): Not reported Duration of LBP: Not reported **Intervention –** Wet cupping **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Not reported **- Depth of insertion:** Not reported **- Response sought:** Not reported **- Needle stimulation:** Not reported **- Needle retention time:** 10 mins **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** Not reported **- Frequency and duration:** once daily for 5 days **Practitioner qualifications and background** Not reported **Control** - Waitlist **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Not reported **- Depth of insertion:** Not reported **- Response sought:** Not reported **- Needle stimulation:** Not reported **- Needle retention time:** Not reported **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** Not reported **- Frequency and duration:** once daily for 5 days **Practitioner qualifications and background** Not reported		

Study	Methodology	Results	Comments and evidence level
Madsen, M, Gotzsche, & Hrobjartsson, A **Acupuncture treatment for pain: systematic review of randomised clinical trials with acupuncture, placebo acupuncture, and no acupuncture groups** **2009** Databases **Cochrane Library, Medline, Embase, Biological Abstracts, and PsycLIT** Relevant Included Studies **Scharf et al 2007** **Witt et al 2006** **Foster et al 2007** **Brinkhaus et al 2006** **Molsberger et al 2002** **Leibing et al 2002** Research question **What is the evidence of effectiveness of the analgesic effect of acupuncture and placebo acupuncture and to explore whether the type of the placebo acupuncture is associated with the estimated effect of acupuncture.** Funding **None**	**Participants** – 6 relevant RCTS n= 2142 Scharf et al – n= 1039/ 57: 5% dropout Witt et al – n= 300/ 14: 5% dropout Foster et al – n= 352/19: 5% dropout Brinkhaus et al – n= 301/ 17: 6% dropout Molsberger et al – n= 186/ 12: 6% dropout Leibing et al – n=150/ 36: 24% dropout **Inclusion:** - Trials that labelled the intervention "acupuncture" - If pain had been estimated by the patients (self-reported pain), on a visual analogue scale or another ranking scale **Exclusion:** - Trials that used transcutaneous electrical nerve stimulation and manual acupressure **Limits:** - Number of relevant RCT's **Scharf et al** Condition: OA N=1039 Mean age intervention: not reported *Intervention – acupuncture + standard care* **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Local acupuncture points, according to theory of Bi Syndrome **- Depth of insertion:** Not reported **- Response sought:** No local twitch response required **- Needle stimulation:** Not reported **- Needle retention time:** Not reported **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** 10 **- Frequency and duration:** 6 weeks, evaluation at 13 weeks **Practitioner qualifications and background** Not reported *Control: Placebo acupuncture + standard care (superficial needling)* **Number of needles inserted per subject per session:** Not reported **- Names of points used:** Non - acupuncture points **- Depth of insertion:** 0.5 cm without Qi **- Response sought:** No local twitch response required **- Needle stimulation:** not reported	**Scharf et al** Intervention: acupuncture/ needling No acupuncture control: Oral NSAID/ 6 physiotherapy sessions Control: superficial needling WOMAC (0-10) SMD: -0.13 (-0.28 to 0.02) **Witt et al** Intervention: acupuncture/ needling No acupuncture control: NSAID is required Control: superficial needling WOMAC (0-10) SMD: -0.52 (-0.80 to -0.23) **Foster et al** Intervention: acupuncture / needling No acupuncture: advice and exercise by a physiotherapist; fixed dose NSAID Control: Non-penetrative needling WOMAC (0-10) SMD: 0.09 (-0.16 to 0.35) **Brinkhaus et al** Intervention: acupuncture/ needling No acupuncture control: NSAID if required Control: superficial needling VAS (0-100mm) SMD: -0.32 (-0.61 to -0.03) **Molsberger et al** Intervention: acupuncture/ needling No acupuncture control: oral NSAID, back school, physiotherapy, physical exercise, mud packs and infrared therapy Control: superficial needling VAS (0-100mm) SMD:-0.50 (-0.87 to -0.13) **Leibing et al** Intervention: acupuncture/ needling No acupuncture control: continuation of existing drugs; no new drugs; 26 sessions of physiotherapy Control: superficial needling VAS change (0-10 cm) SMD: -0.27 (-0.73 to 0.19) **Meta-analysis**	**Reviewer comments** The search strategy was fairly limited and the assessed literature was also limited as only 6 out of the total 13 were relevant to the scope of the research. Fairly poor reporting of interventions and the Inclusion and exclusion criteria was not adequately reported. However, all authors evaluated the eligibility of the trials. Two authors were involved in the data extraction process. In depth participant characteristics were not reported such as age, gender etc. Randomisation was considered and concealment was used in 5 of the 6 relevant included RCT's. Overall, a lack of blinding and reporting bias will affect the reliability of the results in this review. **Quality scores:** **Scharf et al –** patient blinding/ central randomisation **Witt et al –** patient blinding/ centralised telephone randomisation **Foster et al –** patient blinding/ central telephone randomisation **Brinkhaus et al -** patient blinding/ central telephone randomisation **Molsberger et al -** patient blinding/ central telephone randomisation **Leibing et al –** patient blinding/ unclear concealment of allocation **Grade:** AQ (+) **Quality:** 1+

Study	Methodology	Results	Comments and evidence level
	- Needle retention time: Not reported **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions** 10 **- Frequency and duration:** 6 weeks, evaluation at 13 weeks **Practitioner qualifications and background** Not reported **Witt et al** Condition: OA n= 300 Mean age intervention: not reported *Intervention – acupuncture + standard care* **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** local and distant points **- Depth of insertion:** Not reported **- Response sought:** not reported **- Needle stimulation:** Manual stimulation **- Needle retention time:** not reported **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** 12 **- Frequency and duration:** 8 weeks **Practitioner qualifications and background** Not reported *Control: Placebo acupuncture + standard care (superficial needling)* **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Not reported **- Depth of insertion:** Not reported **- Response sought:** Not reported **- Needle stimulation:** Manual stimulation **- Needle retention time:** Not reported **- Needle type:** fine needles **Treatment Regimen** **- Number of treatment sessions:** 12 **- Frequency and duration:** 8 weeks **Practitioner qualifications and background** Not reported **Foster et al**	Acupuncture versus placebo acupuncture Substantial heterogeneity was present in the comparison between acupuncture and placebo acupuncture (P<0.001, I2=66%). A statistically significant difference between acupuncture and placebo acupuncture was found (P<0.001)—pooled standardised mean difference −0.17 (−0.26 to −0.08). Placebo acupuncture versus no acupuncture Substantial heterogeneity existed in the comparison between placebo acupuncture and no acupuncture (P<0.001, I2=66%). We found a statistically significant difference between placebo acupuncture and no acupuncture (P<0.001)—pooled standardised mean difference −0.42 (−0.60 to −0.23). Test for overall effect: z=4.39, P<0.001 **Adverse effects:** Not reported	

Study	Methodology	Results	Comments and evidence level
	Condition: OA n= 352 Mean age intervention: Not reported *Intervention – acupuncture + standard care* **- Number of needles inserted per subject per session:** **- Names of points used:** 6-10 points from 16 local and distal points **- Depth of insertion:** Not reported **- Response sought:** **- Needle stimulation:** Not reported **- Needle retention time:** Not reported **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** 6 **- Frequency and duration:** 3 weeks, evaluation at 6 weeks **Practitioner qualifications and background** Not reported *Control: Placebo acupuncture + standard care (Non-penetrative needling)* **Number of needles inserted per subject per session:** **- Names of points used:** 6-10 points from 16 local and distal points **- Depth of insertion:** Not reported **- Response sought:** **- Needle stimulation:** Not reported **- Needle retention time:** Not reported **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** 6 **- Frequency and duration:** 3 weeks, evaluation at 6 weeks **Practitioner qualifications and background** Not reported **Brinkhaus et al** Condition: LBP n=301 Mean age intervention: Not reported *Intervention – acupuncture + standard care* **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Local and distal points bilaterally **- Depth of insertion:** Not reported **- Response sought:** Not reported **- Needle stimulation:** Manual stimulation		

Study	Methodology	Results	Comments and evidence level
	- Needle retention time: Not reported **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** 12 **- Frequency and duration:** 8 weeks **Practitioner qualifications and background** Not reported *Control: Placebo acupuncture + standard care (Superficial needling)* **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Not reported **- Depth of insertion:** Not reported **- Response sought:** Not reported **- Needle stimulation:** Manual stimulation avoided **- Needle retention time:** Not reported **- Needle type:** fine needles 20-40 mm **Treatment Regimen** **- Number of treatment sessions:** 12 **- Frequency and duration:** 8 weeks **Practitioner qualifications and background** Not reported **Molsberger et al** LBP n= 186 Mean age intervention: Not reported *Intervention – acupuncture + standard care* **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Standard points and distal points **- Depth of insertion:** Not reported **- Response sought:** Not reported **- Needle stimulation:** Mild to strong manipulation (depending on pain) **- Needle retention time:** Not reported **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** 12 **- Frequency and duration:** 4 weeks **Practitioner qualifications and background** Not reported *Control: Placebo acupuncture + standard care (Superficial needling)* **- Number of needles inserted per subject per session:** Not reported		

Study	Methodology	Results	Comments and evidence level
	- Names of points used: Non-acupuncture points **- Depth of insertion:** 1cm **- Response sought:** Not reported **- Needle stimulation:** Manipulation avoided **- Needle retention time:** Not reported **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** 12 **- Frequency and duration:** 4 weeks **Practitioner qualifications and background** Not reported **Leibing et al** LBP n= 150 Mean age intervention: Not reported *Intervention – acupuncture + standard care* **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Not reported **- Depth of insertion:** 10-30mm **- Response sought:** Not reported **- Needle stimulation:** Manual stimulation **- Needle retention time:** Not reported **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** 20 **- Frequency and duration:** 12 weeks **Practitioner qualifications and background** Not reported *Control: Placebo acupuncture + standard care (Superficial needling)* **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Non-acupuncture points **- Depth of insertion:** Not reported **- Response sought:** Not reported **- Needle stimulation:** Needles not stimulated **- Needle retention time:** Not reported **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** 20 **- Frequency and duration:** 12 weeks		

Study	Methodology	Results	Comments and evidence level
	Practitioner qualifications and background Not reported		
Boyles, R, Fowler, R, Ramsey, D & Burrows, E **Effectiveness of trigger point dry needling for multiple body regions: a systematic review** **2015** Databases **PubMed, PEDro, Cinahl & Cochrane** Relevant Included Studies **Irnich et al 2002** **Edwards & Knowles 2003** **Hugeunin et al 2005** **Itoh et al 2014** **Ay et al 2010** **Perez-Palomares et al 2010** **Eftekhar-Sadat et al 2012** **Tsai et al 2010** **Eroglu et al 2013** **Mayoral et al 2013** **Tekin et al 2013** **Cotchett et al 2014** **Mejuto-Vazquez et al 2014** **Llamas-Ramos et al 2014** Research question **What is the evidence of effectiveness of trigger point DN based on high-quality RCTs for all body regions?** Funding **No funding**	**Inclusion:** - RCTs with PEDro scores 6–10 investigating TDN **Exclusion:** - Duplicates - Non-human participants - Non-English language - Exclusive focus on acupuncture or medicinal injections **Limits:** - 2000-2014 - English language - Human studies <u>Irnich et al 2002</u> Condition: Cervical myofascial pain Mean age 51.9 Duration of symptoms: 36.7 mo Intervention: TDN Control 1: Acupuncture (nonlocalized; needles inserted at distant points) Control 2: Sham laser acupuncture Region treated: Neck (trapezius, splenius capitus, SCM, levator, paravertebrals, scalenes, semispinalis capitus) Local twitch response: Yes Outcome measure: VAS, ROM Time to outcome: Immediate 15-30 mins <u>Edwards & Knowles 2003</u> Condition: Myofascial pain Mean age 57 ± 12 Duration of symptoms: 16 ± 23 mo Intervention: Superficial dry needling to MTrP's and acupuncture points; active stretching home exercise program (multiple interventions over 3 wk) Control 1: Active stretching alone (lasting 3 wk) Control 2: no intervention Region treated: Not reported Local twitch response: Not reported Outcome measure: Pain Time to outcome: Prior to treatment, 3 wk (immediately following final intervention), 6 wk <u>Hugeunin et al 2005</u> Condition: Hamstring trigger point pain	<u>Irnich et al 2002</u> Intervention: TDN Control 1: Acupuncture (nonlocalized; needles inserted at distant points) Control 2: Sham laser acupuncture - Decreased pain in nonlocalized acupuncture group (P<0.001) - Improved CS ROM in DN group (P<.05) and nonlocalized acupuncture group (P<0.05) - Significant improvement in assessment of change for nonlocalized acupuncture group as compared to TDN group and control groups (P=0.008 and P=0.001, respectively) No significant difference between TDN and sham groups (P=0.8) <u>Edwards & Knowles 2003</u> Intervention: Superficial dry needling to MTrP's and acupuncture points; active stretching home exercise program (multiple interventions over 3 wk) Control 1: Active stretching alone (lasting 3 wk) Control 2: no intervention - Decreased pain in group 1 (TDN and stretching) as compared to group 3 (control) at 3 wk follow up (P<0.05) <u>Hugeunin et al 2005</u> Intervention: TDN Control 1: Placebo - DN and sham DN equally able to reduce VAS scores during activity but not resting (P<0.05) <u>Itoh et al 2014</u> Intervention: TDN Control 1: TDN on non-trigger points Control 2: Standard Acupuncture Control 3: Sham (needles blunted to prevent - Decreased pain for TDN group as compared to baseline at 3 wk and through end of study (P<0.05) - Decreased pain for TDN group as compared to all other groups at 9 and 12 wk (P<0.01) - Decreased disability score on NDI for TDN group as compared to baseline at 3 wk through end of study (P<0.01) - Decreased disability score on NDI for TDN as compared to all other groups at 9 and 12 wk (P<0.01) <u>Ay et al 2010</u> Intervention: TDN Control 1: Lidocaine injection Control 2: Stretching exercises (both groups) - Decreased pain for both groups (TDN and Lidocaine) at 4 wk and 12 wk (P<.001) - Improved CS ROM for both groups at 4 wk and 12 wk (P<.05)	**Reviewer comments** Adequate search strategy limited to English only language. Protocol was established specifying search strategies, inclusion criteria, data extraction and evaluation criteria. Three investigators searched databases, applied criteria, read and assigned PEDro scores to every RCT. PRISMA guidelines followed to ensure thorough reporting. Conflicts of interest declared. Only RCTs of high quality according to the PEDro scoring system were included. Results may be influenced by publication bias. Heterogeneity of study patients, methods and outcome measures in the data presented here complicates comparisons among studies and analyses of results. Among the studies that found significant differences between groups after intervention, few reported measurable attainment of MCID and effect size scores. While statistically significant values play an important role in determining the influence of an intervention on outcomes, clinical meaningfulness is often a more relevant indicator of potential patient benefit. **Quality scores:** Pedro /10 Irnich et al 2002: 7/10 Edwards & Knowles 2003: 6/10 Hugeunin et al 2005: 8/10 Itoh et al 2014: 7/10 Ay et al 2010: 6/10 Perez-Palomares et al 2010: 7/10 Eftekhar-Sadat et al 2012: 6/10 Tsai et al 2010: 7/10 Eroglu et al 2013: 7/10 Mayoral et al 2013: 7/10

Study	Methodology	Results	Comments and evidence level
	Mean age NA Duration of symptoms: NA Intervention: TDN Control 1: Placebo Region treated: Gluteal muscles Local twitch response: Yes Outcome measure: SLR, VAS Time to outcome: All outcome measures were collected before, immediately after, 24 hr after and 72 hr after intervention Itoh et al 2014 Condition: Myofascial neck pain Mean age 62.3 ± 10.1 Duration of symptoms: 2.9 ± 2.7 y Intervention: TDN Control 1: TDN on non-trigger points Control 2: Standard Acupuncture Control 3: Sham (needles blunted) Region treated: Cervical and proximal upper extremity muscles Local twitch response: Yes Outcome measure: VAS, NDI Time to outcome: VAS prior to treatment, 1-3 wk, 6-9 wk, and 12 wk. NDI prior to treatment, 3, 6, 9, and 12 wk Ay et al 2010 Condition: Myofascial neck/shoulder pain Mean age 38.1 ± 9.8 Duration of symptoms: 34.3 ± 40.9 mo Intervention: TDN Control 1: Lidocaine injection Control 2: Stretching exercises (both groups) Region treated: Upper trapezius Local twitch response: Yes Outcome measure: VAS, ROM Time to outcome: 4 wk, 12 wk Perez-Palomares et al 2010 Condition: Myofascial low back pain Mean age 45.85 ± 14.4 Duration of symptoms: > 4 mo Intervention: TDN once per wk for 3 wk, followed by spray and stretch Control 1: PENS 3 times per wk for 3 wk Region treated: Deep lumbar paraspinal, quadratus lumborum, gluteus medius muscles Local twitch response: Yes	- Improved depression scale scores for both groups at 4 wk and 12 wk (P<.001) - No significant differences between groups Perez-Palomares et al 2010 Intervention: TDN once per wk for 3 wks, followed by spray and stretch Control 1: PENS 3 times per wk for 3 wks Decreased disability score on ODI for "lifting weight" in TDN group only (P<0.05) Eftekhar-Sadat et al 2012 Intervention: TDN Control 1: Sham - Mean VAS scores significantly lower than baseline and lower than control group 4 wks post intervention (P<0.001) - No significant change in ankle ROM for TDN and control groups at any time period Tsai et al 2010 Intervention: TDN Control 1: Sham - Decreased pain in TDN group (P<0.05) compared to sham needling - Improved CS ROM lateral flexion in TDN group (P0<.05) compared to sham needling Eroglu et al 2013 Intervention: TDN Control 1: Lidocaine Injection Control 2: Oral flurbiprofen - Significantly improved PPT and pain for all groups on 3rd and 14th d (P<0.001); no difference between groups - Significantly increased cervical active ROM for all groups on 3rd and 14th d (P<0.001) no difference between groups - Significantly improved QoL for all groups at 3rd and 14th d (P<0.001) with exception of fatigue item on 3rd day for Lidocaine group; no difference between groups for all other measures Mayoral et al 2013 Intervention: TDN Control 1: Sham - Significant change from baseline in the number of patients with pain below 40 on VAS at 1 mo for TDN group (P<0.05) but not for sham group - Significantly different variation rates of VAS scores greater than 40 at 1 mo favoring the TDN group P<0.05 - Significantly greater number (p=0.042, 9% difference) of pain-free subjects at 1 mo for TDN group as compared to sham - No differences between groups for WOMAC - No differences between groups for ROM and strength - Significantly decreased use of analgesic medication in the TDN group (31.8%) compared to sham group (68.2%) (P=0.01) - TDN group achieved the same average degree of pain reduction on VAS in 1 month that the control group achieved in 6 months	Tekin et al 2013: 8/10 Cotchett et al 2014: 9/10 Mejuto-Vazquez et al 2014: 8/10 Llamas-Ramos et al 2014: 9/10 **Grade:** AQ (+) **Quality:** 1

Study	Methodology	Results	Comments and evidence level
	Outcome measure: VAS, QOL Time to outcome: VAS prior to treatment, prior to 2nd TDN session, prior to 6th PENS session, and 3 wk. QoL: prior to treatment and 3 wk Eftekhar-Sadat et al 2012 Condition: Trigger point plantar heel pain Mean age 50.3 ± 9.0 Duration of symptoms: >1 month Intervention: TDN Control 1: Sham Region treated: Gastrocnemius and "cuff muscles" relating to the leg and foot Local twitch response: Yes Outcome measure: VAS, ROM Time to outcome: 4 wk Tsai et al 2010 Condition: Myofascial neck/shoulder pain Mean age 46.4 ± 12.2‡ Duration of symptoms: 7.5 + 3.9 mo Intervention: TDN Control 1: Sham Region treated: Extensor carpi radialis muscles Local twitch response: Yes Outcome measure: VAS Time to outcome: Immediate Eroglu et al 2013 Condition: Neck and low back pain Mean age 33.75 ± 8.10 Duration of symptoms: 48 months Intervention: TDN Control 1: Lidocaine Injection Control 2: Oral flurbiprofen Region treated: trapezius, supraspinatus, rhomboids Local twitch response: Yes Outcome measure: VAS, ROM, QOL Time to outcome: Pre-treatment, 3 d post-treatment, 14 d post-treatment carrl et al 2013 Condition: Knee OA Mean age 71.65 ± 6.06 Duration of symptoms: NA Intervention: TDN Control 1: Sham Region treated: tensor fascia lata, hip adductors, hamstrings, quadriceps, gastrocnemius, popliteus	Tekin et al 2013 Intervention: TDN Control 1: Sham - Significantly decreased VAS scores immediately after first treatment (P=0.034) and after 6th treatment (P<0.001) for TDN group compared to control - All SF-36 scores increased in the TDN group (P<0.05) and only scores relating to vitality increased in the sham group Cotchett et al 2014 Intervention: TDN Control 1: Sham - Significantly greater decrease in VAS scores for TDN group as compared to sham TDN at 6 wk (P=0.002) - Significantly greater decrease in FHSQ pain scores for TDN group as compared to sham TDN at 6 wk (P=0.029) - MID for FHSQ (13 points) not met for between group comparison Mejuto-Vazquez et al 2014 Intervention: TDN Control 1: No treatment - Significant decrease in pain on NPRS scores at 10 min and 1 wk (P< 0.001) - MCID met at 1wk for pain on NPRS scores - Significantly improved ROM cervical lateral flexion (P=0.004), cervical rotation (P=0.009), cervical flexion (P=0.008), cervical extension (P=0.01) Llamas-Ramos et al 2014 Intervention: TDN Control 1: MTrP Manual Therapy - Significant decrease in VAS score in TDN and manual groups (P<0.001) - Significant decrease in disability from baseline in TDN and manual groups (P<0.001) - Significant increase in all ranges of cervical ROM for TDN and manual groups (P<0.001) **Adverse effects:** Not reported	

Study	Methodology	Results	Comments and evidence level
	Local twitch response: Yes Outcome measure: VAS, WOMAC, ROM Time to outcome: Before treatment, 1 mo, 3 mo, and 6 mo Tekin et al 2013 Condition: MTrPs Mean age 42.9 ± 10.9 Duration of symptoms: 63.5 ± 50.7 mo Intervention: TDN Control 1: Sham Region treated: 8 cervicothoracic sites Local twitch response: Not reported Outcome measure: VAS, SF-36 Time to outcome: VAS and SF-36 before treatment, VAS after first treatment, VAS and SF-36 after 6th treatment Cotchett et al 2014 Condition: Plantar heel pain Mean age 54.4± 12.4 Duration of symptoms: 13.6 ± 12.2 mo Intervention: TDN Control 1: Sham Region treated: Distal LE (soleus, gastrocnemius, quadratus plantae, flexor digitorum brevis, abductor hallicus, adbuctor digiti minimi, flexor hallicus longus) Local twitch response: Yes Outcome measure: VAS, Foot Health Status Questionnaire, SF-36, DASH 21, Likert Scale Time to outcome: Before treatment, 2 wk, 4 wk, 6 wk, 12 wk post treatment Mejuto-Vazquez et al 2014 Condition: Unilateral neck pain Mean age 25 ± 4 Duration of symptoms: 3.1 ± 0.8 d Intervention: TDN Control 1: No treatment Region treated: Upper trapezius Local twitch response: Yes Outcome measure: NPRS, ROM Time to outcome: Before treatment, 10 min post, 1 wk post treatment Llamas-Ramos et al 2014 Condition: Upper trapezius pain Mean age 31 ± 3 Duration of symptoms: 7.4± 2.6 mo		

Study	Methodology	Results	Comments and evidence level
	Intervention: TDN Control 1: MTrP Manual Therapy Region treated: Upper trapezius Local twitch response: Yes Outcome measure: NPRS, Norwick-Park Neck Pain Questionnaire, ROM Time to outcome: Before treatment, 1 day after final treatment, 1 wk post treatment, 2 wk post All studies **- Number of needles inserted per subject per session:** Not reported **- Depth of insertion:** Not reported **- Needle stimulation:** Not reported **- Needle retention time:** Not reported **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** Not reported **- Frequency and duration:** Not reported **Practitioner qualifications and background** Not reported		
Chen, N, Wang, J, Mucelli, A, Zhang, X & Wang, C **Electro-Acupuncture is Beneficial for Knee Osteoarthritis: The Evidence from Meta-Analysis of Randomized Controlled Trials** **2017** Databases **PubMed, Cochrane Library, Clinic trials, Foreign Medical Literature Retrial Service (FMRS), Science Direct, China National Knowledge Infrastructure (CNKI), Chinese Scientific Journal Database (VIP), and Wanfang Data** Relevant Included Studies **Bao et al 2013** **Fu 2013**	**Participants** – All RCTs n=695 Age of patients ranged from 35 to 81 **Inclusion:** - Studies published in the Chinese or the English language - Patients that must have been diagnosed with KOA - Randomized or quasi-randomized clinical trials **Exclusion:** - Participants with knee pain, but no symptoms of KOA - Randomized crossover trials, reviews, case reports, animal experiments or qualitative studies - Interventions that included a mixed treatment of more than the EA strategy - Studies comparing interventions grouped under different forms or different acupuncture points of EA - Studies focused on a special syndrome or stage of KOA **Limits:** - English and Chinese studies Bao et al 2013 **Intervention** **- Number of needles inserted per subject per session:** Not reported	**Bao et al 2013** Intervention: EA Control: Physiotherapy LKSS P < 0:05 **Fu 2013** Intervention: EA Control: Ibuprofen SF-36 P < 0.01 **Gao 2013** Intervention: EA Control: Glucosamine Sulfate Capsules LKSS P < 0:01 VAS P<0.05 **Huang 2016**	**Reviewer comments** Comprehensive search strategy in both English and Chinese. Two reviewers independently screened articles for relevance from the perspective of the title and the abstract. Two reviewers assessed the quality of each trial independently according to the Cochrane risk of bias tool. The study utilised STRICTA reporting guidelines No publication bias testing was performed due to the inadequate number of eligible studies. Limited number of included studies with rigorous methods of design, measurement and evaluation. Only one study reported a follow up evaluation. Otherwise all studies looked at immediate follow up only and, therefore, did not provide evidence of medium to long term effects of EA.

Study	Methodology	Results	Comments and evidence level
Gao 2013 **Huang 2016** **Miao et al 2014** **Tukmachi et al 2004** **Zhou et al 2015** **Research question** **What is the evidence of the effectiveness and safety of EA in the management of patients with Knee OA?** Funding **Supported by the grant of National Social Science Foundation of China (No. 15CRK015); National Nature Science Foundation of China (No. 71573139) and grants from the People Program (Marie Curie Actions) of the European Union's Seventh Framework Program FP7/2007 2013/under REA Grant (No. PIR SES-GA-2013612589).**	**- Names of points used:** Neixiyan (Ex-LE 4), Dubi (ST 35), Heding (Ex-LE 2), Xuehai (SP 10), Qimen (LR14), Liangqiu (ST 34), Zusanli (ST 36) EA points: Neixiyan (Ex-LE 4), Dubi (ST35) Xiyan (EX-LE5), Yinglingquan (SP9), Yanglingquan (GB34), Weizhong (BL40), Heding (EX-LE2) **- Depth of insertion:** Not reported **- Response sought:** De qi **- Needle stimulation:** Not reported **- Needle retention time:** 20 mins **- Needle type:** 0.3mm x 40mm **Treatment Regimen** **- Number of treatment sessions:** 12 **- Frequency and duration:** 3 x per week for 4 weeks **Practitioner qualifications and background** Not reported <u>Fu 2013</u> **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Individualized points: Shenshu (BL23), Zhongji (CV3), Xuehai (SP10), Chengshan (BL57) or Shenshu (BL23), Dachangshu (BL25), Zusanli (ST36), Sanyingjiao (SP6) or Shenshu (BL23), Taixi (K3), Diji (SP8), Fenglong (ST40) EA points: Xiyan (EX-LE5), Yinglingquan (SP9), Yanglingquan (GB34) **- Depth of insertion:** Not reported **- Response sought:** De qi **- Needle stimulation:** Not reported **- Needle retention time:** 30 mins **- Needle type:** 0.35mm x (50–60) mm **Treatment Regimen** **- Number of treatment sessions:** 24 **- Frequency and duration:** 6 x per course for 4 courses **Practitioner qualifications and background** Not reported <u>Gao 2013</u> **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Xiyan (EX-LE5), Xuehai (SP 10), Liangqiu (ST 34), Zusanli (ST 36), Ashi points of lesion side, Hegu (LI 4) and Taichong (LR 3) of bilateral side Individualized points: Quchi (LI11), Guanyua (RN4), Sanyingjiao (SP6), Yinglingquan (SP9), Yanglingquan (GB34), Qiuxu (G40), Taixi(K3) EA points: Xiyan (EX-LE5), Xuehai (SP10), Liangqiu (ST 34), Zusanli (ST36), Taichong (LR 3) **- Depth of insertion:** Not reported	Intervention: EA Control: Celebrex <u>LKSS</u> P<0.05 **Miao et al 2014** Intervention: EA Control: Celebrex <u>LKSS</u> P < 0:05 <u>VAS</u> P<0.05 **Tukmachi et al 2004** Intervention: EA Control: Oral medication <u>WOMAC pain index</u> P<0.001 <u>VAS</u> P<0.01 **Zhou et al 2015** Intervention: EA Control: Diclofenac sodium <u>LKSS</u> P < 0:05 <u>VAS</u> P<0.05 **Adverse effects:** Only one trial mentioned adverse effects. Gao 2013 reported the adverse effects of the EA treatment versus Glucosamine Sulfate Capsules. Among 30 patients in the EA group, only one had the mild symptom of fainting, which was a common phenomenon during the acupuncture treatment. Comparatively, four patients out of the 30 suffered from serious adverse effects in the control group, experiencing symptoms that included nausea, abdomen distends or constipation	**Quality scores:** Cochrane risk of bias tool - Random sequence generation: 55% low risk of bias - Allocation concealment: 10% low risk of bias - Blinding of participants and personnel: 10% low risk of bias - Blinding of outcome assessment: 10% low risk of bias - Incomplete outcome data: 0% low risk of bias - Selective reporting: 0% low risk of bias - Other bias: 0% low risk of bias **Grade:** LQ (-) **Quality:** 1

Study	Methodology	Results	Comments and evidence level
	- Response sought: De qi **- Needle stimulation:** Not reported **- Needle retention time:** 40 mins **- Needle type:** 0.3mm x 40mm **Treatment Regimen** **- Number of treatment sessions:** 24 **- Frequency and duration:** 6 x week for 4 week courses **Practitioner qualifications and background** Not reported <u>Huang 2016</u> **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Xiyan (EX-LE5), Xuehai (SP 10), Liangqiu (ST 34) EA points: Neixiyan (Ex-LE 4)1, Xuehai (SP 10) **- Depth of insertion:** 2-3 cm **- Response sought:** De qi **- Needle stimulation:** Not reported **- Needle retention time:** 30 **- Needle type:** 0.3mm x 40mm **Treatment Regimen** **- Number of treatment sessions:** 12 **- Frequency and duration:** 3 x week for 4 weeks **Practitioner qualifications and background** Not reported <u>Miao et al 2014</u> **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** NeiXiyan (EX-LE4), Xuehai (SP 10), Liangqiu (ST 34) of bilateral side EA points: Neixiyan (Ex-LE 4)1, Xuehai (SP 10), Liangqiu (ST 34)2, Waixiyan (EX-LE5) **- Depth of insertion:** Not reported **- Response sought:** De qi **- Needle stimulation:** Not reported **- Needle retention time:** Not reported **- Needle type:** 0.3mm x 50mm **Treatment Regimen** **- Number of treatment sessions:** 30 **- Frequency and duration:** 10 days a course for 30 days **Practitioner qualifications and background**		

Study	Methodology	Results	Comments and evidence level
	Not reported Tukmachi et al 2004 **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Hegu (LI4), Xuehai (SP10), Xiyan (EXLE5), Yinglingquan (SP9), Liangqiu (GB34), Zusanli (ST36),Taichong (LR3), Weizhong (BL40), Chengshan (BL57) EA points: Xiyan (EX-LE5)1, Yinglingquan (SP9), Liangqiu (GB34)2, Weizhong (BL40), Chengshan (BL57) **- Depth of insertion:** 1-1.5 cm **- Response sought:** De qi **- Needle stimulation:** Not reported **- Needle retention time:** 20 mins **- Needle type:** 0.25mm x 30mm **Treatment Regimen** **- Number of treatment sessions:** 10 **- Frequency and duration:** 2 x week for 5 weeks **Practitioner qualifications and background** Not reported Zhou et al 2015 **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Xiyan (EX-LE5), Dubi (ST 35), Heding (Ex-LE 2), Zusanli (ST 36), fangshijingyanxue (Medial bone gap of 45 degree when your knees bend 90 degree), Juegu (GB 39) **- Depth of insertion:** Not reported **- Response sought:** De qi **- Needle stimulation:** Not reported **- Needle retention time:** Not reported **- Needle type:** 0.25mm x 40mm **Treatment Regimen** **- Number of treatment sessions:** 28 **- Frequency and duration:** 14 x per course for 2 courses **Practitioner qualifications and background** Not reported		
Song, G, Tian, X, Jin, Y, Deng, Y, Zhang, M, Pang. X & Zhou, J **Moxibustion is an Alternative in Treating Knee Osteoarthritis. The**	**Participants** – 12 RCT's were included in this review n= 13 *(M/F)* **Kim 2014 –** mean age 56yr MG (17/85), CG (16/94) **Ren 2015 –** mean age 58yr MG (20/49), CG (23/44)	**Kim 2014** **Intervention:** Conventional moxibustion **Control:** Drug therapy **Outcomes:** WOMAC, Physical function	**Reviewer comments** Adequate number of databases were searched. Two reviewers carried out the literature search and screening of listed papers for eligibility. Consultation was also used by a third author for any

Study	Methodology	Results	Comments and evidence level
Evidence from Systematic Review and Meta-Analysis **2016** Databases **PubMed, EMBASE, Cochrane Central Register of Controlled Trials (CENTRAL), and Chinese Biomedical Literature database (CBM)** Relevant Included Studies **Kim 2014** **Ren 2015** **Wu 2011** **Zhang 2011** **Zhao 2014** **Zhou 2014** **Cheng 2008** Research question **What is the evidence of effectiveness of moxibustion in treating knee osteoarthritis?** Funding **Not reported**	**Wu 2011 –** mean age 46yr MG (10/14), CG (12/14) **Zhang 2011 –** mean age 55yr MG (22/38) **Zhao 2014 –** mean age 64yr MG (16/39), CG (21/34) **Zhou 2014** – mean age 66yr MG (14/25), CG (5/17) **Cheng 2008 –** mean age 57yr MG (11/49), CG (16/44) **Inclusion:** - P: adults diagnosed with KOA using definitive diagnostic criteria including American College of Rheumatology (ACR) and guiding principles of clinical research on new drugs (GPCRND)-KOA - RCTs **Exclusion:** -Not reported **Kim 2014** n=212 **Intervention –** Conventional moxibustion **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** ST36, ST35, ST34, SP9, ExLE04, SP10, Ashi point **- Depth of insertion:** Not reported **- Response sought:** Not reported **- Needle stimulation:** Not reported **- Needle retention time:** Not reported **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** 12 **- Frequency and duration:** Moxa stick: 15–30 min/time, 3 times per week for 4 weeks, **Practitioner qualifications and background** Not reported **Control:** Conventional care**,** usual care based on nice guidance **Ren 2015** n= 136 **Intervention –** Conventional moxibustion **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** ST 35, EXLE4, Ashi point **- Depth of insertion:** Not reported **- Response sought:** Not reported **- Needle stimulation:** Not reported **- Needle retention time:** Not reported **- Needle type:** Not reported	**Ren 2015** **Intervention:** Conventional moxibustion **Control:** Drug therapy **Outcomes:** QoL **Wu 2011** **Intervention:** Heat sensitive moxibustion **Control:** Drug therapy **Outcomes:** Pain **Zhang 2011** **Intervention:** Conventional moxibustion **Control:** Drug therapy **Outcomes:** Pain VAS **Zhao 2014** **Intervention:** Conventional moxibustion **Control:** Drug therapy **Outcomes:** **Zhou 2014** **Intervention:** Conventional moxibustion **Control:** Sham moxibustion **Outcomes:** Pain WOMAC, physical function **Cheng 2008** **Intervention:** Sandwiched moxibustion **Control:** Drug therapy **Outcomes:** Pain NRS **Physical function** The included studies, Zhao 2014, Kim 2014 and Zhou 2014, presented physical function outcomes. These findings suggested that moxibustion effectively improved physical function of KOA patients relative to usual care and sham moxibustion. However, it was not statistically superior to oral drug **Pain** The included studies, Zhao 2014, Kim 2014, Cheng 2008 and Zhang 2011 reported on Pain, in which oral drug, usual care or sham moxibustion was used in the control group. Meta-analyses indicated that, compared with oral drug, moxibustion did not significantly alleviate pain (SMD: -	disagreements made by the authors selecting and screening the papers. Detail of the included studies was presented, however the outcome measures WOMAC and VAS, were listed, but not reported on, reducing the consistency of the studies reported results. No exclusion criteria was provided within the review and the excluded studies are not listed. Having said this, most of the included studies were of relatively low risk of bias, which does improve the reliability of the results. In addition, publication bias was not assessed reducing the robustness of the findings. **Quality scores:** Kim 2014 – low risk Ren 2015 – low risk Wu 2011 – low risk Zhang 2011 – unclear risk Zhao 2014 – low risk Zhou 2014 – low risk Cheng 2008 – unclear risk **Grade:** AQ (+) **Quality:** 1

Study	Methodology	Results	Comments and evidence level
	Treatment Regimen **- Number of treatment sessions:** 6 **- Frequency and duration:** 20 min/time, once daily, 3 times/week, total 6 weeks **Practitioner qualifications and background** Not reported **Control:** Sham moxibustion, providing insulation from the heat **Wu 2011** n= 50 **Intervention –** Heat sensitive moxibustion **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Ex-LE4, ST35, ST34, SP9, GB34, SP10, Ashi point **- Depth of insertion:** Not reported **- Response sought:** Not reported **- Needle stimulation:** Not reported **- Needle retention time:** Not reported **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** 21 **- Frequency and duration:** Moxa stick: once daily, total 3 weeks **Practitioner qualifications and background** Not reported **Control**: drug therapy **Regime**: Intra-articular injection of sodium hyaluronate, 2 mL/ time, once every 1 week, total 3 weeks **Zhang 2011** n=61 **Intervention –** Conventional moxibustion **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** SP10, ST34, BL40, GB34 **- Depth of insertion:** Not reported **- Response sought:** Not reported **- Needle stimulation:** Not reported **- Needle retention time:** Not reported **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** 6 **- Frequency and duration:** Moxa stick: 30 min/time, once daily, 1 session 7 days,	0.17; 95% CI: -0.39, 0.05; P=0.12; heterogeneity: I2=1%, P=0.39, whereas it significantly relieved pain compared to usual care and sham moxibustion at short-term, mid-term and long-term **QOL** Kim et al 2014, reported that, compared with usual care, the moxibustion improved the status of physical function and social function but remaining indices did not at short term. Moreover, their study revealed that moxibustion improved body pain at midterm. The other included study (Ren et al 2015) suggested that KOA patients in the active moxibustion group experienced statistically greater improvement in mental health than sham moxibustion at short term. Meanwhile, they also found better mental health and vitality status in the true moxibustion group at short-term and midterm **Adverse effects:** Zhao 2014, reported that, in the active moxibustion group, 10 patients experienced skin flushing of 5mm in diameter at treatment sites but the flushing disappeared within 3 days without medical care Kim 2014, enrolled 102 KOA patients in the moxibustion group, of which 48 and 7patients experienced AEs at least once and >5 times respectively Zhang 2011, found no AEs in the moxibustion group; however acid reflux (n=1), nausea (n=1), and epigastric pain (n=1) were observed in the oral celecoxib group	

Study	Methodology	Results	Comments and evidence level
	Practitioner qualifications and background Not reported **Control:** Drug therapy Regime: Oral celecoxib, 200 mg/time, 1 time/d, total 6 weeks **Zhao 2014** n=110 **Intervention –** Conventional moxibustion **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** ST 35, EXLE4, Ashi point **- Depth of insertion:** Not reported **- Response sought:** Not reported **- Needle stimulation:** Not reported **- Needle retention time:** Not reported **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** 18 **- Frequency and duration:** Moxa pillar: 20 min/time, once daily, 3 times/week, total 6 weeks **Practitioner qualifications and background** Not reported **Control:** sham moxibustion, moxa stick with insulation from the heat **Cheng 2008** n = 130 **Intervention –** Sandwiched moxibustion **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Ex-LE4, EX-LE5, Ex-LE2, SP9, GB34 **- Depth of insertion:** Not reported **- Response sought:** Not reported **- Needle stimulation:** Not reported **- Needle retention time:** Not reported **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** 10 **- Frequency and duration:** Moxa stick: once every 2 days, 10 times/session **Practitioner qualifications and background** Not reported **Control:** Drug therapy **Regime**: Oral diclofenac sodium, 75 mg, 1 time/d, consecutive 15 days		

Study	Methodology	Results	Comments and evidence level
Li, J, Guo, W, Sun, Z, Huang, Q, Lee, E, Wang, Y & Yao, X **Cupping therapy for treating knee osteoarthritis: The evidence from systematic review and meta-analysis** **2017** Databases **PubMed, Embase, the Cochrane Central Register of Controlled Trials and four Chinese databases - WanFang Med Database, Chinese BioMedical Database, Chinese WeiPu Database, and CNKI. Furthermore, the study identified relevant studies via a review of Registry ClinicalTrials.gov, Chinese Clinical Trial, and WHO International Clinical Trials Registry Platform** Relevant Included Studies **Wang et al 2016a** **Tuet et al 2012** **Zhang et al 2013** **Gao et al 2014** **Wang et al 2016b** **Zhang et al 2012** **Ma et al 2010** Research question **What is the available evidence from randomized controlled trials of cupping therapy for treating patients with knee OA?** Funding **Supported by the UK National Institute for Health Research**	**Participants** – All 7 RCTs n=661 **Inclusion:** - RCTs related to the effects of cupping therapy in KOA - Trials published in the form of dissertations P: patients aged over 18 diagnosed with KOA using definitive American College of Rheumatology (ACR) diagnostic criteria I: Cupping therapy was used as the sole intervention or as an adjunct therapy in conjunction with Western medicine therapy for KOA. C: A sham cupping device/placebo or Western medicine as control O: The outcome measures were the clinical efficacy measurement (Guiding Principles of Clinical Research on New Drugs-response rate, GPCRND-response rate), pain (VAS) and physical function (Western Ontario and McMaster Universities Osteoarthritis Index, WOMAC; Lequesne Algo functional Index, LAI), morning stiffness, the maximum distance walked, and activities of daily living **Exclusion:** - Other CAM therapies (e.g. acupuncture, moxibustion, massage, Chinese herbals, Chinese patent medicine) were utilized as an adjunct treatment in conjunction with the Western medicine therapy - Control group treatments that were not relevant to Western medicine therapy or other CAM therapies (e.g. acupuncture, moxibustion, massage, Chinese herbals, Chinese patent medicine) that were used as an adjunct treatment in conjunction with the Western medicine therapy **Limits:** - not Animals/not human - RCT All studies: - Duration of the interventions was mostly 4 weeks, and the site of cupping therapy varied according to traditional Chinese medicine (TCM) theory for six of the seven included RCTs Wang et al 2016a n=171 **Intervention – Dry cupping + drug therapy** **- Names of points used:** EX-LE 4, ST35, ashi **Treatment Regimen** **- Number of treatment sessions: 8** **- Frequency and duration:** 2 x week for 4 weeks **- Time of treatment: 15 mins** **Practitioner qualifications and background** Not reported Tuet et al 2012 n=40	**Wang et al 2016a** Intervention: Dry cupping + drug therapy Control: Drug therapy VAS: MD: -1.62 [-2.56, -0.68], P < 0.01 WOMAC: Pain: MD: -1.01 [-1.87, -0.15], P = 0.02 Stiffness: MD: -0.38 [1.06, 17.12], p= 0.04; Physical function: MD: -3.92[-7.18, -0.66], P < 0.01 **Tuet et al 2012** Intervention: Dry cupping + drug therapy Control: Drug therapy VAS: MD: -0.97 [-1.44, -0.50], P < 0.01 WOMAC: Pain: MD: -1.01 [-1.86, -0.16], P = 0.02 Stiffness: MD: -1.15 [-2.20, -0.10], P = 0.03 Physical function: MD: -9.90 [-18.64, -1.16] P = 0.03 **Zhang et al 2013** Intervention: Dry cupping + drug therapy Control: Drug therapy VAS: MD: -0.26 [-0.78, 0.26], NS **Gao et al 2014** Intervention: Dry cupping + drug therapy Control: Drug therapy Lequesne Algofunctional Index: MD: -3.52 [-6.36, -0.68], P = 0.02 **Wang et al 2016b** Intervention: Dry cupping + drug therapy Control: Drug therapy Lequesne Algofunctional Index: MD: -1.95 [-3.85, -0.05], P = 0.04 **Zhang et al 2012** Intervention: Dry cupping + drug therapy	**Reviewer comments** Adequate search strategy. The study was conducted following the PRISMA guidelines. In addition, the protocol of the systematic review was registered in PROSPERO. Two reviewers independently extracted data, however, cannot tell if authors independently selected studies. Included RCTs are of low quality. The sample size of included studies was very small and thus small sample size effects may be generated. In all included RCTs, none examined the different effects between the sham cupping therapy and the specific effects of cupping therapy. The follow-up period for all included trials were less than 1 month. **Quality scores:** Cochrane risk of bias tool - Random sequence generation: 40% low risk of bias - Allocation concealment: 30% low risk of bias - Blinding of participants and personnel: 0% low risk of bias - Blinding of outcome assessment: 30% low risk of bias - Incomplete outcome data: 45% low risk of bias - Selective reporting: 100% low risk of bias - Other bias: 60% low risk of bias **Grade:** AQ (+) **Quality:** 1

Study	Methodology	Results	Comments and evidence level
(Registration Number: CRD42017057483)	**Intervention – Dry cupping + drug therapy** **- Names of points used:** Not reported **Treatment Regimen** **- Number of treatment sessions**: 20 **- Frequency and duration:** 5 x week for 4 weeks **Time of treatment:** 10 mins **Practitioner qualifications and background** Not reported Zhang et al 2013 n=60 **Intervention – Dry cupping + drug therapy** **- Names of points used:** EX-LE 4, ST35 **Treatment Regimen** **- Number of treatment sessions:** 12 **- Frequency and duration:** 3 x week for 4 weeks **Time of treatment: 20 mins** **Practitioner qualifications and background** Not reported Gao et al 2014 n=66 **Intervention – Wet cupping + drug therapy** **- Names of points used:** Ashi **Treatment Regimen** **- Number of treatment sessions:** 20 **- Frequency and duration:** 5 x week for 4 weeks **Time of treatment:** 20 mins **Practitioner qualifications and background** Not reported Wang et al 2016b n=74 **Intervention – Wet cupping + plus drug therapy** **- Names of points used:** EX-LE 4, ST 32, ST 33, ST34, ST35, ST36 **Treatment Regimen** **- Number of treatment sessions:** 28 **- Frequency and duration:** 1 x daily for 4 weeks **Time of treatment:** 20 mins	Control: Drug therapy Lequesne Algofunctional Index: MD: -2.61 [-3.44, -1.78], P < 0.01 **Ma et al 2010** Intervention: Dry cupping + drug therapy Control: Drug therapy Lequesne Algofunctional Index: MD, -3.55 [-5.15, -1.95], P < 0.01 **Meta-analysis** Western medicine vs Western medicine Plus Dry cupping therapy on VAS Teut et al 2012, Wang et al 2016a, Zhang et al 2013 SMD: -0.32 (-0.7, 0.05) P=0.09 Western medicine vs Western medicine Plus Dry cupping therapy on WOMAC Teut et al 2012, Wang et al 2016a Pain: SMD -1.01 (-1.61, -0.41) Stiffness: -0.81 (-1.14, -0.48) Physical function: -5.53 (-8.58, -2.47) Western medicine vs Western medicine Plus Dry cupping therapy on LAI Gao et al 2014, Ma et al 2010, Wang et al 2016b, Zhang et al 2012 SMD: -2.74 (-3.41, -2.07) **Adverse effects:** Wang et al 2016a None related to cupping therapy Tuet et al 2012 Mild hematomas at the skin location where cupping took place Zhang et al 2013 None related to cupping Gao et al 2014 Not reported Wang et al 2016b	

Study	Methodology	Results	Comments and evidence level
	Practitioner qualifications and background Not reported Zhang et al 2012 n=110 **Intervention – Wet cupping + drug therapy** **- Names of points used:** BL 40 **Treatment Regimen** **- Number of treatment sessions:** 28 **- Frequency and duration:** 1 x daily for a month **Time of treatment:** 20 mins **Practitioner qualifications and background** Not reported Ma et al 2010 n=171 **Intervention – Wet cupping + drug therapy** **- Names of points used:** BL 40 **Treatment Regimen** **- Number of treatment sessions:** Unsure **- Frequency and duration:** 3 x week **Time of treatment:** 15 mins **Practitioner qualifications and background** Not reported	None related to cupping Zhang et al 2012 None related to cupping Ma et al 2010 Not reported	
Morihisa, R, Eskew, J, McNamara, A & Young, J **Dry needling in subjects with muscular trigger points in the lower quarter: A systematic review** **2016** Databases **CINAHL, United** **States National Library of Medicine (NLM) at the National Institutes of Health (Pubmed),**	**Participants (out of the total 20 studies, 6 were were relevant to this evidence bases review)** Cotchett et al. – no = 84/ >18 yr Edwards et al. – no = 40/ majority female Huguenin et al. – no = 85/ male Itoh et al. – no = 35/ 65-81 yr MacDonald et al. – no = 17/ male and female Mayoral et al. – n = 40/ male and female **Inclusion:** - Randomised controlled trials **Exclusion:** - The authors excluded studies that: (1) utilized traditional acupuncture as the method of needle application (2) were written in a non-English language (3) included injection treatments, such as platelet-rich plasma or OnabotulinumtoxinA	**Cotchett et al.** Intervention: Dry needling Control: Sham needling Outcome Measures: VAS - Statistically significant differences (p<0.007) FHSQ – statistically significant differences (P<0.026) *Overall real dry needling was favored over sham control.* **Edwards et al.** Intervention: Needling and stretching Control: Stretching only Control: no treatment Outcome Measures: *The mean number of treatment sessions was lower for the stretching only group, compared to needling and stretching group.*	**Reviewer comments** This systematic review used an acceptable search strategy, including a variety of databases to source information. Bias within the included studies was assessed appropriately, with blinding of all assessors taking place. The included studies relevant study characteristics were reported clearly. Overall the quality of the review was high, however the lack of a reasonable inclusion criteria, gives doubt towards the direction of the review. **Risk of Bias:** Overall (6 RCTs)

Study	Methodology	Results	Comments and evidence level
PEDro, SPORTDiscus, Cochrane Library, and the American Physical Therapy Association's (APTA) PTNow Relevant Included Studies **Cotchett et al 2014** **Edwards et al. 2003** **Huguenin et al. 2005** **Itoh et al. 2007** **MacDonald et al. 1983** **Mayoral et al. 2013** Research question **What is the evidence of effectiveness of dry needling as an intervention for** **lower quarter trigger points in patients with various orthopedic conditions?** Funding **Not reported**	(4) treated the upper quarter only (5) not RCTs **Limitations:** - No date limitations - Studies not published in the English language **<u>All Studies:</u>** **Cotchett et al.** N=84 **Intervention:** Dry needling **- Number of needles inserted per subject per session:** not reported **- Names of points used:** Gastroc-soleus, complex, quadratus, plante, flexsor, digitorum brevis and abductor hallucis **- Depth of insertion:** not reported **- Response sought:** not reported **- Needle stimulation:** not reported **- Needle retention time:** 5 mins **- Needle type:** not reported **Treatment Regimen** **- Number of treatment sessions:** 6 **- Frequency and duration:** 1 treatment a week for 30 mins for a total of 6 weeks **Practitioner qualifications and background** Not reported **Comparator:** Sham needling **Edwards et al.** **Intervention:** Needling and stretching **- Number of needles inserted per subject per session:** not reported **- Names of points used:** Not reported **- Depth of insertion:** not reported **- Response sought:** not reported **- Needle stimulation:** not reported **- Needle retention time:** 3-4 mins **- Needle type:** not reported **Treatment Regimen** **- Number of treatment sessions:** 3-7 **- Frequency and duration:** Not reported **Practitioner qualifications and background** Not reported **Comparator:** stretching only and control	SFMPQ – decreased (P<0.009) **Huguenin et al.** <u>Intervention</u>: Therapeutic dry needling <u>Control</u>: Placebo dry needling <u>Outcome Measures:</u> *No significant changes in VAS scores for gluteal pain after running, but both groups improved in hamstring tightness (P<0.001) and hamstring pain (P<0.001). There was no significant change in ROM* **Itoh et al.** <u>Intervention</u>: Standard acupuncture <u>Control</u>: superficial acupuncture Control: deep acupuncture <u>Outcome Measures:</u> *The group that received Dry needling to deep Trps reported less pain intensity (P<0.5) and improved QoL (P<0.01), compared to the other groups* **MacDonald et al.** <u>Intervention</u>: Acupuncture <u>Control</u>: Placebo dry needling <u>Outcome Measures:</u> Not reported *The acupuncture group had pain relief (P<0.01), reduction in paint activity score, decreased physical signs (P<0.01) and decreased pain severity (P<0.01) compared to the placebo group. The measurements were statistically significant with P<0.05.* **Mayoral et al.** <u>Intervention</u>: Dry needling <u>Control</u>: Sham needling <u>Outcome Measures:</u> *Subject receiving dry needling had less pain at 1 month* VAS - statistical significant differences (P=0.294) WOMAC – no statistical significant differences at baseline (P=0.837) Pain – no statistical significant differences at baseline (P = 0.805) Stiffness - no statistical significant differences at baseline (P = 0.149) ROM – no statistical significant differences at baseline (P = 0.539) **Adverse effects:** Not reported	- Independently reviewed by the same four authors and scored using PEDRO scale - Discrepancies in scoring were resolved by a group consensus. - Majority of the studies received a high-quality rating which represents 7/10 or higher on the PEDRO score. **Quality of evidence: PEDRO scoring criteria** Cotchett et al. - High Edwards et al. - High Huguenin et al. - High Itoh et al. - High MacDonald et al. - Fair Mayoral et al. - Fair **Grade:** AQ (+) **Quality:** 1+

Study	Methodology	Results	Comments and evidence level
	Huguenin et al. **Intervention: Therapeutic needling** **- Number of needles inserted per subject per session:** not reported **- Names of points used:** Gluteal (one occasion) **- Depth of insertion:** not reported **- Response sought:** not reported **- Needle stimulation:** not reported **- Needle retention time:** Not reported **- Needle type:** not reported **Treatment Regimen** **- Number of treatment sessions:** Not reported **- Frequency and duration:** 1 treatment a week for 30 mins for a total of 6 weeks **Practitioner qualifications and background** Not reported **Comparator:** Placebo dry needling **Itoh et al.** **Intervention:** standard acupuncture **- Number of needles inserted per subject per session:** not reported **- Names of points used:** Not reported **- Depth of insertion:** not reported **- Response sought:** not reported **- Needle stimulation:** not reported **- Needle retention time:** 5 mins **- Needle type:** not reported **Treatment Regimen** **- Number of treatment sessions: 6** **- Frequency and duration:** 30 minutes sessions, once per week. **Practitioner qualifications and background** Not reported **Comparator:** superficial acupuncture and deep acupuncture **MacDonald et al.** **Intervention:** Acupuncture **- Number of needles inserted per subject per session:** not reported **- Names of points used:** Trps **- Depth of insertion:** 4mm **- Response sought:** not reported **- Needle stimulation:** not reported		

Study	Methodology	Results	Comments and evidence level
	- Needle retention time: 5 mins **- Needle type:** not reported **Treatment Regimen** **- Number of treatment sessions:** 6 **- Frequency and duration:** **Practitioner qualifications and background** Not reported **Comparators:** placebo and dry needling **Mayoral et al.** **Intervention:** Dry needling **- Number of needles inserted per subject per session:** not reported **- Names of points used:** Not reported **- Depth of insertion:** not reported **- Response sought:** not reported **- Needle stimulation:** not reported **- Needle retention time:** Not reported **- Needle type:** not reported **Treatment Regimen** **- Number of treatment sessions:** Not reported **- Frequency and duration:** assessed at 1, 3 and 6 months post-surgery **Practitioner qualifications and background** Not reported **Comparator:** sham dry needling		
Shim, J, Jung, J & Kim, S **Effects of Electroacupuncture for Knee Osteoarthritis: A Systematic Review and Meta-Analysis** **2016** Databases **MEDLINE, PubMed, EMBASE, CENTRAL, AMED, CNKI, and five Korean databases, and clinical trial registers (e.g., ClinicalTrials.gov) were also searched for ongoing or unpublished trials**	**Participants** – All 31 RCTs n=3187 **Inclusion:** - RCT design - Trails assessing the clinical effects of EA on knee OA as contrasted with sham treatment, MA, or usual care such as drug therapy or physiotherapy - Other studies on groups of participants with OA in other joints or with rheumatoid arthritis were included only when the data on groups of participants with knee OA were independently extracted - "Usual care" was the only additive intervention that could be used with EA as an intervention for the experimental group **Exclusion:** - Non RCTs - Studies on participants suspected of having symptoms of knee OA but in whom the disease was not actually diagnosed - Other studies on groups of participants with complications that may affect symptoms of knee OA	**Results and individual data reported in previous data extractions:** Marvommatis et al 2012: Reported in Zhang et al 2017 Berman et al 2004: Reported in Zhang et al 2017 and Hou et al 2015 Jubb et al 2008: Reported in Hou et al 2015 Lu et al 2010: Reported in Hou et al 2015 Tukmachi et l 2004: Reported in Zhang et al 2017 and Hou et al 2015 Sangdee et al 2002: Reported in Zhang et al 2017 Berman et al 1999: Reported in Zhang et al 2017 **Li & Li 2015** Intervention: EA Control: Medication **Wu et al 2015** Intervention: EA Control: Medication	**Reviewer comments** Comprehensive search strategy. Published review protocol conducted. The systematic review and meta-analysis was conducted in accordance with PRISMA guidelines. Two reviewers independently pursued literature searches among the databases. Difficult to tell if two people extracted data. Publication bias assessed not assessed. A limitation of this article is that a large portion of included RCTs were shown to have a high risk of bias, and considerable heterogeneity was shown in the results of the meta-analysis. Studies varied significantly in regards to the intervention used including

Study	Methodology	Results	Comments and evidence level
Relevant Included Studies **Li & Li 2015** **Wu et al 2015** **Huang & Yang 2014** **Zhao et al 2013** **Zhu et al 2013** **Marvommatis et al 2012** **Ji & Ouyang 2011** **Meng et al 2011** **Lu et al 2010** **Ahsin et al 2009** **Wu 2008** **Jubb et al 2008** **Qiu et al 2006** **Berman et al 2004** **Tukmachi et l 2004** **Vas et al 2004** **Ng et al 2003** **Sangdee et al 2002** **Berman et al 1999** **Yurtkuran 1999** Research question **What is the evidence of the effectiveness of EA treatment on osteoarthritis of the knee?** Funding **Not reported**	- Studies that were conducted on limited groups of participants with certain types of knee OA diagnosed through syndrome differentiation - Electric application using non-invasive types of acupuncture as apparatus that is attachable and contactable to skin **Limits:** - Nil language restriction - RCTs - No search limitations were imposed in terms of year of publication or status of publication **All studies:** n=31 - Periods of EA treatments for experimental groups ranged from one day to 26 weeks - There were 20 involving more than four weeks of EA treatments for patients, while 11 studies involved fewer than four weeks of EA treatments for patients - 23 studies exclusively used EA as an intervention, and eight other studies used both EA and drug therapies (with three of these allowing participants to reduce medication dosages depending on symptoms) - Seven studies that used MA as an intervention in control groups and were therefore not relevant to this review - The frequency of electrical stimulation was between 2 hertz (Hz) and 100Hz and was applied for a range of time between 20 and 60 minutes <u>Li & Li 2015</u> **Intervention** **- Number of needles inserted per subject per session:** 4 **- Names of points used:** EX-LE5, SP10, ST36, ST34, GB34, SP9, Ashi point **- Depth of insertion:** Not reported **- Response sought:** De Qi **- Needle stimulation:** EA, 20 Hz **- Needle retention time:** 30 mins **- Needle type:** 50mm **Treatment Regimen** **- Number of treatment sessions:** 15 **- Frequency and duration:** 3 weeks **Practitioner qualifications and background** Not reported <u>Wu et al 2015</u> **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** EX-LE5 **- Depth of insertion:** 33.3 mm **- Response sought:** Not reported	**Huang & Yang 2014** Intervention: EA + medication Control: Medication **Zhao et al 2013** Intervention: EA Control: Medication **Zhu et al 2013** Intervention: EA Control: Medication Pain intensity VAS: SMD: −2.75 [−3.50, −2.00] WOMAC: −0.99 [−1.56, −0.43] **Ji & Ouyang 2011** Intervention: EA Control: Medication **Meng et al 2011** Intervention: EA + medication + physiotherapy Control: Medication + physiotherapy **Ahsin et al 2009** Intervention: EA Control: Sham EA **Wu 2008** Intervention: EA Control: Medication **Qiu et al 2006** Intervention: EA Control: Medication **Vas et al 2004** Intervention: EA + medication Control: Sham EA + medication Pain intensity VAS: SMD: −1.31 [−1.75, −0.87] WOMAC: SMD: −1.10 [−1.55, −0.65] **Ng et al 2003** Intervention: EA Control: Education **Yurtkuran 1999** Intervention: EA Control: Sham electrical stimulation **Individual data only given for studies within meta-analysis: n=8 (Jubb et al 2008, Berman et al 2004, Tukmachi et al 2004, Vas et al 2004, Berman et al 1999, Zhu et al 2013, Fu 2013 (Excluded	acupuncture points, frequency and modes used. Accordingly, the electrical feature of the EA intervention may have contributed to increasing the heterogeneity of the meta-analysis. **Quality scores:** Cochrane risk of bias tool All 31 trials Random sequence generation: 17/31 low risk of bias Allocation concealment: 6/31 low risk of bias Blinding of participants and personnel: 0/31 low risk of bias Blinding of outcome assessment: 8/31 low risk of bias Incomplete outcome data: 25/31 low risk of bias Selective reporting: 0/31 low risk of bias Other biases: 8/31 low risk of other biases **Grade:** AQ (+) **Quality:** 1+

Study	Methodology	Results	Comments and evidence level
	- Needle stimulation: EA, 40 hz **- Needle retention time:** 40-60 mins **- Needle type:** 50 mm **Treatment Regimen** **- Number of treatment sessions:** 14 **- Frequency and duration:** 4 weeks **Practitioner qualifications and background** Not reported Huang & Yang 2014 **Intervention** **- Number of needles inserted per subject per session:** 4 **- Names of points used:** Ashi point, ST35, EX-LE4, SP10, EX-LE2, SP6, SP9, ST36, LR3 **- Depth of insertion:** Not reported **- Response sought:** De Qi **- Needle stimulation:** EA 15 hz **- Needle retention time:** 30 mins **- Needle type:** 0.35 mm/25mm **Treatment Regimen** **- Number of treatment sessions:** 36 **- Frequency and duration:** 6 weeks **Practitioner qualifications and background** Not reported Zhao et al 2013 **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** CV8, EX-LE5, SP10, ST34 EA points: SP10, EX-LE5, ST34 **- Depth of insertion:** Not reported **- Response sought:** De Qi **- Needle stimulation:** EA **- Needle retention time:** 30 mins **- Needle type:** 0.25 mm/40~70mm **Treatment Regimen** **- Number of treatment sessions:** 12 **- Frequency and duration:** 4 weeks **Practitioner qualifications and background** Not reported Zhu et al 2013 **Intervention** **- Number of needles inserted per subject per session:** Not reported	from this review as it compared EA to manual acupuncture and medication), Marvommatis et al 2012) **Meta-analysis:** EA treatment vs control interventions on pain intensity N= 6 studies (Tukmachi et al 2004, Vas et al 2004, Berman et al 1999, Zhu et al 2013, Fu 2013, Marvommatis et al 2012) SMD: −1.86 [−2.33, −1.39] Heterogeneity: τ2 = 0.24; χ2 = 20.15, df = 5 (P=0.001); I2 = 75% Favours EA EA treatment plus drug therapy vs drug therapy alone on pain intensity N= 2 studies (Tukmachi et al 2004, Marvommatis et al 2012) SMD: −2.01 [−2.51, −1.52] Heterogeneity: τ2 = 0.00; χ2 = 0.00, df = 1 (P=0.95); I2 = 0% Favours EA EA treatment versus sham EA on pain intensity N= 2 studies (Marvommatis et al 2012, VAS et al 2004) SMD: −1.62 [−2.26, −0.97] Heterogeneity: τ2 = 0.15; χ2 = 3.4, df = 1 (P=0.07); I2 = 71% Favours EA EA treatment vs sham EA on pain intensity (meta-analysis using change scores from baseline) N= 2 studies (Berman et al 2004, Jubb et al 2008) SMD: −0.27 [−0.47, −0.06] Heterogeneity: τ , df = 1 (P = 0.51); I2 = 0% 2 = 0.00; χ2 = 0.44 Favours EA EA treatment vs control group interventions on WOMAC total scores N= 4 studies (Vas et al 2004, Berman et al 1999, Zhu et al 2013, Marvommatis et al 2012) SMD: −1.34 [−1.85, −0.83] Heterogeneity: τ = 73% 2 = 0.20; χ2 = 11.17, df = 3 (P = 0.01) I=73% Favours EA	

Study	Methodology	Results	Comments and evidence level
	- Names of points used: Xian, GB34, SP9, ST36, Ashi point, EA points: Xian **- Depth of insertion:** Not reported **- Response sought:** De qi **- Needle stimulation:** EA, 2Hz and 100Hz (alternate), **- Needle retention time:** 20 mins **- Needle type:** 0.25 mm/40mm **Treatment Regimen** **- Number of treatment sessions:** 14 **- Frequency and duration:** 4 weeks **Practitioner qualifications and background** Not reported Ji & Ouyang 2011 **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** ST35, EX-LE4, GB33, BL40, ST36, GB34, GB39 Individualized acupoints: SP10, BL17, BL23, CV4, SP9, SP6, BL11, BL23 EA points: ST35, EX-LE4 **- Depth of insertion:** Not reported **- Response sought:** De qi **- Needle stimulation:** EA 40Hz~60Hz **- Needle retention time:** 30min **- Needle type:** 0.30 mm/40mm **Treatment Regimen** **- Number of treatment sessions:** 24 **- Frequency and duration:** 8 weeks **Practitioner qualifications and background** Not reported Meng et al 2011 **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Not reported **- Depth of insertion:** Not reported **- Response sought:** Not reported **- Needle stimulation:** EA **- Needle retention time:** Not reported **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** 9 **- Frequency and duration:** 3 weeks **Practitioner qualifications and background** Not reported	EA treatment vs control on the SF-36 physical scale N= 3 studies (Berman et al 1999, Fu 2013, Marvommatis et al 2012) SMD: 8.00 [5.04, 10.96] Heterogeneity: τ =4.7, χ2 = 6.38, df = 2 (P =0.04), I2 = 69% Favours EA **Adverse effects:** Not reported	

Study	Methodology	Results	Comments and evidence level
	Ahsin et al 2009 **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** ST34, ST35, ST36, LR8, SP10, ST44, EA points: all acupoints **- Depth of insertion:** Not reported **- Response sought:** De qi **- Needle stimulation:** EA 3Hz **- Needle retention time:** 20~25min **- Needle type:** 30 mm **Treatment Regimen** **- Number of treatment sessions:** 10 **- Frequency and duration:** 10 days **Practitioner qualifications and background** Qualified acupuncturist Wu 2008 **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** EX-LE5, EX-LE2, SP10, SP11, ST34, ST36, SP9, EA points: EX-LE5, SP10, SP11 **- Depth of insertion:** Not reported **- Response sought:** De qi **- Needle stimulation:** EA **- Needle retention time:** 20 mins **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** 12 **- Frequency and duration:** 4 weeks **Practitioner qualifications and background** Not reported Qiu et al 2006 **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** EX-LE5, EA points: all acupoints **- Depth of insertion**: 5.1~6.4mm **- Response sought:** No local twitch response required **- Needle stimulation:** EA 2Hz and 100Hz (alternate) **- Needle retention time:** 30min **- Needle type:** 0.45 mm/75mm **Treatment Regimen** **- Number of treatment sessions:** 8 **- Frequency and duration:** 4 weeks		

Study	Methodology	Results	Comments and evidence level
	Practitioner qualifications and background Not reported Vas et al 2004 **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** GB34, SP9, Xian, ST36, LI4 Individualized acupoints: KI3, SP6, ST40 EA points: GB34, SP9, Xian, ST36 **- Depth of insertion:** Not reported **- Response sought:** De qi **- Needle stimulation:** EA, 2Hz and 15Hz (alternate) **- Needle retention time:** 20 min **- Needle type:** 0.25 mm/45mm **Treatment Regimen** **- Number of treatment sessions:** 12 **- Frequency and duration:** 12 weeks **Practitioner qualifications and background** Doctor specializing in acupuncture Ng et al 2003 **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** ST35, EX-LE4 EA points: all acupoints **- Depth of insertion:** 10-15 mm **- Response sought:** De qi **- Needle stimulation:** EA 2Hz **- Needle retention time:** 20 min **- Needle type**: 0.25 mm/40mm **Treatment Regimen** **- Number of treatment sessions:** 8 **- Frequency and duration:** 2 weeks **Practitioner qualifications and background** Not reported Yurtkuran 1999 **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** SP9, GB34, ST34, ST35 EA points: all acupoints **- Depth of insertion:** Not reported **- Response sought:** No local twitch response required **- Needle stimulation:** EA 4Hz **- Needle retention time:** 20 min		

Study	Methodology	Results	Comments and evidence level
	- Needle type: Not reported **Treatment Regimen** **- Number of treatment sessions:** 10 **- Frequency and duration:** 2 weeks **Practitioner qualifications and background** Not reported		
Choi, T, Lee, M, Kim, J & Zaslawski, C **Moxibustion for the treatment of osteoarthritis: An updated systematic review and meta-analysis** **2017** Databases **PubMed, EMBASE, AMED, the Cochrane Library, seven Korean medical databases (Korean Studies Information, DBPIA, Oriental Medicine Advanced Searching Integrated System (OASIS), Research Informatddion Service System (RISS), KoreaMed, The Town Society of Science Technology and the Korean National Assembly Library), and one Chinese medical database (CNKI)** Relevant Included Studies **Ren et al 2015** **Ren et al 2011** **Zhao et al 2014** **Yuan et al 2015** **Deng et al 2015** **Song et al 2013** **Cheng et al 2008** **Sun et al 2008** **Yang et al 2008** **Zhou et al 2010**	**Participants** – All 19 RCTs n=2196 Participants in studies were diagnosed with KOA according to American College Rheumatology (ACR) criteria in seven trials, Chinese Medical Association (CMA) criteria in four trials and the Guiding Principles of Clinical Research on New Drugs for Traditional Chinese Medicine (GP-TCM) in seven trials The treatment period of the studies varied from 2 weeks to 6 weeks for 12–35 sessions **Inclusion:** - RCTS and quasi-RCTs - Trials published in the form of dissertations and abstracts - Patients with OA in any skeletal articulation joint - Studies that included a mixture of different rheumatic patients were included only if it was possible to extract the data concerning each patient population separately - Studies that used any type of moxibustion (direct or indirect) for treating OA in any of the peripheral joints - Studies that included moxibustion as the sole intervention or as an adjunct therapy in conjunction with another standard treatment for OA - Trials that the control group received the same concomitant treatments as the moxibustion group- Controls of no treatment, sham moxibustion or relevant standard therapies for OA, including conventional drug medications, exercise and rehabilitation therapies **Exclusion:** - Trials in which moxibustion was part of a complex intervention as well as case studies, case series, qualitative studies and uncontrolled trials. - Trials that failed to provide detailed results - Study designs that did not allow for an evaluation of the effectiveness of moxibustion (e.g. by using a treatment for unproven efficacy in the control group or a comparison of two different forms of moxibustion) or if they adopted comparisons between treatments or groups that were expected to have similar effects to moxibustion (e.g. acupuncture) **Limits:** - Nil language restriction - Studies published between August 2011 and August 2016 <u>All studies:</u> Indirect moxa TCM theory	**Ren et al 2015** Intervention: Moxa Control: Sham moxa <u>QOL (SF-36)</u> Non-significant for all subscale except general health after treatment; Non-significant for all subscale except VT, general health after 12 weeks **Ren et al 2011** Intervention: Moxa Control: Sham moxa <u>WOMAC</u>: Pain: P < 0.01, P < 0.05 (6wks); stiffness: P < 0.05, P < 0.05 (6wks), Physical function: P < 0.05, P < 0.05 (6wks) <u>Time for 46 m walk:</u> Non-significant **Zhao et al 2014** Intervention: Moxa Control: Sham moxa <u>WOMAC:</u> Pain: P < 0.001, P = 0.001 (12wks), P = 0.002 (24wks); Physical function: P = 0.015, P < 0.001 (12wks), NS (24wks) **Yuan et al 2015** Intervention: Moxa Control: Drug – diclofenac sodium <u>WOMAC:</u> Total: P < 0.01, P < 0.01 (12wks); pain: P < 0.01; stiffness: P < 0.01; Physical function: NS <u>VAS:</u> P < 0.01, P < 0.01 12wks) **Deng et al 2015** Intervention: Moxa	**Reviewer comments** Comprehensive search strategy which searched twelve databases with no language limits applied. One author searched the database and two authors independently screened potentially eligible studies after reading the title and abstract of identified studies. Data extraction and risk-of-bias assessments were performed by two independent reviewers. Thorough inclusion/exclusion criteria. Sufficient reporting of the intervention using STRICTA guidelines. All of the RCTs were conducted in China, where it has previously been reported that few negative studies have been published (Vickers et al 1998). Most trials did not use internationally recognized reliable and valid outcome measures. **Quality scores:** The Cochrane risk of bias tool - Random sequence generation: 75% low risk of bias - Allocation concealment: 25% low risk of bias - Blinding of participants and personnel: 15% low risk of bias - Blinding of outcome assessment: 20% low risk of bias - Incomplete outcome data: 100% low risk of bias - Selective reporting: 30% low risk of bias - Other bias: 100% low risk of bias

Study	Methodology	Results	Comments and evidence level
Zhang et al 2015 **Zhou et al 2014** **Chen et al 2015** **Wu et al 2011** **Kim et al 2014** Research question **What is the evidence of effectiveness of moxibustion as a treatment for OA patients?** Funding **No funding was received for the preparation of this review. T-YC and MSL were supported by grants from Korea Institute of Oriental Medicine (K16111 and K16292)**	Ren et al 2015 **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** ST35, EX-LE4, Ashi points **- Response sought:** Yes **- Needle retention time:** 20 mins, moxa time per point 3 mins **Treatment Regimen** **- Number of treatment sessions:** 18 **- Frequency and duration:** 3 x weekly for 6 weeks **Practitioner qualifications and background** Not reported Ren et al 2011 **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** ST35, EX-LE4, Ashi points **- Response sought:** Not reported **- Needle retention time:** Not reported, moxa time per point 3 mins **Treatment Regimen** **- Number of treatment sessions:** 18 **- Frequency and duration:** 3 x weekly for 6 weeks **Practitioner qualifications and background** Not reported Zhao et al 2014 **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** ST35, EX-LE4, Ashi point **- Response sought:** Not reported **- Needle retention time:** 20 mins, moxa time per point 3 mins **Treatment Regimen** **- Number of treatment sessions:** 18 **- Frequency and duration:** 3 x weekly for 6 weeks **Practitioner qualifications and background** Not reported Yuan et al 2015 **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** ST35, SP9, ST36, EX-LE2, Ashi points	Control: Drug – diclofenac sodium WOMAC Total: P < 0.05; pain: P < 0.05; stiffness: P < 0.05; Physical function: P < 0.05 **Song et al 2013** Intervention: Moxa Control: Drug – diclofenac sodium WOMAC: Pain: NS; stiffness: P < 0.05; Physical function: P < 0.05 **Cheng et al 2008** Intervention: Moxa Control: Drug – diclofenac sodium NRPS: non-significant VRS: non-significant **Sun et al 2008** Intervention: Moxa Control: Drug – diclofenac sodium GPCRND-KOA scores Morning stiffness: P < 0.05; pain: P < 0.05 **Yang et al 2008** Intervention: Moxa Control: Drug – diclofenac sodium GPCRND-KOA scores Total score: NS, P < 0.05 (8 wks) **Zhou et al 2010** Intervention: Moxa Control: Drug – diclofenac sodium Pain NRS: NS GPCRND-KOA scores P < 0.05, P < 0.05 (8 Wks) **Zhang et al 2015** Intervention A: Moxa Intervention B: Moxa + drug Control: Drug – celecoxib	**Grade:** HQ (++) **Quality:** 1+

Study	Methodology	Results	Comments and evidence level
	- Response sought: Yes **- Needle retention time:** 10-15 mins, moxa time per point 1 min **Treatment Regimen** **- Number of treatment sessions:** 30 **- Frequency and duration:** 1 x daily for 30 days **Practitioner qualifications and background** Not reported Deng et al 2015 **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** ST35, EX-LE4, EX-LE5, LR8, EX-LE2, GB3, Ashi points, KI3, SP9, GB39, ST36, SP9, SP10 in 4 points were chosen at every treatment **- Response sought:** Yes **- Needle retention time:** not reported, moxa time per point 1 min **Treatment Regimen** **- Number of treatment sessions:** 12 **- Frequency and duration:** 3 x weekly for 4 weeks **Practitioner qualifications and background** Not reported Song et al 2013 **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** SP10, ST34, EX-LE2, EX-LE4, EX-LE5, SP9, GB34, Ashi points in 4 points were chosen at every treatment **- Response sought:** Not reported **- Needle retention time:** 20 mins, moxa time per point 5 min **Treatment Regimen** **- Number of treatment sessions:** 20 **- Frequency and duration:** 1 x daily for 20 days **Practitioner qualifications and background** Not reported Cheng et al 2008 **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** EX-LE4, EX-LE5, EX-LE2, SP9, GB34, GV14, SP10, BL23 **- Response sought:** Yes **- Needle retention time:** Not reported, moxa time per point 5 min	WOMAC: vs. C: P < 0.0001; A vs. D: NS; B vs. C Pain (VAS): A vs. C: P < 0.0001; A vs. D: NS; B vs. C: **Zhou et al 2014** Intervention: Moxa Control: Drug – celecoxib Pain: P = 0.04 GPCRND-KOA scores P = 0.009 **Chen et al 2015** Intervention A: Moxa conventional Intervention B: Moxa heat sensitive Control: Intraarticular injection – sodium hyaluronate GPCRND-KOA scores A vs. C: P < 0.00001; B vs. C: P < 0.00001 **Wu et al 2011** Intervention: Moxa Control: Intraarticular injection – sodium hyaluronate GPCRND-KOA scores Non-significant **Kim et al 2014** Intervention: Moxa Control: Usual care WOMAC All subscales and total score: P < 0.01, P < 0.01 (13 wks) QOL (SF-36) PCS, OF, BP, SF: P < 0.05; PCS, BP: P < 0.01 (13 wks); other subscales: NS Pain (NRS) P < 0.01, P < 0.01 (13 wks) **Meta-analysis** Moxibustion vs sham	

Study	Methodology	Results	Comments and evidence level
	Treatment Regimen **- Number of treatment sessions:** 20 **- Frequency and duration:** 1 x every 2 days for 40 days **Practitioner qualifications and background** Not reported Sun et al 2008 **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** EX-LE4, ST35, SP9, GB34, SP10, ST34, EX-LE2, BL18, BL23 in 2–4 points were chosen at every treatment **- Response sought:** Yes **- Needle retention time:** Not reported, moxa time per point 5 min **Treatment Regimen** **- Number of treatment sessions:** 20 **- Frequency and duration:** 1 x daily for 20 days **Practitioner qualifications and background** Not reported Yang et al 2008 **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** EX-LE5, EX-LE2, SP9, GB34, SP10, ST36 in 2–4 points were chosen at every treatment **- Response sought:** Yes **- Needle retention time:** not reported, moxa time per point 5 min **Treatment Regimen** **- Number of treatment sessions:** 20 **- Frequency and duration:** 1 x daily for 20 days **Practitioner qualifications and background** Not reported Zhou et al 2010 **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** EX-LE4, EX-LE5, EX-LE2, SP9, GB34, SP10, ST36, Ashi-points in 2–4 points were chosen at every treatment **- Response sought:** Not reported **- Needle retention time:** Not reported, moxa time per point 5 min **Treatment Regimen** **- Number of treatment sessions:** 20	The meta-analysis showed favourable effects of moxibustion on pain level after the last session of treatment (n = 305; SMD, −0.46; 95% CI:−0.86 to −0.06, P = 0.02, I2= 65%) and at follow-up (n = 305;n SMD, −0.36; 95% CI: −0.70 to −0.01, P = 0.04, I2= 54%) The meta-analysis failed to show superior effects of moxibustion on physical function (n = 305; SMD, −0.23; 95% CI: −0.62 to 0.17,P = 0.26, I2= 65and follow-up (n = 305; SMD, −0.31; 95%CI: −0.69 to 0.07, P = 0.11, I2= 62%) Moxibustion vs drug therapy The meta-analysis showed superior effects of moxibustion on total symptom score compared with diclofenac sodium (n = 534;SMD, −0.46; 95% CI: −0.73 to −0.19; P = 0.0009, I2= 58%) The meta-analysis showed superior effects of moxibustion on pain reduction compared with diclofenac sodium (n = 628 knees; SMD, −0.42; 95% CI:−0.81 to −0.03, P = 0.03) with high heterogeneity (I2= 83%) **Adverse effects:** Ren et al 2015 Blisters n=22 Ren et al 2011 Not reported Zhao et al 2014 Skin flushing n=10 Yuan et al 2015 Nausea n=1 and stomach pain n=1 Deng et al 2015 Not reported Song et al 2013 Not reported Cheng et al 2008 Not reported Sun et al 2008 Not reported Yang et al 2008	

Study	Methodology	Results	Comments and evidence level
	- Frequency and duration: 1 x daily for 20 days **Practitioner qualifications and background** Not reported Zhang et al 2015 **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** EX-LE4, EX-LE5, EX-LE2,ST34,BL40, SP9, GB34, Ashi points, CV4, BL23 **- Response sought:** Yes **- Needle retention time:** 30-40 mins, moxa time per point 1 min **Treatment Regimen** **- Number of treatment sessions:** 10 **- Frequency and duration:** 3 x weekly for 30 days **Practitioner qualifications and background** Not reported Zhou et al 2014 **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** CV8, EX-LE4, ST35, SP10, ST34 **- Response sought:** Not reported **- Needle retention time:** 30-40 mins, moxa time per point 1 min **Treatment Regimen** **- Number of treatment sessions:** 28 **- Frequency and duration:** 7 x week for 4 weeks **Practitioner qualifications and background** Not reported Chen et al 2015 **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** SP9, GB34, ST34, SP10 **- Response sought:** Yes **- Needle retention time:** 45 mins, moxa time per point 1 min **Treatment Regimen** **- Number of treatment sessions:** 43 **- Frequency and duration:** 7 x weekly for 6 weeks **Practitioner qualifications and background** Yes	Not reported Zhou et al 2010 Not reported Zhang et al 2015 Not reported Zhou et al 2014 Not reported Chen et al 2015 Not reported Wu et al 2011 Not reported Kim et al 2014 Burns n=119; 1st degree: 6; 2nd degree: 113 Pruritus and fatigue n=2	

Study	Methodology	Results	Comments and evidence level
	Wu et al 2011 **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Ashi points, EX-LE4, EX-LE5, SP9, GB34, SP10, ST34 **- Response sought:** Yes **- Needle retention time:** 20 mins, moxa time per point 1 min **Treatment Regimen** **- Number of treatment sessions:** 21 **- Frequency and duration:** 7 x weekly for 3 weeks **Practitioner qualifications and background** Not reported Kim et al 2014 **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** ST36, ST35, ST34, SP9, EX-LE4, SP10, Ashi points **- Response sought:** Yes **- Needle retention time:** Not reported, moxa time per point 1 min **Treatment Regimen** **- Number of treatment sessions:** 16 **- Frequency and duration:** 3 x weekly for 4 weeks **Practitioner qualifications and background** Yes		
Manheimer, E, Cheng, K, Linde, K, Lao, L, Yoo, J, Wieland, S, van der Windt, D, Berman, B & Bouter, L **Acupuncture for Peripheral Joint Osteoarthritis** **2010** Databases **Cochrane Central Register of Controlled Trials, CENTRAL, The Cochrane Library 2008, MEDLINE, and EMBASE** Relevant Included Studies	Only three studies were relevant in this study for this data extraction relating to hip OA. Studies related knee OA were not used due the date they were published (<2011) **Participants:** n = 138 **Fink 2001-** Mean age (+/-SD or Range): 62 (9), Men/Women (n/n): 22/43 **Haslam 2001 -** Mean age (+/-SD or Range): 67, Men/Women (n/n): 7/21 **Stener-victorin 2004 -** Mean age (+/-SD or Range): 67, Men/Women (n/n): 18/27 **Inclusion:** - Studies evaluating traditional acupuncture - Exclusively participants with osteoarthritis of one or more of the peripheral joints (i.e. knee, hip, and hand) - Studies that included a mix of participants with OA of the spine and OA of the peripheral joints were included only if the results for the participants with OA of the peripheral joints were reported separately from the results of the participants with OA of the spine - Included trials that compared acupuncture plus another active treatment versus that other active treatment alone	**Fink 2001** Intervention: acupuncture Control: sham needle acupuncture Outcome: VAS, Physical function, overall index of = symptom severity. *Acupuncture vs sham* **VAS** Acupuncture: Mean (SD), 40(25) Control: Mean (SD), 45(24) Standard mean difference: -0.20 [-0.70, 0.30] **Function** Acupuncture: Mean (SD), -1.8(3.32) Control: Mean (SD), -1.2(3.38) Standard mean difference: -0.18 [-0.68, 0.32] **Haslam 2001** Intervention: acupuncture	**Reviewer comments** A diverse search strategy was used in the search process, including a variety of databases and additional searches of reference lists. Small sample size limited the usefulness of the data. The quality of two of the three included studies showed relatively low risk of bias, compared to the third, indicating high quality. However, quality scores were given based on the authors judgement and not by using a standard recognised measurement, therefore the reliability of these scores may be limiting due to subjectivity. Outcomes for one of the included studies was not reported, which further limited the usefulness of this studies

Study	Methodology	Results	Comments and evidence level
Fink 2001 **Haslam 2001** **Stener-Victorin 2004** Research question **What are the effects of traditional needle acupuncture with a sham, another active treatment, or with a waiting list control, for people with OA of the knee, hip, or hand?** Funding **Nil**	- Included all pragmatic trials that compared acupuncture with any other treatments (e.g. exercise, education, medication, etc.) **Exclusion:** - Studies including participants with only OA of the spine - Trials of dry needling/ trigger point therapy, a therapy which rejects traditional concepts of energy and meridians, and which involves inserting needles only at unnamed tender or trigger points to stimulate nerves or muscles - RCTs of laser acupuncture and electroacupuncture without needle insertion because most authorities believe acupuncture involves needle insertion - Excluded RCTs in which one form of acupuncture was compared only with another form **Fink 2001** n=65 **Intervention:** acupuncture **Style**: Chinese **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** *Ashi,* 'GB-30', 'GB-31', 'BL-37' and the distal meridian points 'ST-40' and 'BL-54' were chosen, as well as the master point for tendons and muscles 'GB-34' **- Depth of insertion:** Not reported **- Response sought:** Not reported **- Needle stimulation:** Manual stimulation **- Needle retention time:** Not reported **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** 10 **- Frequency and duration:** 3 times per week, 20 mins for a total of 3 weeks **Control**: sham acupuncture **Practitioner qualifications and background** Not reported **Haslam 2001** n=28 **Intervention:** acupuncture **Style:** Chinese **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** GB29, GB30, GB34, GB43, ST44, LI4 bilaterally, and four 'ah shi' points around the great trochanter, in a north, south, east, west formation **- Depth of insertion:** Not reported **- Response sought:** Not reported **- Needle stimulation:** manual stimulation **- Needle retention time:** Not reported	Control: sham acupuncture Outcome: Modified version of WOMAC and VAS *Acupuncture vs control* Acupuncture: Mean (SD), 69%(248), Control: Mean (SD), 831 (235) Standard mean difference: -0.54 [-1.30, 0.22] **Stener-Victorin 2004** Intervention: acupuncture Control: sham hydro therapy Control: A patient education Outcome: VAS and physical function Not reported **Adverse effects:** The frequency of minor side effects of acupuncture, primarily minor bruising and bleeding at needle insertion sites, ranged from 0% (36) to 45% (44). These frequencies varied widely because of heterogeneous and scanty reporting and different definitions of what constitutes a side effect of acupuncture versus what is an inherent part of treatment (for example, occasional bruising at needle insertion site)	findings. Overall, data was limited in the extraction process to studies published in 2010 or prior to 2010 and, therefore, the results of this review may not be indicative to the information has extracted within this document. **Quality scores: authors judgement** Fink 2001 – low risk Haslam 2001 – high risk Stener-victorin 2004 – low risk **Grade:** AQ (+) **Quality:** 1+

Study	Methodology	Results	Comments and evidence level
	- Needle type: Not reported **Treatment Regimen** **- Number of treatment sessions:** 6 **- Frequency and duration:** 10 minutes for first session, and 25 minutes for subsequent sessions for a total of 6 weeks **Practitioner qualifications and background** Not reported **<u>Stener-Victorin 2004</u>** n= 45 **Intervention:** acupuncture **Style:** Chinese **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Electroacupuncture locally at 4 of following points: BL 54, 36, GB 29, 30, 31, and ST 31. Distal points were always the same: GB34 and BL 60 ipsilateral **- Depth of insertion:** 15-35 mm **- Response sought:** Not reported **- Needle stimulation:** electrical stimulation and rotated towards manual stimulation **- Needle retention time:** Not reported **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** 10 **- Frequency and duration:** 30 mins sessions, 2 times per week, for a total of 5 weeks **Control**: shame hydrotherapy and patient education **Practitioner qualifications and background** Not reported		
Ji, M, Wang, X, Chen, M, Shen, Y, Zhang, X & Yang, J **The Efficacy of Acupuncture for the Treatment of Sciatica:** **A Systematic Review and Meta-Analysis** **2015** Databases **Three Chinese language databases CNKI, CBM**	**Participants** – All 14 studies n=901 intervention group, 941 control group Age: mean age ranged between 18.0 and 77.0 years Disease duration: ranged from 4 days to 18 years **Inclusion:** - Studies published in English or Chinese language - Randomized or quasi-randomized clinical trials - Participating patients that must have been diagnosed with sciatica or presented with any or all of the following symptoms: radiating pain in the sciatic nerve distribution area, tenderness at the nerve stem, positive Lasegue's sign, Kernig's sign, and Bonnet's sign - Any of the manual, warm, electric, or laser types of acupuncture - Considering the following comparisons: acupuncture vs conventional Western medicine - Any of the following outcome measures: effectiveness, pain intensity, and pain threshold **Exclusion:**	**Chen 2010** Intervention: EA Control: Ibuprofen (taken orally), Prednisone (taken orally) 7 times per course <u>VAS:</u> MD: −2.10 [−3.15, −1.05] Statistically significant difference between acupuncture and medication **Dong et al 2008** Intervention: Manual acupuncture Control: Ibuprofen Sustained Release Capsules (taken orally) 15 times per course <u>VAS:</u> MD: −0.87 [−1.70, −0.04] Statistically significant difference between acupuncture and medication **Dong et al 2008**	**Reviewer comments** Extensive search strategy including English and Chinese databases with both English and Chinese search terms. Publication status of the search trials was not restricted. Two reviewers independently screened the title and abstract of each searched article for eligibility and relevance. Independent reviewers were not used for data extraction. Contained a high majority of RCTs which only looked at the subjective outcome of effectiveness as it was the SRs primary outcome of interest. Most of

Study	Methodology	Results	Comments and evidence level
and Wanfang Data and five English language databases **Cochrane Library, PubMed, Web of Science, Science Direct, and FMRS** Relevant Included Studies **Chen 2010** **Dong et al 2008** **Ye et al 2015** Research question **What is effectiveness and safety of acupuncture therapy for treating sciatica?** Funding **Project funded by the Priority Academic Program Development of Jiangsu Higher Education Institutions (PAPD) and grants from the People** **Programme (Marie Curie Actions) of the European Union's** **Seventh Framework Programme FP7/2007-2013 /under REA** **Grant Agreement no. PIR SES-GA-2013-612589**	- Randomised crossover trials, case reports, case series, reviews, qualitative studies, or animal experiments - Participants with back pain or low back pain but no symptoms of sciatica - Interventions that included a combination of more than one treatment strategy - Studies comparing interventions grouped under the same treatment strategy (e.g. a comparison between different forms or different acupoints of acupuncture) **Limits:** - English and Chinese language <u>Chen 2010</u> **Intervention** EA **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Jiaji (L2–4) (EX-B2), Zhibian (BL 54), Huantiao (GB 30), Weizhong (BL 40), Chengshan (BL 57), Xuanzhong (GB39), Kunlun (BL60), Yinmen (BL 37), and Ashi point **- Depth of insertion:** 2 inches for the points Zhibian and Yanglingquan, 3∼4 inches for the point, Huantiao; 1.5 inches for the points Yinmen, Weizhong, and Chengshan **- Response sought:** Muscle twitch **- Needle stimulation:** Electrical **- Needle retention time:** 30 mins **- Needle type:** 0.30 × 25–40 mm **Treatment Regimen** **- Number of treatment sessions:** 6 **- Frequency and duration:** 3 x week for 2 weeks **Practitioner qualifications and background** Not reported <u>Dong et al 2008</u> **Intervention** Acupuncture **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Huantiao (GB 30) **- Depth of insertion:** Not reported **- Response sought:** De-qi **- Needle stimulation:** Manual **- Needle retention time:** 30 mins **- Needle type:** 0.3mm × 4-inch unused sterile needles (Ruiqi Er brand) **Treatment Regimen** **- Number of treatment sessions:** 15 **- Frequency and duration:** 1 x daily for 15 days **Practitioner qualifications and background** Not reported	Intervention: EA Control: Diclofenac Diethylamine gel (external use) four times per day, three weeks <u>VAS:</u> MD: −1.19 [−1.67, −0.71] Statistically significant difference between acupuncture and medication **Pain Intensity** 3 studies (Chen et al 2010, Dong et al 2008 and Ye et al 2015) reported pain intensity using VAS to measure pain - Acupuncture group experienced a significantly greater reduction in pain intensity than those who received conventional medication MD: −1.25; 95% CI: −1.63 to −0.86 p < 0.00001 The result was homogenous (χ2= 3.39; P = 0.18; I2 = 41%) **Subgroup meta-analysis** **<u>Treatment method</u>** <u>Oral</u> 2 studies MD: −1.44 (−2.65, −0.24) 0.02 p = 0.07 I2 = 69% Random <u>External</u> 1 study MD: −1.19 (−1.67, −0.71) p <0.00001 **<u>Drug categories</u>** <u>Ibuprofen + Prednisone</u> 1 study MD: −2.10 (−3.15, −1.05) P= <0.00001 <u>Ibuprofen</u> 1 study MD: −0.87 (−1.70, −0.04) p=0.04 <u>Diclofenac</u> 1 study MD: −1.19 (−1.67, −0.71) p<0.00001 **Adverse effects:** <u>Chen 2010</u> 2 patients reported hypodermal bleeding in intervention group <u>Dong et al 2008</u> Not reported	the included RCTs were of low methodological quality with a high risk of bias. High quality and comprehensive reporting. **Quality scores:** The Cochrane Collaboration tool for assessing the risk of bias <u>Chen 2010</u> - Random sequence generation: Low risk of bias - Allocation concealment: Low risk of bias - Blinding of participants and personnel: Low risk - Blinding of outcome assessment: Unclear risk - Incomplete outcome data: Low risk of bias - Selective reporting: Low risk of bias - Other bias: Unclear risk of bias <u>Dong et al 2008</u> - Random sequence generation: High risk of bias - Allocation concealment: Unclear risk of bias - Blinding of participants and personnel: Unclear risk - Blinding of outcome assessment: Unclear risk - Incomplete outcome data: Unclear risk of bias - Selective reporting: Unclear risk of bias - Other bias: High risk of bias <u>Ye et al 2015</u> - Random sequence generation: Low risk of bias - Allocation concealment: Unclear risk of bias - Blinding of participants and personnel: Unclear risk

Study	Methodology	Results	Comments and evidence level
	Ye et al 2015 **Intervention** EA **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Jiaji (L4-5) (EX-B2), Jiaji (L5-S5) (EX-B2), Zhibian (BL 54), and Huantiao (GB 30) **- Depth of insertion:** Not reported **- Response sought:** De-qi **- Needle stimulation:** Electrical **- Needle retention time:** 30 mins **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** 6 **- Frequency and duration:** 2 x week for 3 weeks **Practitioner qualifications and background** Not reported	Ye et al 2015 Nil All 14 studies: Three trials mentioned adverse effects. - Zhang 2012 and Liu 2012 reported no adverse effects of the acupuncture treatment - Chen 2010: two cases with subcutaneous haemorrhage occurred after needling in the treatment group and the symptom of blood stasis disappeared after three or four days of hot pack	- Blinding of outcome assessment: Unclear risk - Incomplete outcome data: Low risk of bias - Selective reporting: Low risk of bias - Other bias: Unclear risk of bias **Grade:** HQ (++) **Quality:** 1
Qin, Z, Liu, X, Wu, J, Zhai, Y & Liu, Z **Effectiveness of Acupuncture for Treating Sciatica: A Systematic Review and Meta-Analysis** **2015** Databases **MEDLINE, EMBASE, CENTRAL, CBM, CMCC, VIP Database, Wan-Fang Database, CNKI, and CiNii** Relevant Included Studies **Wang and La 2004** **Chen et al 2009** **Zeng 2012** **Zhang et al 2008** **Hu et al 2010** **Du et al 2009** **Chen 2010** **Wang 2008** **Meng 2014** **Ren 2013** **Zhao 2004**	**Participants** n=962 Age: ranged from 18 to 79 years **Inclusion:** - RCTs on acupuncture treatment for sciatica - English, Chinese, and Japanese language studies - Patients with sciatica, including those diagnosed with sciatica synonyms, such as radiculopathy, nerve root compromise, nerve root compression, nerve root pain, and pain radiating below the knee - Any type of invasive acupuncture, such as acupuncture, electroacupuncture, elongated needle acupuncture, auricular acupuncture, abdominal acupuncture, and warm acupuncture - Control interventions may include no treatment, sham acupuncture/ placebo and Western medicine **Exclusion:** - Non RCTs, quasi-RCTs, and RCT protocols were excluded - Trials that included lower back pain without sciatica - Trials comparing two different types of acupuncture - Trials comparing acupuncture with Chinese medicine **Limits:** - No restriction on gender and age **Acupuncture interventions summary:** **Intervention:** EA: Wang & La 2004, Zhang et al 2008, Hu et al 2010, Du et al 2009, Meng 2014, Zhoa 2004 Warming acupuncture: Chen et al 2009, Wang 2008, Ren 2013 Manual needle stimulation: Zeng 2012, Chen 2010 **Acupuncture points used:** varied from 1 to more than 10	**Wang and La 2004:** Intervention: EA Control: Diclofenac sodium 50mg for 7 days VAS: 25.71 ± 2.27 versus 35.33 ± 2.57 **Chen et al 2009** Intervention: Warm acupuncture Control: Injection Nil outcome measures relevant to this review **Zeng 2012** Intervention: Manual acupuncture Control: ibuprofen VAS: 2.07 ± 1.05 versus 2.70 ± 1.34 **Zhang et al 2008** Intervention: EA Control: Meloxicam Nil outcome measures relevant to this review **Hu et al 2010** Intervention: EA Control: Meloxicam Nil outcome measures relevant to this review	**Reviewer comments** Adequate search strategy. SR was conducted according to a published protocol and reported in accordance with PRISMA guidelines. Two authors independently extracted data and evaluated methodological quality. Authors attempted to obtain missing data. Excluded trials not reported. Results of the review may be limited by the inherent methodological limitations of the included RCTs including small sample size. Limited reporting of included RCTs quality assessments. Reporting bias not assessed. Validated measurement scales were utilised. Meta-analyses conducted using random effects model when heterogeneity was absent, otherwise the fixed effect model was used to combine the data. **Quality scores:** The Cochrane Collaboration tool for assessing the risk of bias - Random sequence generation: 7 of 11 studies - Allocation concealment: 3 of 11 studies

Study	Methodology	Results	Comments and evidence level
Research question **What is the current evidence on the effects and safety of acupuncture for treating sciatica?** Funding **Not reported**	**Most common acupoints:** GB 32, BL 40 & GB 34 **Duration of intervention:** ranged from one to four weeks and only one trial mentioned 6 months of follow-up **Acupoints of each trial:** **Wang & La 2004:** Huantiao (GB 30), Weizhong (BL 40) **Chen et al. 2009:** Shenshu (BL 23), Dachangshu (BL 25), Huantiao (GB 30), Weizhong (BL 40), and Kunlun (BL 60) **Zeng 2012:** Huantiao (GB 30), Zhibian (BL 54), Chengfu (BL 36), Fengshi (GB 31), Weizhong (BL 40), Yanglingquan (BL 67), Chengshan (BL 57), Xuanzhong (GB 39), Kunlun (BL 60), and Zulinqi (GB 41) **Zhang et al. 2008:** Jiaji (EX-B2), Yaoyangguan (DU 3), Huantiao (GB 30), and Yanglingquan (BL 67) **Hu et al. 2010**: Yaoyangguan (DU 3), Shiqizhui (EX-B7), Huantiao (GB 30), Yanglingquan (BL 67), Weizhong (BL 40), and Chengshan (BL 57) **Du et al. 2009**: Jiaji (EX-B2) **Chen 2010:** Jiaji (EX-B2), Zhibian (BL 54), Huantiao (GB 30), Yinmen (BL 37), Weizhong (BL 40), Chengshan (BL 57), and Kunlun (BL 60) **Wang 2008**: Jiaji (EX-B2), Zhibian (BL 54), Weizhong (BL 40), and Yanglingquan (BL 67) **Meng 2014**: Jiaji (EX-B2), Huantiao (GB 30), Juegu (GB 39), Weizhong (BL 40), and Zhibian (BL 54) **Ren 2013**: Dachangshu (BL 25), Shenshu (BL 23), Mingmen (DU 4), Guanyuanshu (BL 26), Qihaishu (BL 24), Zhibian (BL 54), Huantiao (GB 30), and Jiaji (EX-B2) **Zhao 2004:** Huantiao (GB 30), Weizhong (BL 40) Wang & La 2004 **Intervention:** **- Depth of insertion**: Not reported **- Response sought**: De-chi **- Needle stimulation:** EA **- Needle retention time:** 25 minutes **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** 7 **- Frequency and duration:** 1 x daily for 7 days **Practitioner qualifications and background** Physician Chen et al 2009	**Du et al 2009** Intervention: EA Control: Diclofenac VAS: 2.12 ± 1.12 versus 2.10 ± 1.39 **Chen 2010** Intervention: Manual acupuncture Control: ibuprofen VAS: 2.78 ± 1.02 versus 4.64 ± 3.21 SF-36: 57.76 ± 15.20 versus 59.07 ± 15.08 Statistically significant difference between acupuncture and medication in reducing the SF-36 score **Wang 2008** Intervention: Warm acupuncture Control: Ibuprofen Nil outcome measures relevant to this review **Meng 2014** Intervention: EA + Ibuprofen Control: Ibuprofen VAS: 3.04 ± 0.53 versus 4.28 ± 0.62 Acupuncture plus medication was significantly more effective than medication alone in providing pain relief after two acupuncture treatment sessions **Ren 2013** Intervention: Warm acupuncture + Mannitol + dexamethasone + mecobalamin tablets Control: Mannitol + dexamethasone + mecobalamin tablets Nil outcome measures relevant to this review **Zhao 2004** Intervention: EA Control: Sham acupuncture Nil outcome measures relevant to this review **Meta-analysis:** Acupuncture vs drugs – VAS 3 trials – Chen, Wang and Zeng, 160 participants MD −1.23, 95%CI −1.87 to −0.60, and I= 0%	- Blinding of outcome assessment: 3 of 11 studies - Incomplete outcome data: 1 of 11 studies * Nil other risk of bias data reported **Grade:** AQ (+) **Quality:** 1

Study	Methodology	Results	Comments and evidence level
	Intervention: **- Depth of insertion**: Not reported **- Response sought**: De-chi **- Needle stimulation:** Warm acupuncture **- Needle retention time:** 20-35 minutes **- Needle type:** 0.3 x 60 mm **Treatment Regimen** **- Number of treatment sessions:** 30 **- Frequency and duration:** 3 x daily for 10 days **Practitioner qualifications and background** Not reported Zeng 2012 **Intervention:** **- Depth of insertion**: 60mm (GB 30/BL54) others 25mm **- Response sought**: De-chi **- Needle stimulation:** Manual stimulation 10 min intervals **- Needle retention time:** 30 minutes **- Needle type:** 0.3 x 75 mm **Treatment Regimen** **- Number of treatment sessions:** 20 **- Frequency and duration:** 2 x daily for 10 days **Practitioner qualifications and background** Not reported Zhang et al 2008 **Intervention:** **- Depth of insertion**: 40-60mm **- Response sought**: De-chi **- Needle stimulation:** Manual stimulation 10 min intervals + EA **- Needle retention time** 20 minutes **- Needle type:** 0.3 x 40-75 mm **Treatment Regimen** **- Number of treatment sessions:** 20 **- Frequency and duration:** 2 x daily for 10 days **Practitioner qualifications and background** Professional acupuncturist Hu et al 2000 **Intervention:**	**Adverse effects:** Wang and La 2004: Not reported Wang and La 2004 Not reported Chen et al 2009 Nil Zeng 2012 Nil Zhang et al 2008 3 patients reported hypodermal bleeding in intervention group; 21 patients in control group reported GI problems Hu et al 2010 5 patients in control group reported GI problems Du et al 2009 Not reported Chen 2010 2 patients reported hypodermal bleeding in intervention group Wang 2008 Not reported Meng 2014 Nil Ren 2013 Not reported Zhao 2004 Nil Acupuncture appears to be associated with few adverse effects, however, the evidence is limited. Acupuncture appears to be associated with fewer adverse effects compared with NSAIDs.	

Study	Methodology	Results	Comments and evidence level
	- Depth of insertion: 40-60mm **- Response sought**: De-chi **- Needle stimulation:** Manual stimulation 10 min intervals + EA **- Needle retention time** 30 minutes **- Needle type:** 0.3 x 50-75 mm **Treatment Regimen** **- Number of treatment sessions:** 20 **- Frequency and duration:** 2 x daily for 10 days **Practitioner qualifications and background** Not reported Du et al 2010 **Intervention:** **- Depth of insertion**: 45-60mm **- Response sought**: De-chi **- Needle stimulation:** EA **- Needle retention time** 45 minutes **- Needle type:** 0.45 x 75 mm **Treatment Regimen** **- Number of treatment sessions:** 4 **- Frequency and duration:** 3 x week **Practitioner qualifications and background** Not reported Chen 2010 **Intervention:** **- Depth of insertion**: 40-75mm **- Response sought**: De-chi **- Needle stimulation:** Manual stimulation **- Needle retention time** 30 minutes **- Needle type:** 0.3 x 25-40 mm **Treatment Regimen** **- Number of treatment sessions:** 2 **- Frequency and duration:** 3 x week **Practitioner qualifications and background** Not reported Wang 2008 **Intervention:** **- Depth of insertion**: Not reported		

Study	Methodology	Results	Comments and evidence level
	- Response sought: De-chi **- Needle stimulation:** Warm acupuncture **- Needle retention time** Not reported **- Needle type:** 0.4 x 75 mm **Treatment Regimen** **- Number of treatment sessions:** 20 **- Frequency and duration:** 2 x daily for 10 days **Practitioner qualifications and background** Not reported <u>Meng 2008</u> **Intervention:** **- Depth of insertion**: Not reported **- Response sought**: Not reported **- Needle stimulation:** EA **- Needle retention time** 30 mins **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** 18 **- Frequency and duration:** 2 x daily for 7 days **Practitioner qualifications and background** Qualified acupuncturist <u>Ren 2013</u> **Intervention:** **- Depth of insertion**: 40-75 mm **- Response sought**: De-chi **- Needle stimulation:** Warm acupuncture **- Needle retention time** 30 mins **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** 10 **- Frequency and duration:** 1 x daily for 10 days **Practitioner qualifications and background** Not reported <u>Zhao 2004</u> **Intervention:** **- Depth of insertion**: 50-75 mm **- Response sought**: De-chi		

Study	Methodology	Results	Comments and evidence level
	- Needle stimulation: EA **- Needle retention time** 30 mins **- Needle type:** 0.25 x 75 mm **Treatment Regimen** **- Number of treatment sessions:** 20 **- Frequency and duration:** 2 x daily for 10 days **Practitioner qualifications and background** Not reported		
Yuan, Q, Gou, T, Liu, L, Sun, F & Zhang, Y **Traditional Chinese medicine for neck pain and low back pain: A systematic review and meta-analysis** **2015** Databases **MEDLINE, EMBASE, Cochrane Library, TCMLARS, CNKI and the Wan Fang database** Relevant included studies which have not been reported in previous data extractions: **Liang et al 2011** **Itoh et al 2007** **Zhang et al 2003** **Giles et al 2003** **Li et al 2006** **Miyaza et al 2009** **Hasegawa et al 2013** **Giles et al 2003** **Cho et al 2013** **Vas et al 2012** **Xu et al 2009** **Li & Chen 2009** **Liu et al 2008** **Braun et al 2011**	**Studies** – All 75 RCTs Participants: n=11077 ranging from 17 to 90 years **Inclusion:** - RCTs published in the English or Chinese language - Men or women (age >17 years) with NP or LBP (with or without radiating pain) of any duration - At least one of the therapies assessed pertains to TCM - A comparison should be done between TCM and other treatment (e.g. TCM versus other treatment, TCM versus no treatment, TCM plus other treatment versus other treatment) - At least one of the following outcomes was evaluated: pain intensity or disability - The duration of follow-up should be at least one day after all treatment sessions were concluded according to the study intervention group of each corresponding trial **Exclusion:** - Trials of neck or back pain caused by trauma, infection, cauda equina syndrome, bone rarefaction, compression fracture of a vertebral body, tumor, or fibromyalgia **Limits:** - English or Chinese language **Included studies** <u>Acupuncture:</u> *Neck:* n=18 studies Duration of treatment 25 mins (20, 30 mins) Treatment sessions: 8.5 (5.8, 10.5) Course of treatment: 4 weeks (3, 4.5 weeks) Number of acupoints selected: 6 (5.8, 10) *LBP:* n=31 studies Duration of treatment 25 mins (20, 30 mins) Treatment sessions: 10 (6, 12) Course of treatment: 4.5 (3.3, 7) weeks Number of acupoints selected: 9.8 (6, 14)	**Results and individual data reported in previous data extractions:** Fu 2009: Results reported in Trinh et al 2016 Nabeta et al 2002: Results reported in Trinh et al 2016 Birch & Jamison 1998: Results reported in Trinh et al 2016 Vas 2006: Results reported in Trinh et al 2016 & Lu et al 2011 White et al 2004: Results reported in Trinh et al 2016 & Lu et al 2011 Petrie & Hazelman 1986: Results reported in Trinh et al 2016 Irnich et al 2001: Results reported in Trinh et al 2016 & Lu et al 2011 Thomas et al 1991: Results reported in Trinh et al 2016 Giles & Muller 1999: Results reported in Trinh et al 2016 Coan et al 1982: Results reported in Trinh et al 2016 Cherkin et al 2009: Results reported in Xu et al 2013, Lam et al 2013 and Hutchinson et al 2012 Haake et al 2007: Results reported in Xu et al 2013, Lam et al 2013 and Hutchinson et al 2012 Itoh et al 2006: Results reported in Lu et al 2011 Brinkhaus et al 2006: Results reported in Xu et al 2013, Lam et al 2013 and Hutchinson et al 2012 Itoh et al 2004: Results reported in Tough et al 2009 Molsberger et al 2002: Results reported in Xu et al 2013, Lam et al 2013 and Madsen et al 2009 Leibing et al 2002: Results reported in Xu et al 2013, Lam et al 2013 and Madsen et al 2009 Kennedy et al 2008: Results reported in Lee et al 2013 and Lu et al 2011 Zaringhalam et al 2010: Results reported in Xu et al 2013 and Lam et al 2013 Witt et al 2006: Results reported in Lu et al 2011, Lam et al 2013 and Hutchinson et al 2012 Coan et al 1980: Results reported in Lam et al 2013 Itoh et al 2009: Results reported in Xu et al 2013 and Lam et al 2013 Grant et al 1999: Results reported in Xu et al 2013, Lam et al 2013 and Hutchinson et al 2012 Muller and Giles 2005: Results reported in Lam et al 2013 Wang and La 2004: Results reported in Qin et al 2015 Giles et al 1999: Results reported in Lam et al 2013 Yun et al 2012: Results reported in Lam et al 2013 Shankar et al 2012: Results reported in Lam et al 2013 Tsui and Cheing 2004: Results reported in Lam et al 2013 Sator-Katzenshlager et al 2004: Results reported in Tough et al 2009	**Reviewer comments** Comprehensive search strategy which was limited to studies published in English and Chinese. Nil restriction of publication status. Experts in the representative fields were also contacted for unpublished trials. Two evaluators independently extracted the data from the studies and evaluated the quality of trials included in the review. Comprehensive supplementary files supplied. Great reporting standards. Most included studies were of small sample size which may give rise to random errors. Most of the comparisons made had low strengths of evidence, others were moderate, and none were high. Clinical heterogeneities present in a number of the meta-analyses limit the translations of results. **Quality scores:** Guidelines for Systematic Reviews in the Cochrane Collaboration Back Review Group Q1 Was the method of randomization adequate? Yes: 48% of included studies Q2 Was the treatment allocation concealed? Yes: 42% of included studies Q3 Were the groups similar at baseline regarding the most important prognostic indicators? Yes: 63% of included studies

Study	Methodology	Results	Comments and evidence level
Lauche et al 2012a **Lauche et al 2012b** Research question **What is the evidence of the effectiveness of TCM treatments for NP and LBP in regards to pain and disability?** Funding **Supported by the Natural Scientific fund of China (no. 81371987, 81171761)**	<u>Cupping:</u> *Neck:* n=5 studies Duration of treatment 10 or 15 mins Treatment sessions: 5 (4, 6) Course of treatment: 2 weeks *LBP:* n=6 studies Duration of treatment 15 or 20 mins Treatment sessions: 7.5 (3.5, 10) Course of treatment: 3 (1.9, 3) weeks <u>Gua Sha:</u> *Neck:* n=2 studies Duration of treatment 15 or 30 mins Treatment sessions: 1 *LBP:* n=1 studies Duration of treatment 15 mins Treatment sessions: 1 <u>Moxibustion:</u> *Neck & LBP:* n=0 studies <u>Tuina:</u> *Neck & LBP:* n=0 studies	Yeung et al 2003: Results reported in Xu et al 2013b Meng et al 2003: Results reported in Xu et al 2013 and Lam et al 2013 Hunter et al 2012: Results reported in Lam et al 2013 Lauche et al 2011: Results reported in Cao et al 2014 Lauche et al 2013; Results reported in Cao et al 2014 Cramer et al 2011: Results reported in Cao et al 2014 Kim et al 2012: Results reported in Cao et al 2014 Hong et al 2006: Results reported in Kim et al 2011 Faradi et al 2009: Results reported in Kim et al 2011 and Cao et al 2014 Kim et al 2011: Results reported in Cao et al 2014 **Adverse effects:** <u>Liang et al 2011</u> Local bleeding on the selected points, local numbness and aching, and fainting during acupuncture. seven participants (three in the study group and four in the control group) fainted. Four participants in the study group and two in the control group complained of feeling numb and aching on the treated points <u>Zhang et al 2003</u> Intervention group in therapeutic effect and improvement of pain for cervical spondylosis is better than the control group <u>Giles et al 2003</u> Mild side effects <u>Cho et al 2013</u> Total 10 persons reported: Temporarily worsened LBP (4), Pain at acupunctured site (2), Bruise of acupunctured site (1), Pain, numbness, or other bothersomeness in leg (including knee) (1), Shoulder pain (2) <u>Vas et al 2012</u> No serious adverse reaction was recorded; With respect to adverse effects provoked by all classes of acupuncture treatment, 8 patients (3.9%) reported increased pain after the treatment session, 3 in the intervention group, 3 in the control group 1, and 2 in the control group 2 <u>Braun et al 2011</u> Slight muscle aches and soreness in application area <u>Lauche et al 2012a</u> No adverse events were reported <u>Lauche et al 2012b</u>	Q4 Was the patient blinded to the intervention Yes: 41% of included studies Q5 Was the care provider blinded to the intervention? Yes: 3% of included studies Q6 Was the outcome assessor blinded to the intervention? Yes: 30% of included studies Q7 Were co-interventions avoided or similar? Yes: 26% of included studies Q8 Was the compliance acceptable in all groups? Yes: 22% of included studies Q9 Was the drop-out rate described and acceptable? Yes: 58% of included studies Q10 Was the timing of the outcome assessment in all groups similar? Yes: 70% of included studies Q11 Did the analysis include an intention-to-treat analysis? Yes: 44% of included studies Q12 Are reports of the study free of suggestion of selective outcome reporting? Yes: 42% of included studies **Grade:** HQ (++) **Quality:** 1+

Study	Methodology	Results	Comments and evidence level
		No adverse events were reported Itoh et al 2007, Zhu et al 2002, Giles et al 2003, Li et al 2006, Miyaza et al 2009, Hasegawa et al 2013, Xu et al 2009, Li et al 2009 & Liu et al 2008 Adverse events not reported Summary: No serious or life-threatening adverse events were found. Trials found some adverse events, which were minor and transient.	

Yuan et al. 2015 results of relevant included studies which have not been reported in previous data extractions

Author	Study Characteristics	Population	Condition	Intervention	Results: Pain, Disability	Results: QOL
Acupuncture for NP						
Liang et al 2011	**Treatment duration**: 3 wks **Follow up duration** (last assessment): 3 months **Inclusion**:(a)18 to 60 yrs; (b) neck pain or stiffness, >=1 monthly recurrence, >=6 months; (c) (VAS,0-10) 3-7 points **Exclusion**: (a) had received acupuncture due to neck pain in the past 6 months; (b) were unwilling to following the study; (c) had a history of cervical or thoracic (i.e., T1—T6) vertebra trauma, or had received surgery on the neck or had systematic neurological, skeletal disorders (i.e., positive finding in radiological examination); (d) afraid of acupuncture treatment	**Mean age (SD/range)**: IG= 36.72 (10. 21) yrs CG= 37.25 (9.56) yrs **% of female**: 72.5% **Co morbidities**: NR **Prior CAM intervention**: no acupuncture for neck pain **Prior surgery related to current complaint**: no surgery for neck pain	**Cause of Pain**: Chronic neck **Duration of Pain**: IG= 50.43 (49.61) months CG=44.89 (36.78) months >= 6months **Severity of pain (Grading)**: VAS (0-10) IG= 5.30 (1.91) CG= 5.49 (1.56) **Co-interventions**: NR	**Groups** **IG** (n = 93) – Traditional acupuncture: 3 times per week during a total of 3 wks, nine sessions, 20 mins, inserted into the muscle (to a depth of 20mm), true acupoints. **Drop outs**: A = 0, B =3, C=2 **CG** (n = 97) – Sham: sham points which were 1 cm lateral to the standard acupuncture points selected in the study group. Other the same as IG. **Drop outs**: A = 0, B =4, C=3	**Outcomes:** **Pain**: VAS (0-10cm) **Disability**: NPQ (0-100)% **Results-Baseline:** mean (SD) Pain**:** IG= 5.30 (1.91); CG= 5.49 (1.56) Disability: IG = 32.73 (12.48), CG = 33.03 (10.64) **Immediate post treatment**: Pain**:** IG = 3.48 (2.04), CG = 4.01 (1.45) Disability: IG = 20.71 (11.91), CG = 24.04 (11.83) **1 month:** Pain**:** IG = 2.89 (1.59), CG = 3.49 (1.41) Disability: IG = 17.44 (9.87), CG = 21.59 (12.23) **Short term**: Pain**:** IG = 2.88 (1.72), CG = 3.19 (1.31) Disability: IG = 19.09 (9.94), CG = 23.53 (13.67)	**Outcome instruments**: **QoL/ well being**: SF-36 (GH) (0-100) **Results:** **Baseline**: IG = 49.14 (17.96), CG = 53.48 (15.93) **immediate post treatment**: IG = 57.79 (16.74), CG = 56.58 (16.19) **1 month:** IG = 60.71 (17.23), CG = 57.87 (16.92) **Short term**: IG = 60.76 (16.51), CG = 59.90 (17.40) **intermediate**: NR **Long term**: NR
Itoh et al 2007	**Treatment duration**: 3 wks **Follow up duration** (last assessment): 3 months N randomized: 36 N completed treatment: 31 N attended last follow up: 31 **Inclusion**: Pts with CNP (> 6mo) age>=45 yrs, no radiation of NP, well functioning cervical nerve, deep tendon reflexes, voluntary muscle action **Exclusion**: Major trauma or systemic disease, other ongoing treatment except	**Mean age (SD/range)**: IG1= 62.3(11) yrs IG2= 62.3(10.1) yrs **% of female**: 72.5% **Racial composition**: Asian **Co morbidities**: NR **Prior episode of pain if acute**: NR	**Cause of Pain**: N-S NP **Duration of Pain**: IG= 3.2(3.1) CG=2.9 (2.7) yrs	**Groups** **IG1** (n = 8) – Traditional acupuncture: needles inserted into muscle to depth of 20min- “sparrow pecking” technique-needle retention for 10 min-or until “deqi” sensation; 3wks **Drop outs**: A = 2 IG (n=8)- TP-Acu: applied to myofascial TPs located by palpation, local twitch elicided-similar technique as IG1; 3wks **Drop outs**: A = 2 **CG1**(n = 10)- Non-TP-Acu: NR; NR	**Outcomes:** **Pain**: VAS (0-100mm) **Disability**: NDI **Results-Baseline:** mean (SD) Pain**:** IG1= 69.5(18.6); IG2=67(13.2), CG1= 70.9(14), CG2=64.1(20.7) Disability: IG1= 12.6(6); IG2=13(6.3), CG1= 15.1(2.7), CG2=12(3.6) **Immediate** IG1=45.9(17.5); IG2=18.6(18.5), CG1= 58.4(16.9), CG2=54.6(20) Disability: IG1=	**Outcome instruments**: **QoL/ well being**: NR **Other**: NR **Results:** **Baseline**: NR **immediate post treatment**: NR **1 month:**NR **Short term**: NR **intermediate**: NR **Long term**: NR

Study	Methodology			Results		Comments and evidence level
	those receiving unified dosage for a month or longer	**Prior CAM intervention**: NR		**CG2** (n = 10) – Sham: NR; NR	9.3(5.2); IG2=3.9(3.4), CG1= 12.8(2.1), CG2=11.3(3.3) **Short term:** Disability (combined): IG=10.9(6.6), CG=11.1(5)	
Zhang et al 2003	**Treatment duration**: 45d **Follow up duration** (last assessment): NR N randomized:120 N completed treatment: 120 **Inclusion**: cervical spondylosis **Exclusion**: acute external injury cause, not compliant	**Mean age (SD/range)**: NR **% of female**: IG=66.7%, CG=45% **Racial composition**: Asian **Co morbidities**: NR **Prior episode of pain if acute**: NR	**Cause of Pain**: Spondylosis, NP **Duration of Pain**: NR **Severity of pain (Grading)**: NR **Co-interventions**: NR	**Groups** **IG** (n = 60) – EA: tianzhu, jinbailao and dashu (bilaterally) for major acu points, frequency 120-250/min, 1 treatment/d, 15treatment/course, 3 courses, 2d interval between courses **Drop outs**: B=0 **CG** (n = 60) – Traction:30 min, average traction weight =7.5kg; **Drop outs**: B=0	**Outcomes:** **Pain**: VAS (10cm), **Disability**: NR **Results:** mean (SD) **Immediate post treatment**: Pain**:** IG = 3.66±2.3, CG = 3.29±1.86 Disability: IG = 25.98±23.67, CG = 25.85±20.27 **Short term**: NR	**Outcome instruments**: **QoL/ well being**: NR **Other**: NR **Results:** **Baseline**: NR **immediate post treatment**: NR **1 month:**NR **Short term**: NR **intermediate**: NR **Long term**: NR
Giles et al 2003	**Treatment duration**: 9 wks **Follow up duration** (last assessment): 12 mo N screened: 109 N randomized:109 N completed treatment: 109 N attended last follow up: 62 **Inclusion**: age >=17yrs with uncomplicated mechanical spinal pain for minimum of 13 wks **Exclusion**: nerve root involvement, spinal anomalies, pathology other than mild-moderate osteoarthritis, leg length inequality >9mm with postural scoliosis	**Mean age (SD/range)**: IG1= 23.8(4.8) IG2= 25(8.1), CG= 29.5(2.07) yrs **% of female**: 45% total **Racial composition**: NR **Co morbidities**: NR **Prior episode of pain if acute**: NR **Prior CAM intervention**: NR **Prior surgery related to current complaint**: None	**Cause of Pain**: N-S, NP, LBP, thorax **Duration of Pain**: Chronic (>13 wks) **Severity of pain (Grading)**: NR **Co-interventions**: None	**Groups** **IG1** (n = 34) – Acupuncture: near and far techniques as chosen by clinician; 2 treatment /wk, max. of 9 wks **Drop outs**: B= 12 **IG2** (n=35)- Spinal manipulation: 20 min appointments. High-velocity, low-amplitude thrust SM to a joint; same as IG1 **Drop outs**: B=10 **CG** (n = 40)- Medication: celecoxib/celebrx (200-400 mg/d); rofecoxib /vioxx (12.5-25 mg/d); NR **Drop outs**: B=18	**Outcomes:** **Pain**: VAS (0-100 mm), **Disability**: ODI **Results:** mean (SD) Baseline: Pain: IG1= 6(2.2); IG2= 6(2.9), CG= 5(3.7) Dsiability: IG1= 30(17.03); IG2=-22(22.96), CG= 32(19.3) **Immediate post treatment**: Pain: IG1= 4(4.4); IG2= 5(3.7), CG= 6(4.4) Dsiability: IG1= 26(20.74); IG2= 14(24.4), CG= 32(23.7) **Short term: NR**	**Outcome instruments**: **QoL/ well being**: SF-36 **Other**: NR **Results:** **Baseline**: NR **immediate post treatment**: NR **1 month:** NR **Short term**: NR **intermediate**: NR **Long term**: NR
Li et al 2006	**Treatment duration**: 2-4 wks **Follow up duration** (last assessment): 6 mo N screened: 150 N randomized:150 N completed treatment: 150 N attended last follow up: 150 **Inclusion**: spinal stenosis of neck; age <69 yrs; disease course< 2yrs; diagnosed by CT or MRI; related signs are positive	**Mean age (SD/range)**: 49 yrs total **% of female**: 46% **Co morbidities**: NR **Prior episode of pain if acute**: NR **Prior CAM intervention**: NR	**Cause of Pain**: NP **Duration of Pain**: Chronic (3 mo- 2yrs) **Co-interventions**: None	**Groups** **IG1** (n = 50) –acupuncture: acupuncture at ashi points and then warm needle; 15 min/2 wks **Drop outs**: C=0 CG (n=50)- Spinal manipulation: NR; 1treatment/wk, 3-4wks **Drop outs**: C=0	**Outcomes:** **Pain**: VAS (0-10 cm) **Disability**: NR **Results:** mean (SD) Baseline: IG=8.84(1.81), CG=8.81(1.82) **Immediate post treatment**: NR **Short term:** IG=4.46(3.11), CG=4.43(2.51)	**Outcome instruments**: **QoL/ well being**: SF-36 **Other**: NR **Results:** **Baseline**: NR **immediate post treatment**: NR **1 month:** NR **Short term**: NR **intermediate**: NR

Study	Methodology			Results		Comments and evidence level
	Exclusion: spinal trauma in 4 mo; systemic infection and fever; cervical tumor	**Prior surgery related to current complaint**: NR				**Long term**: NR
Acupuncture for LBP						
Miyazaki et al 2009	**Treatment duration**: 21 days **Follow up duration** (last assessment): 3 months N randomized:160 N completed treatment: 156 N attended last follow up: 143 **Inclusion**: chronic low back pain with duration >= 6 months and age 25–75 years **Exclusion**: contraindications to acupuncture	**Mean age (SD/range)**: 50.7 yrs, (range, 31–73 years) **% of female**: 33% **Co morbidities**: NR **Prior episode of pain if acute**: NR **Prior CAM intervention**: NR **Prior surgery related to current complaint**: NR	**Cause of Pain**: Non specific **Duration of Pain**: 11.3 (8.4) months	**Groups** **IG** (n = 80– acupuncture + rehabilitation: received acupuncture twice weekly, 10 sessions (in 21 days) as one therapeutic course, each session varied between 30 and 40 minutes. standardized 21-day inpatient rehabilitation program according to current German guidelines. **Drop outs**: A = 1, B =0, C=5 **CG** (n = 80 –rehabilitation: a standardized 21-day inpatient rehabilitation program according to current German guidelines. **Drop outs**: A = 3, B =0, C=8	**Outcomes:** **Pain**: VAS (0-100mm), **Disability**: NR **Results-Baseline:** mean (SD) Pain**:** NR Disability: NR **Immediate post treatment**: Pain**:** NR Disability: NR **Short term**: Pain**:** NR Disability: NR	**Outcome instruments**: **QoL/ well being**: SF-36 **Other**: NR **Results:** **Baseline**: NR **immediate post treatment**: NR **Short term**: NR **intermediate**: NR **Long term**: NR
Hasegawa et al 2013	**Treatment duration**: 4 wks **Follow up duration** (last assessment): 3 mo N screened: NR N randomized:80 N completed treatment: 80 N attended last follow up: 80 **Inclusion**: ages of 18-65 yrs, with NSLBP **Exclusion**: systemic diseases, contra-indications to acu, previous acu treatment, conflicting or ongoing treatment	**Mean age (SD/range)**: 18-65 (mean±SD 45.45±10.48) yrs **% of female**: 63.8% **Racial composition**: NR **Co morbidities**: NR **Prior episode of pain if acute**: NR	**Cause of Pain**: N-S, acute **Duration of Pain**: <1mth (mean±SD 15.25±11.35 days) **Severity of pain (Grading)**: 4-8 points (6.61±1.42) VAS **Co-interventions**: Medication (50 mg sodium diclofenac every 8 h)	**Groups** **IG** (n = 40 Acu: basic points D, H and I and kidney, bladder and liver points of Yamamoto's metho; Bilaterally/12 points /needles (0.20mm×13mm)/3-5mm; 30 min/5 x/4 wks(2x/wk for first wk followed 1x/wk for 3 wks)/ deqi NR **Drop outs**: 0 **CG** (n = 40–sham acupuncture: The same points, non-penetration, just handle contact; Other the same as IG. **Drop outs**: 0	**Outcomes:** **Pain**: VAS (0-10cm), **Disability**: RMQ **Results:** mean (SD) **Immediate post treatment**: Pain**:** IG = 1.74(2.07), CG = 3 (2.41) **Short term:** NR	**Outcome instruments**: **QoL/ well being**: SF-36 **Other**: NR **Results:** **Baseline**: **immediate post treatment**: NR **Short term**: NR **intermediate**: NR **Long term**: NR
Giles et al 2003	**Treatment duration**: 9 wks **Follow up duration** (last assessment): immediate post-treatment N screened: 533 N randomized: 115 N completed treatment: 69 N attended last follow up: 62 **Inclusion**: ages >17 yrs, with uncomplicated mechanical spinal pain (>13 wks) **Exclusion**: nerve root involvement, spinal abnormalies	**Mean age (SD/range)**: 25(8.1) yrs totally **% of female**: 55.1% totally **Co morbidities**: NR **Prior episode of pain if acute**: NR **Prior CAM intervention**: NR **Prior surgery related to current complaint**: NR	**Cause of Pain**: N-S, chronic **Duration of Pain**: > 13 wks **Severity of pain (Grading)**: NR **Co-interventions**: NR	**Groups** **IG** (n = 36– EA: depth of 20-50mm, trigger points, De Qi **Drop outs**: 14 **CG** (n =43–medication: anaesthetic had not been used previously **Drop outs**: 12	**Outcomes:** **Pain**: VAS (0-10cm), **Disability**: NR **Results-baseline:** mean (SD) **Immediate post treatment**: Pain**:** IG = 7(5.2), CG = 5 (3.7) **Short term:** NR	**Outcome instruments**: **QoL/ well being**: NR **Other**: NR **Results:** **Baseline**: **immediate post treatment**: NR

Study	Methodology			Results		Comments and evidence level
Cho et al 2013	**Treatment duration**: 6 wks **Follow up duration** (last assessment): 6 months N screened: 142 N randomized: 130 N completed treatment: 130 N attended last follow up: 116 **Inclusion**: cLBP lasting for at least the last 3 months and nonspecific, uncomplicated LBP that was intact on neurological examination. **Exclusion**: sciatic pain, serious spinal disorders including malignancy, vertebral fracture, spinal infection, inflammatory spondylitis, and cauda equine compression; history of previous spinal surgery; acupuncture treatment of LBP during the previous month; conditions that could compromise the safety of acupuncture; severe psychiatric or psychological	**Mean age (SD/range)**: 42.06 ± 14.04 yrs **% of female**: 84.5% **Co morbidities**: NR **Prior episode of pain if acute**: NR **Prior CAM intervention**: NR **Prior surgery related to current complaint**: NR	**Cause of Pain**: Non-specific **Duration of Pain**: >= 3 months **Severity of pain (Grading)**: VAS (0-10) IG= 6.52 ± 1.41 CG= 6.37 ± 1.18 **Co-interventions**: None	**Groups** **IG** (n = 65–Normal acupuncture: 12 sessions (2 times a week for 6 wk), 15 to 20 mins, inserted into the muscle (to a depth of 20mm), true acupoints. operated to get the due sensation called Diqi **Drop outs**: A = 0, B =7,C=0 **CG** (n = 65–Sham acupuncture: carried out using the same technique and protocol as real acupuncture, except for the use of a semi- blunt needle on non-acupuncture points without penetration. Eight predefined points at the lower back unrelated to traditional acupuncture points were used **Drop outs**: A = 0, B =6,C=1	**Outcomes:** **Pain**: VAS (0-10cm), **Disability**: ODI, **Results-Baseline:** mean (SD) Pain**:** IG= 6.52 ± 1.41; CG= 6.37 ± 1.18 Disability: NR **Immediate post treatment**: Pain**:** IG = 2.96 ± 2.39, CG = 4.28 ± 1.83 Disability: NR **2 weeks:** Pain**:** IG = 3.00 ± 2.41, CG = 4.10 ± 1.85 **Short term:** Pain**:** IG = 2.78 ± 2.32, CG = 4.06 ± 2.19 Disability: NR **Intermediate term**: Pain**:** IG = 2.79 ± 2.44, CG = 3.52 ± 2.53 Disability: NR	**Outcome instruments**: **QoL/ well being**: SF-36 **Other**: NR **Results:** **Baseline**: NR **immediate post treatment**: NR **Short term**: NR **intermediate**: NR **Long term**: NR
Vas et al 2012	**Treatment duration**: 2 weks **Follow up duration** (last assessment): 46 wks N screened: 381 N randomized:275 N completed treatment: 261 N attended last follow up: 210 **Inclusion**: new episode of N-S acute LBP (<2wks) with or without irradiation; working age; naive acu treatment **Exclusion**: More than one absence from work because of back pain within a period of 6 months; systemic or specific disease (e.g. tumor, fracture inflammation) contraindications for acu	**Mean age (SD/range)**: 18-65 (mean±SD 42.67±11.11) yrs **% of female**: 58.5% **Co morbidities**: NR **Prior episode of pain if acute**: NR	**Cause of Pain**: Acute, N-S, LBP **Duration of Pain**: <0.5 mth (mean±SD 6.06±3.72 days) **Severity of pain (Grading)**: (7.04±1.78) on VAS 10cm **Co-interventions**: Medications (NSAID, analgesics), posture recommendation	**Groups** **IG** (n = 68–real acu: N-UE-19, SI3, BL62, GV26, SI6, BL60, BL2, TE5, GB41, GB34; needle 0.25mm×25 or 40mm, with a depth of 0.5-1 cun;20min, 5treatment/2wks, "Deqi" **Drop outs**: A = 4, B =17,C=17 **CG1** (n = 68– Sham acu: LU6, LU10, LI12, SP5, PC6, PC5; penetration with a depth of 0.5-1 cun; Other the same as IG. **Drop outs**: A = 3, B =10, C=15 **CG2** (n = 69–placebo acu: 1 cun from L1-L4 spinous apophysis, blunt needles, non-penetration, at the same points as IG, no deqi; Other the same as IG. **Drop outs**: A = 5, B =18, C=20 **CG3** (n = 70–conventional treatment: avoid remaining in bed, drug prescribed (paracetamol, ibuprofen, diclophenac, ciclobenzaprin). In pts referral form, **Drop outs**: A = 2, B =10, C=13	**Outcomes:** **Pain**: VAS (0-10cm), **Disability**: RMQ **Immediate post treatment**: Pain**:** IG = 50pts improved, CG1 = 51 pts improved Disability: NR **Short term:** NR **Intermediate term**: NR	**Outcome instruments**: **QoL/ well being**: NR **Other**: NR **Results:** **Baseline**: NR **immediate post treatment**: NR **Short term**: NR **intermediate**: NR **Long term**: NR

Study	Methodology			Results		Comments and evidence level
Cupping for LBP						
Xu et al 2009	**Treatment duration**: 3 wks **Follow up duration** (last assessment): immediate post-treatment N screened: 105 N randomized:105 N completed treatment: 105 N attended last follow up: 105 **Inclusion**: (a) lower back pain; (b) current episode of LBP at work or morning. **Exclusion**: Cryptomerorachischisis, possible spinal pathology (e.g., carcinoma), disc prolapse, vertebral pedicle crack, The third lumbar transverse process syndrome	**Mean age (SD/range)**: IG1 = 40.6 (18.9)vs IG2=41.6(19.2) vs. CG =43.2 (16.6)yrs **% of female**: 36.2% **Co morbidities**: NR	**Cause of Pain**: Back strain **Duration of Pain**: IG1 = 46.4 (13.9) vs IG2=43.4(11.9) vs.CG =44.8 (11.4) months **Severity of pain (Grading)**: NR **Co-interventions**: NR	**Groups** **IG 1**(n =35) – Balance-cupping; Bilateral low back area, along BL and GV, every 2 days **Drop outs**: A = 0 **IG2** (n = 35) – Cupping with retention: Bilateral at BL, 15 min daily. **Drop outs**: A = 0 **CG** (n = 35) – Diclofenac: 50 mg, daily, orally **Drop outs**: A = 0	**Outcomes:** **Pain**: VAS(100mm) **Disability**: ODI (0-60) **Results-Baseline:** mean (SD) Pain**:** IG1 = 59.98 (12.91), IG2=58.76(13.69); CG = 57.32 (14.31) Disability: IG1 = 30.66 (8.49), IG2=28.41(9.46); CG = 30.03 (9.21) **Immediate post treatment**: Pain**:** IG1 = 10.21(5.81), IG2 = 17.32(6.95); CG = 16.57 (6.31) Disability: IG1 = 10.21 (3.69), IG2=14.72(5.43); CG = 16.93 (4.39) **Short term**: NR	**Outcome instruments**: **QoL/ well being**: NR **Results:** **Baseline**: NR **immediate post treatment**: NR **Short term**: NR **intermediate**: NR **Long term**: NR
Li et al 2009	**Treatment duration**: 3 wks **Follow up duration** (last assessment): immediate post-treatment N screened: unclear N randomized: 90 N completed treatment: 90 N attended last follow up: 90 **Inclusion**: (a) lower back pain; (b) current episode of LBP; (c) no systemic disease; (d) age 30-55 yrs **Exclusion**: spinal pathology (e.g., carcinoma), fracture, immune disease, nerve deficit, disc prolapse, vertebral pedicle crack	**Mean age (SD/range)**: IG1 = 30.5(8.9) vs IG2=31.7(9.7) vs. CG =30.9 (9.3) yrs. **% of female**: NR **Racial composition**: Asian **Co morbidities**: NR **Prior episode of pain if acute**: NR **Prior CAM intervention**: NR **Prior surgery related to current complaint**: NR	**Cause of Pain**: N-S, LBP **Duration of Pain**: IG1 = 12.9 (3.1) vs IG2=11.6(2.9) vs. CG =13.1 (3.5)mo **Severity of pain (Grading)**: NR **Co-interventions**: NR	**Groups** **IG 1**(n =30) – wet cupping; Bilateral low back area, ashi points, blood letting 10-20ml, cupping, once a week **Drop outs**: A = 0 **IG2** (n = 30) – Cupping with retention: Bilateral at BL, 15 min daily interval **Drop outs**: A = 0 **CG** (n = 30) – Diclofenac: 50 mg, daily, orally **Drop outs**: A = 0	**Outcomes:** **Pain**: VAS(10cm) **Disability**: ODI (0-60) **Results-Baseline:** mean (SD) Pain**:** IG1 = 5.8 (1.9), IG2=5.6(2.0); CG = 5.9 (2.1) Disability: IG1 = 31.6 (6.9), IG2=30.2(6.3); CG = 29.8 (6.1) **Immediate post treatment**: Pain**:** IG1 = 1.2(0.8), IG2 = 2.1(1.1); CG = 2.3 (1.4) Disability: IG1 = 9.8 (2.7), IG2=14.6(3.2); CG = 15.7 (3.8) **Short term**: NR	**Outcome instruments**: **QoL/ well being**: NR **Results:** **Baseline**: NR **immediate post treatment**: NR **Short term**: NR **intermediate**: NR **Long term**: NR
Liu et al 2008	**Treatment duration**: 3 wks **Follow up duration** (last assessment): immediate post-treatment N screened: 75 N randomized: 75 N completed treatment: 75	**Mean age (SD/range)**: IG1 = 39.1(17.1) vs IG2=38.6 (18.5) vs. CG =35.2 (14.3) yrs. **% of female**: 45.3% **Racial composition**: Asian	**Cause of Pain**: N-S, LBP **Duration of Pain**: IG1 = 28.7(9.9) vs IG2=26.9(7.8) vs. CG =24.9(9.3) mo	**Groups** **IG 1**(n =25) – Balance-cupping; Bilateral low back area, along BL and GV, every 2 days **Drop outs**: A = 0 **IG2** (n = 25) – Cupping with retention: Bilateral at BL, 15 min daily.	**Outcomes:** **Pain**: VAS(10cm) **Disability**: ODI (0-60) **Results-Baseline:** mean (SD) Pain**:** IG1 = 6.23 (1.64), IG2=5.97(1.75); CG = 5.86 (1.64)	**Outcome instruments**: **QoL/ well being**: NR **Results:** **Baseline**: NR **immediate post treatment**: NR **Short term**: NR **intermediate**: NR

Study	Methodology			Results		Comments and evidence level
	N attended last follow up: 75 **Inclusion**: (a) lower back pain; (b) current episode of LBP at work or morning; (c) no systemic disease; (d) no psychological illness; (e) age 35-65 yrs **Exclusion**: possible spinal pathology (e.g. carcinoma, fracture, osteoporosis), disc prolapse, self immune disease, nerve deficits	**Co morbidities**: NR **Prior episode of pain if acute**: NR **Prior CAM intervention**: NR **Prior surgery related to current complaint**: NR	**Severity of pain (Grading)**: NR **Co-interventions**: NR	**Drop outs**: A = 0 **CG** (n = 25) – Diclofenac: 50 mg, daily, orally **Drop outs**: A = 0	Disability: IG1 = 30.53 (8.43), IG2=28.69(9.57); CG = 29.72 (9.43) **Immediate post treatment**: Pain**:** IG1 = 1.23(0.32), IG2 = 1.79(0.53); CG = 1.88 (0.41) Disability: IG1 = 10.53 (3.43), IG2=14.69(5.57); CG = 15.72 (4.43) **Short term**: NR	**Long term**: NR
Gua sha for CNP						
Braun et al 2011	**Treatment duration**: 30min(s) **Follow up duration** (last assessment): 7d posttreatment N screened: 101 N randomized: 48 N completed treatment: 48 N attended last follow up: 44 **Inclusion**: Men and women, 18-70 yrs with a self-reported pain follow up restriction of cervical spine mobility, long-term (＞3 month(s)) NP, with ≥ 30 mm on VAS. **Exclusion**: Had undergone invasive treatment within the previous month, receiving anti-coagulants or had hemophilia, anemia, skin disease in the region of treatment, or a coexisting serious illness. participating in another study, experienced treatments with Gua sha or the ginger heat pad, undergone previous surgery in the neck region or had a manifest neurological deficit	**Mean age (SD/range)**: 58.5 ±8.0 yrs **% of female**: 85.5% **Co morbidities**: NR **Prior episode of pain if acute**: NR **Prior CAM intervention**: NR **Prior surgery related to current complaint**: NR	**Cause of Pain**: NR **Duration of Pain**: Mean duration of illness was about 8 yrs in both groups **Severity of pain (Grading)**: for average NP, week before the baseline measure, ≥ 30 mm on VAS **Co-interventions**: NR	**Groups** **IG** (n = 24)– Gua sha; 30min(s), totally once, using a small lid with a rounded edge and a skin lubricant **Drop outs**: A = 0, B = 3 **CG** (n = 24) – thermal therapy: once for 15–20 minutes, heat pad with external ginger (Chinese medicine) **Drop outs**: A = 0, B =1	**Outcomes:** **Pain**: VAS (0-100) **Disability**: NDI (0-100) **Results-Baseline:** mean±SD Pain**:** IG = 61.3±14.0 CG = 58.3±16.2 Disability: IG = 32.8±11.5, CG = 35.6±11.0 **Immediate post treatment**: 7 d average Pain: IG = 22.2±22.3, CG = 50.3±23.4 Disability: IG = 21.8±12.9, CG = 32.8±12.5 **Short term**: NR **Intermediate**: NR **Long term**: NR	**Outcome instruments**: **QoL/wellbeing**: SF-36(0 to 100) mental component, physical component **Other**: pain related to motion **Results:** mean±SD **Baseline**: [SF-mental] IG= 42.8±12.7; CG-= 41.6±12.0 [SF-physical] IG= 41.8±7.9; CG-= 41.2±9.8 **immediate post treatment**: 7 days, both improved significantly while IG compared with CG. **Short term**: NR **intermediate**: NR **Long term**: NR serious.
Lauche et al 2012a	**Treatment duration**: 10–15min(s) **Follow up duration** (last assessment): 7d posttreatment N screened: NR N randomized: 21 N completed treatment: 20 N attended last follow up: 20	**Mean age (SD/range)**: 58.5 ±8.0 yrs **% of female**: 81% **Co morbidities**: NR **Prior episode of**	**Cause of Pain**: NR **Duration of Pain**: duration of pain was > 3 month(s) in both groups **Severity of pain (Grading)**:	**Groups** **IG**(n=10) – Gua sha; 10–15min(s), totally once, using a small lid with a rounded edge and a skin lubricant, applied from C7 to T12 **Drop outs**: A = 0, B = 0 **CG** (n = 11) – wait list: no treatment **Drop outs**: A = 0, B =1	**Outcomes:** **Pain**: VAS (0-10) N based on ITT **Disability**: NR **Results-Baseline:** mean±SD Pain**:** IG = 4.3±1.7 CG = 5.2±1.6 Disability: NR **Immediate post treatment**: 7 days average	**Outcome instruments**: **QoL/wellbeing**: SF-36 (GH) **Other**: Pressure Pain Thresholds (PPT) **Results:** mean±SD **Baseline**: NR **immediate post treatment**: 7 days, both GH and PPT improved significantly while IG compared with CG

Study	Methodology				Results	Comments and evidence level
	Inclusion: Men and women, 18-75 yrs with N-S CNP at least five days a week, long-term (＞3 month(s)), with ≥ 4cm on VAS(0-10cm), previously excluded specific causes for pain **Exclusion**: Vertebral disc prolapse, trauma, inflammatory or malignant disease, and congenital malformation of the spine, as well as radicular. Anticoagulation treatment or a tendency to hemorrhage. Mental health disorders, pregnancy, had invasive treatments within the previous month, spinal surgery within the last year or previous treatment with corticosteroids or opiates	**pain if acute**: NR **Prior CAM intervention**: NR **Prior surgery related to current complaint**: NR	for average NP, week before the baseline measure, ≥ 4cm on VAS(0-10cm). **Co-interventions**: NR		Pain: IG = 3.0±2.2, CG = 5.1±1.4 Disability: NR **Short term**: NR **Intermediate**: NR **Long term**: NR	**Short term**: NR **intermediate**: NR **Long term**: NR
Gua sha for CLBP						
Lauche et al 2012b	**Treatment duration**: 10–15min(s) **Follow up duration** (last assessment): 7d posttreatment N screened: NR N randomized: 19 N completed treatment: 18 N attended last follow up: 18 **Inclusion**: Men and women, 18-75 yrs with N-S CLBP at least five days a week, long-term (>3 mo(s)), with ≥ 4cm on VAS(0-10cm), previously excluded specific causes for pain **Exclusion**: Vertebral disc prolapse, trauma, inflammatory or malignant disease, and congenital malformation of the spine, as well as radicular. Anticoagulation treatment or a tendency to hemorrhage. Mental health disorders, pregnancy, had invasive treatments within the previous month, spinal surgery within the last year or previous treatment with corticosteroids or opiate	**Mean age (SD/range)**: 58.5 ±8.0 yrs **% of female**: 72.2% **Co morbidities**: NR **Prior episode of pain if acute**: NR **Prior CAM intervention**: NR **Prior surgery related to current complaint**: NR	**Cause of Pain**: NR **Duration of Pain**: Mean duration of illness was about 8 yrs in both groups. **Severity of pain (Grading)**: for average LBP, week before the baseline measure, ≥ 30 mm on VAS **Co-interventions**: NR	**Groups** **IG** (n = 10)– Gua sha; 10–15 min(s), totally once, using a small lid with a rounded edge and a skin lubricant, applied from C7 to L5 **Drop outs**: A = 0, B = 0 **CG** (n = 9) – wait list: no treatment **Drop outs**: A = 0, B =1	**Outcomes:** **Pain**: VAS (0-10) **Disability**: NR **Results-Baseline:** mean±SD Pain**:** IG = 3.4±2.4 CG = 3.3±2.1 Disability: NR **Immediate post treatment**: 7 days average Pain: IG = 2.1±1.9, CG = 3.1±2.4 Disability: NR **Short term**: NR **Intermediate**: NR **Long term**: NR	**Outcome instruments**: **QoL/wellbeing**: SF-36(GH) **Other**: Pressure Pain Thresholds(PPT) **Results:** mean±SD **Baseline**: NR **immediate post treatment**: 7 days, GH improved significantly while IG compared with CG. However, not for PPT. **Short term**: NR **intermediate**: NR **Long term**: NR **Harms**: No adverse events were reported.

Study	Methodology	Results	Comments and evidence level

Yuan et al. 2015 Meta-analyses and sensitivity-analyses and subgroup-analyses of pain and disability

Number of Studies and Participants	Comparison	Outcome (Follow-Up Time)	Effect Size (95% CI)*	P Value	Model	I^2 (%)
Acupuncture in NP						
7, 428	Acupuncture v sham acupuncture	Pain (immediate term)	-0.58 [-0.94, -0.22] MD	0.001	Fixed	46.3
2, 290		Pain (1 month)	-0.72 [-1.07, -0.37] MD	0.000	Fixed	0
3, 319		Pain (short term)	-0.32 [-0.68, 0.04] MD	0.082	Fixed	0
4, 334		Disability (immediate term)	-0.29 [-0.51, -0.07] SMD	0.009	Fixed	0
2, 290		Disability (1 month)	-0.42 [-0.66, -0.19] SMD	0.000	Fixed	0
3, 305		Disability (short term)	-0.37 [-0.59, -0.14] SMD	0.001	Fixed	0
3, 272	Acupuncture v sham TENS	Pain (immediate term)	0.73 [-2.05, 3.51] MD	0.607	Random	96.6
2, 149		Pain (immediate term)	-0.53 [-1.84, 0.79] MD	0.433	Random	57.1
3, 227		Pain (short term)	0.45 [-0.98, 1.87] MD	0.539	Random	78.6
2, 142		Pain (short term)	-0.40 [-1.07, 0.27] MD	0.241	Fixed	44.6
3, 273		Disability (immediate term)	0.40 [-0.55, 1.36] SMD	0.409	Random	92.2
2, 150		Disability (immediate term)	-0.07 [-0.39, 0.25] SMD	0.686	Fixed	0
2, 143		Disability (short term)	-0.18 [-0.51, 0.15] SMD	0.274	Fixed	0
1, 108	Acupuncture v sham laser	Pain (immediate term)	-0.69 [-1.75, 0.37] MD	0.202	-	-
1, 108	Acupuncture v massage	Pain (immediate term)	-1.63 [-2.68, -0.58] MD	0.002	-	-
4, 146	Acupuncture v medication	Pain (immediate term)	-0.57 [-1.14, -0.01] SMD	0.048	Random	58.4
3, 116		Pain (immediate term)	-0.35 [-0.72, 0.01] SMD	0.060	Fixed	0
2, 94		Disability (immediate term)	-0.18 [-0.59, 0.23] SMD	0.387	Fixed	0
2, 99	Acupuncture v manipulation	Pain (immediate term)	-0.08 [-0.49, 0.32] SMD	0.682	Fixed	38.4
1, 100		Pain (short term)	0.01 [-0.38, 0.40] SMD	0.958	-	-
2, 99		Disability (immediate term)	0.49 [0.08, 0.89] SMD	0.019	Fixed	0
1, 120	Acupuncture v traction	Pain (immediate term)	1.31 [0.78, 1.84] MD	0.000	-	-
1, 30	Acupuncture v no treatment	Pain (immediate term)	26 [3.686, 183.418] OR	0.000	-	-
Acupuncture in LBP						
9, 1387	Acupuncture v sham acupuncture	Pain (immediate term)	-0.49 [-0.76, -0.21] SMD	0.000	Random	72.8
8, 1368		Pain (immediate term)	-0.36 [-0.54, -0.19] SMD	0.000	Random	39.7
6, 1261		Pain (short term)	-0.45 [-0.76, -0.14] SMD	0.004	Random	76.9
5, 1135		Pain (short term)	-0.31 [-0.56, -0.06] SMD	0.014	Random	56.2
4, 1184		Pain (intermediate term)	-0.17 [-0.28, -0.05] SMD	0.005	Fixed	0
5, 1536		Disability (immediate term)	-0.15 [-0.46, 0.16] SMD	0.336	Random	83.0

Study	Methodology		Results		Comments and evidence level	
4, 1517		Disability (immediate term)	0.00 [-0.20, 0.20] SMD	0.971	Random	66.0
3, 1436		Disability (short term)	0.07 [-0.10, 0.23] SMD	0.420	Random	51.8
2, 1226		Disability (short term)	0.14 [0.02, 0.25] SMD	0.019	Fixed	0
4, 1525		Disability (intermediate term)	-0.02 [-0.24, 0.20] SMD	0.856	Random	71.3
3, 1315		Disability (intermediate term)	0.07 [-0.12, 0.26] SMD	0.460	Random	54.1
3, 188	Acupuncture v sham acupuncture (acute LBP)	Pain (immediate term)	-0.99 [-1.24, -0.73] MD	0.000	Fixed	0
4, 2911	Acupuncture v no treatment	Pain (immediate term)	-0.73 [-0.96, -0.49] SMD	0.000	Random	53.2
3, 2686		Pain (immediate term)	-0.57 [-0.65, -0.49] SMD	0.000	Fixed	8.7
3, 451		Disability (immediate term)	-0.95 [-1.42, -0.48] SMD	0.000	Random	78.2
2, 267		Disability (immediate term)	-0.68 [-0.93, -0.42] SMD	0.000	Fixed	7.9
2, 70	Acupuncture v TENS	Pain (immediate term)	0.46 [-3.16, 4.08] MD	0.805	Random	73.4
2, 70		Pain (short term)	-1.02 [-3.08, 1.04] MD	0.333	Fixed	0
6, 242	Acupuncture v medication	Pain (immediate term)	-0.52 [-1.27, 0.23] MD	0.173	Fixed	42.9
4, 186		Disability (immediate term)	-0.23 [-0.52, 0.06] SMD	0.017	Fixed	28.7
6, 443	Acupuncture v usual care	Pain (immediate term)	-1.56 [-2.45, -0.67] SMD	0.001	Random	93.2
4, 195		Pain (immediate term)	-0.75 [-1.04, -0.46] SMD	0.000	Fixed	0
5, 383		Pain (follow-up)	-1.76 [-2.76, -0.75] SMD	0.001	Random	93.1
3, 135		Pain (follow-up)	-0.86 [-1.21, -0.50] SMD	0.000	Fixed	29.7
5, 320	Acupuncture plus usual care v usual care	Pain (immediate term)	-11.47 [-19.33, -3.61] MD	0.004	Random	59.9
4, 269		Pain (immediate term)	-14.41 [-19.38, -9.45] MD	0.000	Fixed	0
5, 320		Pain (follow-up)	-14.30 [-26.07, -2.54] MD	0.017	Random	82.1
4, 194		Pain (follow-up)	-8.50 [-14.50, -2.50] MD	0.006	Fixed	0
4, 195		Disability (immediate term)	-0.45 [-1.18, 0.29] SMD	0.231	Random	81.9
3, 144		Disability (immediate term)	-0.75 [-1.32, -0.19] SMD	0.009	Random	54
4, 195		Disability (follow-up)	-0.55 [-1.00, -0.10] SMD	0.016	Random	53.1
Cupping in NP						
2, 93	Cupping v waitlist	Pain (immediate term)	-19.10 [-27.61, -10.58]MD	0.000	Fixed	0
		Disability (immediate term)	-6.65 [-10.97, -2.32] MD	0.005	Fixed	1.2
1, 48	Cupping v standard medical care	Pain (immediate term)	-1.72 [-2.74, -0.70] MD	0.0009	-	-
		Disability (immediate term)	-5.78 [-10.80, -0.76] MD	0.025	-	-
1, 40	Cupping v heating pad	Pain (immediate term)	-36.30 [-46.48, -26.12]MD	0.0009	-	-
		Pain (short term)	-21.55 [-34.92, -8.18] MD	0.0009	-	-
		Disability (immediate term)	-7.69 [-13.68, -1.70] MD	0.025	-	-

Study	Methodology		Results		Comments and evidence level	
		Disability (short term)	-10.44 [-15.48, -5.40] MD	0.025	-	-
1, 61	Cupping v muscle relaxation	Pain (immediate term)	-0.16 [-13.90, 13.55] MD	0.98	-	-
		Disability (immediate term)	-2.18 [-4.56, -0.21] MD	0.07	-	-
Cupping in LBP						
4, 430	Cupping v medications	Pain (immediate term)	-0.54 [-0.89, -0.19] MD	0.003	Random	84.5
3, 180	Cupping (retention) v medications		-0.04 [-0.23, 0.15] MD	0.686	Random	0
2, 120	Cupping (balance) v medications		-0.65 [-0.81, -0.48] MD	0.000	Random	0
1, 60	Cupping (wet) v medications		-1.10 [-1.68, -0.52] MD	0.000	-	-
1, 70	Cupping (moving) v medications		-2.28 [-3.42, -1.14] MD	0.000	-	-
3, 360	Cupping v medications	Disability (immediate term)	-3.77 [-5.85, -1.69] MD	0.000	Random	83.8
3, 180	Cupping (retention) v medications		-1.41 [-2.67, -0.16] MD	0.028	Fixed	0
2, 120	Cupping (balance) v medications		-6.06 [-7.54, -4.57] MD	0.000	Fixed	0
1, 60	Cupping (wet) v medications		-5.90 [-7.57, -1.69] MD	0.000	-	-
1, 32	Cupping v waitlist	Pain (immediate term)	-6.9 [-19.16, 5.36] MD	0.27	-	-
		Pain (2 weeks)	-0.8 [-12.16, 10.56] MD	0.89	-	-
		Disability (immediate term)	-3.8 [-8.98, 1.38] MD	0.15	-	-
		Disability (2 weeks)	-2.4 [-8.48, 3.68] MD	0.44	-	-
1, 98	Cupping v usual care	Pain (short term)	-2.20 [-2.60, -1.70] MD	0.01	-	-
		Disability (short term)	-15.0 [-18.8, -11.2] MD	0.01	-	-
Gua sha in NP						
1,19	Gua sha v thermal therapy	Pain (immediate term)	-29.9 (-43.3, -16.6) MD	0.000	-	-
		Disability (immediate term)	-8.5 (-13.6, -3.5) MD	0.000	-	-
1,21	Gua sha v wait list	Pain (immediate term)	-1.6 (-3.0, -0.1) MD	0.000	-	-
Gua sha in LBP						
1,19	Gua sha v wait list	Pain (immediate term)	-1.1 (-2.0, -0.2) MD	0.000	-	-

Lee, J, Choi, T, Lee, M, Lee, H, Shin, B & Lee, H **Acupuncture for Acute Low Back Pain: A Systematic Review** **2013** Databases **Medline, Central, Embase & 2 Chinese databases: The China**	**Participants –** 11 included studies N=1139 **Inclusion:** - RCTS of acupuncture that involved needling for acute/subacute LBP - Reporting of outcome measures that looked at symptom or functional improvement - Patients with pain resulting from acute/subacute nonspecific LBP (<12 weeks) - Needle acupuncture including manual acupuncture, ear acupuncture, Korea hand acupuncture, warm needling, and EA - Types of control: Placebo or sham intervention such as superficial needling or nonpenetrating sham needling, active treatment or standard care or no pain relief	**Liu & Li 2010** Intervention: Acupuncture Control: Diclofenac Control 2: Acupuncture + Diclofenac NRS: At 5 days Acupuncture vs Diclofenac – not significant 3.2 ± 1.0 vs. 3.3 ± 1.0 p>0.05 Acupuncture + Diclofenac vs Diclofenac Combined Acupuncture and Diclofenac was significantly better than Diclofenac alone 4.9 ± 0.8 vs. 3.3 ± 1.0 P<0.00001	**Reviewer comments** Substandard search strategy with 3 English based databases and 2 Chinese databases searched. Language bias limited due to authors attempt to identify all relevant studies irrespective of language. Two independent reviewers identified citations, selected studies and extracted data. Adequacy of the Acupuncture treatment provided in the included

Study	Methodology	Results	Comments and evidence level
Academic Journal and China Doctor/Master's Dissertation Relevant Included Studies **Liu & Li 2010** **Lan 2009** **Kennedy et al 2008** **Kittang et al 2001** **Araki et al 2001** Research question **What is the evidence on effects of acupuncture for acute LBP?** Funding **Supported by Basic Science Research Program through the National Research Foundation of Korea, Daejeon, funded by the Korean Ministry of Education, Science and Technology, Seoul (No. 2005-0049404).**	**Exclusion:** - Nonrandomized or uncontrolled studies were excluded - Trials mainly associated with sciatica - Trials of acupuncture-related techniques without needling (eg, auricular seed, laser, injection, acupoint embedding, acupressure, moxibustion, or magnetic device) - Studies that assessed the combined effect of acupuncture with other related therapies (eg, acupuncture plus cupping) - Trials that compared 1 form of acupuncture with another - Trials comparing acupuncture with herbal medicine were excluded **Liu & Li 2010** **Intervention:** Acupuncture **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Ex-UE7, BL40, ashi points + additional points based on symptoms **- Depth of insertion**: Not reported **- Response sought**: Not reported **- Needle stimulation:** Not reported **- Needle retention time:** Not reported **- Needle type:** Not reported **Co-Intervention** Not reported **Treatment Regimen** **- Number of treatment sessions:** 5 **- Frequency and duration:** 1 x daily for 5 days **Practitioner qualifications and background** Not reported **Lan 2009** **Intervention:** Acupuncture + EA **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Ex-UE7, ashi points, GB30 **- Depth of insertion**: Not reported **- Response sought**: De-qi **- Needle stimulation:** Not reported **- Needle retention time:** Not reported **- Needle type:** Not reported **Co-Intervention** Back exercise with needles in place, no other treatment **Treatment Regimen** **- Number of treatment sessions:** 3 **- Frequency and duration:** 1 x daily for 3 days **Practitioner qualifications and background**	**Lan 2009** Intervention: EA Control: Ibuprofen VAS: EA vs Ibuprofen EA was significantly better than ibuprofen after each Session. After session 1: 4.89 ± 0.65 vs 7.31 ± 0.87 P<0.01 After session 2: 2.13 ± 0.43 vs 5.23 ± 0.88 P<0.01 After session 3: 0.18 ± 0.13 vs. 3.31 ± 0.76 P<0.01 **Kennedy et al 2008** Intervention: Acupuncture Control: Sham Acupuncture VAS Average: Acupuncture vs sham 4-6 week: Results not significant **Kittang et al 2001** Intervention: Acupuncture Control: Naproxen VAS Acupuncture vs Naproxen Nil significant difference at all time periods 1 week: 22.4 vs. 21.2 P>0.05 2 week: 13.0 vs. 12.9 P>0.05 3 month: 6.4 vs. 8.7 P>0.05 6 month: 9.6 vs. 14.4 P>0.05 **Araki et al 2001** Intervention: Acupuncture Control: Sham Acupuncture VAS Acupuncture vs Sham Immediately after 1 session: No significant difference 49. 9 ± 22.2 vs.51.8 ± 26.1 P=0.80 **Adverse effects:** Liu & Li 2010	RCTs was assessed by expert Acupuncturists to allow for further comparison and analysis. Only 5 of the 11 included studies within the SR were relevant to this review due to relevant outcome measures utilised. The relevant included studies were mostly of poor quality, with moderate to high risk of bias, which can impact on the results of this review. Statistical pooling was limited to clinically homogeneous studies reporting similar outcomes. **Quality scores:** Cochrane Back Review Group Risk of bias score: Chen 2010: 6/12 Liu & Li 2010: 5/12 Lan 2009: 5/12 Jin & Chen 2008: 6/12 Kennedy et al 2008: 11/12 Wu et al 2007: 6/12 Gao & Wei 2006: 6/12 Zheng 2005: 3/12 Kittang et al 2001: 5/12 Araki et al 2001: 12/12 **Grade:** AQ (+) **Quality:** 1

Study	Methodology	Results	Comments and evidence level
	Not reported **Kennedy et al 2008** **Intervention:** Acupuncture **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Selected points from GV3, GV4, BL23, BL25, GB29, GB30, GB31, GB34, BL36, BL37, BL40, BL56, BL60 **- Depth of insertion**: Not reported **- Response sought**: De-qi **- Needle stimulation:** Not reported **- Needle retention time:** Not reported **- Needle type:** Not reported **Co-Intervention** Back book + analgesics allowed **Treatment Regimen** **- Number of treatment sessions:** 3-12 sessions **- Frequency and duration:** 1-2 x week for 4-6 weeks **Practitioner qualifications and background** Not reported **Kittang et al 2001** **Intervention:** Acupuncture **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Ex-UE7, GV26, ashi points, ankles **- Depth of insertion**: Not reported **- Response sought**: Not reported **- Needle stimulation:** Not reported **- Needle retention time:** Not reported **- Needle type:** Not reported **Co-Intervention** Advice to increase physical activity **Treatment Regimen** **- Number of treatment sessions:** 4 sessions **- Frequency and duration:** 4 sessions in 2 weeks **Practitioner qualifications and background** Not reported **Araki et al 2001** **Intervention:** Acupuncture **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** SI13 **- Depth of insertion**: Not reported	Not reported Lan 2009 Not reported Kennedy et al 2008 Not reported Kittang et al 2001 1 patient reported more energy and 3 reported tiredness at 1 week, and 2 week, respectively in the Acupuncture group. 16 patients reported GI problems at 1 week, and 12 patients did so at 2 week in the medication group Araki et al 2001 Not reported	

Study	Methodology	Results	Comments and evidence level
	- Response sought: De-qi **- Needle stimulation:** Not reported **- Needle retention time:** Not reported **- Needle type:** Not reported **Co-Intervention** Back exercise with needles in place **Treatment Regimen** **- Number of treatment sessions:** 1 session **- Frequency and duration:** 1 session **Practitioner qualifications and background** Not reported		
Xu, Mai, Yin, X, Li, X, Gao, S, Han, R, Wei, L, Lou, W & Lei, G **Acupuncture for Chronic Low Back Pain in Long-Term Follow-Up: A Meta-Analysis of 13 Randomized Controlled Trials** **2013b** Databases **PubMed, Medline, AMED, EMBASE, CENTRAL, ISI Proceedings for Conference Abstracts, ISRCTN Register, mRCT, CNKI, Wan Fang, Complementary and Alternative Medicine Specialist Library, PEDro & CINAHL** Relevant Included Studies **Grant et al 1999** **Leibing et al 2002** **Molsberger et al 2002** **Kerr et al 2003** **Meng et al 2003** **Yeung et al 2003** **Kazunori et al 2006** **Brinkhaus et al 2006** **Thomas et al 2006** **Haake et al 2007**	**Participants** – All 13 RCTs n=2678 **Inclusion:** - Therapeutic RCTs - Outcomes: pain intensity and indexes related to the clinical outcome (e.g disability, QOL and spinal flexion) - Pain > 3 weeks - Long term follow up of between 4 weeks and one year - Intervention: Acupuncture that accompanied a definite feeling of "De Qi" - "Sham" acupuncture: either puncturing a location near the acupoint with tingling only but not "De Qi", or simulated acupuncture technique using a toothpick or other needle-like object in the needle guide tube **Exclusion:** - Studies with non-clinical outcome measures - Comparisons between the various acupuncture methods (e.g moxibustion, electroacupuncture) - Three-dimensional finite element analysis - Animal studies - Case reports, comparative studies without randomisation, expert opinions, editorials, letters, practice guidelines and reviews **Limits:** - RCTs **Acupuncture Intervention Assessment According to STRICTA:** Grant et al 1999: 11/17 Leibing et al 2002: 17/17 Molsberger et al 2002: 15/17 Kerr et al 2003: 11/17 Meng et al 2003: 13/17 Yeung et al 2003: 13/17 Brinkhaus et al 2006: 12/17	**Grant et al 1999** Outcome measures: VAS Pain SMD: -0.99 (-1.54, -0.44) **Leibing et al 2002** Outcome measures: VAS, Pain disability index Pain SMD: 0.05 (-0.38, 0.48) Disability SMD: -0.04 (-0.47, 0.38) **Molsberger et al 2002** Outcome measures: VAS Pain SMD: -1.17 (-1.62, -0.71) Pain SMD: -1.07 (-1.53, -0.6) **Kerr et al 2003** Outcome measures: VAS, SF-36 Pain SMD: -0.54 (-1.13, 0.06) QOL SMD: 0.06 (-0.52, 0.65) **Meng et al 2003** Outcome measures: VAS, Roland disability questionnaire Pain SMD: 0.41 (-0.16, 0.99) Disability SMD: -0.84 (-1.43, -0.24) **Yeung et al 2003** Outcome measures: NRS, Aberdeen low back pain scale Pain SMD: -1.03 (-1.61, -0.45) Disability SMD: -0.72 (-1.28, -0.16)	**Reviewer comments** Extensive search strategy. Two independent reviewers screened articles, extracted data and completed the risk of bias and quality evaluation. Risk of bias and report quality appraisal using Cochrane Back Review Group Criteria List and STRICTA respectively. Excellent reporting of the appraisals in table format, however, no information was reported regarding acupuncture intervention used within the included RCTs making it difficult to extract clinically relevant information. Conflicts of interest or funding not reported. Publication bias adequately assessed with no potential bias found in terms of pain intensity and pain disability. Clinical heterogeneity exists in the different interventions used within the included studies. The main biases that had the opportunity to affect the results were performance bias and detection bias. **Quality scores:** Cochrane Back Review Group Criteria List for Methodologic Quality Assessment of Randomized, Controlled Trials Grant et al 1999: 5/12 Leibing et al 2002: 8/12 Molsberger et al 2002: 8/12

Study	Methodology	Results	Comments and evidence level
Szczurko et al 2007 **Cherkin et al 2009** **Itoh et al 2009** **Zaringhalam et al 2010** Research question **What is the evidence of the effectiveness of Acupuncture for chronic low back pain in long term follow up?** Funding **Not reported**	Thomas et al 2006: 5/17 Haake et al 2007: 14/17 Szczurko et al 2007: 12/17 Cherkin et al 2009: 17/17 Itoh et al 2009: Not reported Zaringhalam et al 2010: 13/17 **Note: Individual data regarding the acupuncture intervention used within the included RCTs was not reported. **All studies:** **Intervention** - **Number of needles inserted per subject per session:** Not reported - **Names of points used:** Not reported - **Depth of insertion:** Not reported - **Response sought:** Not reported - **Needle stimulation:** Not reported - **Needle retention time:** Not reported - **Needle type:** Not reported **Treatment Regimen** - **Number of treatment sessions:** Not reported - **Frequency and duration:** Not reported **Practitioner qualifications and background** Not reported <u>Grant et al 1999</u> n=60 Mean age: 74 y.o Duration of LBP: >6 months <u>Leibing et al 2002</u> n= 131 Mean age: 48.1 y.o Duration of LBP: N/A <u>Molsberger et al 2002</u> n=186 Mean age: 50 y.o Duration of LBP: Mean 9.9 years	**Brinkhaus et al 2006** Outcome measures: VAS, Pain disability index, SF-36 Pain SMD: -0.08 (-0.36, 0.2) Pain SMD: -0.83 (-1.16, -0.50) Disability SMD: -0.10 (-0.42, 0.23) Disability SMD: -0.45 (-0.78, -0.13) QOL SMD: 0.43 (0.1, 0.76) QOL SMD: 0.87 (0.54, 1.21) **Kazunori et al 2006** Outcome measures: VAS Pain SMD: 1.03 (0.06, 1.99) Disability SMD: 0.51 (-0.41, 1.42) **Thomas et al 2006** Outcome measures: McGill present pain index, Oswestry pain disability index Pain SMD: -0.21 (-0.55, 0.13) Disability SMD: -0.32 (-0.65, 0.02) **Haake et al 2007** Outcome measures: Von Korff Chronic, Pain Grade Scale, SF-36 Pain SMD: -0.13 (-0.31, 0.04) Pain SMD: -0.49 (-0.67, -0.31) QOL SMD: 0.15 (-0.02, 0.33) QOL SMD: 0.71 (0.53, 0.89) **Szczurko et al 2007** Outcome measures: VAS Pain SMD: -1.52 (-2.07, -0.96) Disability SMD: -1.83 (-2.42, -1.25) **Cherkin et al 2009** Outcome measures: NRS, Roland disability questionnaire Pain SMD: 0.1 (-0.12, 0.31) Pain SMD: -0.43 (-0.64, -0.21) Disability SMD: -0.28 (-0.5, -0.06) Disability SMD: -0.21 (-0.43, 0.01) **Zaringhalam et al 2010** Outcome measures: VAS, Roland disability questionnaire, Oswestry pain disability index	Kerr et al 2003: 9/12 Meng et al 2003: 6/12 Yeung et al 2003: 9/12 Brinkhaus et al 2006: 10/12 Thomas et al 2006: 8/12 Haake et al 2007: 10/12 Szczurko et al 2007: 9/12 Cherkin et al 2009: 10/12 Itoh et al 2009: Not reported Zaringhalam et al 2010: 7/12 **Grade:** AQ (+) **Quality:** 1+

Study	Methodology	Results	Comments and evidence level
	Kerr et al 2003 n= 60 Mean age: 41 y.o Duration of LBP: N/A Meng et al 2003 n=47 Mean age: 71 y.o Duration of LBP: > 12 weeks Yeung et al 2003 n= 52 Mean age: 53 y.o Duration of LBP: 3-12 months Brinkhaus et al 2006 n=298 Mean age: Mean 59.8 y.o Duration of LBP: 14.7 years Thomas et al 2006 n=239 Mean age: N/A Duration of LBP: N/A Haake et al 2007 n=1162 Mean age: 50 y.o Duration of LBP: 8 years Szczurko et al 2007 n=75 Mean age: 46.6 y.o Duration of LBP:> 6 weeks Cherkin et al 2009 n=638 Mean age: 47 y.o Duration of LBP: 3-12 months	Pain SMD: -0.58 (-1.35, 0.19) Pain SMD: -0.58 (-1.35, 0.2) Disability SMD: -0.62 (-1.32, 0.22) Disability SMD: -0.55 (-1.32, 0.22) **Meta-analysis** Pain intensity: Acupuncture vs control (Overall) SMD: -0.43 (-0.64, -0.21). – Significant Acupuncture vs blank treatment SMD: -0.64 (-1.13, -0.14) – Significant Acupuncture vs other treatments SMD: -0.49 (-0.90, -0.09) – Significant Acupuncture vs sham SMD: -0.26 (-0.56, 0.05) – Non-significant Disability: Acupuncture vs control (Overall) SMD: -0.43 (-0.66, -0.21) Acupuncture vs sham: Not significant – nil statistics reported QOL: Acupuncture vs control (Overall) SMD: 0.47 (0.15, 0.78), Acupuncture vs sham: SMD: 0.22 (0.03, 0.40) **Secondary meta-analysis:** Only studies which defined chronic as > 12 weeks Results: Compared with sham acupuncture, acupuncture showed no superior benefit in the treatment of chronic low back pain in all four evaluation indexes (pain intensity, disability, spinal flexion and quality of life) **Adverse effects:**	

Study	Methodology	Results	Comments and evidence level
	Itoh et al 2009 n=Not reported Mean age: Not reported Duration of LBP: Not reported Zaringhalam et al 2010 n=80 Mean age: 50-60 y.o Duration of LBP: N/A	Not reported	
Lu, S, Zheng, Z & Xue, C **Does Acupuncture Improve Quality of Life for Patients with Pain Associated with the Spine? A Systematic Review** **2011** Databases **PubMed, CINAHL, Cochrane Central Register of Controlled Trials & EMBASE** Relevant Included Studies **Brinkhaus et al 2006** **Irnich et al 2001** **Itoh et al 2006** **Kerr et al 2003** **Vas et al 2006** **Kennedy et al 2008** **White et al 2004** **Witt et al 2006** Research question **What is the evidence of effectiveness of acupuncture on quality of life and pain for patients with pain associated with the spine?** Funding	**Participants** – All 8 RCTs n=3711 **Inclusion:** - Published RCTs - Trials on pain associated with the spine due to arthritis, disc protrusion, trauma, degeneration, or nonspecific origin - Trials comparing acupuncture with waiting-list or sham interventions - Pain duration: both acute (less than three months) and chronic (over three months) - Trials that used acupuncture involving skin penetrations in the treatment group including the use of the filiform needle, EA, warming needle, three edge needle, dermal needle and intradermal needle - Control groups were waiting-list, sham acupuncture, sham TENS, and sham laser treatment - Trial must have satisfied three criteria: 1: Included at least one QoL measure, using a validated questionnaire, such as SF-36, General Health Questionnaire, RMQ, European Quality of Life, Nottingham Health Profile, Hospital Anxiety Depression Scale, Pain Disability Index, Northwick Park Neck Pain Questionnaire, Oswestry Disability Index, Neck Disability Index, Neck Pain and Disability Index, or Japanese Orthopaedic Association Assessment 2: Used the VAS for pain assessment 3: Received a score of at least three on the Jadad scale **Exclusion:** - Trials that included pain associated with the spine due to cancer, tumour, infection, metastatic diseases, fractures, or neurological origin conditions **Limits:** - RCTs - English, German and Chinese Brinkhaus et al 2006 Low back pain > 6 months **Intervention** Acupuncture **- Number of needles inserted per subject per session:** 10	**Brinkhaus et al 2006** Intervention: Acupuncture Control: Sham acupuncture Control 2: Waiting list SF-36 Physical functioning immediate follow up SMD: 0.43 [0.14, 0.72] SF-36 Physical functioning intermediate term follow up (3mo-1yr) SMD: 0.28 [−0.01, 0.57] SF-36 mental functioning immediate follow up SMD: −0.04 [−0.33, 0.25] SF-36 mental functioning intermediate term follow up (3mo-1yr) SMD: 0.30 [0.01, 0.59] VAS pain immediate follow up SMD: 0.32 [0.03, 0.61] VAS pain intermediate term follow up (3mo-1yr) SMD: 0.19 [−0.10, 0.48] **Irnich et al 2001** Intervention: Acupuncture Control: Sham acupuncture SF-36 Physical functioning immediate follow up SMD: 0.29 [−0.09, 0.66] SF-36 Physical functioning short term follow up (< 3 months) SMD: −0.13 [−0.51, 0.25] VAS pain immediate follow up SMD: 0.25 [−0.13, 0.62] **Itoh et al 2006** Intervention: Acupuncture Control: Sham acupuncture SF-36 Physical functioning immediate follow up SMD: 2.16 [1.12, 3.21] SF-36 short term follow up (< 3 months) SMD: −0.56 [−1.44, 0.33] VAS pain immediate follow up SMD: 3.30 [2.00, 4.60] VAS pain short term follow up (< 3 months) SMD: 1.12 [0.18, 2.06] **Kerr et al 2003** Intervention: Acupuncture Control: Sham TENs VAS pain immediate follow up SMD: 0.39 [−0.20, 0.98]	**Reviewer comments** Comprehensive search strategy which included English, German and Chinese languages. One author conducted citation identification, trial selection and data extraction with a second author double checking. The reporting quality of the trials was assessed by one author. Sufficient follow-up of the included studies missing data. Inadequately reported assessment of bias conducted for the included studies. Excellent reporting of acupuncture interventions used within included RCTs using STRICA. Inclusion of both low back pain and neck pain in one review may be a source of heterogeneity. **Quality scores:** modified Jadad Scale - All studies > 3 on Jadad score - All studies appropriately randomised participants 3 studies did not blind participants from the type of interventions, of which one compared acupuncture with waiting-list (Witt et al 2006) and two (Kerr et al 2003 & Vas et al 200622) compared acupuncture with sham TENS. - All studies acupuncturists were not blinded

Study	Methodology	Results	Comments and evidence level
Supported by the National Health and Medical Research Council of Australia [ID 555411]	**- Names of points used:** BL20 to 34; BL50 to 54; GB30; GV3, 4, 5 and 6; Huatuojiaji and Shiqizhuixia. SI3; BL40, 60 and 62; KI3 and 7; GB31, 34 and 41; LR3 and GV14 and 20 **- Depth of insertion:** Not reported **- Response sought:** De qi **- Needle stimulation:** Manual stimulation **- Needle retention time:** 30 min **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** 12 **- Frequency and duration:** 2 x week for 4 weeks, 1 x week for 4 weeks **Practitioner qualifications and background** > 140 hours of training > 3 yrs experience **CoIntervention:** NSAID <u>Irnich et al 2001</u> Neck pain > 1 month **Intervention** Acupuncture **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Frequently used point SI3, BL10, BL60, LR3, GB20, GB34, TE5. APs: cervical. TPs in trapezius (near GB20) and levator scapulae (near SI14) **- Depth of insertion:** Not reported **- Response sought:** Local twitch response **- Needle stimulation:** Not reported **- Needle retention time:** 30 min **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** 5 **- Frequency and duration:** 5 sessions over 3 weeks **Practitioner qualifications and background** 4 experienced licensed medical acupuncturists; training not mentioned **Cointervention:** None <u>Itoh et al 2006</u> Low back pain > 6 months **Intervention** Acupuncture **- Number of needles inserted per subject per session:** 2-7 **- Names of points used:** TPs based on individual patients' response **- Depth of insertion:** Not reported **- Response sought:** Local twitch response	**Vas et al 2006** Intervention: Acupuncture Control: Sham TENs SF-36 Physical functioning immediate follow up SMD: 0.57 [0.21, 0.93] SF-36 mental functioning immediate follow up SMD: −0.03 [−0.39, 0.32] SF-36 Physical functioning short term follow up (3mo-1yr) SMD: 0.41 [−0.02, 0.84] SF-36 mental functioning intermediate term follow up (3mo-1yr) SMD: 0.20 [−0.23, 0.63] VAS pain immediate follow up SMD: 1.50 [1.10, 1.91] VAS pain intermediate term follow up (3mo-1yr) SMD: −0.54 [−0.97, −0.10] **Kennedy et al 2008** Intervention: Acupuncture Control: Sham acupuncture SF-36 Physical functioning immediate follow up SMD: −0.17 [−0.74, 0.39] SF-36 short term follow up (< 3 months) SMD: −0.43 [−1.00, 0.15] VAS pain immediate follow up SMD: 0.33 [−0.24, 0.90] VAS pain short term follow up (< 3 months) SMD: 0.50 [−0.08, 1.07] **White et al 2004** Intervention: Acupuncture Control: Sham TENs SF-36 Physical functioning immediate follow up SMD: 0.07 [−0.28, 0.42] SF-36 Physical functioning short term follow up (< 3 months) SMD: −0.13 [−0.49, 0.23] SF-36 mental functioning immediate follow up SMD: −0.05 [−0.41, 0.30] SF-36 mental functioning short term follow up (< 3 months) SMD: 0.23 [−0.13, 0.59] VAS pain immediate follow up SMD: 0.48 [0.13, 0.84] VAS pain short term follow up (< 3 months) SMD: 0.29 [−0.07, 0.66] VAS pain intermediate term follow up (3mo-1yr) SMD: 0.13 [−0.25, 0.51] **Witt et al 2006** Intervention: Acupuncture Control: Waiting list No data reported **Meta-analysis** <u>Acupuncture vs sham intervention for physical functioning:</u> SF-36 Physical functioning immediate follow up SMD: 0.40 [0.06, 0.74] - 6 studies SF-36 Physical functioning short term follow up (< 3 months) SMD: −0.21 [−0.44, 0.02] - 4 studies	- Assessors were blinded in five studies (Irnich et al 2001, Itoh et al 2006, Kennedy et al 2008 & Vas et al 2006) - Assessor blinding was not reported in three trials (Brinkhaus et al 2006, White et al 2004 & Witt et al 2006) **Grade:** LQ (-) **Quality:** 1

Study	Methodology	Results	Comments and evidence level
	- Needle stimulation: Not reported **- Needle retention time:** 10 min **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** Not reported **- Frequency and duration:** Not reported **Practitioner qualifications and background** 4 years of training and 7 years of clinical experience **Cointervention:** Not reported <u>Kerr et al 2003</u> Low back pain > 6 months **Intervention** Acupuncture **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** BL23, BL25, GB30, BL40, KI3, and GV4 **- Depth of insertion:** Not reported **- Response sought:** De qi **- Needle stimulation:** Not reported **- Needle retention time:** 30 mins **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** 6 **- Frequency and duration:** 1 x week for 6 weeks **Practitioner qualifications and background** A chartered physiotherapist trained in acupuncture; experience not mentioned **Cointervention:** Standardised advice and exercise <u>Vas et al 2006</u> Neck pain > 3 months **Intervention** Acupuncture **- Number of needles inserted per subject per session:** 7-16 **- Names of points used:** GB20, GB21, LR3, LI4, GB34, BL10, GV14, SI3, BL62, GB39, Yintang, GV20, SP6. AP: shenmen, neck, liver, muscle relaxation, occiput, thalamus, ear kidney **- Depth of insertion:** Not reported **- Response sought:** De qi **- Needle stimulation:** Manual **- Needle retention time:** 30 mins **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** 5	SF-36 Physical functioning intermediate term follow up (3mo-1yr) SMD: 0.32 [0.08, 0.56] - 2 studies <u>Acupuncture vs sham intervention for mental functioning:</u> SF-36 mental functioning immediate follow up SMD: −0.04 [−0.23, 0.15] - 3 studies SF-36 mental functioning short term follow up (< 3 months) SMD: 0.23 [−0.13, 0.59] - 1 study SF-36 mental functioning intermediate term follow up (3mo-1yr) SMD: 0.27 [0.03, 0.51] - 2 studies <u>Acupuncture vs sham intervention for pain</u> VAS pain Immediate follow up SMD: 0.75 [−0.29, 1.22] - 7 studies VAS pain short term follow up (< 3 months) SMD: 0.47 [0.10, 0.84] - 3 studies VAS pain intermediate term follow up (3mo-1yr) SMD: −0.05 [−0.47, 0.37] - 3 studies **Adverse effects:** Not reported	

Study	Methodology	Results	Comments and evidence level
	- Frequency and duration: 2 x week for 2 weeks followed by 1 x week for 1 week **Practitioner qualifications and background** Accredited by the Beijing University of Medical Science (China) and >15 yrs clinical experience **Cointervention:** Auricular seeds Kennedy et al 2008 Low back pain < 12 weeks **Intervention** Acupuncture **- Number of needles inserted per subject per session:** 8-13 **- Names of points used:** GV3, GV4, BL23, 25, 36, 37, 40, 56, 60, GB29-31, 34 **- Depth of insertion:** Not reported **- Response sought:** De qi **- Needle stimulation:** Manual **- Needle retention time:** 30 mins **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** 3-12 **- Frequency and duration:** 4-6 weeks **Practitioner qualifications and background** Senior experienced physiotherapists with >= 10 yr experience and were members of the Acupuncture Association of Chartered Physiotherapists **Cointervention:** Staying active and routine medicine White et al 2004 Neck pain > 2 months **Intervention** Acupuncture **- Number of needles inserted per subject per session:** average: 6 **- Names of points used:** Not reported **- Depth of insertion:** Not reported **- Response sought:** De qi **- Needle stimulation:** Manual **- Needle retention time:** 20 mins **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** 8 **- Frequency and duration:** 2.x week for 4 weeks **Practitioner qualifications and background** Trained with the Association of Chartered Physiotherapists and 7 years' clinical experience **Cointervention:** Acetaminphen		

Study	Methodology	Results	Comments and evidence level
	Witt et al 2006 Low back pain > 6 months **Intervention** EA **- Number of needles inserted per subject per session:** At physician's discretion **- Names of points used:** At physician's discretion **- Depth of insertion:** Not reported **- Response sought:** At physician's discretion **- Needle stimulation:** At physician's discretion **- Needle retention time:** Not reported **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** 15 **- Frequency and duration:** 15 sessions over 3 months **Practitioner qualifications and background** At least >= 140 hours of training and wide variation trainings in style and acupuncture technique **Cointervention:** Conventional treatments		
Lam, M, Galvin, R & Curry, P **Effectiveness of Acupuncture for Nonspecific Chronic Low Back Pain** **2013** Databases **PubMed, EMBASE, AMED, CINAHL ScienceDirect, CENTRAL & Cochrane Library** Relevant Included Studies **Coan et al 1980** **MacDonald et al 1983** **Grant et al 1999** **Carlsson & Sjolund 2001** **Cherkin et al 2001** **Leibing et al 2002** **Molsberger et al 2002** **Kerr et al 2003** **Giles et al 2003** **Itoh et al 2005**	**Participants –** 25 included studies Age: range was between 17 and 90 years **Inclusion:** - RCTs that examined all forms of acupuncture that adhered to the Traditional Acupuncture Theory for treating nonspecific chronic low back pain - Outcome measures included impairment, activity limitation, and participation restriction - Patients 17 years of age or older with nonspecific chronic low back pain, defined as pain, tension, soreness, and/or stiffness in the lumbosacral region with or without radiating leg pain that lasts for 6 weeks or longer for which there is no specific underlying presumptive cause - Control group - patients who received no treatment, another active treatment including medication, physiotherapy, transcutaneous electrical nerve stimulation (TENS), exercise and spinal manipulative therapy, or a sham intervention - Studies in which acupuncture was prescribed in addition to other therapies and compared with these therapies alone **Exclusion:** - Conditions such as cancer, tumors, rheumatoid arthritis, degenerative diseases, deformity, inflammatory conditions - LBP, or pelvic pain due to pregnancy - Non RCTs **Limits:** - Nil date restriction - Nil language restriction **All studies:**	**Coan et al 1980** Intervention: Acupuncture Control: Wait list Postintervention Pain SMD: -0.94 (-1.52, -0.35) **MacDonald et al 1983** Intervention: Acupuncture Control: Placebo No data reported **Grant et al 1999** Intervention: Acupuncture Control: TENS No data reported **Carlsson & Sjolund 2001** Intervention: Acupuncture Control: Active placebo Control 2: TENS No data reported **Cherkin et al 2001** Intervention: Traditional Chinese medical acupuncture	**Reviewer comments** Adequate search strategy. Grey literature search conducted on Google Scholar. PRISMA guidelines were followed to conduct the review. One author identified and screened the titles and abstracts of the articles retrieved through electronic searches. Two authors independently assessed the full text articles to identify the eligible studies for inclusion and assessed the methodological quality for each included study. During data extraction authors of included studies were contacted if further information was required. Low methodological quality in many of the included studies. The included studies often failed to adequately blind participants, personnel, or outcome assessors, all of which are important elements of the internal validity of RCTs. Included studies were of substantial heterogeneity because of different methodologies, control groups, types of acupuncture administered, duration of treatment,

Study	Methodology	Results	Comments and evidence level
Thomas et al 2006 **Muller & Giles 2005** **Brinkhaus et al 2006a** **Brinkhaus et al 2006b** **Witt et al 2006** **Haake et al 2007** **Itoh et al 2009** **Cherkin et al 2009** **Zaringhalam et al 2010** **Hunter et al 2012** **Yun et al 2012** **Giles & Muller 1999** **Meng et al 2003** **Yeung et al 2003** **Tsui & Cheing 2004** **Lin et al 2010** **Shankar et al 2012** Research question **What is the evidence of effectiveness of acupuncture for nonspecific chronic low back pain?** Funding **Nil funds received in support of this review**	**- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Not reported **- Depth of insertion**: Not reported **- Response sought**: Not reported **- Needle stimulation:** Not reported **- Needle retention time:** Not reported **- Needle type:** Not reported **Practitioner qualifications and background** Not reported **<u>Coan et al 1980</u>** **Intervention:** Acupuncture **Co-Intervention** Nil **Treatment Regimen** **- Number of treatment sessions:** 10 **- Frequency and duration:** 1 x week for 10 weeks - **Treatment time:** Not reported **<u>MacDonald et al 1983</u>** **Intervention:** Acupuncture **Co-Intervention** Nil **Treatment Regimen** **- Number of treatment sessions:** 10 **- Frequency and duration:** 1 x week for 10 weeks - **Treatment time:** 20 mins **<u>Grant et al 1999</u>** **Intervention:** Acupuncture **Co-Intervention** Nil **Treatment Regimen** **- Number of treatment sessions:** 20 **- Frequency and duration:** Not reported - **Treatment time:** 20 mins **<u>Carlsson & Sjolund 2001</u>** **Intervention:** Acupuncture **Co-Intervention** Nil **Treatment Regimen** **- Number of treatment sessions:** 10 **- Frequency and duration:** Not reported	Control: Self-care education material No data reported **Leibing et al 2002** Intervention: Acupuncture Control: Sham Postintervention Pain SMD: -11.00 (-20.37, -1.63) Follow up – 36 weeks Pain SMD: -4.00 (-12.51, 4.51) Post intervention Disability SMD: -0.35 (-0.78, 0.08) Follow up – 36 weeks Disability SMD: -0.56 (-1.00, -0.13) **Molsberger et al 2002** Intervention: Acupuncture + Conventional orthopaedical care Control: Conventional orthopaedic care Postintervention Pain SMD: -10.00 (-16.99, 3.01) Follow up – 12 weeks Pain SMD: -20.00 (-27.55, -12.45) **Kerr et al 2003** Intervention: Acupuncture Control: Placebo Control 2: TENS No data reported **Giles et al 2003** Intervention: Acupuncture Control: Medication Postintervention Pain SMD: -10.00 (-32.16, 12.16) Postintervention Activity limitation SMD -0.34 (-0.8, 0.12) **Itoh et al 2005** Intervention: Standard acupuncture with traditional points Control: Superficial Postintervention Pain SMD: -5.1 (-28.76, 18.56) Follow up – 13 weeks' pain SMD: 6.7 (-20.13, 33.53) **Thomas et al 2006** Intervention: Traditional acupuncture Control: Usual care No data reported	outcome measures, and the presentation of the data. **Quality scores:** Cochrane risk of bias tool Coan et al 1980: Unclear risk of bias MacDonald et al 1983: High risk of bias Grant et al 1999: High risk of bias Carlsson & Sjolund 2001: Low risk of bias Cherkin et al 2001: Unclear risk of bias Leibing et al 2002: Unclear risk of bias Molsberger et al 2002: High risk of bias Kerr et al 2003: Unclear risk of bias Giles et al 2003: Low risk of bias Itoh et al 2005: Low risk of bias Thomas et al 2006: Not reported Muller & Giles 2005: High risk of bias Brinkhaus et al 2006a: Unclear risk of bias Brinkhaus et al 2006b: Unclear risk of bias Witt et al 2006: Unclear risk of bias Haake et al 2007: Low risk of bias Itoh et al 2009: Unclear risk of bias Cherkin et al 2009: Low risk of bias Zaringhalam et al 2010: Unclear risk of bias Hunter et al 2012: Unclear risk of bias Yun et al 2012: Low risk of bias Giles & Muller 1999: High risk of bias Meng et al 2003: High risk of bias Yeung et al 2003: Unclear risk of bias Tsui & Cheing 2004: Unclear risk of bias Lin et al 2010: Unclear risk of bias Shankar et al 2012: Unclear risk of bias **Grade:** AQ (+) **Quality:** 1+

Study	Methodology	Results	Comments and evidence level
	- **Treatment time:** Not reported **<u>Cherkin et al 2001</u>** **Intervention:** Traditional Chinese medical acupuncture **Co-Intervention** Nil **Treatment Regimen** **- Number of treatment sessions:** 10 **- Frequency and duration:** Not reported - **Treatment time:** Not reported **<u>Leibing et al 2002</u>** **Intervention:** Acupuncture **Co-Intervention** Nil **Treatment Regimen** **- Number of treatment sessions:** 20 **- Frequency and duration:** Not reported - **Treatment time:** 30 mins **<u>Molsberger et al 2002</u>** **Intervention:** Acupuncture **Co-Intervention** Conventional orthopaedic therapy **Treatment Regimen** **- Number of treatment sessions:** 12 **- Frequency and duration:** Not reported - **Treatment time:** 30 mins **<u>Kerr et al 2003</u>** **Intervention:** Acupuncture **Co-Intervention** Nil **Treatment Regimen** **- Number of treatment sessions:** 6 **- Frequency and duration:** Not reported - **Treatment time:** 30 mins **<u>Giles et al 2003</u>** **Intervention:** Acupuncture **Co-Intervention** Nil **Treatment Regimen** **- Number of treatment sessions:** 18 **- Frequency and duration:** Not reported	**Muller & Giles 2005** Intervention: Acupuncture Control: Medication Postintervention Pain SMD: 0.00 (-20.51, 20.51) Postintervention Activity limitation SMD -0.04 (-0.66, 0.59) **Brinkhaus et al 2006a** Intervention: Acupuncture Control: Superficial needling Postintervention Pain SMD: -9.2 (-17.45, -0.95) Follow up – 52 weeks' pain SMD: -7.7 (-16.17, 0.77) **Brinkhaus et al 2006b** Intervention: Acupuncture Control: Wait list control Postintervention Pain SMD: -0.88 (-1.16, -0.59) Postintervention Disability post intervention: -0.61 (-0.89, -0.33) **Witt et al 2006** Intervention: Acupuncture Control: Delayed acupuncture Postintervention Pain SMD: -0.56 (-0.64, -0.48) **Haake et al 2007** Intervention: Acupuncture Control: Sham acupuncture No data reported **Itoh et al 2009** Intervention: Acupuncture Control: TENS Postintervention Pain SMD: -16.5 (-36.61, 3.61) Follow up – 10 weeks Pain SMD: -8.9 (-30.16, 12.36) Post intervention Disability SMD: -1.07 (-2.14, -0.00) Follow up – 10 weeks Disability SMD: -0.23 (-1.22, 0.75) **Cherkin et al 2009** Intervention: Acupuncture Control: Usual care Postintervention Disability post intervention SMD: -1.26 (-1.58, -0.95)	

Study	Methodology	Results	Comments and evidence level
	- **Treatment time:** 20 mins **Itoh et al 2005** **Intervention:** Standard acupuncture with traditional points **Co-Intervention** Nil **Treatment Regimen** **- Number of treatment sessions:** 6 **- Frequency and duration:** Not reported - **Treatment time:** 30 mins **Thomas et al 2006** **Intervention:** Traditional acupuncture **Co-Intervention** Nil **Treatment Regimen** **- Number of treatment sessions:** 10 **- Frequency and duration:** Not reported - **Treatment time:** Not reported **Muller & Giles 2005** **Intervention:** Acupuncture **Co-Intervention** Nil **Treatment Regimen** **- Number of treatment sessions:** 18 **- Frequency and duration:** Not reported - **Treatment time:** 20 mins **Brinkhaus et al 2006 a** **Intervention:** Acupuncture **Co-Intervention** Nil **Treatment Regimen** **- Number of treatment sessions:** 12 **- Frequency and duration:** Not reported - **Treatment time:** 30 mins **Brinkhaus et al 2006b** **Intervention:** Acupuncture **Co-Intervention** Nil **Treatment Regimen** **- Number of treatment sessions:** 12 **- Frequency and duration:** Not reported	**Zaringhalam et al 2010** Intervention: Acupuncture Control: Baclofen Postintervention Pain SMD: -0.79 (-1.42, -0.16) Postintervention Disability post intervention SMD: -0.97 (-1.61, -0.33) **Hunter et al 2012** Intervention: Auricular acupuncture + exercise Control: Exercise No data reported **Yun et al 2012** Intervention: Standard acupuncture Control: Usual-care group received massage, Physical therapy, or NSAIDs No data reported **Giles & Muller 1999** Intervention: EA Control: NSAIDs No data reported **Meng et al 2003** Intervention: EA Control: Usual care (NSAIDs, muscle relaxants, paracetamol, back exercises) Postintervention Pain SMD: -0.6 (-1.15, -0.06) Follow up – 8 weeks Pain SMD: -0.81 (-1.37, -0.25) **Yeung et al 2003** Intervention: EA Control: Exercise Follow up – 4 weeks Pain SMD: -0.61 (-1.16, -0.05) **Tsui & Cheing 2004** Intervention: EA Control: Exercise Postintervention Pain SMD: -1.26 (-2.09, -0.44) Follow up – 8 weeks Pain SMD: -1.44 (-2.28, -0.59)	

Study	Methodology	Results	Comments and evidence level
	- **Treatment time:** 30 mins **<u>Witt et al 2006</u>** **Intervention:** Needle acupuncture **Co-Intervention** Nil **Treatment Regimen** **- Number of treatment sessions:** 15 max **- Frequency and duration:** Not reported - **Treatment time:** Not reported **<u>Haake et al 2007</u>** **Intervention:** Acupuncture **Co-Intervention** Nil **Treatment Regimen** **- Number of treatment sessions:** 10 **- Frequency and duration:** 2 x week for 5 weeks - **Treatment time:** 30 mins **<u>Itoh et al 2009</u>** **Intervention:** Acupuncture **Co-Intervention** Nil **Treatment Regimen** **- Number of treatment sessions:** 5 **- Frequency and duration:** Not reported - **Treatment time:** 15 mins **<u>Cherkin et al 2009</u>** **Intervention:** Standard acupuncture **Co-Intervention** Nil **Treatment Regimen** **- Number of treatment sessions:** 10 **- Frequency and duration:** Not reported - **Treatment time:** 20 mins **<u>Zaringhalam et al 2010</u>** **Intervention:** Acupuncture **Co-Intervention** Nil **Treatment Regimen** **- Number of treatment sessions:** 10 **- Frequency and duration:** Not reported	**Lin et al 2010** Intervention: EA Control: Control group No data reported **Shankar et al 2012** Intervention: EA Control: Conventional drug therapy (oral valdecoxib) with physiotherapy Postintervention Pain SMD: -0.52 (-1.04, -0.01) **<u>Meta-analysis results:</u>** **Acupuncture vs no treatment** 5 studies VAS or NPS: - Significant moderate difference between acupuncture and no treatment immediately postintervention (SMD = − 0.72 [95% CI, −0.94 to −0.49], P < 0.000; I2 = 51%) Function: immediately postintervention statistically significant difference between the intervention and the control (SMD = − 0.94 [95% CI, − 1.41 to − 0.47], P < 0.00, I2 = 78%) **Acupuncture vs medication** 3 studies VAS - Statistical but not clinically relevant difference in self-reported pain immediately postintervention (MD = − 10.56 [95% CI, −20.34 to −0.78], P = 0.03, I2 = 0%) Activity limitation - Significant moderate difference in favour of acupuncture with respect to the levels of activity limitation immediately postintervention (SMD = − 0.36 [95% CI, −0.67 to −0.04], P = 0.03, I2 = 7%) **Acupuncture vs TENS** 3 studies VAS - No significant difference found in self-reported pain intensity between acupuncture and TENS post intervention (P =1.00) and in the follow up range between 10 and 12 weeks (p=0.29) **Acupuncture vs Sham** 4 studies VAS - Acupuncture clinically more effective in reducing pain when compared with sham acupuncture (MD = −16.76 [95% CI, −33.33 to − 019], P =0.05, I2 = 90%) immediately postintervention 3 studies	

Study	Methodology	Results	Comments and evidence level
	- **Treatment time:** 20-25 mins **Hunter et al 2012** **Intervention:** Auricular acupuncture **Co-Intervention** Exercise **Treatment Regimen** **- Number of treatment sessions:** 6 **- Frequency and duration:** Not reported - **Treatment time:** 48 hours **Yun et al 2012** **Intervention:** Standard acupuncture **Co-Intervention** Nil **Treatment Regimen** **- Number of treatment sessions:** 18 **- Frequency and duration:** Not reported - **Treatment time:** 20 mins **Giles & Muller 1999** **Intervention:** EA **Co-Intervention** Nil **Treatment Regimen** **- Number of treatment sessions:** 6 - **Frequency and duration:** Not reported - **Treatment time:** 20 mins **Meng et al 2003** **Intervention:** EA **Co-Intervention** Nil **Treatment Regimen** **- Number of treatment sessions:** 10 **- Frequency and duration:** Not reported - **Treatment time:** 20 mins **Yeung et al 2003** **Intervention:** EA **Co-Intervention** Nil **Treatment Regimen** **- Number of treatment sessions:** 12 **- Frequency and duration:** Not reported	- Follow up 6-12 weeks' significant difference was evident up to 3 months after intervention (MD = − 9.55 [95% CI, − 16.52 to − 2.58], P = 0.007, I2 = 40%) **Acupuncture + usual care vs usual care** 4 studies - Significant but not a clinically meaningful difference was found in favour of acupuncture with respect to self-reported levels of pain immediately postintervention (MD = − 13.99 [95% CI, −20.48 to −7.50], P < 0.000, I2 = 34%). Similar findings were reported at follow-up (MD = − 12.91 [95% CI, −21.97 to −3.85], P < 0.005, I2 = 63%) **EA vs usual care or self-care** 5 studies VAS - Significant difference in self-reported pain between the EA group and usual-care group immediately postintervention (SMD = −1.39 [95% CI, −2.37 to −0.40], P <0.000, I2 = 92%) Follow up – 4 studies: - Moderate significant difference in pain reduction between the intervention and control group (SMD = − 0.66 [95% CI, −1.17 to −0.15], P < 0.01, I2 = 66%) **Adverse effects:** Not reported	

Study	Methodology	Results	Comments and evidence level
	- **Treatment time:** 30 mins **<u>Tsui & Cheing 2004</u>** **Intervention:** EA **Co-Intervention** Nil **Treatment Regimen** **- Number of treatment sessions:** 8 **- Frequency and duration:** Not reported - **Treatment time:** 20 mins **<u>Lin et al 2010</u>** **Intervention:** EA **Co-Intervention** Nil **Treatment Regimen** **- Number of treatment sessions:** 12 **- Frequency and duration:** Not reported - **Treatment time:** 20 mins **<u>Shankar et al 2012</u>** **Intervention:** EA **Co-Intervention** Nil **Treatment Regimen** **- Number of treatment sessions:** 10 **- Frequency and duration:** Not reported - **Treatment time:** 20 mins		
Hutchinson, A, Ball, S, Andrews, J & Jones, G **The effectiveness of acupuncture in treating chronic non-specific low back pain: a systematic review of the literature** **2012** Databases **Medline** Relevant Included Studies **Haake et al 2007**	**Participants –** 7 relevant studies N=13894 **Inclusion:** - RCTs within the last 10 years - Adults suffering from non-specific low back pain for 12 weeks or more - Studies looking at manual acupuncture which was defined as the insertion of needles into acupuncture points along a meridian **Exclusion:** - Non RCTs - Duplicated studies - Subject's who had low back pain of known origin (e.g. pregnancy, pain during labour or osteoporosis) - Study compared different forms of acupuncture - Study used purely electro-acupuncture or auricular acupuncture - Targeted a specific age group (e.g the elderly)	**Haake et al 2007** Intervention: Acupuncture Control: Sham Acupuncture Control 2: Guideline based conventional therapy Significant difference between acupuncture over conventional therapy for the outcomes Von Korff chronic pain scale, HFAQ and SF-12. No significant difference between acupuncture and sham at 6 months **Witt et al 2006** Intervention: Manual Acupuncture Control: No Acupuncture control group Significant improvement in acupuncture group in back pain and function and cost effectiveness - HFAQ score: 3 months - increased by 12.1 points (15%) in the acupuncture group and by 2.7 points (3.5%) in the control group. The difference was 9.4 points (95% confidence interval) which was statistically significant ($p < 0.01$) showing acupuncture more effective than routine care.	**Reviewer comments** Insufficient search strategy which utilises only 1 database and limits the search to English only and within the last 10 years. Poor and inadequate reporting throughout. Unable to determine if two people independently selected studies and extracted data. No assessment of scientific quality of included RCTs. Included studies have a broad age variation of participants with two studies including participants 18 to 65 years of age with the others ranging up to 86 years of age. This disparity in age

Study	Methodology	Results	Comments and evidence level
Witt et al 2006 **Brinkhaus et al 2006** **Thomas et al 2006** **Cherkin et al 2009** **Kerr et al 2003** **Leibing et al 2002** Research question **What is the effectiveness of acupuncture in the treatment of adults with chronic non-specific low back pain?** Funding **Not reported**	- Analysed cost effectiveness in isolation **Limits:** - 2001-2011. Last 10 years. - English language **Haake et al 2007** **Intervention:** Acupuncture **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Not reported **- Depth of insertion**: 5 to 40 mm **- Response sought**: Not reported **- Needle stimulation:** Not reported **- Needle retention time:** 30 mins **- Needle type:** Not reported **Co-Intervention** Not reported **Treatment Regimen** **- Number of treatment sessions:** 10-12 **- Frequency and duration:** Not reported **Practitioner qualifications and background** Not reported **Witt et al 2006** **Intervention:** Manual Acupuncture **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Not reported **- Depth of insertion**: Not reported **- Response sought**: Not reported **- Needle stimulation:** Not reported **- Needle retention time:** Not reported **- Needle type:** Not reported **Co-Intervention** Not reported **Treatment Regimen** **- Number of treatment sessions:** 15 maximum **- Frequency and duration:** Not reported **Practitioner qualifications and background** Not reported **Brinkhaus et al 2006** **Intervention:** Manual Acupuncture **- Number of needles inserted per subject per session:** Not reported	- SF-36 and Low Back pain rating scale were statistically significantly improved at 3 months in the acupuncture group compared to the control ($p < 0.01$). Sub-analysis: Acupuncture had greater effect: - On patients with worse back function ($p<0.01$) - On patients that were younger ($p<0.01$) - At 3 months compared to at 6 months **Brinkhaus et al 2006** Intervention: Manual Acupuncture Control: Sham acupuncture using superficial points Significant difference between acupuncture and no treatment. No difference between acupuncture and sham VAS: 8 weeks – VAS decreased by 28.7 mm (SD +/- 30.3 mm) in the acupuncture group and by 23.6 mm (SD +/- 31.0 mm) in the minimal acupuncture group. The difference between acupuncture and minimal acupuncture was 5.1 mm ($p > 0.05$) and 21.77 mm between the acupuncture group and the waiting list group ($p < 0.01$). 26 and 52 week follow up: The differences in outcome measures were reduced **Thomas et al 2006** Intervention: Traditional Acupuncture Control: Usual care The results showed an intervention effect of 5.6 points ($p = 0.06$) in the SF-36 at 12 months and an estimated effect of 8.0 points ($p < 0.01$) at 24 months in the acupuncture group. No evidence of functional improvement was found and no data at 3 months is reported. **Cherkin et al 2009** Intervention: Individualised Acupuncture Intervention 2: Standardised Acupuncture Control: Simulated Acupuncture with toothpick and needle guide Significant difference between all acupuncture including individualized, standardized and simulated acupuncture and usual care in RMDQ at 8/52 and 26/52. No difference between acupuncture and sham. RMDQ: statistically significant improvement in function in all groups at 8 weeks ($p < 0.01$) but was no longer significant at 52 weeks. The real and simulated acupuncture groups did not differ from each other ($p > 0.05$) **Kerr et al 2003** Intervention: Standardised Acupuncture Control: Placebo TENS (4 electrodes, switched off, 30 minutes, 10 sessions) Significant improvement in all outcomes for acupuncture (SF-36 ($p < 0.01$), MPQ ($p < 0.01$) and	range may impact upon the results as those suffering low back pain at 55 years and over may be suffering from degenerative changes. Great disparity in the methodologies and the treatment techniques used including limited standardisation of needling techniques within the studies. **Quality scores:** Not assessed **Grade:** LQ (-) **Quality:** 1-

Study	Methodology	Results	Comments and evidence level
	- Names of points used: Not reported **- Depth of insertion**: Not reported **- Response sought**: De qi **- Needle stimulation:** Not reported **- Needle retention time:** 30 mins **- Needle type:** Not reported **Co-Intervention** Not reported **Treatment Regimen** **- Number of treatment sessions:** 12 **- Frequency and duration:** 12 sessions over 8 weeks **Practitioner qualifications and background** Not reported **<u>Thomas et al 2006</u>** **Intervention:** Traditional Manual Acupuncture **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Not reported **- Depth of insertion**: Not reported **- Response sought**: Not reported **- Needle stimulation:** Not reported **- Needle retention time:** Not reported **- Needle type:** Not reported **Co-Intervention** Not reported **Treatment Regimen** **- Number of treatment sessions:** Average 8.1 sessions **- Frequency and duration:** Not reported **Practitioner qualifications and background** Not reported **<u>Cherkin et al 2009</u>** **Intervention:** Individualised Acupuncture **- Number of needles inserted per subject per session:** 5-20 **- Names of points used:** Not reported **- Depth of insertion**: Not reported **- Response sought**: Not reported **- Needle stimulation:** Not reported **- Needle retention time:** 15-20 mins **- Needle type:** Not reported **Co-Intervention** Not reported **Treatment Regimen**	ROM ($p < 0.01$)). Significant improvement in SF-36, ROM and VAS for placebo TENS. No significant difference between the 2 groups for any outcome measure **Leibing et al 2002** Intervention: Physiotherapy + Acupuncture Control 1: Physiotherapy + sham acupuncture Control 2: Physiotherapy Significant improvement in acupuncture group in all outcomes over control at 12/52 (pain intensity ($p<0.01$), pain disability ($p<0.01$), Psychological distress ($p<0.05$)). No significant difference in sham acupuncture and acupuncture in pain disability or intensity **Adverse effects:** Not reported	

Study	Methodology	Results	Comments and evidence level
	- Number of treatment sessions: 10 **- Frequency and duration:** Not reported **Practitioner qualifications and background** Not reported **<u>Kerr et al 2003</u>** **Intervention:** Standardised Acupuncture **- Number of needles inserted per subject per session:** 11 **- Names of points used:** Not reported **- Depth of insertion**: Not reported **- Response sought**: Not reported **- Needle stimulation:** Not reported **- Needle retention time:** 30 mins **- Needle type:** Not reported **Co-Intervention** Not reported **Treatment Regimen** **- Number of treatment sessions:** 10 **- Frequency and duration:** Not reported **Practitioner qualifications and background** Not reported **<u>Leibing et al 2002</u>** **Intervention:** Physiotherapy + Acupuncture **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Not reported **- Depth of insertion**: 10-30 mm **- Response sought**: Not reported **- Needle stimulation:** Not reported **- Needle retention time:** Not reported **- Needle type:** Not reported **Co-Intervention** Not reported **Treatment Regimen** **- Number of treatment sessions:** 20 **- Frequency and duration:** Not reported **Practitioner qualifications and background** Not reported		
Kim, J, Lee, M, Lee, D, Boddy, K & Ernst, E	**Participants** – 2 out of the 7 relevant RCT's n= 168 **Hong et al 2006 –** no. 60/ nonspecific lower back pain/ 1 week to 3.1 years disease duration	**<u>Hong et al 2006</u>** <u>Intervention</u>: Dry-cupping <u>Control</u>: NSAIDs Dexibuprofen	**Reviewer comments** Multiple databased were used in the search process. Data was extracted by

Study	Methodology	Results	Comments and evidence level
Cupping for Treating Pain: A Systematic Review **2011** Databases **MEDLINE, AMED,** **EMBASE, CINAHL, five Korean Medical Databases (Korean Studies Information, DBPIA, Korea Institute of Science and Technology Information, KoreaMed, and Research Information Centre for Health Database), four Chinese Medical Databases (China National Knowledge Infracture: China Academic Journal, Century Journal Project, China 2 Evidence-Based Complementary and Alternative Medicine Doctor/Master Disseration Full Text DB and China Proceedings Conference Full Text DB) and The Cochrane Library** Relevant Included Studies **Hong et al 2006** **Farhadi et al 2009** Research question **What is the evidence for or against the effectiveness of cupping as a treatment option for pain?** Funding **Korea Institute of Oriental Medicine (K09050)**	**Farhadi et al 2009 –** no. 98/ nonspecific lower back pain/ ≥4 weeks **Inclusion:** - Whether placebo controlled or controlled against another active treatment or no treatment - Trials published in the forms of dissertation and abstract **Exclusion:** - Trials with cupping as concomitant treatment together with other treatments of unproven efficacy - Trials with designs that did not allow an evaluation of efficacy of the test intervention (e.g. by using treatments of unproven efficacy in the control group or comparing two different forms of cupping) **Limits:** - Nil language restriction **Hong et al 2006** n=37 Mean age intervention: Not reported Duration of LBP: 1 week to 3.1 years **Intervention –** dry cupping **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Bladder meridian (BL12-BL27) **- Depth of insertion:** Not reported **- Response sought:** Not reported **- Needle stimulation:** Not reported **- Needle retention time:** Not reported **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** 6 **- Frequency and duration:** 5 mins, ½ days for 11 days **Practitioner qualifications and background** Not reported **Control** – NSAIDs Dexibuprofen, n=33 **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Not reported **- Depth of insertion:** Not reported **- Response sought:** Not reported **- Needle stimulation:** Not reported **- Needle retention time:** Not reported **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** 6	Outcome Measure: Pain on VAS (100 mm) Main result: Mean difference 22.8 (95% CI, 11.4–34.2), *P* < .0001 in favour of intervention **Farhadi et al 2009** Intervention: Wet cupping Control 1: Usual care Outcome measure: PPI of the MPQ (6 point Likert pain scale) Main result: Mean difference 2.2 points (95% CI, 1.7–2.6), *P* < .01 in favour of Intervention **Adverse effects:** Hing et al 2006: Not reported Farhadi 2008: Vaso-vagal shock (n=3)	three independent reviewers, however it was not stated whether more than one reviewer selected the studies. Participant characteristics are not adequately reported. Inclusion and exclusion criteria is not stated clearly in this review and the excluded papers are not listed. Risk of bias was assessed meeting the four criteria of randomisation, blinding, withdrawals, and allocation concealment. Patient and assessor blinding was done separately, due to it being hard to blind therapists to the use of cupping, which helped to improve the concealment process. In addition, sample sizes were small and none of the studies used a power calculation, which could potentially lead to publication bias. Details of drop outs within the included studies was not reported, which can lead to attrition bias and reduce the reliability of the overall results of this review. **Quality scores:** Cochrane classification - Risk of bias within studies included in the systematic review and meta-analysis **Hong et al 2006** – Unclear risk of bias **Farhadi et al 2009** – Low risk of bias **Grade:** AQ (+) **Quality:** 1

Study	Methodology	Results	Comments and evidence level
	- Frequency and duration: 0.15 g, three times daily for 12 days, n=33 **Practitioner qualifications and background** Not reported **Farhadi et al 2009** n=48 Mean age intervention: Not reported Duration of LBP: non-specific low back pain for ≥4 weeks **Intervention –** Wet cupping **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Not reported **- Depth of insertion:** Not reported **- Response sought:** Local twitch response **- Needle stimulation:** Not reported **- Needle retention time:** Not reported **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** 3 **- Frequency and duration:** 20 mins, three stage, 3 days intervals **Practitioner qualifications and background** Not reported **Control** - Usual care, n=50 **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Not reported **- Depth of insertion:** Not reported **- Response sought:** Not reported **- Needle stimulation:** Not reported **- Needle retention time:** Not reported **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** 6 **- Frequency and duration:** Not reported **Practitioner qualifications and background** Not reported		
Wang, Y, Qi, Y, Tang, F, Li, F, Li, Q, Xu, P, Xie, G & Sun, H	**Participants** – All 6 RCTs n=458 Diagnosis: NSLBP **Inclusion:**	**AlBedah et al 2015** Intervention: Wet cupping Control: Usual care Outcomes: McGill pain questionnaire, ODI	**Reviewer comments** Adequate search strategy except for the number of databases searched. Two reviewers independently screened articles, scored methodologic quality,

Study	Methodology	Results	Comments and evidence level
The effect of cupping therapy for low back pain: A meta-analysis based on existing randomized controlled trials **2017** Databases **PubMed, Cochrane & Embase** Relevant Included Studies **Hong et al 2006** **Liu et al 2008** **Li & Chen 2009** **Farhadi et al 2009** **AlBedah et al 2015** Research question **What is the evidence of the effectiveness and safety of cupping for patients with LBP?** Funding **Supported by Guangdong province natural science foundation of China (2015A030313724 & 2013B090600144)**	- RCT design in English or Chinese language - Trials concerning cupping therapy for subacute or chronic non-specific LBP - Intervention: type of cupping therapy - Control: medication or usual care - Outcomes: VAS, ODI, McGill pain questionnaire **Exclusion:** - Comorbid factors such as a fracture, dislocation of lumbar spine - Non RCT - Sample size less than 15 - Studies without available data for statistics were excluded **Limits:** - English and Chinese - RCTs <u>All studies:</u> Intervention: - Dry cupping 3 studies - Wet cupping 2 studies - Moving cupping 1 study Control: - Oral medication 3 studies - Usual care 3 studies Treatment sessions: - 11 days to 3 weeks <u>AlBedah et al 2015</u> n=80 Mean age intervention: 36.48 +/-9.3 **Intervention** Wet cupping **- Number of cups per subject per session:** Not reported **- Names of points used:** Not reported **- Response sought:** Not reported **- Stimulation:** Not reported **- Retention time:** Not reported **- Cup type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** 6 **- Frequency and duration:** 3 x week for 2 weeks **Practitioner qualifications and background** Not reported	Outcome times: 2, 4 weeks <u>McGill pain questionnaire</u> Baseline: Inv – 2.35 +/- 1.2 Con – 2.13 +/- 0.96 2 weeks: Inv – 1.17 (0.96-1.4) Con – 2.3 (2-1-2.7) 4 weeks: Inv – 0.98 (0.7-1.2) Con – 2.3 (2.1-2.6) <u>ODI</u> Baseline: Inv – 38.33 +/- 19.2 Con – 32.05 +/- 15.9 2 weeks: Inv – 19.6 (16.5-22.7) Con – 35.4 (32.3-38.5) 4 weeks: Inv – 15.2 (11.6-18.8) Con – 35.9 (32.3-39.5) **Meta-analysis** <u>Cupping therapy vs control</u> *VAS* 4 RCTs, n=280 SMD: -0.73 (-1.42, -0.04) P=0.04 Significant difference in favour of cupping *ODI* 4 RCTs, n=288 SMD: -3.64 (-5.85, -1.42) P=0.001 Significant difference in favour of cupping *McGill pain questionnaire* 3 RCTs, n=178 SMD: -6.12 (-14.54, 2.31) No significant difference found	and extracted data. The systematic review and meta-analysis was conducted in accordance with PRISMA guidelines. Blinding of outcome assessors was not conducted in any of the included RCTs, so all trials exist a high detection bias. Low risk of withdrawal bias due to short follow up times and limited drop outs. No test for publication bias. High heterogeneity present in the results of all interested outcomes. Findings need to be further confirmed by subgroup analysis based on different types of cupping and control management. **Quality scores:** Jadad scale Hong et al 2006: 2/5 Liu et al 2008: 2/5 Li & Chen 2009: 2/5 Farhadi et al 2009: 3/5 AlBedah et al 2015: 3/5 **Grade:** AQ (+) **Quality:** 1

Study	Methodology	Results	Comments and evidence level
	Results and individual data reported in previous data extractions: Hong et al 2006 Reported in Kim et al 2011 data extraction Control: medication Liu et al 2008 Reported in Yuan et al 2015 data extraction Control: medication Li & Chen 2009 Reported in Yuan et al 2015 data extraction Control: medication Farhadi et al 2009 Reported in Kim et al 2011 and Cao et al 2014 data extraction Control: Usual care	**Adverse effects:** Hong et al 2006 Not reported Liu et al 2008 Not reported Li & Chen 2009 Not reported Farhadi et al 2009 3 events reported in intervention group AlBedah et al 2015 Nil events occurred	
Li, X, Chen, H, Zheng, X & Liu, N **Acupuncture combined with traction therapy for lumbar disc herniation: a systematic review** **2014** **[Chinese]** **Databases** **CNKI, Cochrane & Embase, PubMed, WF** **Relevant Included Studies** **Wang 2007** **Guan 2010** **Tuo et al. 2011** **Wu et al. 2012** **Zhong et al. 2013** **Research question**	**Participants** – 5 relevant RCT's n= 386 Lumbar disc herniation **Inclusion:** - The type of researching using randomized controlled trial (RCT), regardless of the use of blind method - Research participants are patients diagnosed of lumbar disc herniation according to the diagnostic standards, or diagnosed via X-ray and CT, regardless of gender, age, source of the cases. The diagnostic standards include: 1) the diagnostic standards for lumbar disc herniation as stated in the *Diagnostic and treatment effectiveness standards of Chinese medicine diseases,* published in 1994 by the national Chinese medicine management bureau 2) the diagnostic standards for lumbar disc herniation as stated in the *Lumbar disc herniation* edited by Yougu Hu 3) the diagnostic standards for lumbar disc herniation stated in the *Chinese medicine new medicine clinic research guiding principles* published by People's Republic of China Ministry of Health 4) *Shanghai Chinese medicine disease diagnostic and treatment regulations* published by Shanghai Healthy Bureau - For the observation group, the intervention measure includes both acupuncture and traction - The acupuncture treatment includes acupuncture or electroacupuncture; traction is limited to non-manual traction; for the control group, single treatment method was used **Exclusion:** - Animal experiment research; literature review; republished articles; case reports; abstract only articles; incomplete articles or those with data errors	**Wang, 2007** Intervention: Acupuncture + traction Control: Traction Outcome measure: VAS Result: SMD -1.31 (-1.77, -0.86) **Guan, 2010** Intervention: Electroacupuncture + traction Control: Traction Outcome measure: VAS Result: -1.26 (-1.66, -0.86) **Tuo et al, 2011** Intervention: Electroacupuncture + traction Control: Traction Outcome measure: VAS, ODI Result: -2.5 (-3.18, -1.81) **Wu et al, 2012** Intervention: Electroacupuncture + traction Control: Traction Outcome measure: VAS	**Reviewer comments** Systematic review reported in Chinese. Did two independent reviewers: - Screen articles? Yes - Data extract? Yes **Quality scores:** Risk of bias summary – all studies - Random sequence generation: Unclear risk of bias - Allocation concealment: Unclear risk of bias - Blinding of participants: High risk of bias - Blinding of outcome assessment: High risk of bias - Incomplete outcome data: Unclear risk of bias - Selective reporting: Unclear risk of bias - Other bias: Unclear risk of bias

Study	Methodology	Results	Comments and evidence level
What is the evidence of effectiveness of acupuncture combined with traction therapy for lumbar disc herniation? **Funding** **No reported**	**Limits:** - 2000 to 2013 **<u>Wang 2007</u>** n=90 **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Not reported **- Depth of insertion:** Not reported **- Response sought:** Not reported **- Needle stimulation:** Not reported **- Needle retention time:** Not reported **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** Not reported **- Frequency and duration:** Not reported **Practitioner qualifications and background** Not reported **<u>Guan 2010</u>** n=120 **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Not reported **- Depth of insertion:** Not reported **- Response sought:** Not reported **- Needle stimulation:** Not reported **- Needle retention time:** Not reported **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** Not reported **- Frequency and duration:** Not reported **Practitioner qualifications and background** Not reported **<u>Tuo et al 2011</u>** n=60 **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Not reported	Result: -1.53 (-2.11, -0.95) **Zhong et al, 2013** Intervention: Acupuncture + traction Control: Traction Outcome measure: JOA Result: Not reported **Meta-analysis** 4 studies, n=165 VAS SMD: -1.59 (-2.07, -1.12) **Adverse effects:** Not reported	

Study	Methodology	Results	Comments and evidence level
	- Depth of insertion: Not reported **- Response sought:** Not reported **- Needle stimulation:** Not reported **- Needle retention time:** Not reported **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** Not reported **- Frequency and duration:** Not reported **Practitioner qualifications and background** Not reported **Wu et al 2012** n=60 **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Not reported **- Depth of insertion:** Not reported **- Response sought:** Not reported **- Needle stimulation:** Not reported **- Needle retention time:** Not reported **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** Not reported **- Frequency and duration:** Not reported **Practitioner qualifications and background** Not reported **Zhong et al 2013** n=66 **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Not reported **- Depth of insertion:** Not reported **- Response sought:** Not reported **- Needle stimulation:** Not reported **- Needle retention time:** Not reported **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** Not reported **- Frequency and duration:** Not reported		

Study	Methodology	Results	Comments and evidence level
	Practitioner qualifications and background Not reported		
Lee, M, Choi, T, Kim, J & Choi, S **Using Guasha to treat musculoskeletal pain: A systematic review of controlled clinical trials** **2010** Databases **MEDLINE, AMED, EMBASE, CINAHL, Korean Studies Information, DBPIA, KISTI, KoreaMed, RISS, CNKI & the Cochrane Library** Relevant Included Studies **Nil** Research question **What is the evidence of the effectiveness of Guasha in treating musculoskeletal pain?** Funding **Supported by the Korea Institute of Oriental Medicine (K09050)**	**Participants** – All 5 RCTs and 2 CCTs N=736 **Inclusion:** - RCTs and CCTs - Trials treating patients (regardless of gender or age) diagnosed with musculoskeletal pain - Trials published as journal articles, dissertations and abstracts were eligible **Exclusion:** - Trials that compared one type of Guasha with another - Trials with Guasha as a part of a complex intervention **Limits:** - Nil language restriction ** <u>No studies within this SR were relevant to the current review</u> **Exclusion reason:** <u>Tang et al 2008:</u> Condition – Fibromyalgia <u>Chen & Chen 1995:</u> Nil relevant outcome measures <u>Ma et al 2003</u>: Nil relevant outcome measures <u>Wu 1996:</u> Nil relevant outcome measures <u>Li & Li1996:</u> Nil relevant outcome measures <u>Gou 1995:</u> CTT + nil relevant outcome measures <u>Wang et al 2004:</u> CTT + nil relevant outcome measures	**Authors conclusion:** Current evidence is insufficient to show that Guasha is effective in pain management **Adverse effects:** No adverse events were reported within the seven included studies	**Reviewer comments** Inclusive search strategy with 11 databases searched without language restriction with the search terms being in English, Korean and Chinese. Unable to truly determine if two independent reviewers screened studies and extracted data. The status of publication was not used as an inclusion criterion with trials published as journal articles, dissertations and abstracts eligible. Adequate risk of bias assessment, however, reporting poor. Publishing and reporting bias are possible. No competing interests declared. Involved a high percentage of low-quality trials which are more likely to overestimate effect sizes. No studies within the SR were relevant to this evidenced based review. **Quality scores:** Cochrane criteria - All of the included studies (five RCTs and two CCTs) had risks of performance bias, attrition bias and detection bias - None of these studies reported randomization methods or allocation concealment or the blinding of the outcome assessors - Dropouts and withdrawals were not mentioned in these studies **Grade:** LQ (-) **Quality:** 1-
Liu, L, Huang, Q, Liu, Q, Thitham, T, Li, L, Ma, Y & Zhao, J	**Participants** – All 11 RCTs n=682	**Chen 2014** Intervention: Dry needling	**Reviewer comments**

Study	Methodology	Results	Comments and evidence level
Evidence for Dry Needling in the Management of Myofascial Trigger Points Associated with Low Back Pain: A Systematic Review and Meta-Analysis **2017** Databases **PubMed, Ovid, EBSCO, ScienceDirect, Web of Science, Cochrane Library, CINAHL, and China National Knowledge** Relevant Included Studies **Chen 2014** **Itoh and Katsumi 2005** **Mahmoudzadeh et al 2016** **Shen and Ding 2015** **Yang and Zhou 2010** **Tellez-Garcia et al 2015** Research question **What is the evidence of the effectiveness of dry needling of myofascial trigger points associated with low back pain?** Funding **Supported by the National Natural Science Foundation of China (no. 81470105)**	Duration of LBP: Acute to chronic; however, most LBP cases reported (9/11 studies) were chronic **Inclusion:** - RCT design - Participants diagnosed with LBP with the presence of MTrPs - Used dry needling alone as an intervention - Used pain intensity and/or functional disability as outcome measure to assess the curative effect **Exclusion:** - MTrPs were not defined according to the criteria of Simons et al - Dry needling combined with acupoint acupuncture was used - Different types of dry needling were compared with one another - Full text cannot be obtained - RCTs had no available data **Limits:** - Nil language restriction - RCTs <u>Chen 2014</u> n=58 Mean age intervention: 41.48 +/- 8.14 Duration of LBP: >6mo **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Not reported **- Depth of insertion:** Not reported **- Response sought:** No local twitch response required **- Needle stimulation:** Not reported **- Needle retention time:** Not reported **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** 20 **- Frequency and duration:** 1 x every 2 days for 40 days **Practitioner qualifications and background** Not reported <u>Itoh and Katsumi 2005</u> n=44 Mean age intervention: 72.3 +/- 3.7 Duration of LBP: 7.1 +/- 4.4 years **Intervention** **- Number of needles inserted per subject per session:** Not reported	Control: Super laser therapy Pain VAS: Post intervention SMD: 0.57 (0.04, 1.10) RDQ: Post intervention SMD: 0.86 (0.32, 1.4) Pain VAS: 3 months SMD: 0.96 (0.42, 1.51) RDQ: 3 months SMD: 0.78 (0.25, 1.32) **Itoh and Katsumi 2005** Intervention: Dry needling Control 1: Superficial needling Control 2: Acupoints acupuncture Control 3: Sham dry needling Pain VAS: Post intervention SMD: -1.11 (-1.88, -0.33) RDQ: Post intervention SMD: -0.32 (-1.05, 0.41) Pain VAS: 3 weeks SMD: -0.40 (-1.13, 0.33) RDQ: 3 weeks SMD: -0.03 (-0.76, 0.69) **Mahmoudzadeh et al 2016** Intervention: Dry needling Control: Standard physiotherapy Pain VAS: Post intervention SMD: -0.56 (-1.08, -0.03) ODI: Post intervention SMD: -0.54 (-1.06, -0.01) Pain VAS: 2 months SMD: -0.72 (-1.26, -0.19) RDQ: 2 months SMD: -0.82 (-1.36, -0.29) **Shen and Ding 2015** Intervention: Dry needling Control: Super laser therapy Pain VAS: Post intervention SMD: -1.93 (-2.54, -1.31) ODI: Post intervention SMD: -2.07 (-2.7, -1.43) **Yang and Zhou 2010** Intervention: Dry needling Control: Local anesthetic injection Pain VAS: Post intervention SMD: -1.62 (-2.03, -1.20) **Tellez-Garcia et al 2015** Intervention: Dry needling Control: Dry needling plus neuroscience education Pain VAS: Post intervention SMD: 0.35 (-0.79, 1.5) ODI: Post intervention SMD: 0.28 (-0.86, 1.42)	Comprehensive search strategy in both English and Chinese. Two reviewers independently screened articles, scored methodologic quality, and extracted data. The systematic review and meta-analysis was conducted in accordance with PRISMA guidelines. Insufficient reporting of the dry needling intervention limits the clinical utility of the results. No follow up of data that was not available or full text RCTs that could not be obtained. High clinical heterogeneity within the review. Publication bias assessed using Egger publication bias plots, with the insufficient sample sizes possibly leading to publication bias in the meta-analysis of RCTs. 90.9% of the population of patients within this review are from Asia limiting the generalisability of review findings to other regions. **Quality scores:** Cochrane back and neck group guidelines - Risk of bias within studies included in the systematic review and meta-analysis Chen 2014: 10/13 Itoh and Katsumi 2005: 11/13 Mahmoudzadeh et al 2016: 9/13 Shen and Ding 2015: 8/13 Yang and Zhou 2010: 8/13 Tellez-Garcia et al 2015: 11/13 **Grade:** HQ (++) **Quality:** 1

Study	Methodology	Results	Comments and evidence level
	- Names of points used: Not reported **- Depth of insertion:** Not reported **- Response sought:** Local twitch response **- Needle stimulation:** Not reported **- Needle retention time:** 30 minutes **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** 3 **- Frequency and duration:** 2 x week for 3 weeks **Practitioner qualifications and background** Not reported <u>Mahmoudzadeh et al 2016</u> n=58 Mean age intervention: 36.1 +/- 7.8 Duration of LBP: 16.5 +/- 21.0 months **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Not reported **- Depth of insertion:** Not reported **- Response sought:** Local twitch response **- Needle stimulation:** Not reported **- Needle retention time:** 15 minutes **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** 10 **- Frequency and duration:** 1 x evert 2 days for 20 days **Practitioner qualifications and background** Not reported <u>Shen and Ding 2015</u> n=300 Mean age intervention: 54.00 +/- 2.31 Duration of LBP: 6.80 +/- 1.26 years **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Not reported **- Depth of insertion:** Not reported **- Response sought:** No local twitch response required **- Needle stimulation:** Not reported	**Meta-analysis** <u>Dry needling vs other treatments</u> Post intervention: Pain VAS I2=94%; SMD: -1.06 (-1.77 to -0.36) P=003 Statistically significant effects of dry needling compared with other treatments in pain intensity Post intervention: functional disability I2= 88%; SMD: -0.76 (-1.46 to -0.06) P=0.03) Statistically significant effects of dry needling compared with other treatments in functional disability Follow up: Pain VAS I2=83%; SMD: -0.43 (-1.17 to 0.30) P=0.25 No significant effects of dry needling compared with other treatments in pain intensity Follow up: functional disability I2= 75%; SMD: -0.2 (-0.8 to 0.4) P=0.51) No significant effects of dry needling compared with other treatments in functional disability <u>Dry needling vs dry needling plus other treatments</u> Post intervention: Pain intensity I2=0%, SMD: 0.83 (0.55-1.11), p<0.00001 Significant effects were observed in the meta- analysis of studies assessing pain intensity in favour of dry needling plus other treatments Post intervention: functional disability I2=0%; SMD: 0.13 (-0.14 to 0.40) p=0.36) No significant difference was observed in the assessment of functional disability **Adverse effects:** Not reported	

Study	Methodology	Results	Comments and evidence level
	- Needle retention time: 30 minutes **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** 14 **- Frequency and duration:** 1 x every 2 days for 4 weeks **Practitioner qualifications and background** Not reported <u>Yang and Zhou 2010</u> n=120 Mean age intervention: Not reported Duration of LBP: Not reported **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Not reported **- Depth of insertion:** Not reported **- Response sought:** No local twitch response required **- Needle stimulation:** Not reported **- Needle retention time:** Not reported **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** 4 **- Frequency and duration:** 1 x week for 4 weeks **Practitioner qualifications and background** Not reported <u>Tellez-Garcia et al 2015</u> n=12 Mean age intervention: 27 +/- 13 Duration of LBP: 19 +/- 8 months **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Not reported **- Depth of insertion:** Not reported **- Response sought:** Local twitch response **- Needle stimulation:** Not reported **- Needle retention time:** 30 minutes **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** 3		

Study	Methodology	Results	Comments and evidence level
	- Frequency and duration: 1 x week for 3 weeks **Practitioner qualifications and background** Not reported		
Trinh, K, Graham, N, Irnich, D, Cameron, I & Forget, M **Acupuncture for Neck Disorders** **2016** Databases **CENTRAL, MEDLINE, EMBASE, MANTIS, CINAHL, ICL & Traditional Chinese Medical Literature Analysis and Retrieval System** Relevant Included Studies **Tough 2010** **Cameron 2011** **Kwak 2012** **Birch 1998** **Ilbuldu 2004** **Sun 2010** **Fu 2009** **Liang 2009** **Thomas 1991** **White 2004** **He 2004** **He 2005** **Itoh 2007** **Nabeta 2002** **Vas 2006** **Coan 1982** **Petrie 1983** **Irnich 2001** **Liang 2011** **Petrie 1986** **Sahin 2010** **Seidel 2002**	**Participants -** 27 included studies - Whiplash-associated disorders (WADs) ranging from acute to chronic n= 205 3 studies: Tough 2010, Cameron 2011, Kwak 2012 - Chronic myofascial neck pain n=186 participants 5 studies: Birch 1998, Chou 2009, Ilbuldu 2004, Sun 2010, Tsai 2010 - Chronic pain due to arthritic changes n=542 5 studies: Fu 2009, Liang 2009, Thomas 1991, White 2000, White 2004 - Chronic non-specific neck pain n=4011 6 studies: He 2004, He 2005, Itoh 2007, Nabeta 2002, Vas 2006, Witt 2006 - Neck pain with radicular signs n=43 2 studies: Coan 1982, Petrie 1983 - Subacute or chronic mechanical neck pain n=5111 6 studies: Irnich 2001, Irnich 2002, Liang 2011, Petrie 1986, Sahin 2010, Seidel 2002 **Inclusion:** - Published trials that used random assignment to intervention groups, in full text or abstract form - Acupuncture was compared with sham acupuncture, wait-list or inactive treatment (e.g. sham laser) - Age > 18 y.o - Following neck disorders: Mechanical neck disorders (MNDs), including whiplash associated disorders (WADs) categories 1 and 2, myofascial pain syndrome (MPS) and degenerative changes - Neck disorder with headache - Neck disorders with radicular symptom, including WAD category 3 **Exclusion:** - Quasi-randomised controlled trials and CCTs - Neck disorders with definite or possible long tract signs, neck pain caused by other pathological entities, neck pain related to neurological disease, neck pain related to fracture and dislocation, headache not of cervical origin, co-existing headache when neck pain was not dominant or when headache was not provoked by neck movement or sustained neck posture; or 'mixed' headache <u>Cameron 2011</u> N=116 **Intervention:** EA **- Number of needles inserted per subject per session:** 8 **- Names of points used:** GB39, GB20, L114, SI6 bilaterally **- Depth of insertion**: 1 to 1.5 cm depth **- Response sought**: Unable to feel the current	**Cameron 2011:** Intervention: Real EA Control: Sham EA Significant difference in reduction in VAS scores in favour of the intervention group <u>VAS:</u> Baseline mean: Inv: 5.3, Con: 5.8 End of study mean: Inv: 4.1, Con: 5.5 3 months: SMD -0.38 (95% CI random -0.73 to -0.02) 6 months: SMD -0.59 (95% CI random -0.95 to -0.23) <u>NDI:</u> Baseline mean: Inv: 15.6, Con: 18.7 End of study mean: Inv: 14.5, Con: 16.8 Reported results: not significant SMD -0.22 (95% CI random -0.57 to 0.13) at 3 months SMD -0.31 (95% CI random -0.66 to 0.05) at 6 months <u>SF-36 - Physical Component</u> Baseline mean: Inv: 43.6, Con: 41.3 End of study mean: Inv: 41.9, Con: 38.3 Reported results: not significant **Coan 1982:** Intervention: Acupuncture TCM Control: Wait list Significant difference in reduction in VAS scores in favour of the intervention group <u>VAS:</u> Baseline mean: Inv: 6.0, Con: 5.3 End of study mean: Inv: 3.6, Con: 5.4 SMD -0.74 (95% random CI -1.49 to 0.00) at 8 weeks **Fu 2009:** Intervention: Acupuncture Control: Superficial insertion non acupoints <u>VAS:</u> Significant immediate post treatment favouring acupuncture but not over long term Baseline mean: acupuncture 5.14, sham 5.58	**Reviewer comments** Comprehensive, librarian-assisted search of multiple databases. Avoided language bias by including all languages during study selection; however, did not search non-English language databases. At least two review authors independently identified citations, selected studies and extracted data. Excluded trials reported. Sufficient follow-up of the included studies missing data by authors. Comprehensive assessment of the risk of bias in included studies. 12 of the 27 included studies had fatal flaws, including selection, performance, attrition and reporting biases. Reporting bias assessed through comparing published protocols and RCT. Meta-analyses conducted using random effects model when heterogeneity was absent. **Quality scores:** GRADE - Random sequence generation: 17 of 27 studies - Allocation concealment: 6 of 27 studies - Blinding of participants: 12 of 27 - Blinding of outcome assessment: 12 of 27 studies - Incomplete outcome data: 2 of 27 studies - Selective reporting: 3 of 27 studies - Fatal flaw: 15 of 27 studies Overall: Low-moderate evidence base **Grade:** HQ (++)

Study	Methodology	Results	Comments and evidence level
Research question **What is the evidence on effects of acupuncture on function, disability, patient satisfaction and global perceived effect among individuals with neck pain?** Funding **Nil**	**- Needle stimulation:** Electrical stimulation **- Needle retention time:** 30 minutes **- Needle type:** Electrodes attached to needles at 2 acupuncture points in the cervical area, plus 1 in each wrist and ankle. 2 to 5 Hz 1.5 v **Co-Intervention** Included medication, physiotherapy and chiropractic therapy **Treatment Regimen** **- Number of treatment sessions:** 12 **- Frequency and duration:** 2 x weekly for 6 weeks **Practitioner qualifications and background** Not reported <u>Coan 1982</u> N=30 **Intervention:** Acupuncture **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Varied between participants and day to day -TCM theory **- Depth of insertion**: Not reported **- Response sought**: Not reported **- Needle stimulation:** Not reported **- Needle retention time:** Not reported **- Needle type:** Not reported **Co-Intervention -** Some participants received electroacupuncture and moxibustion on occasions **Treatment Regimen** **- Number of treatment sessions:** 12-16 **- Frequency and duration:** 3 to 4 sessions/wk over 4 weeks **Practitioner qualifications and background** Not reported <u>Fu 2009</u> N=112 **Intervention:** Acupuncture **- Number of needles inserted per subject per session:** 3 **- Names of points used:** Du14, ExHN15, SI15 **- Depth of insertion**: To muscle layer **- Response sought**: Deqi **- Needle stimulation:** Not reported **- Needle retention time:** 20 mins **- Needle type:** Not reported **Co-Intervention** – Infrared radiation	End of study mean (3 months): acupuncture 2.89, sham 3.28 SMD -0.53 (95% CI random -0.91 to -0.16) immediate post treatment SMD -0.59 (95% CI random -0.97 to -0.21) at 4 weeks SMD -0.23 (95% CI random -0.61 to 0.14) at 3 months <u>NPQ:</u> Significant immediate post treatment favouring acupuncture but not over long term Baseline mean: acupuncture 33.63, sham 33.21 End of study mean: acupuncture 20.55, sham 25.77 SMD -0.41 (95% CI -0.79 to -0.04) immediate post treatment SMD -0.50 (95% CI -0.88 to -0.12) at 4 weeks SMD -0.40 (95% CI -0.78 to -0.03) at 3 months **He 2004:** Intervention: Acupuncture with electrostimulation Control: sham electrostimulation + alternate points <u>VAS:</u> Baseline mean: acupuncture 57, placebo 48 End of study mean: acupuncture 15, placebo 36 immediate post treatment Reported results: statistically significant favouring acupuncture at immediate post and 6-month follow-up but not at 3 years SMD -3.17 (95% CI -4.44 to -1.90) post treatment SMD -1.54 (95% CI random -2.47 to -0.61) at 6 months SMD -2.72 (95% CI random -3.89 to -1.56) at 3 years **He 2005:** Intervention: Acupuncture with electrostimulation Control: sham electrostimulation + alternate points <u>VAS:</u> Baseline mean: acupuncture 57, placebo 48 End of study mean: acupuncture 15, placebo 36 immediate post treatment Reported results: statistically significant favouring acupuncture at immediate post and 3-year follow-up SMD -3.17 (95% CI -4.44 to -1.90) immediate post treatment SMD -1.75 (95% CI -3.01 to -0.49) at 6 months SMD -3.33 (95% CI -4.78 to -1.88) at 3 years **Kwak 2012:** Intervention: Acupuncture Control: Wait list <u>VAS:</u>	**Quality:** 1+

Study	Methodology	Results	Comments and evidence level
	Treatment Regimen **- Number of treatment sessions:** 9 **- Frequency and duration:** 1 x every other day for 18 days **Practitioner qualifications and background** Not reported <u>He 2004</u> N=24 **Intervention:** Acupuncture + EA **- Number of needles inserted per subject per session:** 16 body points, 6 ear points **- Names of points used:** Not reported **- Depth of insertion**: Not reported **- Response sought**: Not reported **- Needle stimulation:** electrostimulation **- Needle retention time:** 45 minutes **- Needle type:** Not reported **Co-Intervention** **Treatment Regimen** **- Number of treatment sessions:** 10 **- Frequency and duration:** 3 x week over 3-4 weeks **Practitioner qualifications and background** Not reported <u>He 2005</u> N=24 **Intervention:** Acupuncture + Electrical stimulation **- Number of needles inserted per subject per session:** 16 body points, 6 ear points **- Names of points used:** Not reported **- Depth of insertion**: Not reported **- Response sought**: Not reported **- Needle stimulation:** Electrostimulation **- Needle retention time:** 45 minutes **- Needle type:** Not reported **Co-Intervention** Not reported **Treatment Regimen** **- Number of treatment sessions:** 10 **- Frequency and duration:** 3 x week over 3-4 weeks **Practitioner qualifications and background** Not reported	Baseline mean: acupuncture 4.59, wait-list 4.88 End of study mean 2 weeks: acupuncture 2.74, wait-list 4.47 immediate post treatment Reported results: statistically significant favouring acupuncture **Liang 2009:** Intervention: Acupuncture Control: Sham acupuncture <u>Northwick Park Neck Pain Questionnaire</u> Baseline mean: routine acupuncture 35.32, sham acupuncture 31.96 End of study mean: routine acupuncture 19.16, sham acupuncture 23.76 Both groups showed improvement SMD -0.39 (95% CI -0.77 to -0.00) immediate post treatment **Liang 2011:** Intervention: Acupuncture Control: Sham acupuncture <u>VAS</u> Baseline mean: acupuncture 5.30, sham 5.49 End of study mean: acupuncture 2.88, sham 3.19 Significant favouring acupuncture SMD -0.30 (95% CI random -0.59 to -0.00) immediate post treatment SMD -0.40 (95% CI random -0.69 to -0.10) at 4 weeks SMD -0.20 (95% CI random -0.50 to 0.09) at 3 months <u>NPQ</u> Baseline mean: acupuncture 32.73, sham 33.04 End of study mean: acupuncture 19.09, sham 23.53 Significant favouring acupuncture SMD -0.28 (95% CI -0.57 to 0.02) immediate post treatment SMD -0.37 (95% CI -0.67 to -0.07) at 4 weeks SMD -0.37 (95% CI -0.67 to -0.07) at 3 months <u>SF-36 Physical Component</u> Baseline mean: acupuncture 80.79, sham 79.22 End of study mean: acupuncture 84.26, sham 85.88 No significant differences between groups SMD 0.38 (95% CI 0.08 to 0.68) immediate post treatment SMD -0.05 (95% CI -0.35 to 0.24) at 4 weeks SMD -0.11 (95% CI -0.40 to 0.18) at 3 months **Ilbulda 2004:** Intervention: Dry needling UT	

Study	Methodology	Results	Comments and evidence level
	Ilbuldu 2004 N=60 **Intervention:** Dry needling **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Upper trapezius **- Depth of insertion**: Not reported **- Response sought**: Not reported **- Needle stimulation:** Not reported **- Needle retention time:** Not reported **- Needle type:** Not reported **Co-Intervention** Paracetamol as needed **Treatment Regimen** **- Number of treatment sessions:** 4 **- Frequency and duration:** 1 x week over 4 weeks **Practitioner qualifications and background** Not reported Itoh 2001 N=31 **Intervention:** Acupuncture **- Number of needles inserted per subject per session:** 9 **- Names of points used:** GB20, GB21, BL10, BL11, SI12, SI13; distal TE5, LI4, SI3 **- Depth of insertion**: 20 mm **- Response sought**: Deqi **- Needle stimulation:** Sparrow pecking **- Needle retention time:** 10 minutes **- Needle type:** Not reports **Co-Intervention** None specified **Treatment Regimen** **- Number of treatment sessions:** 6 **- Frequency and duration:** 6 treatments within 10 weeks; applied in 2 phases of 3 treatments: 3 treatments within first 3 weeks, no treatment from week 4 to 7 and 3 treatments from week 7 to 10 **Practitioner qualifications and background** Not reported Kwak 2012 N=40 **Intervention:** Acupuncture **- Number of needles inserted per subject per session:** Not reported	Control: Placebo laser VAS: Baseline mean: DN 7.62, placebo 7.65 End of study mean: DN 4.24, placebo 4.22 Significant differences favouring laser compared with DN and placebo post treatment only SMD -0.02 (95% CI -0.64 to 0.60) immediate post treatment SMD 0.01 (95% CI random -0.61 to 0.63 at 6 months Nottingham Health Profile Physical Activity Baseline mean: DN 32.80, placebo 25.59 End of study mean: DN 13.68, placebo 16.08 Significant differences favouring laser compared with DN and placebo SMD 0.22 (95% CI -0.40 to 0.84) immediate post treatment SMD -0.14 (95% CI -0.76 to 0.48) at 6 months **Itoh 2007:** Intervention: Acupuncture Control 1: TrP Acupuncture Control 2: Non TrP Acupuncture Control: Sham Acupuncture VAS: Baseline mean: SA 69.5, TrP 67.0, non-TrP 70.9, SH 64.1 End of study mean: SA 51.6, TrP 11.0, non-TrP 57.6, SH 53.9 Reported results: statistically significant improvement in the TrP group only Acupuncture vs Sham: SMD -0.24 (95% CI random -1.26 to 0.78) immediate post treatment Acupuncture vs Sham: SMD -0.10 (95% CI random -1.11 to 0.92) at 3 weeks Neck Disability Index Baseline mean: SA 12.6, TrP 13.0, non-TrP 15.1, SH 12.0 End of study mean: SA 10.9, TrP 3.1, non-TrP 12.0, SH 11.1 Reported results: TrP group demonstrated greatest improvement Acupuncture vs Sham: SMD -0.19 (95% CI random -1.21 to 0.83) immediate post treatment Acupuncture vs Sham: SMD -0.03 (95% CI random -1.05 to 0.98) at 3 weeks **Nabeta 2002:** Intervention: Acupuncture Control: Sham acupuncture VAS: Baseline mean: acupuncture 60.5, sham 48.8 End of study mean: acupuncture 43.3, sham 46.8 Significant favouring acupuncture SMD -0.15 (95% CI -0.82 to 0.52) at 9 days	

Study	Methodology	Results	Comments and evidence level
	- Names of points used: gallbladder (GB), small intestine (SI), bladder (BL), triple energiser (TE) and large intestine (LI) meridian systems located on shoulder, neck, head and upper limbs **- Depth of insertion**: 1 to 2 cm **- Response sought**: Not reported **- Needle stimulation:** Not reported **- Needle retention time:** 15 minutes **- Needle type:** Not reports **Co-Intervention** None specified **Treatment Regimen** **- Number of treatment sessions:** 6 **- Frequency and duration:** 3 x week for 2 weeks **Practitioner qualifications and background** Not reported <u>Liang 2009</u> N=53 **Intervention:** Acupuncture **- Number of needles inserted per subject per session:** 3 **- Names of points used:** GV 14, Ex-HN 15 and SI 15 **- Depth of insertion**: 1 to 2 cm **- Response sought**: Deqi **- Needle stimulation:** Not reported **- Needle retention time:** 20 minutes **- Needle type:** 40 mm long needles (diameter of 0.30 mm) **Co-Intervention** Infrared radiation **Treatment Regimen** **- Number of treatment sessions:** 9 **- Frequency and duration:** 3 x week for 3 weeks **Practitioner qualifications and background** Not reported <u>Liang 2011</u> N=53 **Intervention:** Acupuncture **- Number of needles inserted per subject per session:** 6 **- Names of points used:** Du14, SI15 and Ex-HN15 bilaterally **- Depth of insertion**: 20 mm **- Response sought**: Deqi **- Needle stimulation:** Manual **- Needle retention time:** 20 minutes	**Petrie 1986:** Intervention: Acupuncture Control: Sham TENS <u>VAS: 4 item scale</u> Baseline mean: Inv: 47.08, sham TNS 31.67 End of study mean: Inv 31.77, sham TNS 24.72 No significant differences between groups SMD -0.17 (95% CI -0.62 to 0.96) immediate post treatment SMD -0.30 (95% CI -1.09 to 0.49) at 4 weeks **Sahin 2010** Intervention: EA Control: Sham EA <u>VAS:</u> Baseline mean: EAP 7.38, sham EAP 6.19 End of study mean: EAP 4.50, sham EAP 4.50 Not significant, including pain at rest SMD -0.56 (95% CI -1.31 to 0.19) immediate post treatment SMD 0.00 (95% CI -0.73 to 0.73) at 3 months **Seidel 2002** Intervention: Acupuncture Control: Sham Laser <u>VAS:</u> Baseline mean: Acu 39.3, LLLT0 34.1 End of study mean: Acu 7.0, LLLT0 25.2 SMD -0.86 (95% CI -1.70 to -0.02) at immediate post SMD -0.46 (95% CI -1.27 to 0.35) at 4-week follow-up Statistically significant favouring acupuncture immediate post treatment and at 4 week follow-up **Sun 2010** Intervention: Acupuncture Control: Sham acupuncture <u>VAS:</u> Baseline mean: acupuncture 50, sham 50 End of study mean: acupuncture 30, sham 30 No significance differences between groups SMD -0.42 (95% CI -1.10 to 0.26) immediate post treatment SMD -0.54 (95% CI -1.22 to 0.15) at 4 weeks	

Study	Methodology	Results	Comments and evidence level
	- **Needle type:** Not reported **Co-Intervention** Infrared radiation **Treatment Regimen** - **Number of treatment sessions:** 9 - **Frequency and duration:** 3 x week for 3 weeks **Practitioner qualifications and background** Not reported <u>Nabeta 2002</u> N=34 **Intervention:** Acupuncture - **Number of needles inserted per subject per session:** Not reported - **Names of points used:** Treatment was provided to 'tender points' on the posterior aspect of the neck and upper back - **Depth of insertion**: 20 mm - **Response sought**: Deqi - **Needle stimulation:** Sparrow pecking - **Needle retention time:** 5 minutes - **Needle type:** Disposable stainless needles (0.2 mm × 40 mm) **Co-Intervention** Not specified **Treatment Regimen** - **Number of treatment sessions:** 3 - **Frequency and duration:** 1 x week for 3 weeks **Practitioner qualifications and background** Not reported <u>Petrie 1986</u> N=25 **Intervention:** Acupuncture - **Number of needles inserted per subject per session:** 5 - **Names of points used:** Du14, GB20 and GB21 bilaterally manually - **Depth of insertion**: Not reported - **Response sought**: Deqi - **Needle stimulation:** Not reported - **Needle retention time:** 20 minutes - **Needle type:** Not reported **Co-Intervention** Analgesics **Treatment Regimen** - **Number of treatment sessions:** 8 - **Frequency and duration:** 2 x week for 4 weeks	SMD 0.00 (95% CI -0.67 to 0.67) at 12 weeks **Tough 2010** Intervention: TrP needling Control: Sham acupuncture <u>SF-McGill Pain Questionnaire, VAS component</u> Baseline mean: acupuncture 4.9, sham acupuncture 5.0 End of study mean: acupuncture 1.7, sham acupuncture 3.2 Not significant SMD -0.60 (95% CI -1.29 to 0.09) at 6 weeks <u>Neck Disability Index</u> Baseline mean: acupuncture 18.6, sham acupuncture 20.5 End of study mean: acupuncture 8.4, sham acupuncture 11.9 Reported results: not significant SMD -0.41 (95% CI -1.09 to 0.27) at 6 weeks **Vas 2006** Intervention: Acupuncture Control: TENS placebo <u>VAS</u> Baseline mean: acupuncture 68.7, placebo TENS 72.3 End of study mean: acupuncture 27.6, placebo TENS 45.5 SMD -1.50 (95% CI random -1.91 to -1.10) at 1 week SMD -0.54 (95% CI random -0.97 to -0.10) at 6 months <u>Northwick Park Pain Questionnaire</u> Baseline mean: acupuncture 52.7, placebo TENS 56.5 End of study mean: acupuncture 22.5, placebo TENS 43.8 Reported results: significant at 1 week after final treatment SMD -1.22 (95% CI -1.60 to -0.83) at 1 week 6-month follow-up for this outcome: NR <u>SF-36 Physical Component</u> Baseline mean: acupuncture 36.7, placebo TENS 37.6 End of study mean: acupuncture 27.4, placebo TENS 32.3 Results: significant difference at 1 week favouring acupuncture but not at 6 months SMD -0.57 (95% CI random -0.93 to -0.21) at 1 week SMD 0.41 (95% CI random -0.02 to 0.84) at 6 months **White 2004** Intervention: Acupuncture Control: Mock TENS	

Study	Methodology	Results	Comments and evidence level
	Practitioner qualifications and background Not reported Sahin 2010 N=29 **Intervention:** EA **- Number of needles inserted per subject per session:** 14 **- Names of points used:** Du14 and GB20, GB21, LI4, UB10, UB60, TE5 all bilaterally **- Depth of insertion**: Not reported **- Response sought**: Deqi **- Needle stimulation:** manually stimulated on insertion, EAP added after 1 to 4 Hz, 200 µs **- Needle retention time:** Not reported **- Needle type:** Not reported **Co-Intervention** Not reported **Treatment Regimen** **- Number of treatment sessions:** 10 **- Frequency and duration:** 10 sessions over 3 weeks **Practitioner qualifications and background** Not reported Seidel 2002 N=48 **Intervention:** Acupuncture **- Number of needles inserted per subject per session:** 15 **- Names of points used:** Option of 15 acupuncture points was available. **- Depth of insertion**: Not reported **- Response sought**: Deqi **- Needle stimulation:** Not reported **- Needle retention time:** 15 minutes **- Needle type:** Seirin needles 7, 0.3 × 30 mm and 0.2 × 15 mm **Co-Intervention** Avoided in trial design **Treatment Regimen** **- Number of treatment sessions:** 8 **- Frequency and duration:** 2 x week for 4 weeks **Practitioner qualifications and background** Not reported Sun 2010 N=34	VAS Baseline mean: acupuncture 49.6, mock TENS 54.1 End of study mean: acupuncture 20.91, mock TENS 24.36 Acupuncture reduced pain, with no clinically effective difference between groups SMD -0.48 (95% CI random -0.84 to -0.13) at 1 week SMD -0.29 (95% CI random -0.66 to 0.07) at 8 weeks SMD -0.07 (95% CI random-0.45 to 0.30) at 6 months SMD -0.13 (95% CI random -0.51 to 0.25) at 1 year NDI SMD -0.08 (95% CI random -0.43 to 0.27) at 1 week SMD -0.24 (95% CI random -0.60 to 0.12) at 8 weeks SMD -0.09 (95% CI random -0.47 to 0.28) at 6 months SMD -0.23 (95% CI random -0.61 to 0.15) at 1 year SF-36, Physical Component SMD 0.07 (95% CI random -0.28 to 0.42) at 1 week SMD -0.13 (95% CI random -0.49 to 0.23) at 8 weeks Time points at 6 months and 1 year not reported for this outcome Significant improvement in both treatment groups **Adverse effects:** Tough 2010: increased pain (16/20 acupuncture, 9/20 sham) Cameron 2011: Similar in both groups, including slight pain, sweating and decreased blood pressure Kwak 2012: 3 acupuncture participants reported mild adverse events (2 with bruising, 1 with fatigue) Birch 1998: Not reported Ilbuldu 2004: Not reported Sun 2010: 1 participant in treatment group experienced ecchymosis, 1 in control group experienced slight dizziness; both were transient and resolved Fu 2009: 1 in each group fainted Liang 2009: Not reported Thomas 1991: Not reported White 2004: He 2004: Not reported He 2005: Not reported Itoh 2007: Not reported Nabeta 2002: None Vas 2006: mild for both groups (4 in treatment group, 2 in control group) Coan 1982: Not reported Petrie 1983: Not reported	

Study	Methodology	Results	Comments and evidence level
	Intervention: Acupuncture **- Number of needles inserted per subject per session:** 6 **- Names of points used:** TE14, GB20, SI3 bilaterally **- Depth of insertion**: Not reported **- Response sought**: Deqi **- Needle stimulation:** manually stimulated **- Needle retention time:** 20 mins **- Needle type:** Not reported **Co-Intervention** Not reported **Treatment Regimen** **- Number of treatment sessions:** 6 **- Frequency and duration:** 2 x week for 3 weeks **Practitioner qualifications and background** Not reported Tough 2010 N=34 **Intervention:** TrP Needling **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** MTrP **- Depth of insertion**: Not reported **- Response sought**: Not reported **- Needle stimulation:** 6 to 7 sparrow pecking **- Needle retention time:** Not reported **- Needle type:** 0.25 mm × 30 to 40 mm length **Co-Intervention** Not reported **Treatment Regimen** **- Number of treatment sessions:** 2-6 **- Frequency and duration:** 1 x week for 2 to 6 weeks **Practitioner qualifications and background** Not reported Vas 2006 N=85 **Intervention:** Acupuncture **- Number of needles inserted per subject per session:** Bilateral points **- Names of points used:** Not reported **- Depth of insertion**: Not reported **- Response sought**: Deqi **- Needle stimulation:** Manual every 10 mins	Irnich 2001: For acupuncture, complaints of slight pain and low blood pressure. For sham laser acupuncture, complaints of slight pain, low blood pressure and sweating Liang 2011: local bleeding, fainting: 3 participants in treatment and 4 in control; local numbness, aching or bleeding at points: 4 participants in treatment and 2 in control. All adverse events transient and resolved, although those who fainted decided to withdraw from the study Petrie 1986: Not reported Sahin 2010: Not reported Seidel 2002: reported for control and for index treatment; not specified Summary – Adverse effects: Acupuncture appears to be a safe treatment modality, as adverse effects are minor. Reported adverse effects include increased pain, bruising, fainting, worsening of symptoms, local swelling and dizziness. These studies reported no life-threatening adverse effects.	

Study	Methodology	Results	Comments and evidence level
	- Needle retention time: 30 mins **- Needle type:** sterile, single-use needles (25 mm × 0.25 mm or 40 mm × 0.25 mm) **Co-Intervention** Vaccaria seeds were applied in the ear auricle and were taped there until the following treatment session. Not avoided but comparable; both groups were provided with analgesic rescue medications once weekly. **Treatment Regimen** **- Number of treatment sessions:** 5 **- Frequency and duration:** 5 x sessions over 5 weeks **Practitioner qualifications and background** Not reported <u>White 2004</u> N=124 **Intervention:** Acupuncture **- Number of needles inserted per subject per session:** 6 on average **- Names of points used:** Western acupuncture points **- Depth of insertion**: Not reported **- Response sought**: Deqi **- Needle stimulation:** Not reported **- Needle retention time:** 20 mins **- Needle type:** Single use **Co-Intervention** Not reported **Treatment Regimen** **- Number of treatment sessions:** 8 **- Frequency and duration:** 2 x week for 4 weeks **Practitioner qualifications and background** Physiotherapists with 7 years of experience		
Liu, L, Huang, Q, Liu, Q, Ye, G, Bo, C, Chen, M & Li P **Effectiveness of Dry Needling for Myofascial Trigger Points Associated with Neck and Shoulder Pain: A Systematic Review and Meta-Analysis** **2015** Databases **PubMed, EBSCO, Physiotherapy Evidence Database,**	**Participants** – All 20 RCTs n=839 **Inclusion:** - RCT design - Patients with MTrPs associated with neck and shoulder pain - Acupuncture or dry needling as an intervention - At least 1 outcome measure of either VAS or NRS to assess pain intensity **Exclusion:** - MTrPs in patients with neck and shoulder pain were latent MTrPs - Different types of dry needling were compared with each other - RCT subjects were animals - RCT reported no data/results	<u>*Outcome measure classification:*</u> *Short term: immediately to 3 days after the final reported treatment* *Medium term: 9 to 28 days after final treatment* *Long term: 2 to 6 months after the final treatment* **Ay et al 2010** Intervention: Dry needling Control: Lidocaine injection Medium term: SMD 2.00 (1.46, 2.54) Long term: SMD 0.33 (-0.11, 0.78) **Byeon et al 2003**	**Reviewer comments** Adequate search strategy with grey literature search conducted. Two reviewers independently screened the articles, scored methodological quality and extracted data. Inadequate reporting of intervention/control makes it difficult to extract clinically important details from the SR. Publication bias assessed using funnel plots. High heterogeneity was observed for most metaanalyses due to differences in subjects, different

Study	Methodology	Results	Comments and evidence level
ScienceDirect, The Cochrane Library, ClinicalKey, Wanfang Data Chinese database, China Knowledge Resource Integrated Database, Chinese Chongqing VIP Information & SpringerLink. Supplementary searches of google scholar and clinicaltrials.org Relevant Included Studies **Ay et al 2010** **Byeon et al 2003** **Chou et al 2009** **Chou et al 2011** **DiLorenzo et al 2004** **Ga et al 2007a** **Ga et al 2007b** **Hong 1994** **Illbuldu et al 2004** **Itoh et al 2007** **Kamanli et al 2005** **Ma et al 2010** **Rayegani et al 2014** **Tekin et al 2013** **Tough et al 2010** **Tsai et al 2010** **Ziaeifar et al 2014** Research question **What is the evidence of the effectiveness of dry needling of myofascial trigger points associated with neck and shoulder pain?** Funding **Supported by the National Natural Science Foundation of China (grant no. 81470105)**	**Limits:** - Nil language restriction - RCTs and clinical trials **All studies:** **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Not reported **- Depth of insertion:** Not reported **- Response sought:** Not reported **- Needle stimulation:** Not reported **- Needle retention time:** Not reported **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** Not reported **- Frequency and duration:** Not reported **Practitioner qualifications and background** Not reported Ay et al 2010 n=80 Mean age intervention: 38.08 +/- 9.81 Diagnosis: Myofascial pain syndrome Duration: 34.27 +/- 40.95 months Byeon et al 2003 n=30 Mean age intervention: 50.9 +/- 9.7 Diagnosis: Myofascial pain syndrome Duration: Not reported Chou et al 2009 n=20 Mean age intervention: 37.7 +/- 11.3 Diagnosis: Active MTrPs Duration: 5.9 +/- 3.3 months Chou et al 2011 n=45 Mean age intervention: 34.1 +/- 10.7	Intervention: Dry needling Control: Intramuscular electrical stimulation, intramuscular stimulation Short term IMES: SMD 0.46 (-0.43, 1.36) Short term IMS: SMD -0.27 (-1.15, 0.61) Medium term IMES: SMD 2.13 (0.98, 3.27) Medium term IMS: SMD 0.92 (-0.01, 1.86) **Chou et al 2009** Intervention: Acupuncture Control: Sham Short term: SMD -3.62 (-5.15, -2.09) **Chou et al 2011** Intervention: Modified acupuncture Control: Placebo Short term: SMD -3.67 (-4.89, -2.44) **DiLorenzo et al 2004** Intervention: Dry needling Control: Placebo Medium term: SMD -1.87 (-2.34, -1.40) **Ga et al 2007a** Intervention: Acupuncture Control: Lidocaine injection Medium term: SMD 0.14 (-0.49, 0.77) **Ga et al 2007b** Intervention: Dry needling Control: intramuscular stimulation Medium term: SMD 0.31 (-0.31, 0.94) **Hong 1994** Intervention: Acupuncture with local twitch Control: Lidocaine injection Short term: SMD 0.27 (-0.69, 1.23) Medium term: SMD 3.46 (2.45, 4.48) **Illbuldu et al 2004** Intervention: Dry needling	inclusion criteria between studies, variance in the comparison treatments, variance in the outcome measures, design of the trials, use of blinding, and concealment of allocation. **Quality scores:** PEDro score Ay et al 2010: 6/10 Byeon et al 2003: 6/10 Chou et al 2009: 6/10 Chou et al 2011: 6/10 DiLorenzo et al 2004: 6/10 Ga et al 2007a: 7/10 Ga et al 2007b: 9/10 Hong 1994: 8/10 Illbuldu et al 2004: 7/10 Itoh et al 2007: 8/10 Kamanli et al 2005: 5/10 Ma et al 2010: 6/10 Rayegani et al 2014: 6/10 Terkin et al 2013: 8/10 Tough et al 2010: 7/10 Tsai et al 2010: 6/10 Ziaeifar et al 2014: 7/10 **Grade:** AQ (+) **Quality:** 1+

Study	Methodology	Results	Comments and evidence level
	Diagnosis: Unilateral MTrPs Duration: 6.1 2.2 months DiLorenzo et al 2004 n=101 Mean age intervention: 69.56 +/- 6.21 Diagnosis: Shoulder pain due to activation of MTrPs Duration: 3.53 weeks Ga et al 2007a n=39 Mean age intervention: 79.22 +/- 6.80 Diagnosis: Chronic shoulder or neck pain due to MPS Duration: Not reported Ga et al 2007b n=40 Mean age intervention: 79.22 +/- 6.80 Diagnosis: Chronic MPS Duration: Not reported Hong 1994 n=58 Mean age intervention: 41.7 +/- 14.4 Diagnosis: MPS Duration: 7.6 +/- 4.7 months Illbuldu et al 2004 n=60 Mean age intervention: 35.29 +/- 9.18 Diagnosis: MTrPs Duration: 38.48 +/- 31.94 months Itoh et al 2007 n=40 Mean age intervention: 62.3 +/- 10.1 Diagnosis: Neck pain due to MTrPs Duration: 2.9 +/- 2.7 years Kamanli et al 2005	Control: Placebo Medium term: SMD 0.03 (-0.59, 0.65) Long term: SMD -0.12 (-0.74, 0.5) **Itoh et al 2007** Intervention: Acupuncture Control: Sham Medium term: SMD -1.76 (-3.02, 0.51) Long term: SMD -2.37 (-3.78, 1.04) **Kamanli et al 2005** Intervention: Acupuncture Control: Lidocaine injection Medium term: SMD 1.03 (0.06, 2.01) **Ma et al 2010** Intervention: Acupuncture Control 1: placebo Control 2: Mini scalpel release Medium term Placebo: SMD -1.5 (-2.36, -0.65) Medium term MSR: SMD 0.39(-0.34, 1.11) Long term MSR: SMD 1.00 (0.24, 1.34) **Rayegani et al 2014** Intervention: Dry needling Control: Physiotherapy Results not reported **Tekin et al 2013** Intervention: Dry needling Control: Sham Short term: SMD -0.86 (-1.52, -0.19) Medium term: SMD -1.58 (-2.32, -0.85) **Tough et al 2010** Intervention: Dry needling Control: Sham Medium term: SMD 0.1 (-0.57, 0.78) **Tsai et al 2010**	

Study	Methodology	Results	Comments and evidence level
	n=29 Mean age intervention: 37.20 +/- 8.08 Diagnosis: MTrPs Duration: 32.50 +/- 21.99 months <u>Ma et al 2010</u> n=43 Mean age intervention: 42.2 +/- 5.3 Diagnosis: MPS Duration: 22.5 +/- 15.3 years <u>Rayegani et al 2014</u> n=28 Mean age intervention: 32 +/- 10 Diagnosis: MPS Duration: 9.6 +/- 8.4 years <u>Terkin et al 2013</u> n=39 Mean age intervention: 42.9 +/- 10.9 Diagnosis: MPS Duration: 63.5 +/- 50.7 months <u>Tough et al 2010</u> n=41 Mean age intervention: 34.2 +/- 10.8 Diagnosis: MTrPs pain due to whiplash injury Duration: 6.8 +/- 4.3 weeks <u>Tsai et al 2010</u> n=35 Mean age intervention: 46.4 +/-12.2 Diagnosis: Unilateral shoulder pain due to MTrPs Duration: 7.5 +/- 3.9 months <u>Ziaeifar et al 2014</u> n=33 Mean age intervention: 30.06 +/- 9.87 Diagnosis: MTrPs Duration: Not reported	Intervention: Dry needling Control: Sham Short term: SMD -0.88 (-3.1, -0.73) **Ziaeifar et al 2014** Intervention: Dry needling Control: Compression technique Medium term: SMD -0.79 (-1.5, -0.08) **Meta-analysis** <u>Dry needling vs sham/control</u> Short term: 6 studies SMD: -1.91 (-3.1, -0.73) Significant Medium term: 5 studies SMD: -1.07 (-1.87, -0.27) Significant Long term: 2 studies SMD: -1.15 (-3.34, 1.04) Non-significant <u>Dry needling vs injection</u> Short term: 6 studies SMD: -0.01 (-0.41, 0.4) Non-significant Medium term: 4 studies SMD: 1.69 (0.4, 2.98) Significant for injection Long term: 1 study SMD: 0.33 (-0.11, 0.78) Non-significant **Adverse effects:** Not reported	

Study	Methodology	Results	Comments and evidence level
Baxter, D, Bleakley, C & McDonough, S **Clinical Effectiveness of Laser Acupuncture: A Systematic Review** **2008** Databases **Sports discus, Medline, EMBASE, CINAHL, British Nursing Index, AMED, PubMed, PEDro & Acubriefs** Relevant Included Studies **Lundeberg et al 1987** **Snyder-Mackler et al 1986** **Ceccherelli et al 1989** **Haker & Lundeberg 1991** **Haker & Lundeberg 1990** **Laaskso et al 1997** **Hakguder et al 2003** **Gur et al 2004** **Ilbuldu et al 2004** **Altan et al 2005** Research question **What is the clinical effectiveness of laser Acupuncture, principally for the reduction of pain of musculoskeletal origin?** Funding **Nil reported**	**Participants** n=433 Age: > 18 years **Inclusion:** - RCTs published in the English language - Subjects with a soft tissue injury, an acute or chronic pain condition or any systemic illness - Articles evaluating laser acupuncture (application of low intensity laser radiation to classical meridian points or trigger points) as the primary intervention - Acceptable control interventions were: no treatment, placebo or sham laser, other sham procedure, or other therapeutic intervention - Outcomes: pain intensity (VAS), or a global measure of patient improvement (overall improvement, proportion of patients recovered, subjective improvement of symptoms) **Exclusion:** - Randomised cross over design - Studies in which the primary treatment involved needling, acupressure, sham laser acupuncture or non-acupuncture application of low intensity laser therapy **Limits:** - Adults > 18 y.o **Style of acupuncture:** Laser Acupuncture **Lundeberg et al 1987** **Diagnosis** Lateral epicondylitis (Tennis elbow) **Intervention** HeNe Laser, GaAs laser **Comparison** Placebo GaAs Laser Wavelength: 904 nm Pulsed: 73 Hz Power output: 0.07 mW Dose: 0.042 J point × 10 points He Ne Laser Wavelength: 632.4 nm Continuous wave Power output: 1.56 mW Dose: 0.0936 J point × 10 points Acupuncture points: LI10, LI11, LI12, SJ5, SJ10, SI4, SI8, H3, H4, P3 No. of treatments: 10 2 x sessions a week for 5-6 weeks	**Lundeberg et al 1987** Intervention 1: GaAs laser Intervention 2: He Ne laser Control: placebo - Outcome measures: VAS, pain on wrist dorsiflexion, grip strength, patient and medical assessment of outcome & nerve conduction study - Follow ups: after intervention - No significant change in any outcome - Authors conclusion: negative **Snyder-Mackler et al 1986** Intervention: Laser Control: Placebo - Outcome measure: VAS - Follow ups: after intervention, 3 months, 6 months - Significant decrease in pain $p < 0.05$ following laser - Authors conclusion: positive * No means / SDs – graphical presentation only **Ceccherelli et al 1989** Intervention: Laser Control: Placebo - Outcome measure: McGill pain questionnaire, VAS - Follow ups: after intervention, 3 months - Significant decrease in pain after treatment and at 3 months in favor of laser group. - Effect size: Pain (VAS) Post Rx SMD: 27.5 (16.3−38.9) 3 months: SMD: 27.1 (16.6−37.6) - Authors conclusion: positive **Haker & Lundeberg 1990** Intervention: Laser Control: Placebo - Outcome measure: NPRS, grip strength - Follow ups: after intervention, 3 months, 1 year - No significant difference at any point - Effect size: VAS pain post Rx: RR. 3.09 (0.88−10.38) - Authors conclusion: negative **Haker & Lundeberg 1991**	**Reviewer comments** Adequate search strategy. Thorough reporting of inclusion/exclusion criteria. Only one reviewer selected included studies and extracted data introducing the possibly of bias. Relevant details on any follow ups were noted. Methodological quality of each RCT was independently assessed by two authors. Assessment of the clinical appropriateness of the Laser Acupuncture treatment dose and points used created an additional means of assessing the evidence. Lack of included RCTs of high quality and low risk of bias with quality reporting of laser irradiation parameters and employing clinically appropriate treatments may have impacted the results of the review. Nil conflicts of interests declared. **Quality scores:** van Tulder scale > 6 high quality < 6 low quality Lundeberg et al 1987: 5/11 Snyder-Mackler et al 1986: 5/11 Ceccherelli et al 1989: 4/11 Haker & Lundeberg 1991: 7/11 Haker & Lundeberg 1990: 6/11 Laaskso et al 1997: 4/11 Hakguder et al 2003: 5/11 Gur et al 2004: 6/11 Ilbuldu et al 2004: 4/11 Altan et al 2005: 4/11 **Grade:** LQ (-) **Quality:** 1-

Study	Methodology	Results	Comments and evidence level
	Snyder-Mackler et al 1986 **Diagnosis** Myofascial trigger point pain – neck & back **Intervention** Laser TrP Acupuncture **Comparison** Placebo Laser parameters Wavelength: 632.8 nm Continuous wave Power output: 0.95 mW Dose: 0.019 J point × 3 each Acupuncture points: Trigger points – x 3 20 seconds Number of TrPs unclear No. of treatments: 10 2 x sessions a week for 5-6 weeks Additional treatments: 12 subjects – 6 per group received hot packs and high voltage pulsed current **Ceccherelli et al 1989** **Diagnosis** Myofascial pain in cervical region **Intervention** Laser **Comparison** Placebo Laser parameters Wavelength: 904 nm Pulsed: 1000 Hz/200 ns Power - peak power: 25 W Dose: 1 J point; total 5 J Acupuncture points: No.: 5 points Points: LI4, LI11 LI14, SI3, small intestine, triple burner 5 No. of treatments: 12 3 x sessions a week for 4 weeks **Haker & Lundeberg 1990** **Diagnosis** Lateral epicondylitis **Intervention** Laser **Comparison** Placebo Laser parameters Wavelength: 904 nm Pulsed: 70 Hz/180 ns Power - average power: 12 mW	Intervention: Laser Control: Placebo - Outcome measure: NPRS, grip strength - Follow ups: after intervention, 3 months, 6 months and 1 year - No significant difference at end of treatment. Significant difference in favor of placebo treatment at follow up in terms of grip strength ($p<0.05$) - Effect size: VAS pain post Rx: RR. 0.55 (0.15−1.93) - Authors conclusion: negative **Laaksso et al 1997** Intervention: Laser low dose – red, laser high dose – red, laser low dose – IR, laser high dose IR Control: Placebo - Outcome measure: VAS - Follow ups: after intervention Results: significant reductions in pain in all laser groups, however, reductions in laser group higher - Data not reported ** - Authors conclusions: negative **Hakguder et al 2003** Intervention: Laser + exercise Control: exercise - Outcome measure: VAS, pain pressure threshold - Follow ups: after intervention, 3 weeks post Results: Significant differences in laser group in terms of pain immediately after treatment and at 3 weeks follow up. - Effect size: Pain post Rx: 2.36 (1.36−3.36) - Authors conclusion: positive **Gur et al 2004** Intervention: Laser Control: Placebo - Outcome measure: mean number of trigger points, pain at rest/movement, Neck pain disability scale, BDI - Follow ups: 2, 3 and 12 weeks Results: Significant differences in: - Mean number of trigger points ($p < 0.01$) favoring laser at all follow ups - Pain ($p < 0.01$) decreased versus baseline at all follow ups in Laser; Week 2 only in Placebo - NPDS, NHP, BDI ($p < 0.01$) in favor of Laser at all follow ups except week 12 (NHP) Effect size: Pain	

Study	Methodology	Results	Comments and evidence level
	Peak power: 8.3 W Dose: 0.36 J point Acupuncture points: LI, LI10, LI11, LI12, Lu 5 and SJ 5. No. of treatments: 10 2-3 x sessions a week for 4-5 weeks **Haker & Lundeberg 1991** **Diagnosis** Lateral epicondylitis **Intervention** Laser **Comparison** Placebo Laser parameters Wavelength: 632.8 nm Continuous wave Power output – 5 mW (70 mrad) Dose: 0.3 J point Acupuncture points: LI11, LI12 No. of treatments: 10 3-4 sessions a week **Laaksko et al 1997** **Diagnosis** Myofascial trigger point pain **Intervention 1** Laser low dose / red Laser parameters Wavelength: 670 nm Pulsed: 5000 hz Power output – 10 mW Spot size: 0.036 cm2 Dose: 1 J cm – 2 point **Intervention 2** Laser high dose / red Laser parameters Wavelength: 670 nm Pulsed: 5000 hz Power output – 10 mW Spot size: 0.036 cm2 Dose: 5 J cm – 2 point **Intervention 3** Laser high dose / IR Laser parameters Wavelength: 820 nm	2 weeks 2.28 (0.69−3.87) 12 weeks 2.02 (0.81−3.23) - Authors conclusion: positive **Ilbuldu et al 2004** Intervention 1: Laser Intervention 2: Dry needling 1 x week for 4 weeks Comparison: Placebo Laser - Outcome measure: VAS, Analgesic consumption, cervical range of movement, NHP - Follow ups: after treatment and 6 months Results: Significant decreases in pain (at rest and on activity), ROM, NHP immediately post treatment No significant differences between groups at 6 months Effect sizes: Pain post Rx: 2.65 (1.35−3.95); Pain 6 months: 0.87 (−0.89−2.63); NHP post treatment: 8.76 (0.36−17.88) NHP 6 months: 4.23 (−5.38−13.84) - Authors conclusion: positive **Altan Let al 2005** Intervention 1 Laser Comparison Placebo Laser - Outcome measure: Pain, Algometry, cervical ROM - Follow ups: after treatment and 12 weeks Results: Significant improvement in all parameters for both groups (within group analysis) Comparison of the percentage changes did not show significant differences relative to pre-treatment values (between group analyses) - Effect size: Pain post Rx: 0.05 (0.02−0.08) - Authors conclusion: negative **Adverse effects:** Not reported	

Study	Methodology	Results	Comments and evidence level
	Pulsed: 5000 hz Power output – 25 mW Spot size: 0.028 cm2 Dose: 1 J cm – 2 point **Intervention 3** Laser high dose / IR Laser parameters Wavelength: 820 nm Pulsed: 5000 hz Power output – 25 mW Spot size: 0.028 cm2 Dose: 5 J cm – 2 point **Comparison** Placebo **Hakguder et al 2003** **Diagnosis** Myofascial pain syndrome – neck and upper back **Intervention** Laser + exercise **Comparison** Exercise – stretching cervical region Laser parameters Wavelength: 780 nm Continuous Power output: 5 mW/Spot Diameter 0.5 cm Dose: 0.98 J point, 5 J cm - 2 Acupuncture points: LI11, LI12 No. of treatments: 10 1 x daily for 10 days **Gur et al 2004** **Diagnosis** Myofascial pain syndrome – neck and shoulder region **Intervention** Laser **Comparison** Placebo Laser parameters Wavelength: 904 nm Pulsed: 2800 Hz/200 ns Power output – Average 11.2 mW Peak Power: 20 W Dose: 2 J cm—2 point Acupuncture points: LI11, LI12		

Study	Methodology	Results	Comments and evidence level
	No. of treatments: 10 1 x daily for 2 weeks excluding weekends Ilbuldu et al 2004 **Diagnosis** Trigger point pain in upper trapezius **Intervention 1** Laser **Intervention 2** Dry needling 1 x week for 4 weeks **Comparison** Placebo Laser Laser parameters Wavelength: 632.8 nm Continuous wave Power output – not specified Dose: 2 J cm—x 3 points Acupuncture points: Not reported No. of treatments: 12 3 x weekly for 4 weeks Altan et al 2005 **Diagnosis** Myofascial pain in cervical region **Intervention 1** Laser **Comparison** Placebo Laser Laser parameters Wavelength: 904 nm Pulsed: 1000 Hz/180 ns Power output – available of 27 W, 50 W or 27×4 W Dose: unclear 2 mins over each point Acupuncture points: 3 x TrPs bilaterally, 1 x point in tight band in trapezius bilaterally No. of treatments: 10 10 x over 2-week period Additional treatment: Daily exercise – isometric and stretching just short of pain for 2 weeks at home **Practitioner qualifications and background** Not reported		
Gattie, E, Cleland, J & Snodgrass, S	**Participants** – All 13 RCTs n=723 **Inclusion:**	**Campa-Moran et al 2015** Intervention: Dry needling Control 1: Ischemic compression technique	**Reviewer comments** Incomprehensive search strategy. Only studies published in Englishes included.

Study	Methodology	Results	Comments and evidence level
The Effectiveness of Trigger Point Dry Needling for Musculoskeletal Conditions by Physical Therapists: A Systematic Review and Meta-analysis **2017** Databases **MEDLINE, AMED, CINAHL & Embase** Relevant Included Studies **Campa-Moran et al 2015** **Santos et al 2014** **Edwards and Knowles 2003** **Llamas-Ramos et al 2014** **Mejuto-Vazquez et al 2014** **Pecos-Martin et al 2015** **Perez-Palmares et al 2010** **Sterling et al 2015** **Ziaeifar et al 2014** Research question **What is the evidence of short and long-term effectiveness of dry needling delivered by a physical therapist for any musculoskeletal pain condition?** Funding **Nil**	- Human subjects with musculoskeletal conditions - Must be treated by a physical therapist with dry needling, compared with a control, sham, or other intervention - RCTs **Exclusion:** - Patients < 18 y.o - Full text studies in English **Limits:** - Human subjects - RCTs <u>Campa-Moran et al 2015</u> Condition: Chronic myofascial neck pain Duration: Inv: 10.0 ± 2.9 months Intervention: Dry needling <u>Santos et al 2014</u> Condition: myofascial pain Duration: > 6 weeks Intervention: Dry needling <u>Edwards and Knowles 2003</u> Condition: myofascial pain Duration: Inv: 16 ± 23 months Intervention: Dry needling <u>Llamas-Ramos et al 2014</u> Condition: Chronic mechanical neck pain Duration: Inv: 7.4 ± 2.6 months Intervention: Dry needling <u>Mejuto-Vazquez et al 2014</u> Condition: Acute mechanical neck pain Duration: Inv: 3.4 ± 0.7 days Intervention: Dry needling <u>Pecos-Martin et al 2015</u> Condition: Chronic neck pain Duration: Inv: 5.7 ± 2.6 months Intervention: Dry needling	Control 2: Mobilisation – manual therapy Outcome measures: VAS, NDI, ROM VAS immediate vs control 1: SMD 0.08 (–0.72, 0.88) VAS immediate vs control 2: SMD 0.54 (–0.28, 1.35) VAS 1-4 weeks vs control 1: SMD –1.37 (–2.28, –0.46) VAS 1-4 weeks vs control 2: SMD 0.30 (–0.51, 1.10) NDI 1-4 Weeks control 1: SMD –0.51 (–1.33, 0.30) NDI 1-4 Weeks control 2: SMD 0.38 (–0.43, 1.19) **Santos et al 2014** Intervention: Dry needling Control 1: Ischemic compression technique Control 2: Control Outcome measures: VAS, WHOQOL-BREF Not reported **Edwards and Knowles 2003** Intervention: Dry needling Control 1: Stretching Control 2: Control Outcome measures: short form of the McGill Pain Questionnaire MPQ 1-4 weeks vs Control: SMD –0.33 (–1.09, 0.43) MPQ 5-8 weeks vs Control: SMD –0.50 (–1.27, 0.27) MPQ 1-4 weeks vs Stretching: SMD –0.31 (–1.07, 0.45) MPQ 5-8 weeks vs Stretching: SMD –0.57 (–1.34, 0.20) **Llamas-Ramos et al 2014** Intervention: Dry needling Control 1: Ischemic compression technique Outcome measures: NPRS, PPT, Northwick Park NPQ, ROM NRPS immediate: SMD –0.18 (–0.59, 0.22) NRPS 1 weeks: SMD –0.23 (–0.63, 0.18) NRPS 2 weeks: SMD –0.10 (–0.51, 0.31) NPQ 2 weeks: SMD 0.12 (–0.30, 0.53) **Mejuto-Vazquez et al 2014** Intervention: Dry needling Control: control Outcome measures: NRPS, ROM NRPS immediate: SMD –0.81 (–1.81, 0.19)	Two independent reviewers screened titles and abstracts to determine which studies met the inclusion and exclusion criteria. Data extraction performed by only one independent author. Review conducted following PRISMA guidelines. Publication bias assessed adequately. High heterogeneity in 5 of the 8 meta-analyses performed with included studies investigating any type of musculoskeletal pain, where participant samples differed, comparison groups varied, and follow-up times for outcomes were different. The review investigates dry needling performed by a single health professional (physiotherapist) which improves the generalizability of findings to physiotherapists, however, this excludes articles reporting the effect of dry needling by other health professionals. **Quality scores:** PEDro quality scale /10 Campa-Moran et al 2015: 6/10 Santos et al 2014: 5/10 Edwards and Knowles 2003: 7/10 Llamas-Ramos et al 2014: 8/10 Mejuto-Vazquez et al 2014: 8/10 Pecos-Martin et al 2015: 9/10 Perez-Palmares et al 2010: 6/10 Sterling et al 2015: 9/10 Ziaeifar et al 2014: 4/10 **Grade:** AQ (+) **Quality:** 1+

Study	Methodology	Results	Comments and evidence level
	Perez-Palmares et al 2010 Condition: Chronic low back pain Duration: Not reported Intervention: Dry needling Sterling et al 2015 Condition: WAD > 3 months Duration: 20.6 ± 18.0 months Intervention: Dry needling Ziaeifar et al 2014 Condition: Trigger points in the upper trapezius Duration: Not reported Intervention: Dry needling All Studies **Intervention** Dry needling **- Number of needles inserted per subject per session:** Not reported **- Depth of insertion:** Not reported **- Response sought:** Not reported **- Needle stimulation:** Not reported **- Needle retention time:** Not reported **- Needle type:** Not reported **Treatment Regimen** **- Number of treatments:** Not reported **- Frequency and duration:** Not reported **Practitioner qualifications and background** Physiotherapists – All studies	NRPS 1-4 weeks: SMD –1.30 (–2.38, –0.23) **Pecos-Martin et al 2015** Intervention: Dry needling Control: Sham dry needling Outcome measures: VAS, NPQ VAS 1 week: SMD –1.57 (–2.10, –1.04) VAS 4 week: SMD –1.91 (–2.48, –1.35) NPQ 1-4 weeks: SMD –1.34 (–1.85, –0.83) **Perez-Palmares et al 2010** Intervention: Dry needling Control: Percuteneous electrical nerve stimulation Outcome measures: VAS, ODI **Sterling et al 2015** Intervention: Dry needling + exercise Control: Sham dry needling + exercise Outcome measures: VAS, NDI VAS 5-8 week: SMD 0.00 (–0.44, 0.44) VAS: 9-12 week: SMD –0.14 (–0.58, 0.31) VAS: 6 months: SMD: –0.50 (–0.97, –0.03) VAS: 12 months: SMD: –0.20 (–0.66, 0.26) NDI 6 weeks: SMD –0.03 (–0.47, 0.41) NDI 12 weeks: SMD –0.08 (–0.52, 0.37) NDI 6 months: SMD –0.36 (–0.83, 0.10) NDI 12 months: SMD –0.39 (–0.85, 0.08) **Ziaeifar et al 2014** Intervention: Dry needling Control 1: Ischemic compression technique Outcome measures: VAS, DASH VAS 1-4 weeks: SMD –0.79 (–1.51, –0.08) DASH 1-4 weeks: SMD –0.37 (–1.06, 0.32) **Meta-analysis** Dry needling vs control/sham immediate to 12-week effect Pain: - 6 studies	

Study	Methodology	Results	Comments and evidence level
		- Low-quality evidence suggesting a moderate effect (SMD, –0.7; 95% CI: –1.06, –0.34) favouring dry needling over control/sham Function: - 5 studies - Low-quality evidence suggesting a small effect (SMD, –0.44; 95% CI: –0.85, –0.04) favouring dry needling over control/sham <u>Dry needling vs control/sham 6 to 12 month effects</u> Pain: - 2 studies - Non-significant (SMD, –0.26; 95% CI: –0.58, 0.06) dry needling vs control/sham in the long term Function: - 2 studies - Low-quality evidence suggesting a small effect (SMD, –0.32; 95% CI: –0.62, –0.02) favouring dry needling over sham/control <u>Dry needling vs other treatment immediate to 12 week effects</u> Pain - 6 studies - Moderate-quality evidence suggesting a small effect (SMD, –0.43; 95% CI: –0.77, –0.10) favouring dry needling over other treatment Function: - 6 studies - Non-significant dry needling vs other treatments (SMD, –0.01; 95% CI: –0.49, 0.47) **Adverse effects:** Not reported	
Cagnie, B, Castelein, B, Pollie, F, Steelant, L, Verhoeyen, H & Cools, A **Evidence for the use of ischemic compression and dry needling in the management of trigger points of the upper trapezius in**	**Participants** – All 15 RCTs The number of patients varied between 39 and 117 in each study 7 studies looked at ischemic compression 8 studies looked at dry needling **Inclusion:** - Studies assessing the effects of ischemic compression and/or DN - Studies comparing with other (non-) physiotherapeutic treatments	**Ay et al 2010** Intervention: DN + neck exercises for 12 weeks Control: Lidocaine injection + neck exercises for 12 weeks Outcomes: ROM, BDI 4 weeks: Improvement in both groups for all parameters 12 weeks: Improvement in both groups for all parameters No difference between groups	**Reviewer comments** Inadequate search strategy with only two databases searched and a small list of search terms. Two reviewers independently screened articles and extracted data. Three independent, blinded researchers scored

Study	Methodology	Results	Comments and evidence level
patients with neck pain: a systematic review **2015** Databases **PubMed & Web of Science** Relevant Included Studies **Ay et al 2010** **Eroglu et al 2013** **Ga et al 2007** **Hong et al 1994** **Itoh et al 2007** **Ma et al 2010** Research question **What is the evidence of the effectiveness of ischemic compression and dry needling on trigger points in the upper trapezius muscle in patients with neck pain?** Funding **Author Castelein is funded by BOFUGent 01D30812. Financial disclosure statements have been obtained, and no conflicts of interest have been reported by the authors or by any individuals in control of the content**	- Outcomes: pain, ROM, functionality, and quality-of-life - RCTs only - Participants with neck pain that were diagnosed with active or latent TPs in the UT - Studies scoring at least 50% on the quality assessment. **Exclusion:** - Articles about side effects or complications <u>Ay et al 2010</u> Condition: Idiopathic neck pain with active trigger point in UT Intervention: DN + neck exercises for 12 weeks Duration: forward and backward needling, until there were no more latent trigger points Frequency: 1 session <u>Eroglu et al 2013</u> Condition: Idiopathic neck pain with active trigger point in UT Intervention: DN + self stretching Duration: 20 repetitions of rapid movements until the latent trigger point was no longer perceived Frequency: 3 sessions (1st, 3rd, and 14th day) <u>Ga et al 2007</u> Condition: Idiopathic neck pain with active trigger point in UT Intervention: DN (+ self-stretching 3 times a day) Duration: forward and backward needling, until there were no more latent trigger points Frequency: 3 sessions (1st, 7th, and 14th day) <u>Hong et al 1994</u> Condition: Idiopathic neck pain with active trigger point in UT Intervention: DN (+ stretching) Duration: forward and backward needling, until there were no more latent trigger points Frequency: 1 session <u>Itoh et al 2007</u> Condition: Chronic neck pain Intervention: Dry needling Duration: until latent trigger point was elicited, the needle was left in place for 10 mins Frequency: 6 sessions over 10 weeks <u>Ma et al 2010</u> Condition: Chronic neck pain with active trigger point in UT Intervention: DN + self-stretching	**Eroglu et al 2013** Intervention: DN + self-stretching Control: Lidocaine injection + self-stretching Outcomes: ROM, QOL: Nottingham Health Profile Baseline, on the 3rd and 14th day of treatment: Improvement in all groups on the 3rd and 14th day of treatment. No significant difference between groups **Ga et al 2007** Intervention: DN (+ self-stretching 3 times a day) Control: Lidocaine injection + (self-stretching 3 times a day) Outcomes: Pain: shoulder, neck, and headache, ROM, Depression: Geriatric Depression Scale (Short Form) Measurements on days 0, 7, 14, and 28 just before each treatment Pain: decreased in both groups, no difference between the groups ROM: increased in both groups, except for extension in the TP needling group Depression: a trend toward decrease in both groups **Hong et al 1994** Intervention: DN (+ stretching) Control: Lidocaine injection (+ stretching) Outcomes: Pain, ROM Baseline, immediately, and 2 weeks after treatment Pain: Decrease in both groups immediately after treatment, but no difference between the groups. Greater increase in lidocaine injection group 2 weeks after treatment. ROM: Increase immediately after treatment in both groups, effects decreased 2 weeks after treatment (no difference between the groups) **Itoh et al 2007** Intervention: Dry needling Control 1: Non-TP DN Control 2: sham acupuncture Control 3: Standard acupuncture Outcomes: ROM, Pain, NDI Baseline + 1, 2, 3, 6, 7, 8, 9, and 12 weeks after the first treatment Pain: Decrease in all groups, but with different time course. After 9 weeks, the DN group reported relatively lower pain than the other groups did. NDI: Decrease in DN group only **Ma et al 2010**	methodologic quality of all the included articles. Lack of reporting of the dry needling intervention used within individual included studies limits the clinical utility of the review. Large number of studies looked at combined interventions eg: DN and stretching program, which might have influenced the results regarding the relative contribution of the DN to treatment effects. No studies looked at long term effects of dry needling. No assessment of publication bias. No meta-analysis conducted **Quality scores:** The checklist for RCTs, developed by the Dutch Cochrane Centre and Dutch Institute for Healthcare Improvement /9 Ay et al 2010: 7/9 Eroglu et al 2013: 5/9 Ga et al 2007: 7/9 Hong et al 1994: 7/9 Itoh et al 2007: 7/9 Ma et al 2010: 6/9 **Grade:** LQ (-) **Quality:** 1-

Study	Methodology	Results	Comments and evidence level
	Duration: forward and backward needling, until there were no more latent trigger points Frequency: 2-4 sessions over 2 weeks All studies **- Number of needles inserted per subject per session:** Not reported **- Depth of insertion:** Not reported **- Response sought:** Reported well above **- Needle stimulation:** Not reported **- Needle retention time:** Only reported in Itoh et al 2007 **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** Poorly reported **- Frequency and duration:** Poorly reported **Practitioner qualifications and background** Not reported	Intervention: DN + self-stretching Control 1: self-stretching Control 2; Mini scalpel release Outcomes: Pain, ROM Baseline, 2 weeks and 3 months after treatment Greater improvement for Mini scalpel release and DN for all parameters compared with self-stretching at 2-weeks and 3-months follow-up Greater decrease in pain and increase in ROM compared with DN at 3 months' follow-up **Adverse effects:** Not reported	
Zhang, Y, Zhou, M, Wei, T & Song, X **System evaluation and Meta-analysis on clinical efficacy of heat-sensitive moxibustion in treatment of cervical spondylotic radiculopathy** **2016** **Databases** **CNKI, CBM database, Chinese Science and Technology Periodical Database (VIP), WanFang Data, Pubmed and Cochrane Library** Relevant Included Studies **Nil relevant studies** Research question **What is the efficacy of heat-sensitive moxibustion** **in treatment of cervical spondylotic radiculopathy?**	**Participants** – All 10 RCTs n=1008 All included participants conformed to the diagnostic criteria of cervical spondylotic radiculopathy established in National Cervical Spondylotic conference in 1992 **Inclusion:** - RCTs or CCTs - Studies in Chinese or English - Definite evaluation criteria of diagnosis and efficacy - The intervening measures included heat-sensitive moxibustion or heat-sensitive moxibustion combined with other therapy applied in the treatment group, and other therapy, except heat-sensitive moxibustion, applied in the control group - Outcome measures: efficacy (total effective rate and cure rate, McGill pain scale, VAS **Exclusion:** - Heat-sensitive moxibustion studies about other types of cervical spondylosis - The control group was not set - Papers of heat-sensitive moxibustion were included in the basic treatment of control group - Animal experiments, reviews, individual cases or experts' experience reports, thesis and dissertation - Papers published repeatedly **Limits:** - RCTs - English and Chinese ***No relevant RCTs*** **Reasons for exclusion**	***No relevant RCTs*** **Authors conclusion:** The improvement SF-MPQ of treatment group was superior to that of control group, and the difference was statistically significant. VAS of treatment group was lower than that of control group, and the difference was statistically significant. *Control groups included traditional moxibustion, acupuncture and EA **Adverse effects:** Not reported	**Reviewer comments** Adequate search strategy in both English and Chinese, however, limited key words were used which may have lead to missed studies. Two reviewers independently screened articles, scored methodologic quality, and extracted data. Adequate risk of bias assessment. Poor reporting of controls and interventions. No competing interests declared. No studies within the SR were relevant to this evidenced based review. **Quality scores:** Cochrane risk of bias tool All 10 RCTs Random sequence generation (selection bias) - Low risk of bias Allocation concealment (selection bias) - Unclear risk of bias Blinding of participants and personnel (performance bias) - Unclear risk of bias Blinding of outcome assessment (detection bias) - Unclear risk of bias

Study	Methodology	Results	Comments and evidence level
Funding **Supported by Anhui Provincial Colleges science research platform team building program: 2015TD033; Provincial demonstrating experiment and practice training centre: 20100541**	<u>Intervention and controls both forms of Acupuncture:</u> - Xie et al 2010: - Qiu et al 2012 - Gao et al 2012 - Bian et al 2012 - Tang et al 2013 - Wang et al 2013 - Ye et al 2015 - Cai et al 2015 - Li & Cao 2015 <u>No outcome measures of interest to this review</u> Yang et al 2014		Incomplete outcome data (attrition bias) - Unclear risk of bias Selective reporting (reporting bias) - Unclear risk of bias Other bias - Unclear risk of bias **Grade:** HQ (++) **Quality:** No studies or data of interest
Tough, E, White, A, Cummings, M, Richards, S & Cambell, J **Acupuncture and dry needling in the management of myofascial trigger point pain: A systematic review and meta-analysis of randomized controlled trials** **2009** Databases **Pubmed, EMBASE, AMED, MEDLINE, Cochrane Central/ Cochrane Reviews,** **PEDro and SCI-EXPANDED** Relevant Included Studies **Chu 1997** **Ilbuldu et al 2004** **DiLorenzo et al 2004** **Huguenin et al 2005** **Itoh et al 2004** **Itoh et al 2007** Research question **Does dry needling directly into MTrPs achieved superior pain**	**Participants** – All 7 RCTs n=564 **Inclusion:** - RCTs including crossover studies - Studies where at least one intervention group were treated by direct insertion of a dry needle into the MTrPs after locating the patient's area of tenderness **Exclusion:** - If the 'active treatment' involved inserting needles: (i) superficially over the site of a MTrP; (ii) into traditional acupuncture points; (iii) into prespecified MTrP locations - Studies where the control intervention was considered to be an 'active' treatment, classified as: (i) oral medication (ii) an injected substance or (iii) traditional meridian acupuncture needling **Limits:** - RCTS and CCTs - Human studies - No language restriction <u>Chu 1997</u> Myofascial neck pain Intervention: Direct needling into MTrPs Control: EMG needle into non-MTrPs **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Not reported **- Depth of insertion:** Not reported **- Response sought:** Not reported **- Needle stimulation:** Not reported	**Chu 1997** Myofascial neck pain Intervention: Direct needling into MTrPs Control: EMG needle into non-MTrPs Between group MD: ''I induces more relief than C" Not tested formally Within group MD: No statistical comparison I 82 (67%) patients had 'pain relief' C 23(55%) patients had 'pain relief' **DiLorenzo et al 2004** Myofascial shoulder pain Intervention: Direct needling into MTrPs + standard rehabilitation Control: Standard rehabilitation of physical therapy and ongoing daily medication (dosage unchanged) Between group MD: I superior to C ($p < 0.001$) Within group MD: Significant reduction in pain in both groups (both $p < 0.05$) (VAS 0–10) I 60% reduction; mean change 4.18 C 38% reduction; mean change 3.06 **Itoh et al 2004** Myofascial low back pain Intervention: Direct needling into MTrPs Control: Superficial insertion of needle into skin over site of MTrP; needle left in situ for 10 min Between group MD: No between group difference ($p = NS$) Within group MD: Significant reduction in pain in group A ($p < 0.01$) but not in group C ($p = NS$) I 50% reduction; mean change 32.5	**Reviewer comments** Adequate search strategy. Incomprehensive and limited inclusion/exclusion criteria. Two authors independently scrutinised the titles and abstracts. Two authors independently extracted data from each paper. No follow up of missing data. Likelihood of publication bias was not assessed. Generally low internal validity of included studies. Sample sizes were generally small which raises the possibility of type II error, where the likelihood of a study producing a false negative result is increased. Statistical heterogeneity observed within meta-analysis. Treatment interventions varied considerably in location of needle placement, the depth of insertion, individual treatment times and overall number of treatment sessions. **Quality scores:** Modified Jadad score <u>Chu 1997</u> Appropriate randomisation: Unclear Allocation concealment: No

Study	Methodology	Results	Comments and evidence level
reduction in patients with a diagnosis of MTrP pain when compared with either: no additional intervention; indirect local dry needling either superficially over the MTrP or elsewhere in the muscle; or a placebo control such as a non-penetrating sham needle or sham laser? **Funding** **EA Tough and AR White are supported by the National Institute for Health Research (NIHR)**	**- Needle retention time:** Not reported **- Needle type:** EMG Needle **Treatment Regimen** **- Number of treatment sessions:** Not reported **- Frequency and duration:** Not reported **Practitioner qualifications and background** Not reported <u>DiLorenzo et al 2004</u> Myofascial shoulder pain Intervention: Direct needling into MTrPs + standard rehabilitation Control: Standard rehabilitation of physical therapy and ongoing daily medication (dosage unchanged) **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Not reported **- Depth of insertion:** Not reported **- Response sought:** Deqi **- Needle stimulation:** Needle manipulation **- Needle retention time:** 5 mins **- Needle type:** Acupuncture needle (diameter 0.40 mm) **Treatment Regimen** **- Number of treatment sessions:** Not reported **- Frequency and duration:** Not reported **Practitioner qualifications and background** Not reported <u>Huguenin et al 2005</u> Myofascial hamstring pain Intervention: Direct needling into MTrPs Control: Blunt end needle applied via guide tube over site of MTrP; needle manipulated to mimic real needling; application approx. 10 s **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Not reported **- Depth of insertion:** Not reported **- Response sought:** until LTR and pain eliminated **- Needle stimulation:** 'sparrow pecking' technique **- Needle retention time:** application approx 1 minute **- Needle type:** Acupuncture needle (diameter 0.30 mm)	C 27% reduction; mean change 17.4 **Huguenin et al 2005** Myofascial hamstring pain Intervention: Direct needling into MTrPs Control: Blunt end needle applied via guide tube over site of MTrP; needle manipulated to mimic real needling; application approx. 10 s Between group MD: No between group difference (p = NS) Within group MD: Significant reduction in pain in both groups (both p < 0.001) I 60% improved; median change 18 C 60% improved median change 18 **Ilbuldu et al 2004** Myofascial neck pain Intervention: Direct needling into MTrPs + home exercise program of upper and middle trapezius and pectoral muscle stretches. Control: Inactive laser over site of MTrPs Between group MD: No statistical comparison long-term outcome at 6 months – no difference between interventions Within group MD: No statistical comparison I 27% reduced; mean change 36.15 C 36% reduced; mean change 28.26 **Itoh et al 2007** Myofascial neck pain Intervention: Direct needling into MTrPs Control: Blunt end needle applied over site of MTrP; needle manipulated to mimic 'sparrow pecking'; mimic removal after 10 mins Between group MD: Not reported Within group MD: Significant reduction in pain in group A (p < 0.01) but not in group C (p = NS) I 72% reduction; mean change 48.4 C 34% reduction; mean change 23.6 **Meta-analysis** <u>MTrP dry needling vs sham</u> 4 studies, n= 67 I, n=67 c WMD: 14.09 (-5.91, 33.99) I2 = 88% Non-significant difference	Patient blinding: No Withdrawal: No <u>DiLorenzo et al 2004</u> Appropriate randomisation: Unclear Allocation concealment: Unclear Patient blinding: No Withdrawal: Unclear <u>Huguenin et al 2005</u> Appropriate randomisation: Yes Allocation concealment: Yes Patient blinding: Yes Withdrawal: Yes <u>Ilbuldu et al 2004</u> Appropriate randomisation: Unclear Allocation concealment: Unclear Patient blinding: No Withdrawal: Unclear <u>Itoh et al 2004</u> Appropriate randomisation: Yes Allocation concealment: No Patient blinding: Yes Withdrawal: Yes <u>Itoh et al 2007</u> Appropriate randomisation: Yes Allocation concealment: No Patient blinding: Yes Withdrawal: No **Grade:** AQ (+) **Quality:** 1

Study	Methodology	Results	Comments and evidence level
	Treatment Regimen **- Number of treatment sessions:** Not reported **- Frequency and duration:** Not reported **Practitioner qualifications and background** Not reported Ilbuldu et al 2004 Myofascial neck pain Intervention: Direct needling into MTrPs + home exercise program of upper and middle trapezius and pectoral muscle stretches. Control: Inactive laser over site of MTrPs **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Not reported **- Depth of insertion:** Not reported **- Response sought:** Not reported **- Needle stimulation:** Not reported **- Needle retention time:** Not reported **- Needle type:** Acupuncture needle (diameter 0.25 mm) **Treatment Regimen** **- Number of treatment sessions:** Not reported **- Frequency and duration:** Not reported **Practitioner qualifications and background** Not reported Itoh et al 2004 Myofascial low back pain Intervention: Direct needling into MTrPs Control: Superficial insertion of needle into skin over site of MTrP; needle left in situ for 10 min **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Not reported **- Depth of insertion:** Not reported **- Response sought** Eliciting local twitch response **- Needle stimulation:** 'sparrow pecking' technique **- Needle retention time:** needle left in situ for 10 min **- Needle type:** Acupuncture needle (diameter 0.2 mm) **Treatment Regimen** **- Number of treatment sessions:** Not reported **- Frequency and duration:** Not reported	**Adverse effects:** Not reported	

Study	Methodology	Results	Comments and evidence level
	Practitioner qualifications and background Not reported Itoh et al 2007 Myofascial neck pain Intervention: Direct needling into MTrPs Control: Blunt end needle applied over site of MTrP; needle manipulated to mimic 'sparrow pecking'; mimic removal after 10 mins **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Not reported **- Depth of insertion:** Not reported **- Response sought** Eliciting local twitch response **- Needle stimulation:** 'sparrow pecking' technique **- Needle retention time:** needle left in situ for 10 min **- Needle type:** Acupuncture needle (diameter 0.2 mm) **Treatment Regimen** **- Number of treatment sessions:** Not reported **- Frequency and duration:** Not reported **Practitioner qualifications and background** Not reported **Practitioner qualifications and background** Not reported		
Asher, G, Jonas, D, Coeytaux, R, Reilly, A, Loh, Y, Motsinger-Reif, A & Winham, S **Auriculotherapy for Pain Management: A Systematic Review and Meta-Analysis of Randomized Controlled Trials** **2010** Databases **Medline, AMED, ISI Web of Science, and CINAHL** Relevant Included Studies **Sator-Katzenshlager et al 2003** **Sator-Katzenshlager et al 2004**	**Participants** – 2 relevant RCT's n= 108 **Sator-Katzenshlager et al 2003 –** Chronic neck pain **Sator-Katzenshlager et al 2004 –** Chronic low-back pain **Inclusion:** - RCT - Compared auriculotherapy to sham auriculotherapy control, standard medical care, or waiting-list control - Measured the effect on pain or medication use - Published in English in a peer-reviewed journal **Exclusion:** - Studies were excluded that compared auriculotherapy to a nonauriculotherapy active control treatment that did not have clear evidence of efficacy **Limits:** - Nil language restriction - Human subjects **Sator-Katzenshlager et al 2003**	**Sator-Katzenshlager et al 2003** Intervention: Indwelling EA Control: Indwelling AA + mock EA Outcome measure: VAS: SMD 5.361 (3.528, 7.195) **Sator-Katzenshlager et al 2004** Intervention: EA Control: Indwelling AA Outcome measure: VAS: SMD 2.955 (2.229, 3.681) **Meta-analysis** Not applicable to relevant included studies **Adverse effects:** 29% reported some type of acupuncture-related adverse event.	**Reviewer comments** Inclusion and exclusion criteria is reported well, however excluded papers are not listed in the review. Two reviewers independently assessed titles and abstracts, which were excluded only if both reviewers agreed that the trial did not meet eligibility criteria. Limited details regarding the studies interventions and the control groups, including duration, number of sessions etc. The two included relevant studies were both outliers and therefore were not included in the meta-analysis, mainly due to the fact that they utilised a summed weekly pain score and only included subjects that had high baseline pain scores. In addition, the information provided within the table describing sample size does not match within the

Study	Methodology	Results	Comments and evidence level
Research question **What is the evidence of effectiveness of auriculotherapy for pain management?** Funding **Financial support was provided by National Institutes of Health/National Centre for Complementary and Alternative Medicine grant T32AT003378 (GNA), and NIH/ NIGMS grant T32GM081057**	n=21 Mean age intervention: Not reported Duration of LBP: Not reported **Intervention –** Indwelling EA **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Cervical spine, shenmen, cushion **- Depth of insertion:** Not reported **- Response sought:** Not reported **- Needle stimulation:** Not reported **- Needle retention time:** Not reported **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** Not reported **- Frequency and duration:** **Practitioner qualifications and background** Not reported **Control** – Indwelling AA + mock EA n=21 **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Cervical spine, shenmen, cushion **- Depth of insertion:** Not reported **- Response sought:** Not reported **- Needle stimulation:** Not reported **- Needle retention time:** Not reported **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** Not reported **- Frequency and duration:** Not reported **Practitioner qualifications and background** Not reported **<u>Sator-Katzenshlager et al 2004</u>** n=87 Mean age intervention: Not reported Duration of LBP: Not reported **Intervention –** Indwelling EA **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Cushion, shenmen, Lumbar, spine		body text for Sator-Katzenshlager et al 2004. **Quality scores:** Criteria of the U.S. Preventive Services Task Force and the National Health Service Centre for Reviews and Dissemination (U.K.). Sator-Katzenshlager et al 2003 – Good Sator-Katzenshlager et al 2004 – Fair **Grade:** AQ (+) **Quality:** 1

Study	Methodology	Results	Comments and evidence level
	- Depth of insertion: Not reported **- Response sought:** Not reported **- Needle stimulation:** Not reported **- Needle retention time:** Not reported **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** Not reported **- Frequency and duration:** **Practitioner qualifications and background** Not reported **Control** – Indwelling AA n=87 **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Cushion, shenmen, Lumbar, spine **- Depth of insertion:** Not reported **- Response sought:** Not reported **- Needle stimulation:** Not reported **- Needle retention time:** Not reported **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** Not reported **- Frequency and duration:** Not reported **Practitioner qualifications and background** Not reported		
Espejo-Antúnez, L, Tejeda, J, Albornoz-Cabello, M, Rodríguez-Mansilla, J, Cruz-Torres, B, Ribeiro, F & Silva, A **Dry needling in the management of myofascial trigger points: A systematic review of randomized controlled trials** **2017** Databases **PubMed, Scopus, The Cochrane Library & PEDro**	**Participants** – All 13 RCTs n=701 Conditions included myofascial pain syndrome, mechanical neck pain, and total knee arthroplasty **Inclusion criteria** - Be a RCT, investigating the effects of dry needling for the management of MTrPs and/or myofascial pain syndrome - Have applied a dry needling technique that conforms with the following definition: an invasive procedure (superficial or deep) consisting of using a needle without any chemical agent inserted into the skin over an active or latent MTrP and that does not follow the principles of the Traditional Chinese Medicine - Have diagnosed MTrPs using the criteria of Travell et al. and myofascial pain syndrome as a soft tissue rheumatism characterized by associated MTrPs in one or more muscles, taut bands, referred pain, sensory changes, and local twitch response - Report on at least one outcome related to pain intensity either using a visual analogue scale or a numeric pain rating scale	**Irnich et al 2002** Intervention: Dry needling (DN) Control 1: Needle Acupuncture (NLA) at distant points Control 2: Sham laser acupuncture **Pain VAS** DN Pre: 3.3±1.9., Post: 2.9 ± 2.2; NLA- Pre: 3.5 ± 2.3, Post: 1.9 ± 1.6; Sham laser Pre: 3.0 ± 1.9, Post: 2.8 ± 1.9 **Ilbuldu et al 2004** Intervention: Dry needling Control 1: Laser Control 2: Placebo laser **Pain VAS:**	**Reviewer comments** Comprehensive search strategy with no language restrictions of studies between 2000 and 2015. Two reviewers independently screened articles, scored methodologic quality, and extracted data. Insufficient reporting of the dry needling intervention limits the clinical utility of the results. **Quality scores:** PEDRO score Irnich et al 2002: 9/10 Ilbuldu et al 2004 : 7/10 Tsai et al 2010 : 6/10 Tekin et al 2013 :8/10

Study	Methodology	Results	Comments and evidence level
Relevant Included Studies **Irnich et al 2002** **Ilbuldu et al 2004** **Tsai et al 2010** **Tekin et al 2013** **Mejuto-Vazquez et al 2014** **Pecos-Martin et al 2015** **Kamanli et al 2005** **Eroğlu et al 2013** **Ay et al 2010** **Couto et al 2014** **Ga et al 2007** **Ziaeifar et al 2014** **Llamas-Ramos et al 2014** Research question **What is the evidence of the effectiveness of dry needling in the treatment of MTrPs and to explore the impact of specific aspects of the technique on its effectiveness.** Funding **iBiMED is supported by the Portuguese Foundation for Science and Technology (REF:UID/BIM/04501/2013) and FEDER/ Compete 2020 funds.** **CINTESIS is supported by FEDER through the operation POCI-01-0145-FEDER-007746 funded by the Programa Operacional Competitividade e Internacionalização - COMPETE 2020 and by National Funds through FCT – Fundação para a Ciência e a Tecnologia (REF:UID/IC/4255/2013)**	- Be written in English - Be conducted in adult human participants **Exclusion criteria** - Studies were excluded on the basis of the following: review articles, editorials or letters to the editor, case reports - Studies not involving a dry needling intervention (e.g. acupuncture) or comparing different types of dry needling and studies where participants had other concurrent disorders **Irnich et al 2002** n=34 Mean age intervention: NR Condition: Cervical MPS Duration of Sy: NR **Intervention** **- Number of needles inserted per subject per session:** NR **- Names of points used**: NR **- Depth of insertion:** Deep - **Response sought:** Local twitch response required **- Needle stimulation:** NR **- Needle retention time**: NR **- Needle type**: NR **Treatment Regimen** **- Number of treatment sessions**: 1 **- Frequency and duration:** NR **Practitioner qualifications and background**: 8 years experience **Ilbuldu et al 2004** n=60 Mean age: NR Condition: MTrPs in the upper trapezius muscle Duration of Sy: NR **Intervention** **- Number of needles inserted per subject per session:** NR **- Names of points used:** NR **- Depth of insertion:** NR **- Response sought:** NR **- Needle stimulation:** NR **- Needle retention time:** NR **- Needle type:** 0.25 x 25mm **Treatment Regimen**	DN: VAS-rest: Pre: 5.1 ± 2.0, Post: 3.7±2.3, p < 05; VAS-activity: Pre: 7.6 ± 1.5, Post: 5.3 ± 2.45, p < 0.001. Laser: VAS-rest: Pre: 5.5 ± 2.0, Post: 2.1 ± 1.4, p<0.05; VAS-activity: Pre: 7.2 ± 1.4, Post: 2.9 ± 2.0, p < 0.001. **Disability** Dimensions “Pain” and “Physical Activity”. Pre-Posttest: p < 0.05 in both groups **Tsai et al 2010** Intervention: Dry needling Control 1: Superficial needling in ECRL **Pain VAS:** DN: % change after treatment: 28.5 ± 21.8 Superficial needling: % change after treatment: 10.0±8.1 **Tekin et al 2013** Intervention: Dry needling Control 1: Sham DN **Pain VAS:** DN: Pre: 6.6 ± 1.3, After the 1st session: 4.0 ± 1.6, After the 6th session: 2.2 ± 2.0 Sham DN: Pre: 6.4 ± 1.6, After the 1st session: 5.4 ± 1.6, After the 6th session: 5.3 ± 1.8 Between-group difference: After the 1st session: p =0.034, After the 6th session: p < 0.001 **Quality of life:** DN: All domains have a significant increase (p < 0.05) Sham DN: Significant increases in vitality only (p < 0.05) **Mejuto-Vazquez et al 2014.** Intervention: Dry needling Control 1: No intervention **Pain VAS:** <u>DN:</u> Pre-post: −1.9 (95% CI: −3.1,−0.7); p < 0.01; Pre-1 wk: −3.7 (95%CI: −5.3,−2.2); p < 0.01 <u>No intervention</u>: Pre-post: 0.2 (95%CI: −0.3, 0.8); p > .05) Pre-1 wk: −0.7 (95%CI: −1.4, −0.1) ; p > 0.05 <u>Between-group difference</u>: Post: 2.1 (95%CI: 1.0,3.2); p < 0.01 1wk: 3.0 (95%CI: 2.1,3.9); p < 0.01 **Pecos-Martin et al 2015**	Mejuto-Vazquez et al 2014 : 9/10 Pecos-Martin et al 2015 : 9/10 Kamanli et al 2005 : 5/10 Eroğlu et al 2013 : 7/10 Ay et al 2010 : 6/10 Couto et al 2014 : 9/10 Ga et al 2007 : 7/10 Ziaeifar et al 2014 : 7/10 Llamas-Ramos et al 2014 : 9/10 **Grade:** AQ (+) **Quality:** 1

Study	Methodology	Results	Comments and evidence level
	- Number of treatment sessions: 4 **- Frequency and duration:** NR **Practitioner qualifications and background:** NR **Tsai et al 2010** n=35 Mean age: NR Condition: Unilateral shoulder pain with active MTrP in the upper trapezius and latent MTrP in the ECRL muscle Duration of Sy: NR **Intervention** **- Number of needles inserted per subject per session:** NR **- Names of points used:** NR **- Depth of insertion:** Deep and superficial **- Response sought**: Elicit as many LTRs as possible, until no more LTRs could be elicited. Usually 1–2 mins **- Needle stimulation:** NR **- Needle retention time:** NR **- Needle type:** 0.5 x 50mm **Treatment Regimen** **- Number of treatment sessions:** 1 **- Frequency and duration:** NR **Practitioner qualifications and background:** > 10 years experience **Tekin et al 2013** n=39 Mean age: NR Condition: MPS with at least one active MTrP involving the cervical and thoracic region **Duration of Sy**: NR **Intervention** **- Number of needles inserted per subject per session:** NR **- Names of points used:** NR **- Depth of insertion:** NR **- Response sought:** The needle was moved forward until the trigger point was reached. The needle was withdrawn immediately after pricking **- Needle stimulation:** NR **- Needle retention time:** NR **- Needle type:** 0.25 x 25mm **Treatment Regimen** **- Number of treatment sessions:** 6	Intervention: Dry needling Control 1: DN outside the MTrP **Pain VAS:** DN: Pre-1 wk: 2.7 (95%CI: 2.0, 3.3); p < 0.001; Pre-1 mo: 3.2 (95%CI: 2.6, 3.8), p < 0.001. DN outside MTrP: Pre-1 wk: 0.3 (95%CI:−0.0, 0.6); p ≥ 0.05; Pre-1 mo: 0.5 (95%CI: 0.1, 0.9); p≥0.05. Between-group difference: 1 wk post: 2.4 (95%CI: 1.6, 3.2); p < 0.001; 1mo: 2.7 (95%CI: 2.0, 3.4); p < 0.001 **Disability** DN: Pre-1 mo: 9.7 (95%CI: 7.3–12.2); p < 0.001 DN outside MTrP: Pre-1 mo: 1.7 (95%CI:−0.1, 3.6) (p > 0.05) Between-group difference: 1mo: 8.0 (95%CI:5.0, 11.0) (p < 0.001). **Kamanli et al 2005** Intervention: Dry needling Control 1: Lidocaine injection (LIG) Control 2: Botulin toxin injection (BTG) **Pain VAS:** DN: Pre:7.0 ± 2.7; Post:5.1 ± 2.9, p = 0.083; BTG: Pre:6.1 ± 2; Post: 2.7 ± 1.0, p = 0.012; LIG: Pre: 6.9 ± 1.4; Post:2.0 ± 1.7, p =0.005 Between-group difference: LIG vs DNG: p =0.023. BTG vs DNG: p = 0.022. **Disability** DN: Pre:16.2 ± 6.9; Post:14.2 ± 7.0, p = 0.293; BTG: Pre:16.6 ± 6.; Post:10.1 ± 5.1, p = 0.021; LIG: Pre: 18.5 ± 6.6; Post:6.4 ± 4.8, p =0.005 Between-group difference: LIG vs DNG: p =0.023 **Eroğlu et al 2013** Intervention: Dry needling Control 1: Oral flurbiprofen (OF) Control 2: Lidocaine injection (LIG) Pain VAS: DN: 0.56 [5 (0–10)] OF: 0.46 [3.5 (0–10)] LIG: 0.46 [3 (0–10)] Changes between groups: VAS Interaction groups: F: 0.41, p =0.76 **QOL**	

Study	Methodology	Results	Comments and evidence level
	- Frequency and duration: NR **Practitioner qualifications and background:** NR **Mejuto-Vazquez et al 2014** n= 17 Mean age: NR Condition: Acute mechanical neck pain **Duration of Sy**: NR **Intervention** **- Number of needles inserted per subject per session**: NR - **Names of points used**: NR - **Depth of insertion:** Deep - **Response sought:** NR - **Needle stimulation**: Once the first LTR was obtained, vertical motions for 25 to 30 s - **Needle retention time:** NR **- Needle type:** 0.3 X 30mm **Treatment Regimen** **- Number of treatment sessions:** 1 **- Frequency and duration:** NR **Practitioner qualifications and background**: > 5 years' experience **Pecos-Martin et al 2015** N=72 Mean age: NR Condition: Mechanical neck pain **Duration of Sy**: NR **Intervention** **- Number of needles inserted per subject per session:** NR **- Names of points used:** NR **- Depth of insertion:** Deep **- Response sought:** **- Needle stimulation:** Needle insertions were repeated 8 to 10 times **- Needle retention time:** NR **- Needle type:** 0.25 X 25mm **Treatment Regimen** **- Number of treatment sessions:** 1 **- Frequency and duration:** NR **Practitioner qualifications and background:** 12 years' experience	No significant differences except for fatigue dimension on the third and 14th days in the lidocaine injection group (p= 0.02) **Ay et al 2010** Intervention: Dry needling Control: Lidocaine injection (LIG) plus a homebased exercise program **Pain VAS:** DN: Pre: 5.6 ± 1.3, Post 4 wk: 3.8 ± 0.5, 12th wk:1.3 ± 0.8, p < 0.001. Lidocaine injection: Pre: 5.8 ± 1.3, Post 4 wk: 2.3 ± 1.0, Post 12th wk: 0.9 ± 0.8, p < 0.001; Between-group difference: Post 4 wk: p = 0.053; Post 12th wk: p = 0.215 **Disability** DN: Pre: 12.1 ± 3.6, Post 4 wk: 10.9 ± 3.3,12th wk:10.1 ± 2.6, p < 0.001. LIG: Pre: 14.5 ± 16.9, Post 4 wk: 10.7 ± 2.6 Post 12th wk: 9.9 ± 2.8, p < 0.001; Between-group difference: Post 4 wk: p = 0.716; Post 12th wk: p = 0.903 **Couto et al 2014** Intervention: Dry needling Control 1: Placebo-sham electroacupuncture Control 2: Lidocaine injection (LIG) Pain VAS: Between-group difference: DN vs Placebo-sham (Relative Change 44.8% (33.6–63.9%), p < 0.001; DN vs LIG (Relative Change: 28.73% (7.5–49.7%), p < 0.01; LIG vs Placebo-sham (Relative change:22.5% (5.6–39.2%), p < 0.001 **QOL** Physical health: Between-group difference: DN vs Placebo-sham (Relative Change:−22.8% (−36.2–9.4%), p < 0.01; LIG vs DN (Relative Change:−15.6% (−27.2–3.9%), p < 0.01; Placebo-sham vs LIG (Relative change:−6.3% (−8.2–2.3), p > 0.05 Mental health: Between-group difference: DN vs Placebo-sham (Relative Change: 23.0% (13.0–32.9%), p < 0.001; LIG vs DN (Relative Change:11.9% (0.4–23.4%), p < 0.001; Placebo-sham vs LIG (Relative change:12.6% (3.0–22.1%), p < 0.001 **Ga et al 2007** Intervention: Dry needling (DN) Control 1: DN plus needling of multifidus muscle at the C3-C5 level plus self-stretching exercises Pain VAS: DN: Pre: 7.0 ± 1.3, Day 28: 3.8 ± 2.5, p < 0.001; DN + needling of multifidus: Pre: 6.4 ± 2.1, Day 28: 3.5 ± 2.4, p < 0.001. Between-group difference: p > 0.05 **Ziaeifar et al 2014** Intervention: Dry needling	

Study	Methodology	Results	Comments and evidence level
	Kamanli et al 2005 N=29 Mean age**:** NR Condition: MTrPs in the cervical and/or periscapular regions **Duration of Sy**: NR **Intervention** **- Number of needles inserted per subject per session:** NR **- Names of points used:** NR **- Depth of insertion:** NR **- Response sought:** NR **- Needle stimulation:** Each point was needled 8 to 10 times **- Needle retention time:** NR **- Needle type:** 0.5 X 32mm **Treatment Regimen** **- Number of treatment sessions:** 1 **- Frequency and duration:** NR **Practitioner qualifications and background:** NR **Eroğlu et al 2013** N=60 **Mean age:** NR **Condition:** MTPs involving the neck and back region **Duration of Sy**: NR **Intervention** **- Number of needles inserted per subject per session:** NR **- Names of points used:** NR **- Depth of insertion:** Deep **- Response sought:** NR **- Needle stimulation:** Until the LTR was no longer elicited or resistant muscle tautness was no longer perceived **- Needle retention time:** NR **- Needle type:** 0.71 x 38mm **Treatment Regimen** **- Number of treatment sessions:** 1 **- Frequency and duration:** NR **Practitioner qualifications and background:** NR **Ay et al 2010** N=80	Control 1: Trigger point manual compression (TPMC) Pain DN: Pre: 6.6 ± 1. 6, Post: 1.3 ± 1.9, p < 0.001 TPMC: Pre: 6.2 ± 1.3, Post: 3.1 ± 2.3, p < 0.001 Between-group difference: p = 0.01 Disability DN: Pre: 24.7 ± 10.81. Post: 12.81 ± 10.1, p = 0.001; TPMC: Pre:26.44 ± 8.56. Post: 16.9 ± 11.6, p =0.006; Between-group difference: p = 0.34 **Llamas-Ramos et al 2014** Intervention: Dry needling Control 1: Manual therapy (MT) with MTrP pressure release plus stretching of the upper trapezius muscle Pain VAS: DN: Pre-post: −4.3 (95%CI: −4.7,−3.9), p < 0.01; Pre-1 wk: −4.9 (95%CI:−5.3,−4.5), p < 0.01; Pre-2 wk: −5.3 (95%CI: −5.7,−5.9), p < 0.01 MT: Pre-post: −4.0 (95%CI: −4.5,−3.4), p < 0.01; Pre-1 wk: −4.6 (95%CI:−5.1,−4.1), p<0.01; Pre-2wk: −5.2 (95%CI: −5.6,−4.7), p < 0.01 Between-group difference: Post: 0.3 (95%CI: −0.3, 1.0); 1wk: 0.3 (95%CI: −0.2, 0.9); 2wk: 0.1 (95%CI: −0.4,0.7); p > 0.05 **Adverse effects:** Not reported	

Study	Methodology	Results	Comments and evidence level
	Mean age**:** NR Condition: MPS with at least one MTrP located in the upper trapezius **Duration of Sy**: NR **Intervention** **- Number of needles inserted per subject per session:** NR **- Names of points used:** NR **- Depth of insertion:** Deep **- Response sought:** NR **- Needle stimulation:** The needle was inserted a few times with fan-shaped movements **- Needle retention time:** NR **- Needle type:** 0.71 x 32mm **Treatment Regimen** **- Number of treatment sessions:** 1 **- Frequency and duration:** NR **Practitioner qualifications and background:** NR **Couto et al 2014** N=78 **Mean age:** NR **Condition:** Myofascial pain syndrome **Duration of Sy**: NR **Intervention** **- Number of needles inserted per subject per session:** NR **- Names of points used:** NR **- Depth of insertion:** Deep **- Response sought:** **- Needle stimulation:** A maximum stimulation time of 1 minute per MTrP and 3 minutes for multiple deep intramuscular stimulation **- Needle retention time:** NR **- Needle type:** 0.25 x 40mm **Treatment Regimen** **- Number of treatment sessions:** 8 **- Frequency and duration:** NR **Practitioner qualifications and background:** > 6 years **Ga et al 2007** N=40 Mean age: NR Condition: chronic MPS of upper trapezius muscle		

Study	Methodology	Results	Comments and evidence level
	Duration of Sy: NR **Intervention** **- Number of needles inserted per subject per session:** NR **- Names of points used:** NR **- Depth of insertion:** Deep **- Response sought:** **- Needle stimulation:** Needled forward and backward to the MTrP until there were no more LTRs **- Needle retention time:** NR **- Needle type:** 0.3 x 60mm **Treatment Regimen** **- Number of treatment sessions:** 3 **- Frequency and duration:** NR **Practitioner qualifications and background:** Completed the "Trigger Point Injection Training Course" and the "Basic Course for Gunn IMS" **Ziaeifar et al 2014** N=33 Mean age: NR Condition: MTrp located in the upper trapezius Duration of Sy: NR **Intervention** **- Number of needles inserted per subject per session:** NR **- Names of points used:** NR **- Depth of insertion:** NR **- Response sought:** **- Needle stimulation:** Needled forward and backward to the MTrP until there were no more LTRs **- Needle retention time:** NR **- Needle type:** NR **Treatment Regimen** **- Number of treatment sessions:** 3 **- Frequency and duration:** NR **Practitioner qualifications and background:** NR **Llamas-Ramos et al 2014** N=94 **Mean age:** NR **Condition:** Chronic mechanical neck pain **Duration of Sy**: NR **Intervention** **- Number of needles inserted per subject per session:** NR		

Study	Methodology	Results	Comments and evidence level
	- Names of points used: NR **- Depth of insertion:** Deep **- Response sought:** NR **- Needle stimulation:** Once the first LTR was obtained, vertical motions for 25 to 30 s **- Needle retention time:** 2-3 mm vertical motions with no rotations at approximately 1 Hz **- Needle type:** 0.3 x 30mm **Treatment Regimen** **- Number of treatment sessions:** 2 **- Frequency and duration:** NR **Practitioner qualifications and background:** > 6 years		
Moon, T, Posadzki, P, Choi, Park, T, Kim, H Lee, M & Ernst, E **Acupuncture for Treating Whiplash Associated Disorder:** **A Systematic Review of Randomised Clinical Trials** **2014** Databases **AMED, CINAHL, Clinicaltrials, EMBASE, ISI Web of Knowledge, MEDLINE, PEDro, PSYCINFO, Rehab Trials, Rehadat, The Cochrane Library, China National Knowledge Infrastructure, J stage, Journal archive, Science Links Japan, Korea Institute of Science and Technology Information, DBpia, Korea National Assembly Library, Koreann Studies Information Service System, and Oriental Medicine Advanced Searching Integrated System** Relevant Included Studies **Kwak et al 2012** **Cameron et al 2011** **Han et al 2011**	**Participants** n=309 **Inclusion:** - RCTs of acupuncture, electroacupuncture or dry needling for the treatment of WAD - Patients with WAD by any defined or specified diagnostic criteria, regardless of sex, age, or race - Studies in which patients suffered from any type of ailment, such as muscular or psychological problems due to whiplash injury - Treatments involving needle insertion at acupoints, pain points, or trigger points - Outcome measures pertaining to pain intensity, quality of life, and function **Exclusion:** - Trials testing other forms of Acupuncture, such as laser Acupuncture, herbal Acupuncture, moxibustion, acupressure, pressed studs, or transcutaneous electrical stimulation - RCTs in which one form of Acupuncture was compared to another form of Acupuncture **Limits:** - Nil reporting, language, or blinding restrictions **Style of acupuncture:** Electro-acupuncture - Cameron 2011 & Han 2011 Acupuncture - Kwak 2012 & Aiger 1998 Dry needling – Tough 2010 Kwak et al 2012 **Intervention** **- Number of needles inserted per subject per session:** Flexible selection considering the painful lesion **- Names of points used:** SI2, SI3, SI5, SI7, LI11, SI 15, SI 14, BL10, BL12, BL13, BL14, BL60, BL62, BL66, GB20, GB21, GB40, GB41, TE15, TE5 **- Depth of insertion:** insertion to a 1.0–2.0 cm depth using a guide tube	**Kwak et al 2012** Intervention: Acupuncture + usual care Control: Usual care (exercise + rest) VAS: Significant difference in favour of acupuncture p=0.0001 Effect size: insufficient data Acupuncture was associated with a significant alleviation of pain **Cameron et al 2011** Intervention: EA frequency 2–5Hz, 1.5 volts Control: Sham EA VAS: Significant difference (P = 0.05) at 3 months, and (P = 0.007) at 6 months Effect size: −0.5 NDI: Non significant (P > 0.05) Effect size: −0.4 SF-36: Non significant (P > 0.05) Effect size: 0.3 EA was associated with a reduction in pain intensity, but not clinically significant **Han et al 2011** Intervention: EA + herbal medicine Control: Sham EA and herbal medicine VAS: Significant difference (P = 0.043) Effect size: 0.8 NDI: Non-significant Effect size: 0.5 Cotreatment with EA could be recommended as a useful therapy for WAD patients **Tough et al 2010**	**Reviewer comments** Sufficient search strategy with 20 databases used including Chinese, Japanese and Korean databases. Data screening, selection and quality assessment were conducted by two independent reviewers. PRISMA statement was used for the reporting structure of this systematic review. Authors of included RCTs were contacted and asked for any unpublished data. Possibility of publication bias present within the review. The included studies were heterogeneous in terms of methodological design, WAD grades, control groups, and primary outcome measures. None of the included RCTs fully described the details of their treatments, making them difficult or even impossible to reproduce. Nil attempt to quantitively summarise results into meta-analysis due to statistical and clinical heterogeneity of the studies. Limited total number of trials plus limited sample size within trials makes it difficult to allow definitive judgments. **Quality scores:** Assessment of Risk of Bias

Study	Methodology	Results	Comments and evidence level
Tough et al 2010 **Aigner et al 1998** Research question **How effective is acupuncture for the treatment of whiplash associated disorder (WAD)?** Funding **Not reported**	**- Response sought:** Not reported **- Needle stimulation:** Rotating needles using the index finger and thumb **- Needle retention time:** 15 mins **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** 6 **- Frequency and duration:** 6 sessions over 2 weeks **Practitioner qualifications and background** Not reported <u>Cameron et al 2011</u> **Intervention** **- Number of needles inserted per subject per session:** 8 **- Names of points used:** GB39, GB20, LI14, SI6 bilaterally **- Depth of insertion:** Not reported **- Response sought:** Not reported **- Needle stimulation:** Not reported **- Needle retention time:** Not reported **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** 12 **- Frequency and duration:** 2 x week for 6 weeks **Practitioner qualifications and background** Not reported <u>Han et al 2011</u> **Intervention** **- Number of needles inserted per subject per session:** 6 **- Names of points used:** BL10, GB20, GB21, SI14, SI15, SI11 **- Depth of insertion:** Not reported **- Response sought:** Not reported **- Needle stimulation:** Not reported **- Needle retention time:** 15 mins **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** 8 **- Frequency and duration:** 2 x week for 4 weeks **Practitioner qualifications and background** Not reported	Intervention: Dry needling + physiotherapy Control: Sham needling + physiotherapy <u>SF-MPQ:</u> Nonsignificant (P = 0.67) Effect size: 0.2 <u>NDI:</u> Nonsignificant (P = 0.43) Effect size: 0.1 **Aigner et al 1998** Intervention: Acupuncture Control: Drugs (chlormezanone and paracetamol) + physiotherapy Intergroup difference not reported Effect size: insufficient data Author conclusion: Acupuncture can improve ROM and reduce the duration of acute complaints and drug intake **Adverse effects:** Adverse events were mentioned in three studies (Kwak et al 2012, Cameron et al 2011 & Tough et al 2010), but no serious adverse events were reported. Most of the reported mild adverse events occurring with Acupuncture were bruising, fatigue, slight pain, sweating, and low blood pressure Kwak et al 2012: Three mild reactions (two with mild bruising, one with fatigue) and no serious adverse reactions Cameron et al 2011: Six mild reactions (slight pain, sweating, and low blood pressure) and no serious adverse reactions Tough et al 2010: None	Random sequence generation: 4/5 low risk of bias Allocation concealment: 3/5 low risk of bias Blinding of participants and personnel: 3/5 unclear risk of bias Blinding of outcome: 1/5 moderate risk of bias Incomplete outcome: 2/5 moderate risk of bias Selective reporting: 0/5 unclear risk of bias Other Bias: 0/5 unclear risk of bias **Grade:** AQ (+) **Quality:** 1-

Study	Methodology	Results	Comments and evidence level
	Tough et al 2010 **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Myofascial trigger points **- Depth of insertion:** Not reported **- Response sought:** Not reported **- Needle stimulation:** Sparrow pecking motion (moving up and down five or six times) **- Needle retention time:** Not reported **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** 2-6 **- Frequency and duration:** 2-6 weeks **Practitioner qualifications and background** Not reported Aigner et al 1998 **Intervention** **- Number of needles inserted per subject per session:** 4 **- Names of points used:** TB5, SI6 bilaterally **- Depth of insertion:** Not reported **- Response sought:** Not reported **- Needle stimulation:** Not reported **- Needle retention time:** Not reported **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** Not reported **- Frequency and duration:** Not reported **Practitioner qualifications and background** Not reported		
Gadau, M, Yeung, W, Liu, H, Zaslawski, C, Tan, Y, Wang, F, Bangrazi, S, Chung, K, Bian, Z & Zhang, S **Acupuncture and moxibustion for lateral elbow pain: a systematic review of randomized controlled trials** **2014**	**Participants:** All 19 trials n=1190 Sample size of included studies ranged from 16 to 120 participants All subjects were out-patients Age range from 17 to 74 years in the treatment arm and 20 to 76 years in the control arm **Inclusion:** - RCTs studying subjects with a primarily diagnosis of lateral epicondylitis or lateral elbow pain, in which acupuncture, moxibustion, or acupuncture and moxibustion combined was used for treatment - Acupuncture is defined as needle acupuncture, including electro-acupuncture and auricular acupuncture that employed needle penetration	**Frink et al 2002** Intervention: Acupuncture Control: Sham acupuncture Outcomes Strength test: - Inv: At baseline: 90.5 ± 40.40 - Con: At baseline: 77.7± 36.40 - MD: 12.80 (−15.26 to 40.86), P = 0.37 - Inv: At 2 weeks FU: 128.2 ± 41.64 - Con: At 2 weeks FU: 92.75 ± 34.78	**Reviewer comments** Comprehensive search strategy including both English and Chinese databases and a search of unpublished studies, dissertations and conference reports. Two independent authors search databases and assessed potentially relevant articles. However, only one author extracted the data and the other checked the extracted data. Authors followed the PRISMA guidelines in reporting of the review. Revised

Study	Methodology	Results	Comments and evidence level
Databases **Cochrane, MEDLINE, EMBASE, LILACS, AMED, HKInChiP, CBM, CNKI, Clinical-Trials.gov, ProQuest Digital Dissertations, BIOSIS Previews, ChiCTR and Electronic Theses and Dissertations System of Taiwan for "gray literature", such as unpublished studies, dissertations and conference reports** Relevant Included Studies **Frink et al 2002** **Irnich et al 2003** **Molsberger et al 1994** **Davidson et al 2001** **Grua et al 1999** Research questions **Is acupuncture or moxibustion alone more effective than sham acupuncture or other conventional treatments in the treatment of lateral elbow pain?** **Is acupuncture and moxibustion combined more effective than acupuncture or moxibustion alone?** Funding **Partially supported by grant to SPZ from HKBU (FRG 1/1112/047)**	- Studies that used other standard therapies, such as injection of Western drugs, physiotherapy, oral Western medication, sham acupuncture, or no treatment **Exclusion:** - Other variants of acupuncture, such as acupressure, acupoint injection, laser acupuncture, auricular acupressure, and TENS - Treatments that used acupotomy (small needle-scalpel therapy) - Studies that compared the same intervention with different combinations of acupoints, as acupoint specificity **Limits:** - Nil language restriction <u>Frink et al 2002</u> **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** 1 local tender point, LI 10, LI 11, LU 5, LI 4 and SJ 5 **- Depth of insertion:** Not reported **- Response sought:** obtain De-qi **- Needle stimulation:** Manual manipulation **- Needle retention time:** retained for 25 min **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** 10 **- Frequency and duration:** 2 treatments per week for 5 weeks **Practitioner qualifications and background** Reported <u>Irnich et al 2003</u> **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** LI 4, LI 10, SI 3, SJ 5, GB 34, **- Depth of insertion:** Not reported **- Response sought:** obtain De-qi **- Needle stimulation:** Manual manipulation **- Needle retention time:** retained for 25 min **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** 3 **- Frequency and duration:** 3 treatments for 10 days **Practitioner qualifications and background** Not reported	- MD: 35.45 (7.42 to 63.48), P = 0.01* - Inv: At 2 months FU: 142.9 ± 41.56 - Con: At 2 months FU: 114.2 ± 46.08 - MD: 28.70 (−3.20 to 60.60), P = 0.08 Pain (VAS): - Inv: At baseline: 16.46 ± 3.10 - Con: At baseline: 17.17 ± 3.76 - MD: −1.24 (−3.74 to 1.26), P = 0.33 - Inv: At 2 weeks FU: 8.03 ± 4.60 - Con: At 2 weeks FU: 12.28 ± 4.14 - MD: −4.25 (−7.44 to −1.06), P = 0.009* - Inv: At 2 months FU: 6.01 ± 5.09 - Con: At 2 months FU: 8.73 ± 5.03 - MD: −2.72 (−6.41 to 0.97), P = 0.15 DASH scores: - Inv: At baseline: 38.08 ± 13.66 - Con: At baseline: 33.72 ± 13.05 - MD: 4.36 (−5.38 to 14.10), P = 0.38 - Inv: At 2 weeks FU: 14.38 ± 9.35 - Con: At 2 weeks FU: 25.18 ± 13.63 - MD: −10.80 (−19.26 to −2.34), P = 0.01* - Inv: At 2 months FU: 11.14 ± 13.10 - Con: At 2 months FU: 18.85 ± 13.75 - MD: −7.71 (−17.48 to 2.06), P = 0.12 **Irnich et al 2003** Intervention: Acupuncture Control: Ultrasound Outcomes Pain-free grip strength: - Inv: At baseline: 64.7 ± 34.00 - Con: At baseline: 53.7 ± 17.70 - MD: 11.00 (−4.03 to 26.03), P = 0.15 - Inv: At first treatment: 7.12 ± 8.13 - Con: At first treatment: 2.47 ± 3.14 - MD: 4.65 (1.23 to 8.07), P = 0.008* - Inv: At last treatment: 21.54 ± 14.35 - Con: At last treatment: 8.53 ± 9.05 - MD: 13.01 (6.36 to 19.66), P = 0.0001* - Inv: At 2 weeks FU: 27.95 ± 15.66	STRICTA (2010) criteria were used to appraise the acupuncture procedures, the Cochrane risk of bias tool was used to assess the methodological quality of the studies. None of the included studies reported acupuncture procedure detailed enough to satisfy the STRICTA criteria. Examination of publication was not conducted. Study conclusions impacted by low methodological quality of included trials and small sample sizes. Contained a high number of included studies which looked at the subjective outcome measure of cure rate. Other major limitations of the studies was blinding, especially in the Chinese studies. Moreover, there was a lack of standardization of outcome measures, no clear statement of primary outcome measure, and much variation in the selection of control treatment, in the duration of treatments, in the duration of observation and in the method of acupuncture or moxibustion treatment. Dropouts and adverse event reporting were absent in most of the trials. Taken together, these limitations may lead to an over estimation of the efficacy and an under estimation of the adverse effects of acupuncture and moxibustion treatment. **Quality scores:** Cochrane risk of bias tool <u>Frink et al 2002</u> Random sequence generation - Low Allocation concealment - Unclear Blinding of participants and outcome assessors - Low Complete collection and reporting of outcome data - Low Selective outcome reporting - Low Adequate attention to other sources of bias - Low

Study	Methodology	Results	Comments and evidence level
	Molsberger et al 1994 **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Ipsilateral GB 34 **- Depth of insertion:** Not reported **- Response sought:** obtain De-qi **- Needle stimulation:** Manual manipulation **- Needle retention time:** retained for 5 min **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** 1 **- Frequency and duration:** 1 treatment **Practitioner qualifications and background** Reported Davidson et al 2001 **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** LI 4, SJ 5, LI 10, LI 11, LI 12, **- Depth of insertion:** Not reported **- Response sought:** obtain and maintain De-qi **- Needle stimulation:** manual manipulation **- Needle retention time:** retained for 20 min **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** 8-12 **- Frequency and duration:** Acupuncture, 2-3 treatments per week for 4 weeks **Practitioner qualifications and background** Not reported Grua et al 1999 **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** LI 4, LI 10, LI 11, LI 12, LI 15, PC 5, PC 7, GB 20, GB 21, GB 34, ST 37, ST 38 **- Depth of insertion:** Not reported **- Response sought:** obtain De-qi **- Needle stimulation:** Manual manipulation **- Needle retention time:** retained for 20 min **- Needle type:** Not reported **Treatment Regimen**	- Con: At 2 weeks FU: 7.4 ± 7.90 - MD: 20.55 (13.67 to 27.43), P < 0.00001* Impairment caused by pain (NRS): - Inv: At baseline: 8.19 - Con: At baseline: 7.72 - Inv: At first treatment: −1.57 - Con: At first treatment: −0.80 - Inv: At last treatment: −4.31 - Con: At last treatment: −2.04* - Inv: At 2 weeks FU: −4.77 (59% mean decrease in impairment caused by pain) - Con: At 2 weeks FU: −1.88* (24% mean decrease in impairment caused by pain) - Calculation of MD not possible **Molsberger et al 1994** Intervention: Acupuncture Control: Sham acupuncture Outcome 11-point box pain scale (NRS): - Inv: Immediately after treatment: 55.8% (2.95) mean pain reduction - Con: Immediately after treatment: 15.0% (2.77) mean pain reduction - MD: 40.80 (39.18 to 42.42), P < 0.001* **Davidson et al 2001** Intervention: Acupuncture Control: Ultrasound Outcomes Pain-free grip strength: - Inv: At first treatment: 10.25 ± 5.84 - Con: At first treatment: 6.08 ± 4.19 - MD: 4.17 (−0.81 to 9.15), P = 0.10. - Inv: At last treatment: 14.09 ± 9.53 - Con: At last treatment: 11.96 ± 12.28 - MD: 2.13 (−8.64 to 12.90), P = 0.70 Pain Score (VAS): - Inv: At first treatment: 39.63 ± 29.51 - Con: At first treatment: 46.50 ± 26.91 -MD: −6.81 (−34.48 to 20.86), P = 0.63 - Inv: At last treatment: 13.63 ± 13.79 - Con: At last treatment: 32.69 ± 29.21 - MD: −19.06 (−41.44 to 3.32), P = 0.10	Irnich et al 2003 Random sequence generation - High Allocation concealment - High Blinding of participants and outcome assessors - Low Complete collection and reporting of outcome data - Low Selective outcome reporting - Low Adequate attention to other sources of bias - High Molsberger et al 1994 Random sequence generation – Unclear Allocation concealment - Unclear Blinding of participants and outcome assessors - High Complete collection and reporting of outcome data - Low Selective outcome reporting - Low Adequate attention to other sources of bias - Low Davidson et al 2001 Random sequence generation - Low Allocation concealment - Unclear Blinding of participants and outcome assessors - High Complete collection and reporting of outcome data - Low Selective outcome reporting - Low Adequate attention to other sources of bias - Low Grua et al 1999 Random sequence generation – Unclear Allocation concealment - Unclear Blinding of participants and outcome assessors - High Complete collection and reporting of outcome data - Low Selective outcome reporting - Low

Study	Methodology	Results	Comments and evidence level
	- Number of treatment sessions: 10 **- Frequency and duration:** 1-2 treatments per week for approx. 5 weeks **Practitioner qualifications and background** Reported **All 19 studies:** - The total number of treatment sessions ranged from one to 36. - The frequency of treatments varied from once a day to once every three days - The duration of an entire treatment course lasted from one to 37 days - The number of needles used per session ranged from one to 12 needles - The number of moxa-cones used in the moxibustion interventions ranged from two to seven cones per acupoint - 14 studies reported that De-qi sensation was sought - The duration of each treatment session lasted between one and 30 minutes, with most studies ranging between 20 to 30 minutes	DASH score: - Inv: At first treatment: 36.35 ± 25.54 - Con: At first treatment: 38.02 ± 15.24 - MD: −1.67 (−22.28 to 18.94), P = 0.87 Inv: At last treatment: 23.75 ± 17.73 Con: At last treatment: 33.23 ± 24.06 - MD: −9.48 (−30.19 to 11.23), P = 0.37 - Inv: At 4 week FU: 23.75 ± 18.41 - Con: At 4 week FU: 22.40 ± 18.73 - MD: 1.35 (−16.85 to 19.55), P = 0.88 **Grua et al 1999** Intervention: Acupuncture Control: Ultrasound Outcome Maigne functional recovery test: Inv: At last treatment: 5.80 ± 3.37 Con: At last treatment: 9.80 ± 3.65 - MD: −4.00 (−6.18 to −1.82), P = 0.0003* Inv: At 6 months FU: 5.20 ± 3.64 Con: At 6 months FU: 10.0 ± 3.45 - MD: −4.80 (−7.00 to −2.60, P < 0.0001* Pain Score(VAS): - Inv: At last treatment: 2.85 ± 1.81 - Con: At last treatment: 4.49 ± 1.64 - MD: −1.64 (−2.71 to −0.57), P = 0.003* - Inv: At 6 months FU: 2.05 ± 1.39 - Con: At 6 months FU: 4.90 ± 1.45 MD: −2.85 (−3.73 to −1.97), P < 0.00001* **Adverse effects:** Adverse events were only reported in four studies (Irnich et al 2003, Grau et al 1999, Xu 2010 and Jin et al 2005). The studies by Irnich et al. 2003 and Grua et al. 1999 stated that no adverse event was observed during acupuncture treatment. The studies by Jin et al. 2005 and Xu et al. 2010 both reported that blister-forming ginger moxibustion resulted in permanent scar tissue. However, it is unknown if the subjects of the latter two studies have been informed in advance that scarring might result after the course of treatment, in which case the permanent scar tissue might not be considered an adverse event.	Adequate attention to other sources of bias - Low **Grade:** HQ (++) **Quality:** 1

Study	Methodology	Results	Comments and evidence level
Tang, H, Fan, H, Chen, J, Yang, M, Yi, X, Dai, G, Chen, J, Tang, L, Rong, H, Wu, J & Liang, F **Acupuncture for Lateral Epicondylitis: A Systematic Review** **2015** Databases **EMBASE, PubMed, the Cochrane Library, CNKI, Chinese Scientific Journal Database (VIP database), Wanfang Database, and Chinese Biomedical Literature Database (Sinomed). Also searched the WHO International Clinical Trials Registry Platform Search Portal that contains Current Controlled Trials, ClinicalTrials.gov, and Chinese Clinical Trial Register** Relevant Included Studies **Fink et al 2002** **Irnich et al 2003** **Jiang et al 2005** **Li et al 2014** Research question **What is the evidence of the effectiveness and safety of acupuncture for lateral epicondylitis** Funding **Supported by funds from the Science and Technology Department of Sichuan province, Grants numbers 2011SZ0302 and 2015SZ0096**	**Participants** – All 4 RCTs n=309 Age ranged from 18 to 70 years **Inclusion:** - All RCTs involving acupuncture for treating lateral epicondylitis - Completed or ongoing trials - Trials using only the two parallel designs - Adult participants (≥18 years old) presenting with LE regardless of sex, race, or educational and economic status - Interventions in the treatment group included acupuncture, electroacupuncture, warm acupuncture, needle acupuncture, and manual acupuncture - Controlled interventions with sham acupuncture, placebo control, no treatment/waiting list control, or active treatment (e.g., nonsteroidal anti-inflammatory drugs and/or local injection of corticosteroids) - RCTs evaluating acupuncture combined with another treatment compared with that other treatment alone - Primary outcome was the elbow functional status - Secondary outcome was the myodynamia and adverse events **Exclusion:** - Nonrandomized controlled trials, randomized crossover trials, retrospective studies, case studies, and review studies - Participants with severe physical or mental disease - Trials in which points were stimulated without needle insertion (such as via laser stimulation, acupressure, or transcutaneous electrical nerve stimulation) - RCTs that compare different forms of acupuncture or herbal medicine <u>Fink et al 2002</u> n=45 Mean age intervention: 52.5 ± 8.7 **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Ashi, LI10, LI11, LU5, LI4, and SJ5 **- Depth of insertion:** Not reported **- Response sought:** Not reported **- Needle stimulation:** Not reported **- Needle retention time:** 25 mins **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** 10 **- Frequency and duration:** 2 x week for 5 weeks **Practitioner qualifications and background**	<u>Fink et al 2002</u> Intervention: Real acupuncture Control: Sham acupuncture Elbow myodynamia (Maximal muscle strength): SMD 0.33 [−0.29, 0.93] - Non-significant Elbow functional status (DASH? Outcome measure used difficult to tell): SMD −0.32 [−0.93, 0.29] - Non-significant <u>Irnich et al 2003</u> Intervention: Real acupuncture Control: Sham acupuncture Elbow functional status (Impairment caused by pain): SMD −0.77 [−1.34, −0.20] - Statistically significant Elbow myodynamia (Grip strength): 0.54 [−0.02, 1.10] - Non-significant <u>Jiang et al 2005</u> Intervention: Electroacupuncture plus moxibustion with material insulation Control: Blockage therapy Elbow functional status (Unsure what outcome measure used): SMD 12.10 [10.65, 13.55] - Statistically significant <u>Li et al 2014</u> Intervention: Electroacupuncture plus massage and blockage therapy Control: Blockage therapy Elbow functional status (Mayo Elbow Performance Score) SMD: 2.00 [−0.98, 4.98] - Non significant Elbow myodynamia (Grip strength index): SMD 2.00 [−1.11, 5.11] - Non-significant **Meta-analysis** <u>Acupuncture vs sham acupuncture</u> Elbow functional status: Two studies (Frink et al 2002, Irnich et al 2003) SMD: -0.56 [−0.98, −0.15] Heterogeneity: $\chi 2 = 1.13$, df = 1 (P = 0.29); I2 = 11%	**Reviewer comments** Comprehensive search was conducted through 7 electronic databases and WHO International Clinical Trials Registry Platform Search Portal. Two reviewers independently assessed the eligibility of the searched studies. The data has been extracted by two reviewers independently using a specially designed extraction form developed according to the Cochrane Handbook. Interpretation of findings should be with cautions as the SR included a small number of included studies and participants. No trials reported a formal sample size calculation which is essential to ensure adequate statistical power. Mostly included studies were of low quality due to no detailed definition on random sequence generation, allocation concealment, and blinding of participants and personnel. Large report bias present caused by the ununiformed assessment scales of elbow functional status and upper limb myodynamia. **Quality scores:** Cochrane Collaboration Risk of Bias Tool based <u>Summary of included studies:</u> Random sequence generation: - 50% low risk of bias, 50 % high risk of bias Allocation concealment: - 100% Unclear risk of bias Blinding of participants and personnel: - 25% low risk of bias, 75% unclear risk of bias Blinding of outcome assessment: - 50% low risk of bias, 50 % unclear risk of bias Incomplete outcome data: - 100% low risk of bias Selective reporting:

Study	Methodology	Results	Comments and evidence level
	Not reported Irnich et al 2003 n=50 Mean age intervention: 31-70 y.o **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** LI4, LI10, SI3, SJ5, and GB34 **- Depth of insertion:** Not reported **- Response sought:** Not reported **- Needle stimulation:** Not reported **- Needle retention time:** 25 mins **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** 3 **- Frequency and duration:** 3 x treatments in 10 days **Practitioner qualifications and background** Not reported Jiang et al 2005 n=128 Mean age intervention: 42.14 ± 5.62 **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** LI4, LR3 **- Depth of insertion:** Not reported **- Response sought:** Not reported **- Needle stimulation:** Not reported **- Needle retention time:** 20 mins **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** 10 **- Frequency and duration:** within 5 treatments per week **Practitioner qualifications and background** Not reported Li et al 2014 n=86 Mean age intervention: 18-22 y.o **Intervention**	Acupuncture plus moxibustion with material insulation vs blockage therapy Elbow functional status: One study (Jiang et al 2005) SMD: 12.10 [10.65, 13.55] Acupuncture plus blockage therapy vs blockage therapy Elbow functional status: One study (Li et al 2014) SMD: 2.00 [−0.98, 4.98] Acupuncture vs sham acupuncture Elbow myodynamia: Two studies (Frink et al 2002, Irnich et al 2003) SMD: 0.44 [0.03, 0.85] Heterogeneity: $\chi 2 = 0.26$, df = 1 (P = 0.61); I2 = 0% Acupuncture plus blockage therapy vs blockage therapy Elbow myodynamia: One study (Li et al 2014) SMD: 2.00 [−1.11, 5.11] **Adverse effects:** Of the four studies, three studies (Fink et al 2002, Irnich et al 2003, Li et al 2014) reported the adverse events - Frink et al 2002: reported that no serious adverse event was observed during the study - Irnich et al 2003 and Li et al 2014 reported that the pain would be the main reason for the dropout	- 100% low risk of bias **Grade:** AQ (+) **Quality:** 1

Study	Methodology	Results	Comments and evidence level
	- Number of needles inserted per subject per session: Not reported **- Names of points used:** Ashi, LI11, LI12, LI10, SJ5, and LI4 **- Depth of insertion:** Not reported **- Response sought:** Not reported **- Needle stimulation:** Not reported **- Needle retention time:** 30 mins **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** 10 **- Frequency and duration:** 1 x daily for 10 days **Practitioner qualifications and background** Not reported		
Chang, W, Lai, P & Tsou, Y **Analgesic effect of manual acupuncture and laser acupuncture for lateral epicondylalgia: a systematic review and meta-analysis** **2014** Databases **Medline, Pubmed, CINAHL** Relevant Included Studies **Wang 2011** **Gu & Shan 2007** **Fink et al 2002a** **Fink et al 2002b** **Molsberger & Hille 1994** **Haker & Lundeberg 1991** **Haker & Lundeberg 1990a** **Haker & Lundeberg 1990b** **Lundeberg et al 1987** Research question **What is the evidence of the effectiveness of manual acupuncture and laser**	**Inclusion:** - RCTs - Patients with lateral epicondylalgia - Pain on extension of the elbow (positive Mills test) - Sham or placebo control **Exclusion:** - Not reported **Limits:** - Not reported <u>Wu 2011</u> n=68 Age: 42.1 mean **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Ashi points **- Depth of insertion:** Not reported **- Response sought:** Not reported **- Needle stimulation:** Not reported **- Needle retention time:** 30 mins **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** 20 **- Frequency and duration:** Not reported **Practitioner qualifications and background** Not reported	**Wang 2011** Intervention: Needle acupuncture Control: Placebo Result: After treatment 7 and 30 days follow-up, pain was reduced p<0.05, compared with placebo group **Gu & Shan 2007** Intervention: Needle acupuncture Control: Placebo Result: After treatment, pain was reduced and ADL was improved p<0.05, compared with placebo group **Fink et al 2002a** Intervention: Needle acupuncture Control: Placebo Result: After treatment, pain for isometric wrist extension was reduced p<0.05, compared with placebo group **Fink et al 2002b** Intervention: Needle acupuncture Control: Placebo Result: After treatment, pain for isometric wrist extension was reduced and strength of wrist extensor and DASH was improved p<0.05, compared with placebo group **Molsberger & Hille 1994** Intervention: Needle acupuncture Control: Placebo Result: After treatment, pain was reduced p<0.05, compared with placebo group	**Reviewer comments** Inadequate search strategy with a limited number of databases searched. Insufficient reporting of the inclusion and exclusion criteria. Difficult to tell if two researchers independently selected studies and extracted the data. Likelihood of publication bias assessed appropriately. Based on the PEDro scale, the methodological quality and design of the primary studies was moderate. Adequate level of reporting the intervention and control. **Quality scores:** PEDro scale /11 All studies ranged from 3 to 9 Wang 2011 7/11 Gu & Shan 2007 7/11 Fink et al 2002a 9/11 Fink et al 2002b 9/11 Molsberger & Hille 1994 7/11 Haker & Lundeberg 1991 5/11 Haker & Lundeberg 1990a 6/11 Haker & Lundeberg 1990b 5/11 Lundeberg et al 1987 3/11 **Grade:** AQ (+) **Quality:** 1

Study	Methodology	Results	Comments and evidence level
acupuncture on lateral epicondylalgia? Funding **Support from China Medical University under the contract No. CMU100-N2-05**	<u>Gu and Shan 2007</u> n=62 Age: 48.6 mean **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** SI 11, Ashi, LI4, LI11, **- Depth of insertion:** Not reported **- Response sought:** Not reported **- Needle stimulation:** Not reported **- Needle retention time:** 30 mins **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** 10 **- Frequency and duration:** Not reported **Practitioner qualifications and background** Not reported <u>Fink et al 2002a</u> n=54 Age: 52.1 mean **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Ashi, L14, LI10, LI11, LU5, SJ5 **- Depth of insertion:** Not reported **- Response sought:** Not reported **- Needle stimulation:** Not reported **- Needle retention time:** 25 mins **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** 10 **- Frequency and duration:** 2 x weekly **Practitioner qualifications and background** Not reported <u>Fink et al 2002b</u> n=45 Age: 52.1 mean **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Ashi, L14, LI10, LI11, LU5, SJ5	**Haker & Lundeberg 1991** Intervention: Laser acupuncture Control: Sham acupuncture Result: no differences at 3, 6 and 12 week follow up in pain and strength outcomes **Haker & Lundeberg 1990a** Intervention: Needle acupuncture Control: Placebo Result: After treatment and 3 months follow up, grasp force and strength of wrist extensors were improved $p<0.05$, compared with placebo group **Haker & Lundeberg 1990b** Intervention: Laser acupuncture Control: Sham acupuncture Result: no differences at 10th session, 3 months and 12 months follow up in pain and strength outcomes **Lundeberg et al 1987** Intervention: Laser acupuncture Control: Sham acupuncture Result: no differences at 3 month follow up in pain and strength outcomes **<u>Analysis for analgesic effect</u>** **Wang 2011 -** Significant **Gu & Shan 2007 -** Significant **Fink et al 2002a -** Non-Significant **Fink et al 2002b** – Non-Significant **Molsberger & Hille 1994 -** Significant **Haker & Lundeberg 1991 -** Non-Significant **Haker & Lundeberg 1990a -** Significant **Haker & Lundeberg 1990b –** Non-Significant **Lundeberg et al 1987** – Non-Significant **Adverse effects:** Not reported	

Study	Methodology	Results	Comments and evidence level
	- Depth of insertion: Not reported **- Response sought:** Not reported **- Needle stimulation:** Not reported **- Needle retention time:** 25 mins **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** 10 **- Frequency and duration:** 2 x weekly **Practitioner qualifications and background** Not reported <u>Molsberger & Hille 1994</u> n=48 Age: 47.9 mean **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** GB34 **- Depth of insertion:** Not reported **- Response sought:** Not reported **- Needle stimulation:** Not reported **- Needle retention time:** 5 mins **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** Not reported **- Frequency and duration:** Not reported **Practitioner qualifications and background** Not reported <u>Haker & Lundeberg 1991</u> n=58 Age: 45.3 mean **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Ashi, LI11, LI12 **- Depth of insertion:** Not reported **- Response sought:** Not reported **- Needle stimulation:** Not reported **- Needle retention time:** 2 mins at each point **- Needle type:** Not reported **Treatment Regimen**		

Study	Methodology	Results	Comments and evidence level
	- Number of treatment sessions: 10 sessions **- Frequency and duration:** 3 – 4 x weekly **Practitioner qualifications and background** Not reported Haker & Lundeberg 1990a n=86 Age: 47 mean **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** LI10, LI11, LI12, SJ5, LU5 **- Depth of insertion:** Not reported **- Response sought:** Not reported **- Needle stimulation:** Not reported **- Needle retention time:** 30 sec at each point **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** 10 sessions **- Frequency and duration:** 3 – 4 x weekly **Practitioner qualifications and background** Not reported Haker & Lundeberg 1990b n=49 Age: 46.7 mean **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** LI10, LI11, LI12, SJ5, LU5 **- Depth of insertion:** Not reported **- Response sought:** Not reported **- Needle stimulation:** Not reported **- Needle retention time:** 30 sec at each point **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** 10 **- Frequency and duration:** 2 – 3 x weekly **Practitioner qualifications and background** Not reported Lundeberg et al 1987		

Study	Methodology	Results	Comments and evidence level
	n= 57 Age: 43 mean **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** LI10, LI11, LI12, SJ5, LU5, SJ10, SI4, SI8, H3, H4, P3 **- Depth of insertion:** Not reported **- Response sought:** Not reported **- Needle stimulation:** Not reported **- Needle retention time:** 60 sec at each point **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** 10 – 12 **- Frequency and duration:** 2 x weekly for 5 - 6 weeks **Practitioner qualifications and background** Not reported **LA parameters** Haker & Lundeberg 1991 GaAs laser Wavelength: 904nm Pulse wave Haker & Lundeberg 1990b GaAs laser Wavelength: 904nm Pulse wave Lundeberg et al 1987 GaAs laser Wavelength: 632.8 nm Continuous wave Power ranged from 0.07 to 12 mW Frequencies ranging from 70 to 38700 Hz Dosages ranged from 0.004 to 0.9 J		
Sim, H, Shin, B, Lee, M, Jung, A, Lee, H & Ernst, E	**Participants:** All 6 studies Duration of CTS: 1 to 84 (mean, 26.9 months) Duration of treatment: 2.8 to 6 weeks (mean: 4.1 weeks) **Inclusion:**	**Weinstein et al 2004** Intervention: Acupuncture Control 1: Sham acupuncture - acupoint but 5 bilateral irrelevant meridian points Control 2: Sham acupncutre – sham points	**Reviewer comments** Comprehensive search strategy which contained 11 databases. All included RCTs were read by 2 independent reviewers and data were extracted

Study	Methodology	Results	Comments and evidence level
Acupuncture for Carpal Tunnel Syndrome: A Systematic Review of Randomized Controlled Trials **2011** Databases **Medline, EMBASE, Cochrane Library, CINAHL, 6 Korean medical databases: DBPIA, Korea Institute of Science and Technology Information, The National Library of Korea, Korean traditional knowledge portal, OASIS and KoreaMed, and a Chinese medical database: China Academic Journal** Relevant Included Studies **Weinstein et al 2003** **Yang et al 2009** **Shi et al 2006** Research question **What is the evidence of the effectiveness of acupuncture and acupuncture-like treatments for carpal tunnel syndrome?** Funding **Not reported**	- Parallel and cross-over RCTs that assessed the efficacy of acupuncture regardless of blinding, language, and type of reporting - Dissertations and abstracts - Diagnosis of CTS in 1 or both hands was made via electrodiagnostic parameters such as nerve conduction velocity or through relevant clinical diagnostic criteria with definite clinical symptoms and physical examination results - Controls included no treatment, sham acupuncture, and relevant active interventions such as steroid nerve blocks, splint, drugs, or physical therapy - Cointerventions allowed if given to both groups **Exclusion:** - Studies testing acupuncture as part of more complex interventions in which acupuncture was only 1 of several treatments and causal inferences are thus limited **Limits:** - Nil language restriction <u>Weinstein et al 2003</u> n=111 Duration of CTS: 84 months **Intervention** **- Number of needles inserted per subject per session:** 8 **- Names of points used:** 6 bilateral meridian relevant points + PC6, PC7 **- Depth of insertion:** Not reported **- Response sought:** Not reported **- Needle stimulation:** Not reported **- Needle retention time:** Not reported **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** Not reported **- Frequency and duration:** 1 x, 2 x, 3 x weekly for 6 weeks **Practitioner qualifications and background** Not reported <u>Yang et al 2009</u> n=77 Duration of CTS: 7.65 months **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** PC6, PC7 **- Depth of insertion:** Not reported **- Response sought:** De qi **- Needle stimulation:** Not reported	Outcome measure: symptoms severity scale - Non-significant difference between all groups - There was an overall improvement in SSS from baseline to end point, but there was no statistically significant difference between groups A, B, and C or in the frequency **Yang et al 2009** Intervention: Acupuncture Control 1: Oral steroids – prednisolone Outcome measure: Global symptom score (Numbness, Pain, Paresthesia, Weakness, Nerve conduction study) P = .15, MD, -0.33 [-0.78, 0.12] Nerve conduction study DML P = .007, MD, -0.63 [-1.09, -0.17] CMAP P = 0.57, MD, -0.13 [-0.58, 0.32] MNCV P = 0.92, MD, 0.02 [-0.42, 0.47] DSL P = 1.00, MD, .00 [-0.45, .45] W-P SNCV P = 0.50, MD, -0.15 [-0.60, 0.29] SNAP P = 0.82, MD, 0.05 [0.50, 0.39] - The AT group had a significantly better improvement in distal motor latency and decreased nocturnal awakening compared with the steroid group at week 4 **Shi et al 2006** Intervention: Acupuncture + Tuina massage therapy Control 1: Tuina massage therapy Outcome measure: D4MNSCV- 4th digit median nerve sensory nerve conduction velocity P = 0.0002, MD, 1.05 [0.51, 1.59] D4UNSCV 4th digit ulnar nerve sensory nerve conduction velocity P = 1.00, MD, 0.00 [-0.51, .51] - AT and tuina massage showed more effective improvement than the massage treatment alone. Also, the recovery rate was increased and there were fewer complications **Outcomes** <u>Needle acupuncture vs sham acupuncture</u> No statistical difference found between groups <u>Needle acupuncture vs oral steroids</u> Yang et al 2009 evaluated the effect of manual acupuncture compared with oral steroids. Although the study described a superior effect of needle acupuncture over oral steroids in terms of GSS score, the SRs recalculation of the mean difference (MD) showed no statistical difference (P = .15), except for distal motor latency in terms of NCS (P = .007) <u>Needle acupuncture + Tuina massage vs Tuina alone</u>	independently, based on predefined criteria. Based on the Cochrane risk of bias, the methodological quality and design of the primary studies was poor. The prescription of acupuncture points was not consistent across studies, and the duration and frequency of treatment were also not uniform. Details of dropouts and withdrawals were mentioned only in Weinstein et al 2004 and Yang et al 2009, this may lead to exclusion or attrition bias. A number of studies had sample sizes that were small and, therefore, susceptible to type II error and are underpowered. **Quality scores:** Cochrane risk of bias tool <u>Weinstein et al 2003</u> Was the allocation sequence adequately generated? - Uncertain risk of bias Was allocation adequately concealed? - Uncertain risk of bias Was knowledge of the allocated intervention adequately prevented during the study? Patient – Low risk of bias Therapists – High risk of bias Assessors – Low risk of bias Were incomplete outcome data adequately addressed? Low risk of bias Are reports of the study free of suggestion of selective outcome reporting? - Uncertain risk of bias Was the study apparently free of other problems that could put it at a high risk of bias? - Uncertain risk of bias <u>Yang et al 2009</u> Was the allocation sequence adequately generated? - Low risk of bias Was allocation adequately concealed?

Study	Methodology	Results	Comments and evidence level
	- Needle retention time: 30 minutes **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** 8 sessions **- Frequency and duration:** 1 session 2 x week for 4 weeks **Practitioner qualifications and background** Not reported <u>Shi et al 2006</u> n=60 Duration of CTS: 2.47 months **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** PC6, LI5, LU10, LI4, PC8 **- Depth of insertion:** Not reported **- Response sought:** Not reported **- Needle stimulation:** Not reported **- Needle retention time:** Not reported **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** 30 **- Frequency and duration:** 1 x every second day for 12 days, 1 x every 3 days **Practitioner qualifications and background** Not reported <u>Description of acupuncture treatments: All studies</u> - A total of 21 acupuncture points were included (meridian points - 18; extra point - 1; AA points - 2) - 85.7% were located in the upper extremities, especially the hand and wrist on the affected side - All RCTs stated the rationale for acupuncture point selection from traditional Chinese Medicine theory	Shi et al 2006 compared the effect of needle acupuncture plus tuina massage versus tuina massage alone. Recalculation of the MD revealed a favorable effect of acupuncture in terms of the NCV of the median nerve (P = .0002) but not of the ulna nerve (P = 1.00) **Adverse effects:** Two studies described adverse events related to needle acupuncture: Weinstein et al 2003 noted that 56 of 173 total adverse events were related to needle acupuncture and Yang et al 2009 found an adverse event rate of 5% in the needle acupuncture group. Both of these studies reported no serious adverse events resulting from needle acupuncture	- Uncertain risk of bias Was knowledge of the allocated intervention adequately prevented during the study? Patient – High risk of bias Therapists – High risk of bias Assessors – High risk of bias Were incomplete outcome data adequately addressed? – Low risk of bias Are reports of the study free of suggestion of selective outcome reporting? - Uncertain risk of bias Was the study apparently free of other problems that could put it at a high risk of bias? – High risk of bias <u>Shi et al 2006</u> Was the allocation sequence adequately generated? - Low risk of bias Was allocation adequately concealed? - Uncertain risk of bias Was knowledge of the allocated intervention adequately prevented during the study? Patient – High risk of bias Therapists – High risk of bias Assessors – High risk of bias Were incomplete outcome data adequately addressed? – Uncertain risk of bias Are reports of the study free of suggestion of selective outcome reporting? – Uncertain risk of bias Was the study apparently free of other problems that could put it at a high risk of bias? - High risk of bias **Grade:** AQ (+) **Quality:** 1

Study	Methodology	Results	Comments and evidence level
Jain, T & Sharma, K **The effectiveness of physiotherapeutic interventions in treatment of frozen shoulder/adhesive capsulitis: A systematic review** **2014** Databases **MEDLINE, CINAHL, Cochrane, PEDro, ProQuest, Science Direct, and Sport Discus** Relevant Included Studies **Cheing et al 2008** **Ma et al 2006** **Sun et al 2001** Research question **What is the evidence of the effectiveness of physical therapy interventions for the management of frozen shoulder?** Funding **The authors have not received any financial payments or other benefits from any commercial entity related to the contents of the work being presented**	**Participants** – All 39 RCTs The patients' age ranged from 22–96 years with the mean age of 53.77 ± 3.97 years. The duration of symptoms in the reviewed studies ranged from 6 weeks to 10.2 months, placing almost all of the subjects in Stages 1, 2 and 3 of frozen shoulder **Inclusion:** - experimental or quasi-experimental reports from peer-reviewed journals - intervention that included "physical therapy", "manual therapy", "exercise", "electrotherapy", "mobilization", "acupuncture", "rehabilitation", "treatment", and "education" with the intended goal of treating frozen shoulder was implemented - subjects were diagnosed with the frozen shoulder diagnostic criteria **Exclusion:** - studies that investigated other shoulder disorders, surgical techniques, utilized no treatment such as long-term outcome studies, and economic evaluation studies. **Limits:** - Since 2000 - English only <u>Ma et al 2006</u> n=75 Mean age intervention: 58.4 years Duration of symptoms: 25.8 weeks **Intervention** - **Number of needles inserted per subject per session:** Not reported - **Names of points used:** Not reported - **Depth of insertion:** Not reported - **Response sought:** Not reported - **Needle stimulation:** Not reported - **Needle retention time:** 15 mins - **Needle type:** Not reported **Treatment Regimen** - **Number of treatment sessions:** 8 - **Frequency and duration:** 2 x week for 4 weeks **Practitioner qualifications and background** Not reported <u>Cheing et al 2008</u> n=70 Age: 33-90 years Duration of symptoms: 6.71 ± 6.50 months **Intervention** - **Number of needles inserted per subject per session:** Not reported	**Ma et al 2006** Intervention: Acupuncture Control: Physiotherapy All patients showed improvement in QOL (SF-36) Pain was controlled better by acupuncture while ROM improved following physical therapy **Cheing et al 2008** Group 1: EA + HEP Group 2: IFT + HEP Control: HEP Significant change in Constant Murley Assessment and VAS score in EA and IFT group as compared to control at least until the 6 month follow up **Sun et al 2001** Intervention: Acupuncture Control: Physiotherapy Compared with the exercise group the exercise + acupuncture group was significantly improved Improvements in scores by 39.8% and 76.4% were seen for the exercise and the exercise + acupuncture groups, respectively at 6 weeks and were sustained at the 20-week re-assessment **Authors findings** Ma et al. 2006 compared the effects of physical therapy to acupuncture and found pain to be better controlled by acupuncture as compared to physical therapy. They suggested integration of acupuncture and physical therapy for short term pain relief. Ma et al. found ROM to be better improved by physical therapy as compared to acupuncture. They further reported that combined acupuncture and physical therapy gives better improvement in ROM than either acupuncture alone or physical therapy alone. The authors suggested integration of acupuncture and physical therapy for short term improvement in ROM. Cheing et al 2008 found both electro-acupuncture and interferential therapy to be effective in short term and long-term pain relief. Electro-acupuncture and interferential therapy were also reported to be effective in improving function. Sun et al 2001 compared the effects of physical therapy to acupuncture and reported that combined acupuncture and physical exercises gives better improvement in function than physical exercises alone. The authors suggested integration of acupuncture and physical therapy for short term improvement in function. **Adverse effects:** Not reported	**Reviewer comments** Search strategy limited to English only and studies since 2000. Unable to determine if two reviewers independently screened articles and extracted data. Two independent reviewers scored methodologic quality. Poor reporting of intervention. The interpretation of the results of individual studies is hampered by methodological flaws, such as small number of subjects, lack of indication for duration of symptoms before treatment, high dropout rates, the use of co-interventions, and a short follow-up. Moreover, many studies do not even provide details regarding the stage of the disease process, previous treatments, and etiological considerations. **Quality scores:** Sackett's critical appraisal criteria /8 Cheing et al 2008: 7/8 Ma et al 2006: 5/8 Sun et al 2001: 6/8 **Grade:** LQ (-) **Quality:** 1-

Study	Methodology	Results	Comments and evidence level
	- Names of points used: Not reported **- Depth of insertion:** Not reported **- Response sought:** Not reported **- Needle stimulation:** Not reported **- Needle retention time:** Not reported **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** 10 **- Frequency and duration:** 2-3 x week for 4 weeks **Practitioner qualifications and background** Not reported <u>Sun et al 2001</u> n= 25 Age – 41-69 years Duration of symptoms: 5.5 +/- 1.6 months **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Not reported **- Depth of insertion:** Not reported **- Response sought:** Not reported **- Needle stimulation:** Not reported **- Needle retention time:** Not reported **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** Not reported **- Frequency and duration:** 6-week duration **Practitioner qualifications and background** Not reported		
Vickers, A, Angel M, Cronin, M, Alexandra C & Maschino, B **Acupuncture for Chronic Pain - Individual Patient Data Meta-analysis** **2012** Databases	**Participants** – All 29 RCTs n=14597 Relevant studies: Non-specific back and neck pain n=15 Osteoarthritis n=9 Shoulder pain n=4 **Inclusion:** - Atleast 1 group receiving acupuncture needling and 1 group receiving either sham (placebo) acupuncture or no-acupuncture control	**Cherkin et al 2001** Intervention: Acupuncture Control: Non-specific advice Difference between groups Acupuncture vs No acupuncture: adjusted p=0.75 (no estimate given) ***Suarez-Almazor et al 2001*** Intervention: Acupuncture Control: Penetrating needle Control 2: Ancillary care	**Reviewer comments** Limited search strategy with the search comprising of two databases. Two reviewers independently screened articles, however, the scoring of methodological quality and data extraction cannot be determined regarding if done independently. Quality assessment mainly relied on adequacy of blinding and did not take other factors into consideration. No evidence of publication bias.

Study	Methodology	Results	Comments and evidence level
MEDLINE & the Cochrane Collaboration Central Register of Controlled Trials Relevant Included Studies **Berman et al 2004** **Vas et al 2004** **Witt et al 2005** **Scharf et al 2006** **Witt et al 2006** **Foster et al 2007** **Williamson et al 2007** **Lansdown et al 2009** **Suarez-Almazor et al 2010** **Carlsson & Sjolund 2001** **Cherkin et al 2001** **Kerr et al 2003** **Brinkhaus et al 2006** **Thomas et al 2006** **Witt et al 2006** **Haake et al 2007** **Molsberger et al 2002** **Kennedy et al 2008** **Cherkin et al 2009** **Irnich et al 2001** **White et al 2004** **Salter et al 2006** **Vas et al 2006** **Witt et al 2006** **Kleinhenz et al 1999** **Guerra de Hoyos et al 2004** **Vas et al 2008** **Molsberger et al 2010** Non-previously reported studies **Cherkin et al 2001** **Suarez-Almazor et al 2001** **Salter et al 2006** **Kleinhenz et al 1999** **Molsberger et al 2010**	-Patients with 1 of 4 indications—nonspecific back or neck pain, shoulder pain, chronic headache, or osteoarthritis - Current episode of pain must be of at least 4 weeks duration for musculoskeletal disorders - Primary end point must be measured more than 4 weeks after the initial acupuncture treatment **Exclusion:** - Unconcealed allocation **Limits:** - Nil language restriction - RCTs **Osteoarthritis studies:** *Berman et al 2004* – Reported on in Hou et al 2015 & Zhang et al 2017 data extraction *Vas et al 2004* – Reported on in Hou et al 2015 data extraction *Witt et al 2005* – Reported on in Hou et al 2015 & Zhang et al 2017 data extraction *Scharf et al 2006* – Reported on in Hou et al 2015 & Zhang et al 2017 data extraction *Witt et al 2006* – Reported on in Madsen et al 2009 & Zhang et al 2017 data extraction *Foster et al 2007* – Reported on in Madsen et al 2009 *Williamson et al 2007* - Reported on in Hou et al 2015 *Lansdown et al 2009* - Reported on in Zhang et al 2017 data extraction *Suarez-Almazor et al 2001* *- N= 496* *- Acupuncture vs Penetrating needle vs Ancillary care* *- Outcome: WOMAC pain* *- Time: 3 months* **Non-specific back pain studies** *Carlsson & Slojundl 2001* - Reported in Lam et al. 2013 data extraction *Kerr et al 2003* - Reported in Lam et al. 2013, Hutchinson et al 2012 & Lu et al 2011 data extraction *Brinkhaus et al 2006* - Reported in Lam et al. 2013 data extraction *Thomas et al 200* - Reported in Lam et al. 2013 & Hutchinson et al 2012 data extraction *Witt et al 2006* - Reported in Lam et al. 2013, Hutchinson et al 2012 & Lu et al 2011 data *Haake et al 2007* - Reported in Lam et al. 2013, Hutchinson et al 2012 & Xu et al 2013b data *Molsberger et al 2002* - Reported in Lam et al. 2013 & Xu et al 2013b data *Kennedy et al 2008* - Reported in Lam et al. 2013 & Lu et al 2011 data *Cherkin et al 2009* - Reported in Xu et al. 2013b, Lam et al. 2013 & Hutchinson et al 2012 data extraction *Cherkin et al 2001* *- N= 249* *- Acupuncture vs non-specific advice* *- Outcome: Roland Morris Disability Questionnaire*	Difference between groups Acupuncture vs No acupuncture: p=0.0002 (no estimate given) Acupuncture vs Sham: p>0.20 (no estimate given) **Salter et al 2006** Intervention: Acupuncture Control: Usual care Difference between groups Acupuncture vs No acupuncture: 1.75 (no CI given) p = 0.8 **Kleinhenz et al 1999** Intervention: Acupuncture Control: Non-penetrating needle Difference between groups Acupuncture vs Sham: (no estimate given) (95% CI 2.3, 19.4) p=0.001 **Molsberger et al 2010** Intervention: Acupuncture Control: Non-penetrating needle Control 2: Usual care Difference between groups (VAS) Acupuncture vs Sham: 14 (95% CI 7.87–20.13) p<0.001 Acupuncture vs No acupuncture: 14 (95% CI 8.22–19.78) p<0.001 **Meta-analysis** <u>Acupuncture vs Sham acupuncture</u> Non-specific back and neck pain N=8 95% CI: 0.37 (0.27-0.46) P<0.001 Osteoarthritis N= 5 95% CI: 0.26 (0.17-0.34) P<0.001 Shoulder pain N= 3 95% CI: 0.62 (0.46-0.77)	Large total sample size. Because the comparisons between acupuncture and no-acupuncture cannot be blinded, both performance and response bias are possible. Meta-analyses combined different end points, such as pain and function, measured at different times. **Quality scores:** Authors opinion Intermediate likelihood of bias from unblinding n=4 Low likelihood of bias from unblinding n= 16 **Grade**: LQ (-) **Quality**: 1

Study	Methodology	Results	Comments and evidence level
Research question **What is the evidence of the effectiveness of Acupuncture for chronic pain?** Funding **Funded by an R21 AT004189I from the NCCAM, by a grant from the Samueli Institute and by the UK NIHR under its Programme Grants for Applied Research scheme (RP-PG-0707-10186)**	*- Time: 2 months* **Non-specific neck pain studies** *Irnich et al 2001 – Reported in Lu et al 2011 data extraction* *White et al 2004 – Reported in Trinh et al 2016 data extraction* *Vas et al 2006 – Reported in Trinh et al 2016 data extraction* *Witt et al 2006* - Reported in Lam et al. 2013, Hutchinson et al 2012 & Lu et al 2011 data extraction *Salter et al 2006* *- N= 21* *- Acupuncture vs usual care* *- Outcome: Northwick park neck pain questionnaire* *- Time: 3 months* **Shoulder pain** *Guerra de Hoyos 2004 – Reported in Cox et al 2016 data extraction* *Vas et al 2008 – Reported in Cox et al 2016 data extraction* Kleinhenz et al 1999 *- N= 45* *- Acupuncture vs non-penetrating needle* *- Outcome: Constant Murley Score* *- Time: 1 month* Molsberger et al 2010 *- N= 308* *- Acupuncture vs non-penetrating needle vs usual care* *- Outcome: VAS* *- Time: 6 months*	P<0.001 <u>Acupuncture vs No-Sham acupuncture</u> Non-specific back and neck pain N=7 95% CI: 0.55 (0.51-0.58) P<0.001 Osteoarthritis N= 6 95% CI: 0.57 (0.50-0.64) P<0.001 Shoulder pain N= 0 **Adverse effects:** Not reported	
Xu, S, Wang, L, Cooper, E, Zhang, M, Manheimer, E, Berman, B, Shen X and Lao, L **Adverse events of acupuncture: A systematic review of case reports** **2013a** Databases **PubMed, Medline, the Central Information System of Complementary Medicine (CISCOM), Excerpta Medica**	**Participants (cases age/ Sex)** Ishibe 2001 – 13/M Nambiar 2001 Woo 2001 – 79/ F Leavy 2002 – 33/M Woo 2003 – 73/M Ha 2003 – 68/F Daivajna 2004 – 48/F Kim 2004 – 50/M Chen 2004 – 44/M Bang 2005 – 64/M Seeley 2006 – 31/M Lee 2008 – 79/M Hwang 2008 – 25/F	*Infections associated with acupuncture:* **Ishibe 2001** <u>Disease treated:</u> LBP # <u>Punctured site:</u> Not stated <u>Diagnosis:</u> Septic arthritis <u>Practitioner:</u> Acupuncturist <u>Remarks:</u> Recovered (1 wk) **Nambiar 2001** <u>Disease treated:</u> LBP # <u>Punctured site:</u> Not stated <u>Diagnosis:</u> Endocarditis <u>Practitioner:</u> Not reported <u>Remarks:</u> Recovered **Woo 2001**	**Reviewer comments** Comprehensive literature search was carried out using multiple databases. Inclusion/exclusion criteria is listed, however it is not clearly reported. Two authors screened titles and abstracts, however it is unclear whether authors extracted and selected the included case reports. Detailed information regarding the interventions used was lacking leading to difficulty in interpretation of results. Most cases of adverse events did not report the qualification of the practitioner making it difficult to draw

Study	Methodology	Results	Comments and evidence level
(EMBASE), Citations in Nursing and Allied Health Literature (CINAHL), and the Complementary and Alternative Medicine for Pain (CAMPAIN) Relevant Included Studies **Ishibe 2001** **Nambiar 2001** **Woo 2001** **Woo 2003** **Leavy 2002** **Ha 2003** **Daivajna 2004** **Kim 2004** **Chen 2004** **Bang 2005** **Seeley 2006** **Lee 2008** **Hwang 2008** **Hwang 2008** **Ogasawara 2009** **Kim 2010** **Kuo 2011** **Saw 2004** **Simmons 2006** **Tien 2008** **Woo 2009** **Nakajima 2010** **Castro-Silva 2011** **Kuo 2010** **Kung 2005** **Chau 2006** **Weng 2008** Research question **What is the frequency and severity of adverse events reported for acupuncture, moxibustion, and cupping?**	Hwang 2008 – 25/F Ogasawara 2009 – 50/F Kim 2010 – 53/F Kuo 2011 – 57/M Saw 2004 – 55/F Simmons 2006 – 69/M Tien 2008 – 78/M Woo 2009 – 43/F Nakajima 2010 – 60/F Castro-Silva 2011 – 59/M Kuo 2010 - 39/F Kung 2005 – 63/F Chau 2006 – 53/F Weng 2008 - 58/F **Inclusion:** - Original case reports of complications or adverse events of acupuncture, moxibustion, and cupping published **Exclusion:** - Analysis of the same adverse event - Irrelevant studies: non-case report, such as a review, commentary, or clinical trial **Limits:** - English language - 2000 to 2011 **All Studies:** 117 case reports Adverse events of acupuncture associated with *acupuncture, moxibustion and cupping* (2000-2011): *Acupuncture* - Complications 284 - Infections 239 - Isolated incidents 48 - Outbreaks 191 - Internal organ or tissue injury 38 - Pneumothorax 13 - Central nerve system 9 - Peripheral nerves 4 - Heart 5 - Other injuries 7 - Other complications 7	Disease treated: Knee OA Punctured site: GB38 (leg) Diagnosis: Mycobacterium chelonae Practitioner: Not reported Remarks: Recovered (3 wk) **Woo 2003** Disease treated: LBP Punctured site: Back Diagnosis: Staphylococcus Practitioner: Not reported Remarks: Recovered (5 wk) **Leavy 2002** Disease treated: Hip pain Punctured site: Low limb Diagnosis: *Staphylococcus aureus* Practitioner: Not reported Remarks: Recovered (6 wk) **Ha 2003** Disease treated: LBP Punctured site: Back Diagnosis: Staphylococcus Practitioner: Not reported Remarks: Recovered (4 mo) **Daivajna 2004** Disease treated: LBP Punctured site: Low back Diagnosis: Septic arthritis Practitioner: Not reported Remarks: Recovered (3 wk) **Kim 2004** Disease treated: LBP Punctured site: Lower back Diagnosis: Discitis from staphylococcus Practitioner: Acupuncturist Remarks: Recovered (?) **Chen 2004** Disease treated: Nuchal and subscapular pain Punctured site: Cervical paraspinal and medial scapular region Diagnosis: *Staphylococcus aureus* Practitioner: Not reported	conclusions regarding the effect of qualifications and experience on the rate of adverse events. **Grade:** LQ (-) **Quality:** 2-

Study	Methodology	Results	Comments and evidence level
Funding **Supported partially by Grant no. R24 AT00- 1293-04 from the National Centre for Complementary and** **Alternative Medicine (NCCAM) at the US National Institutes of Health - grant awarded to the University of Maryland School of Medicine, Baltimore, Maryland**	- Adverse reactions 10 *Moxibustion* 4 *Cupping 10*	Remarks: Recovered (5 mo) **Bang 2005** Disease treated: LBP Punctured site: Lumbar paraspinal muscles Diagnosis: *Escherichia coli* Practitioner: Not reported Remarks: Paraplegic **Seeley 2006** Disease treated: Hip pain Punctured site: Hip, thigh Diagnosis: Staphylococcus bacteraemia Practitioner: TCM doctor Remarks: Recovered (4 wk) **Lee 2008** Disease treated: LBP Punctured site: Back Diagnosis: *Escherichia coli* and MRSA Practitioner: Not reported Remarks: Recovered (76 d) **Hwang 2008** Disease treated: LBP Punctured site: Back Diagnosis: Pneumoretroperitoneum Practitioner: OMD Remarks: Recovered (1 wk) **Hwang 2008** Disease treated: LBP Punctured site: Not stated Diagnosis: Pneumoretroperitoneum Practitioner: Licenced OMD Remarks: Recovered (7 d) **Ogasawara 2009** Disease treated: LBP Punctured site: Lower back Diagnosis: Septic arthritis (MRSA) Practitioner: Not reported Remarks: Recovered (70 d) **Kim 2010** Disease treated: LBP Punctured site: Lower back	

Study	Methodology	Results	Comments and evidence level
		Diagnosis: Psoas abscess Practitioner: Not reported Remarks: Recovered (2 wk) **Kuo 2011** Disease treated: LBP Punctured site: Bilateral paraspinal muscles Diagnosis: MRSA Practitioner: Not reported Remarks: Recovered (2 mo) **Saw 2004** Disease treated: Knee OA Punctured site: Knee Diagnosis: Necrotizing fasciitis Practitioner: Not reported Remarks: Recovered **Simmons 2006** Disease treated: Knee pain Punctured site: SP10 (knee) Diagnosis: Cellulitis, septicaemia and pneumonia Practitioner: Not reported Remarks: Death due to renal failure **Tien 2008** Disease treated: Knee RA Punctured site: Knee Diagnosis: *Listeria monocytogenes* Septic arthritis Practitioner: Acupuncturist Remarks: recovered 3 week **Woo 2009** Disease treated: Knee pain Punctured site: Knee Diagnosis: MRSA Practitioner: Not reported Remarks: Not reported **Nakajima 2010** Disease treated: Knee pain Punctured site: Needles embedded at knee Adverse events: *Enterococcus faecalis* knee infection Practitioner: Not reported Remarks: Recovered (1yr) **Castro-Silva 2011**	

Study	Methodology	Results	Comments and evidence level
		Disease treated: Ankle pain Punctured site: Limb Adverse events: *Mycobacterium haemophilum* infection Practitioner: Not reported Remarks: Recovered (4 mo) *Other organ or tissue injuries associated with acupuncture:* **Kuo 2010** Disease treated: Knee soreness Punctured site: Popliteal fossa Adverse events: Popliteal arteriovenous fistula Practitioner: Not specified Remarks: Discharged Adverse events associated with acupuncture **Kung 2005** Disease treated: Ankle pain Punctured site: GB34, B40 (leg & ankle) Adverse events: Syncope Pt was sitting Adverse events associated with moxibustion **Chau 2006** Disease treated: Headache Punctured site: Leg and foot Adverse events: Cellulitis Practitioner: Untrained individual Remarks: Recovered Adverse events associated with cupping **Weng 2008** Disease treated: Not stated Punctured site: Thigh Adverse events: Acquired hemophilia Practitioner: Not stated Remarks: Improved in 1 week **Summary** - The review was overall designed to identify the individual cases associated with adverse events associated with acupuncture, moxibustion and cupping and to analyse the possible causes to help minimise the risks, improving safe practice within the profession. - This review of case reports suggests that acupuncture has a high rate of causing infection in comparison to other methods such as moxibustion and cupping.	

Study	Methodology	Results	Comments and evidence level
		- The vast majority of adverse events associated with the ankle, foot and knee are infections, however the routes of infection have changed. The current findings suggest that skin contact with unsterilized equipment and dirty towels, in unhygienic clinical settings were the main causes for outbreak in bacterial infection. - It was concluded within the study that acupuncture has a low rate of adverse events when conducted among licensed, qualified practitioners in the West, based on 4 recent surveys in Germany and the UK. - No case reports of peripheral or central nervous system injury, pneumothoraxes or heart injuries were associated with acupuncture of the ankle, foot and knee. - Individual case reports of adverse events were identified for treating knee soreness with acupuncture at the popliteal fossa and ankle pain at the acupoints GB34, B40. Individual adverse events were also reported for moxibustion treatment at the leg and foot and cupping at the thigh. - Biomedical knowledge such as anatomy and microbiology is needed in order avoid organ injury and infection. Skin cleansing should also be required, particularly for those patients with immune compromised conditions. Information in future reports on adverse events needs to include information on training qualification of practitioners and the procedure used for the treatment. **Conclusion** Although serious adverse events associated with acupuncture are rare, acupuncture practise is not risk free. Adequate measures are required to minimise risks presented by acupuncture: - Training in biomedical knowledge (anatomy and microbiology) - Safe and clean practice guidelines	
Zheng, W, Zhang, J & Shang, H **Electro-acupuncture-related adverse events: A systematic review** **2012** Databases **Chinese Biomedical Literature Database, Chinese Journal Full-Text Database and Weipu Journal Database** Relevant Included Studies **Gao 1989** **Chen 2009** Research question **To assess the safety of electro acupuncture (EA)**	**Participants: 2 relevant studies out of a total 15** (age; gender) Gao 1989 – 54; male Chen 2009 – 42; male **Inclusion:** - Published surveys, case reports and case series were included if they reported factual data relating to the safety of EA **Exclusion:** - Review articles, translations and clinical trials - Adverse events (AE), related to other types of acupuncture (e.g. Auricular acupuncture, injection in acupoints, and laser acupuncture) **All Studies:** 2 relevant of out a total 15 studies studied the safety and potential AE's associated with electro-acupuncture. This was broken down into General AE's, Traumatic events, Other general events and lastly Specific AE's: **General AE's**: 7 cases out of 6 articles	**Electro-acupuncture related adverse events, relevant to musculoskeletal conditions* Gao 1989 Reason for acupuncture: Leg pain Adverse event: Scorch (S) Outcome: Not reported Causality: Certain Chen 2009 Reason for acupuncture: Lumbar strain Adverse event: Tardive fainting (G) Outcome: Causality: **Summary:** This review was designed to identify the safety associated adverse events with using the treatment of electro-acupuncture. Most of the AE's identified in this review were related to the electrics added to the acupuncture needles. In addition, when strong electric currents are used in higher risk acupoints it can increase the risk of any AE. The results report that EA acupoints should	**Reviewer comments** A comprehensive search was carried out and search terms were searched as free text, which removed the filter of English only results. Overall reporting of events was fairly broad making it hard to draw a specific conclusions and causal links in the 2 relevant cases, between treatment and adverse events. In addition, it was not possible to calculate incidence rates of the AE's, which limited the findings significance. Two reviews independently selected the articles found through the search and extracted the data. Inclusion and exclusion criteria was reported, however was limited and did not list the excluded studies. Also, the flow diagram was poorly reported, making it had to analyse the inclusion/exclusion process.

Study	Methodology	Results	Comments and evidence level
Funding **Supported by the New Century Excellent Talents in University program, which is supported by the Chinese Ministry of education**	*Traumatic events: 4 cases* *Other general events: 3 cases* **Specific AE's:** 37 cases out of 9 articles *Peripheral nerve irritation-related events: 14 cases* *Cardiac-conduction block: 17 cases* *Electrical burn: 1 case* *Spasm: 3 cases* *Irritable gastric ulcer: 2 cases* **Acupoints (WHO code):** Gao 1989 – Rights Leg Chen 2009 – Jiaji (ex-B2), Weizhong (BL 40)	not be located in the head or the neck and the pericardial area as the electric currents can affects the function of the heart and central nervous system, causing potentially irreversible complications. **Conclusion** There were a range of AE's associated with EA in this review, however it was not possible to calculate incidence rates of the AE's, although it can be concluded that a majority of the AE's were associated with improper operations and, therefore, EA should be used with caution.	Further limitation of this review was that all of the AE's were reported in Chinese literature, which can result in publication bias. Additionally, a minimal amount of the included cases was relevant, as the other 13 do not meet the project scope for musculoskeletal conditions, which limited the amount of information that was able to be extracted from this review. **Grade:** LQ (-) **Quality:** 1-
Zhang, J, Hongcai, A Shang, A, Gaoa, X & Ernstb, E **Acupuncture-related adverse events: a systematic review of the Chinese literature** **2010** Databases **Chinese Biomedical Literature Database (1980–2009), Chinese Journal Full-Text Database (1980–2009) and Weipu Journal Database (1989–2009)** Relevant Included Studies **Liu 1992** **Liu 2001** **Liu 2007** **Kang 1994** Research question **A review of the available Chinese-language literature and acupuncture involvement in related adverse events**	**Participants:** 4 relevant studies out of a total 17 case series Cases (age in years and sex, or no. of cases) Liu 1992 – 52, female Liu 2001 – 34,45 & 56, females Liu 2007 - 42, female Kang 1994 – 72, female **Inclusion:** - Case reports, case series, surveys and other observational studies were included in the review if they reported factual data on complications related to acupuncture - Reports on traditional needle acupuncture, defined as a procedure in which stainless steel filiform needles are inserted into acupoints – acupuncture points located throughout the body that are associated with specific therapeutic effects and manipulated in place **Exclusion:** - Review articles, translations and clinical trials were excluded - Other types of acupuncture, such as electro-acupuncture, laser acupuncture and auricular acupuncture, were excluded. **Limits:** - Chinese language papers - 1980-2009 **All Studies:** 17 cases identified AE's and out of these 4 were relevant to musculoskeletal conditions. AE's were categorised into	**Case reports of infection after acupuncture, identified through a systematic review of the Chinese-language literature, 1980-2009.* Liu CR 1992 Reason for acupuncture: Leg pain Acupoint (code or site): Not reported Adverse event: Tetanus Outcome: Recovery Caused by acupuncture result: Probably Liu CB 2001 Reason for acupuncture: Lower back and shoulder pain Acupoint (code or site): Not reported Adverse event: Fainting Outcome: Recovery Caused by acupuncture result: Certainly Liu YZ 2007 Reason for acupuncture: Shoulder pain Acupoint (code or site): Shoulder site Adverse event: fainting Outcome: Recovery Caused by acupuncture result: Certainly Kang YH 1994 Reason for acupuncture: Arm pain, rheumatoid arthritis	**Reviewer comments** Search strategy was comprehensive, outlining search terms and including a detailed flow diagram in the review, however, the search was limited to Chinese medical databases, which can impact on the generalisability of the results. Inclusion/exclusion criteria was stated in the review; however it was not clear and the excluded studies were not identified. Biases are not discussed within this review and scientific quality of the included case reports is not reported or mention within the body of text, reducing the results reliability. **Grade:** 1- **Quality:** LQ (-)

Study	Methodology	Results	Comments and evidence level
Funding **Supported by the New Century Excellent Talents in University program, which is supported by the Chinese Ministry of education**	**Traumatic events –** 87 articles (73 case reports/14 case series/totalled 296 cases) *Arachnoid and spinal dura mater – 9 cases* *Thoracic organs and tissues – 201 cases* *Abdominal organs and tissues – reported in 16 patients* *Neck area – 6 cases* *Eyes – reported in 5 articles* *Peripheral nerves, vessels and other tissues – 3 cases* *Needling site pain and broken needle – 4 cases* **Infectious events** – 9 cases **Other adverse events** – Total of 172 acupuncture related adverse events that were neither due to either infection, trauma were reported.	Acupoint (code or site): LI4, LI10, LI11, SJ3 Adverse event: Stroke Outcome: Recovery Caused by acupuncture result: Probably **Summary:** This review identifies many acupuncture related adverse events sourced within the Chinese literature. The findings showed that the injuries and the infection post acupuncture treatment, were related to inappropriate technique, where as other adverse events were not. Insufficient knowledge and poor aseptic procedures were also a big contributor to adverse events along with improper manipulation techniques at high-risk acupoints. In addition, as a result of this review, it should be noted that patient conditions should be considered before treatment, however, some adverse events are also inevitable, but the impact of these could be minimised using preventative measure. Adding to this, most of the acupuncturists were practicing out of village clinics or rural hospitals which caused most of the traumatic events. This is an indication that highly educated and qualified acupuncturists could potentially minimise the adverse events associated with acupuncture treatments **Conclusion** Overall, acupuncture can be considered inherently safe in the hands of well-trained practitioners. However, there is a need to find effective ways to improve the practice of acupuncture and to monitor and minimize the health risks involved	

Appendix 7: Data Extraction Tables RCTs

Study	Methodology	Results	Comments and evidence level
Ge, W, Leson, C & Vukovic C **Dry cupping for plantar fasciitis: a randomized controlled trial** **2017** Research question **What are the effects of dry cupping on pain and function of patients with plantar fasciitis?** Funding: **Not reported**	**Participants** n=29 Age: 15 to 59 year **Inclusion:** - Patient history, risk factors, and physical examination findings consistent with plantar fasciitis - Aged between 15 and 60 years of age **Exclusion:** - Contraindications to manual therapy or electrical stimulation, including tumours, recent fractures, rheumatoid arthritis, steroid use, severe vascular disease, open wounds, recent surgery to ankle or foot, impaired sensation, pacemaker, and implants - Inability to comply with treatment or the follow-up protocols - Undergoing other treatments for heel pain **Style of acupuncture**: Dry Cupping Therapy **Treatment Rationale/Differential Diagnosis**	**Pain response in each group** VAS mean changes in score: Intervention: −29.8 (−39.4, −20.1) mm Control: −28.0 (−36.7, −19.2) mm No statistically significant difference (p=0.39) **Functional outcomes in each group** FAAM mean change in score: Intervention: 16.9 (7.8, 26.0) % Control: 12.9 (8.2, 17.6) % No statistically significant difference (p=0.27) LEFS mean changes in score: Intervention: 19.6 (8.6, 30.7) % Control: 11.4 (7.7, 15.1) % No statistically significant difference (p=0.08). **Patient-reported outcomes**	**Reviewer comments** Poorly reported RCT. Lack of information reported makes it difficult to interpret results. Convenience sampling impacts generalisability of results with subjects being mostly young volunteers. Power calculation done. Nil blinding of subjects or investigators, therefore, possibility of bias present. **Grade:** LQ (-) **Quality**: 1-

Study	Methodology	Results	Comments and evidence level
	- Treatment rationale: Western Medical **- Treatment variation:** Not reported **Intervention:** **- Details of cupping:** Plastic cupping bell with plastic manual hand pump **- Number of cups per subject per session:** 1 **- Names of points used:** Not reported - Cup applied to painful site **- Depth of insertion:** N/A **- Response sought:** Vacuum intensity tolerable **- Cup stimulation:** Not reported **- Retention time:** 10 minutes **- Cup type:** Kangzhu 6-Cup Biomagnetic Chinese Cupping Therapy Set, Model B1 × 6, Kangzhu, Beijing, China **Treatment Regimen** **- Number of sessions:** 8 **- Frequency and duration:** 2 x week for 4 weeks **Other components of treatment:** Nil **Practitioner qualifications and background:** Not reported **Comparator interventions:** Electrical stimulation therapy - interferential to painful site for 10 minutes, intensity tolerable, carrier frequencies 4,000 Hz and 4,000–4,150 Hz, beat frequency 80–150 Hz	Patient perceived function mean change in score: Intervention: 12.3 (7.6, 17.0) % Control: 14.3 (5.5, 23.0) % No statistically significant difference (p=0.36) **Adverse effects:** Not reported	
Espi-Lopez, G Serra-Ano, P, Vicent-Ferrando, J, Sanchez-Moreno-Giner, M, Arias-Buria, J, Cleland, J, Fernandez-de-Las-Penas, C **Effectiveness of inclusion of dry needling in a multimodal therapy program for patellofemoral pain: a randomized parallel group trial** **2017** Research question **What is the effects of adding trigger point dry needling to a manual therapy and exercise program on pain, function, and disability in individuals with patellofemoral pain?**	**Participants** n=60 Age: Inv - 29.7 +/- 9.5 years, Con - 29.2 +/- 10.5 years **Inclusion:** - Anterior knee or retropatellar pain of insidious onset for at least 6 months, provoked or associated with at least 2 of the following: prolonged sitting, prolonged kneeling, squatting, running, hopping, or stair walking - Aged between 19 and 60 years of age - Positive patellofemoral gliding test - Negative McMurray test, nil knee joint effusion and full ROM **Exclusion:** - Radiological findings suggesting knee OA - History of knee injury including ligament sprain, fracture, dislocation or meniscus tear - History of lower extremity surgery - Patients with a fear of needles or a coagulation disorder **Style of acupuncture:** TrP DN **- Treatment Rationale:** Western Medical - Treat active TrPs based on the hypothesis that TrPs induce motor control disturbances, accelerated muscle fatigability, and increased motor activation in the affected and related muscles	**Pain response in each group:** KOOS pain subscale (0-100) mean change in score: <u>15 days:</u> Intervention: 12.3 (6.7, 17.9) Control: 15.2 (10.1, 20.3) <u>3 months:</u> Intervention: 11.3 (5.4, 17.2) Control: 13.5 (6.8, 20.2) No statistically significant difference (p>.391) NPRS (0-10) knee pain intensity mean change: <u>15 days:</u> Intervention: –1.7 (–3.0, –0.4) Control: –2.0 (–3.2, –0.8) <u>3 months:</u> Intervention: –1.6 (–3.0, –0.2) Control: –1.3 (–2.3, –0.3) No statistically significant difference (p>.391) **Functional outcomes in each group:** IKDC (0-100) mean change in score:	**Reviewer comments** Well conducted and reported RCT. Randomisation method and allocation concealment good. Power calculations completed. Low dropout rate with 97% of subjects completing follow-up. Therapist blinding occurred. Convenience sampling impacts generalisability of results. Did not include a no intervention control group or sham needling technique. **Grade:** HQ (++) **Quality**: 1+

Study	Methodology	Results	Comments and evidence level
Funding **No reported**	**- Treatment variation:** Needling points chosen depending on TrP location **Intervention** **- Details:** TrP DN to active TrPs in the quadriceps muscle + manual therapy + exercise **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Not reported - inserted into the skin over the TrP **- Depth of insertion:** ranged from 15 to 20 mm for the vastus medialis to 30 to 35 mm for the vastus lateralis muscle **- Response sought:** First local twitch response **- Needle stimulation:** fast-in and fast-out technique. Needle was moved up and down (3- to 5-mm vertical motions with no rotations) at approximately 1 Hz until no more local twitch responses were elicited **- Needle retention time:** 2 to 5 minutes **- Needle type:** 0.32 × 40-mm disposable stainless-steel needles (Novasan, SA, Madrid, Spain) **Treatment Regimen** **- Number of treatment sessions:** 3 **- Frequency and duration:** 1 x week for 3 weeks. 30 to 40 min sessions (15 to 20 min for manual therapy, 10 to 15 min for exercises, and 2 to 5 min for TrP DN) **Other components of treatment** Manual therapy: Lumbopelvic, hip, knee and ankle manipulations. Hip external rotator stretches. Fascial manipulation of patellofemoral region. Exercise program: mini-squats, seated knee extensions, lunges, and lateral steps - 3 sets of 15 repetitions **Practitioner qualifications and background** Physical therapist with 10 years of clinical experience in TrP DN **Control or comparator interventions** Manual therapy + exercise as above only	<u>15 days:</u> Intervention: 14.4 (8.5, 20.3) Control: 11.5 (6.3, 16.7) <u>3 months:</u> Intervention: 14.8 (10.1, 19.5) Control: 12.5 (7.0, 18.0) No statistically significant difference (p>.391) KSS function subscale (0-100) mean change in score: <u>15 days:</u> Intervention: 3.7 (2.9, 4.5) Control: 6.0 (1.0, 11.0) <u>3 months:</u> Intervention: 5.4 (3.6, 7.2) Control: 3.9 (2.7, 5.1) No statistically significant difference (p>.391) **Patient-reported outcomes:** KOOS knee-related QOL (0-100) mean change: <u>15 days:</u> Intervention: 10.1 (2.6, 17.6) Control: 14.9 (8.7, 21.1) <u>3 months:</u> Intervention: 14.9 (8.7, 21.1) Control: 11.4 (5.6, 17.2) No statistically significant difference (p>.391) **Adverse effects** Twelve patients in the manual therapy + exercise + TrP DN group (40%) experienced muscle soreness after TrP DN, which resolved spontaneously within 36 to 48 hours. No other adverse events were reported by the participants	
Yu, H, Xu, L, MA, T **Therapeutic effect of electro-acupuncture in the treatment of Achilles tendonitis** **2014** Research question **What is the clinical efficacy of electro-acupuncture for the treatment of Achilles tendonitis?**	**Participants** n= 60 Age: 18-65 years (53 year mean) **Inclusion:** - Patients who were aged from 18-65 years old - Those who complied with the diagnostic criteria, were suffering from Achilles tendonitis and willing to receive the treatment **Exclusion:** - Patients suffering from other foot diseases such as high pressure of calcaneus, gout, fractures and tumours	**Pain response in each group** VAS scores (0-10) Intervention: Before treatment: 3.03 ± 1.81 After treatment: 1.67 ± 0.71 Control: Before treatment: 2.87 ± 1.57 After treatment: 2.13 ± 1.17 Intervention group significant improvement (p<0.01), Control nil significant difference. Between group difference non-significant (p>0.05) **Functional outcomes in each group** No outcome measure or subscale looking at functional outcomes were reported **Patient-reported outcomes**	**Reviewer comments** Poorly reported and lacks valid and reliable outcomes measures. No reported dropout rates or follow up data. No information confirming intention to treat within allocated groups, was reported. Single participant blinded study, (researches were not blind to treatment allocation) increasing bias. Furthermore, a lack of reporting on the targeted patient population

Study	Methodology	Results	Comments and evidence level
Funding **Not reported**	- Patients suffering from concomitant cardiovascular, liver, kidney, hematopoietic system, the endocrine system and other serous primary diseases and mental illness - Patients with partial or complete Achilles tendon rupture **Style of acupuncture:** EA **- Treatment rationale:** TCM **- Treatment variation:** These acupoints were described in the methodology BL 57, *Ashi* point, *KI3,* BL 60, ST 36, SP 6, BL 56KI 6, KI 5), GB 40) and BL 62); and these were selected as the main acupoints; KI 3, BL 60, BL 57 and Ashi **Intervention** **- Details:** 20-minute electro-acupuncture treatment **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** BL 57, Ashi (worst paint point), KI3, BL 60 were main acupoints. ST 36, SP 6, BL 56, KI 6, KI 5, GB 40, BL 62, were selected as matching acupoints. Two matching acupoints were selected alternately at each time of electro-acupuncture **- Depth of insertion:** BL 57 25mm, Ashi 15mm **- Response sought:** Not reported **- Needle stimulation:** Needles were manipulated with lifting, thrusting and twisting gently till the needling sensations spread to heel or sole **- Needle retention time:** 10 minutes **- Needle type:** 0.25mm x 40mm disposable filiform needle were applied perpendicularly at BL 57/ Ashi point targeted with filiform needles (0.25mm x 25mm) **Treatment Regimen** **- Number of treatment sessions:** 12 **- Frequency and duration:** 3 x week for week 1 and 2, 2 x week for week 3 and 4, 1 x week for week 5 and 6 **Other components of treatment** Nil **Practitioner qualifications and background** Not reported **Control/comparator intervention:** Low frequency Impulse treatment. 30 minutes' duration. 100 Hz frequency, 50 Hz disperse	Not assessed **Adverse effects:** No obvious adverse reactions during and after treatment reported	throughout the study made it hard to put results into context, but also to distinguish how useful the results are for clinical practice. The study was, however randomised and used an acceptable random number table as its concealment method. **Grade:** LQ (-) **Quality:** 1-
Huang, Z, Song, S **Observation on clinical effects of herbal cake-partitioned moxibustion for knee osteoarthritis**	**Participants** n=120 Age: Inv - 57.9 ± 6.8 years, Con - 55.4 ± 5.2 years **Inclusion:** - Diagnosed with knee OA using the diagnostic criteria Guiding Principles for Clinical Study of New Chinese Medicines	**Pain response in each group** No outcome measure or subscale looking at a pain response was reported **Functional outcomes in each group** WOMAC scores Intervention: Before treatment 63.15 ± 8.13 After treatment 28.63 ± 4.56	**Reviewer comments** Quality of reporting limits interpretation of results. Convenience sampling used. Randomisation adequate. No power calculation conducted. No reporting of patient or therapist blinding.

Study	Methodology	Results	Comments and evidence level
2015 Research question **What is the effect of herbal cake-partitoned moxibustion on knee OA?** Funding: **Not reported**	- Age: 40 to 70 years old - Nil use of non-steroidal anti-inflammatory drugs and hormones for at least a month **Exclusion:** - Serious diseases in the cardiac, pulmonary, hepatic, renal and hematopoietic system - Complications influencing the knee joint such as psoriasis, metabolic bone disease and acute trauma - Women whom are pregnant - Serious drug allergy **Style of acupuncture**: Moxibustion **- Treatment rationale:** TCM. Triple effect of herbal drugs, moxibustion and acupoints **- Treatment variation:** 3 acupoints were selected from the below acupoints **Intervention:** **- Details of moxibustion:** Herbal cake-partitioned moxibustion **- Number of herbal cakes per subject per session:** 9 **- Names of points used:** Acupoints: Dubi (ST 35), Neixiyan (EX-LE 4), Liangqiu (ST 34), Xuehai (SP 10), Zusanli (ST 36), Yanglingquan (GB 34) and Yinlingquan (SP 9) **- Depth of insertion:** N/A **- Response sought:** Moxibustion was given until the skin became red but without causing blisters **- Cup stimulation:** Three cones were given to each acupoint for each session **- Retention time:** When the patient felt hot, moxa cones were replaced **- Moxibustion type:** Moxa cone: Moxa wool was modelled into conical moxa cone of 2 cm by 2.5 cm. Herbal cake: 0.4 cm by 2.5 cm made of equal portions of Cao Wu (Radix Aconiti Kusenzoffii), Wei Ling Xian (Radix Clematidis), Tou Gu Cao (Herba Speranskia Tuberculata), Ru Xiang (Olibanum), Mo Yao (Myrrha), Gong Ding Xiang (Flos Caryophylli), and Chuan Xiong (Rhizoma Ligustici Chuanxiong) **Treatment Regimen** **- Number of sessions:** 20 **- Frequency and duration:** 5 x week for 4 weeks **Other components of treatment:** Nil **Practitioner qualifications and background:** Not reported **Comparator interventions:** Diclofenac Sodium Sustained-release tablets (Voltaren, produced by Beijing Novartis Pharmaceuticals Co. Ltd., China, 75 mg/tablet), 75 mg each time, taken after a meal, once per day for 4 weeks	Control: Before treatment 61.72±8.65 After treatment 39.14±5.48 Statistically significant difference ($p<0.05$) between before and after scores for both intervention and control groups. Statistically significant difference ($p<0.05$) between the two groups change in scores **Patient-reported outcomes** Not assessed **Adverse effects:** No obvious adverse reactions during and after treatment	**Grade:** LQ (-) **Quality**: 1-

Study	Methodology	Results	Comments and evidence level
Chen, R, Chen, M, Su, T, Zhou, M, Sun, J, Xiong, J, Chi, Z, Xie, D, Zhang, B **Heat-sensitive moxibustion in patients with osteoarthritis of the knee: a three-armed multicenter randomized active control trial** **2015** Research question **What is the effectiveness of Heat-sensitive moxibustion for treating Knee OA compared with conventional moxibustion or conventional drugs?** Funding: **Major state basic research development program of the People's Republic of China (grant number 2015CB554503),** **National Natural Science Foundation of China (grant number 81160453), National Natural Science Foundation of China** **(grant number 81202854) and the Jiangxi key R&D project**	**Participants** n=432 Age: mean 54 years Average time since diagnosis: 4.6 years **Inclusion:** - Diagnosis of Knee OA according to the GPCRND - Moderate to severe swelling with floating patella test negative - Aged 38 to 70 years old - Acupuncture point heat-sensitisation phenomenon present in the region bounded by SP9, GB34, ST34 and SP10 **Exclusion:** - History of serious life-threatening disease, such as heart disease or disease of brain blood vessels, liver, kidney and haematopoietic system - Diabetes, diabetic polyneuropathy and polyneuropathic disturbances - Women whom are pregnant - Acute knee joint trauma or ulceration of local skin - Complications of serious genu varus/valgus and flexion contraction **Style of acupuncture**: Intervention A: Heat Sensitive Moxibustion Intervention B: Conventional Moxibustion **- Treatment rationale:** TCM **- Treatment variation:** Structured approach **Intervention:** **- Details of moxibustion:** Intervention A: Moxibustion stick suspended 3 cm over the skin to search for the acupuncture point heat-sensitisation phenomenon Intervention B: Acupuncture points chosen as below with the sensation of acupuncture point heat-sensitisation phenomenon not pursued or avoided in treatment **- Number of sticks per subject per session:** 9 **- Names of points used:** Intervention A Acupoints: Rectangle bounded by SP9, GB34, ST34 and SP10 Intervention B Acupoints: EX-LE5 (Xiyan, two points) and EX-LE2 (Heding) **- Depth of insertion:** N/A **- Response sought:** Intervention A**:** Disappearance of the acupuncture point heat sensitisation phenomenon Intervention B: Local warmth without burning pain **- Stimulation:** N/A **- Retention time:** Intervention A: 30-60 mins Intervention B: 15 mins	**Pain response in each group** No outcome measure or subscale looking at a pain response was reported **Functional outcomes in each group:** GPCRND-KOA scores: Intervention A: Before treatment 11.2 ± 3.3 1 month: 2.8 ± 1.8 (2.6-3.0) 7 months: 3.6 ± 1.6 (3.3-3.9) Intervention B: Before treatment 11.3 ± 3.2 1 month: 4.9 ± 2.8 (4.4-5.3) After treatment 6.4 ± 1.5 (6.2-6.6) Control: Before treatment 12.1 ± 2.9 1 month: 5.6 ± 2.1 (5.4-5.9) 7 months: 7.0 ± 1.9 (6.6-7.3) All groups decreased significantly ($p<0.01$) following treatment. Intervention A versus Intervention B ($p=0.023$) – Significant. Intervention A versus Control ($p=0.0096$) – Significant. Intervention B versus Control ($p=0.091$) - Nil significance **Patient-reported outcomes** Not assessed **Adverse effects:** No adverse events were reported in the 432 participants	**Reviewer comments** Well conducted pragmatic, three-armed, multicentre RCT. Power calculation conducted with good sample size. Adequate randomisation and concealment. Intention to treat analysis conducted. Nil blinding of therapist and use of usual control instead of sham procedure increases risk of bias. **Grade:** AQ (+) **Quality**: 1

Study	Methodology	Results	Comments and evidence level
	- Moxibustion type: Moxa stick 22 mm by 120 mm produced by Jiangxi provincial TCM Hospital, China **Treatment Regimen** - Intervention A and B **- Number of sessions:** 35 **- Frequency and duration:** 2 x daily for 1 week (5 days a week) then 1 x daily for 5 weeks **Other components of treatment:** Nil additional use of treatments such as physiotherapy or regular pain-relieving drugs **Practitioner qualifications and background:** Intervention A: Acupuncturists with at least 5 years training and experience Intervention B: Licenced doctor **Comparator interventions:** Sodium hyaluronate intra-articular injection every 6 days (2 mL) for a total of five times		
Zhou, B, Fan, S, Wang W, Lu B, Zhang, H, Yang, W, Wang, A **Clinical research on treating fracture of middle and lower 1/3 of tibiofibular by electro-acupuncture** **2014** Research question **What is the efficacy on treatment of fractures of the middle and lower 1/3 of the tibiofibular using electro-acupuncture (group A), warm needling moxibustion (group B) and traditional Chinese medicine (group C)?** Funding **Not reported**	**Participants** n= 600 Age: Group A 21-57 years (45.0 mean), Group B 19-61 years (46.8 mean), Group C 24-68 years (47.0 mean) **Inclusion:** - Lateral X-rays of patients with closed and stable fractures of the middle and lower 1/3 of tibiofibular **Exclusion:** - Not reported **Style of acupuncture:** Electro-acupuncture **Treatment Rationale:** Traditional Chinese Medicine (TCM) **Intervention** *Group A:* **- Details:** EA **- Number of needles inserted per subject per session:** 4 **- Names of points used:** Four points selected (GB 39), (exterior), (SP 6) and (interior) **- Depth of insertion:** Not reported **- Response sought:** Not reported **- Needle stimulation:** Slow insertion into skin. GB 39 and SP 6 connected with negative electrodes and Ashi was connected with positive electrodes **- Needle retention time:** Not reported **- Needle type:** Not reported Group B: **- Details:** Warm needling moxibustion **- Number of needles inserted per subject per session:** 2 **- Names of points used:** GB 39 and SP 6)	**Pain response in each group** Not assessed **Functional outcomes in each group** Not assessed **Patient-reported outcomes** Not assessed **Clinical healing situation in each group:** Intervention (EA) Group A: Healing days: 60±7.4 No. of delayed union: 15(7.0%) No. of non-union: 3(1.5%) Comparator (warm needling moxibustion) Group B: Healing days: 83±10.6 No. of delayed union: 24(11.5%) No. of non-union: 7(3.5%) Control (Spint + TCM) Group C: Healing days: 98±10.6 No. of delayed union: 29(14.5%) No. of non-union: 11(5.5%) **Adverse effects** Not reported	**Reviewer comments** Poorly reported RCT lacking overall methodological detail and reasoning. Fails to report inclusion/exclusion criteria and instead uses a general description of the patient population that was investigated, as its criteria. A lack of intervention and treatment procedure detail also adds to the vague nature of the reporting, making it hard to distinguish the control group, which is not clearly identified. Outcome measures are not clearly reported, dropout rates are not identified and information confirming patients being analysed per allocated group is not clearly described. **Grade:** LQ (-) **Quality**: 1-

Study	Methodology	Results	Comments and evidence level
	- Depth of insertion: Not reported **- Response sought:** Not reported **- Needle stimulation:** Not reported **- Needle retention time:** Not reported **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** 6 **- Frequency and duration:** 30 minute sessions, 1 x daily for 6 days. **Other components of treatment:** Nil **Practitioner qualifications and background** Not reported **Control or comparator interventions** External fixation splint + musk bone capsules 5 x pills 3 x daily		
Gang, J, Mi, Y & Wang, H **Clinical efficacy comparison between electroacupuncture and meloxicam in the treatment of knee osteoarthritis at the early and middle stage: a randomized controlled trial.** **[Chinese]** **2016** Research question **What is the clinical efficacy of EA compared to meloxicam on knee osteoarthritis at the early to middle stage?** Funding **No funding mentioned**	**Participants** n=90 Early and middle stage knee OA **Inclusion:** - Meeting the diagnosis standards for knee OA as stated in the 2007 version of *Guide for OA Diagnosis and Treatment* - Aged between 40-70 - Grade 2 and grade 3 patients based on the X-Ray Kellgren-Lawrence grading of knee OA (K-L Radiology grading) - Those who volunteer to participate and signed the consent form **Exclusion:** - Not meeting the above mentioned diagnosis standards and having other diseases which affect the knee OA - Those who have a history of joint trauma or knee surgery - Those who had knee joint cavity injection in the previous 6 months - Those who have other serious diseases such as angiocardiopathy, cerebrovascular disease, liver, kidney, or hematopoietic system disease - Those who can't withstand or cooperate with treatments **Style of acupuncture:** Acupuncture **- Treatment Rationale:** TCM **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Dubi (ST 35), Neixiyan (EX-LE 4), Liangqiu (ST 34), Heding (EX-LE 2), Xuehai (SP 10), Yan- glingquan (GB 34) and Zusanli (ST 36); **- Depth of insertion:** Not reported	**Pain response in each group:** Not reported **Functional outcomes in each group:** WOMAC <u>Electroacupuncture group:</u> - Number of participants: 43 - Pain: Before treatment 37.63+/-3.70 After treatment 14.08+/-4.23 - Stiffness Before treatment 14.52+/-2.19 After treatment 4.76+/-2.02 - Daily functions Before treatment 60.07+/-4.98 After treatment 35.98+/-4.17 - Total score Before treatment 112.22+/-6.58 After treatment 54.82+/-6.27 <u>Meloxicam group</u> - Number of participants: 45 - Pain: Before treatment 39.83+/-4.83 After treatment 15.93+/-4.04 - Stiffness	**Reviewer comments** Randomised controlled trial reported in Chinese.

Study	Methodology	Results	Comments and evidence level
	- Response sought: De qi. Regular acupuncture is used first, after De qi, electroacupuncutre equipment is connected **- Needle stimulation:** regular needling; for the electroacupuncture, it is said continuous wave, at a frequency of 2Hz, and the intensity of 2mA, mild reinforcing-reducing method **- Needle retention time:** 20 mins **- Needle type:** 0.30mmX40mm disposable stainless-steel needle **Treatment Regimen** **- Number of treatment sessions:** 21 **- Frequency and duration:** 1 x every 2 days for 6 weeks **Other components of treatment** Not reported **Practitioner qualifications and background** Not mentioned **Control or comparator interventions** Meloxicam: The meloxicam tablets were prescribed for oral administration, 7. 5 mg, once a day	Before treatment 12.23+/-2.04 After treatment 5.13+/-1.62 - Daily functions Before treatment 61.39+/-4.54 After treatment 36.54+/-3.91 - Total score Before treatment 113.45+/-6.94 After treatment 57.60+/-5.85 - No significant difference between groups in WOMAC scores (P > 0.05) 8-foot walking test: - Result in the EA group was significantly less than that in the meloxicam group (P < 0.05) 5-time sit-to-stand test: - Result in the EA group was significantly less than that in the meloxicam group (P < 0.05) **Patient-reported outcomes:** Not reported **Adverse effects** Not mentioned	
Wang, X, Wang, X, Hou, M, Wang, H & Feng, J **Warm needling moxibustion for knee osteoarthritis: a randomized controlled trial** **[Chinese]** **2017** Research question **What is the effect efficacy of warm-needling moxibustion for knee osteoarthritis?** Funding	**Participants** n=55 Knee OA **Inclusion:** - those who meet the above mentioned diagnostic standards - aged between 40-75 - volunteering to participate the entire treatment and having signed the consent form -Suffering grade 2 and above X-ray Kellgren Lawrence grading on the knee of concern - VAS>/=3 **Exclusion:** - combined with sprains or other external injuries - lower limb joints seriously deformed, painful or having other pathological changes that affect normal walking - having received surgery or arthroscope treatment	**Pain response in each group:** Not reported **Functional outcomes in each group:** WOMAC **Observation group** No. 25 Pain - before treatment 7.40+/-3.67 - after treatment 2.96+/-2.73 Stiffness - before treatment 3.24+/-2.03 - after treatment 1.44+/-0.87 difficulty in daily living - before treatment 20.96+/-13.79 - after treatment 11.00+/-8.99	**Reviewer comments** Randomised controlled trial reported in Chinese.

Study	Methodology	Results	Comments and evidence level
Not mentioned	- having serious visceral pathological changes, other serious metabolic abnormality diseases or bone tumor - having received immunosuppressant, or local or general adrenal cortical hormone treatment within 3 weeks prior to the experiment - having mental disorder, being intellectually challenged, or post-natal or breast-feeding females **Style of acupuncture:** Warm needling moxibustion **- Treatment Rationale:** TCM **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Dubi (ST 35), Neixiyan (EX-LE 4), Xuehai (SP 10), Liangqiu (ST 34), Yinlingquan (SP 9), Yanglingquan (GB 34), Weizhong (BL 40), Heyang (BL 55) and Fengshi (GB 31) **- Depth of insertion:** Dubi – 25-40mm Others – 25-30mm **- Response sought:** Deqi **- Needle stimulation:** After de qi, Aiduan (diameter 18mm, length 28mm) was lighted to be put on the end of the needles to apply warm needling **- Needle retention time:** 40 minutes **- Needle type:** Disposal needles 0.30mm-50mm **Treatment Regimen** **- Number of treatment sessions:** 12 **- Frequency and duration:** 1 x day for first 6 days, then 1 x every 2 days for 12 days **Other components of treatment** Nil reported **Practitioner qualifications and background** Not mentioned **Control or comparator interventions** No treatment was given in the control group for 3 weeks	Total score - before treatment 31.64+/-18.00 - after treatment 15.44+/-11.77 **Control group** No. 21 Pain - before treatment 5.95+/-3.98 - after treatment 6.05+/-3.77 Stiffness - before treatment 2.76+/-2.07 - after treatment 2.76+/-1.87 Difficulty in daily living - before treatment 15.24+/-11.14 - after treatment 15.86+/-11.30 Total score - before treatment 23.90+/-16.19 - after treatment 24.86+/16.19 WOMAC total was reduced in the observation group after treatment (P<0.01), but no significant change was observed in the control group (all P>0.05). The pain score, stiffness scores and total score of WOMAC in the observation group were lower than those in the control group (P<0.01, P<0.05); the score of daily function activities was declined in the observation group, but not significantly different from that in the control group (P>0.05) **Patient-reported outcomes:** Not reported **Adverse effects** In the observation group, there is one case of minor burn. The participant rested 2 days afterward before continuing the treatment	
Kim, T, Kim, K, Kang, J, Lee, M, Kang, K, Kim, J, Kim, J, Lee, S, Shin, M, Jung, S, Kim, A, Park, H,	**Participants** n=212 Age: Median Inv 56 years, Con 57 years	**Pain response in each group:** NRS (0-100) Intervention: Baseline - 57.02 ±14.3	**Reviewer comments** Well conducted multi-centre, non-blinded, parallel-group, randomised controlled trial. Sufficient stratified

Study	Methodology	Results	Comments and evidence level
Jung, H, Song, H, Kim, H, Choi, J, Hong, K, Choi, S **Moxibustion treatment for knee osteoarthritis: a multi-Centre, non-blinded, randomized controlled trial on the effectiveness and safety of the moxibustion treatment versus usual care in knee osteoarthritis patients** **2014** Research question **Funding supported by the Development of Acupuncture, Moxibustion and Meridian Standard Health Technology' project of the Korea Institute of Oriental Medicine (K12010)**	Mean duration of Knee OA: Inv 4 years, Con 3 years **Inclusion:** - Idiopathic Knee OA diagnosed according to the clinical guidelines of the American College of Rheumatology - Moderate-severe KOA (grades 2/3/4) - Daily average greater than 40 points on the 0-to-100 NRS - Meet at least 3 of the following 6 conditions: age of 50 to 70 years, stiffness within 30 minutes of waking in the morning, crepitus, bony tenderness, bony enlargement or no palpable warmth **Exclusion:** - History of positive rheumatoid factor, cancer, traumatic injury or significant deformity of the knee - Past knee replacement surgery, knee arthroscopy within the last 2 years, steroid injection within the last 3 months or visco-supplement injection and joint-fluid injection within the last 6 months **Style of acupuncture:** Moxibustion **- Treatment Rationale:** Traditional Korean medicine **- Treatment variation:** Up to 2 Ashi points unilaterally were used if needed. For patients with bilateral knee OA, treatments were provided bilaterally **Intervention** **- Number of acupuncture points chosen per subject per session:** 6 standard points + 2 Ashi points **- Names of points used:** ST36, ST35, ST34, SP9, Ex- LE04 and SP10 **- Depth of insertion:** N/A **- Response sought:** Applied until patient could no longer tolerate the stimulation **- Stimulation:** A total of 3 moxibustion cones were applied indirectly to each point per treatment session **- Retention time:** 5-10 minutes **- Moxa type:** Smokeless, paper devices of 1.9cm x 2. cm were used to hold the mugwort - Manina moxibustion, Haitnim Bosung Inc, South Korea **Treatment Regimen** **- Number of treatment sessions:** 12 **- Frequency and duration:** 3 x per week for 4 weeks **Other components of treatment** All patients received an educational leaflet containing basic information about knee OA and recommendations on the principles of self-exercise, good postures and rules for daily activities. Co-interventions allowed to both groups in all study periods included surgery, conventional medication, physical therapy, acupuncture, herbal medicine, over-the-counter drugs and other active treatments **Practitioner qualifications and background**	5 weeks - 44.77 ± 22.73 13 weeks - 40.53 ± 26.63 Control: Baseline - 57.63 ± 12.93 5 weeks - 56.23 ± 17.71 13 weeks - 54.26 ± 19.61 Statistically significant difference between intervention and control at 5 weeks and 13 weeks (p<0.01), however, small effect sizes at 5 weeks (0.0073) and 13 weeks (0.0075) K-WOMAC pain score: Intervention: Baseline - 6.93 ± 3.48 5 weeks - 5.07 ± 3.75 13 weeks - 5.18 ± 3.83 Control: Baseline - 7.21 ± 3.8 5 weeks - 7.14 ± 3.94 13 weeks - 7.32 ± 3,98 Statistically significant difference between intervention and control at 5 weeks and 13 weeks (p<0.01) with comparatively large effect size at 5 weeks (0.0532) and 13 weeks (0.0595). **Functional outcomes in each group:** Timed stand test Intervention: Baseline - 27.34 ± 19.16 5 weeks - 24.79 ± 19.77 13 weeks - 22.85 ± 9.76 Control: Baseline - 26.03 ± 8.83 5 weeks - 25.24 ± 8.84 13 weeks - 25.76 ± 9.09 Statistically significant difference at 5 weeks (p=0.0486) and 13 weeks (p=0.0006) Six-minute walk test Intervention: Baseline - 493.8 ± 95.1 5 weeks - 486.1 ± 81.3 13 weeks - 489.2 ± 79.3 Control: Baseline - 480.1 ± 78.2 5 weeks - 481.8 ± 80.4 13 weeks - 479.0 ± 78.0 No significant improvement at 5 weeks (p=0.51) and	randomisation with appropriate sequence generation and allocation concealment. Pilot study and power calculation conducted. Drop outs reported but not accounted for in analysis. Dropout rate in the intervention group 4.9% and control group 11.8%. Outcome assessors were not blinded which might introduce detection bias. Risk of expectation bias high. Clinically relevant outcome measures used. Analysis included stratification into knee OA severity further enhancing clinical generalisability. **Grade:** HQ (+) **Quality**: 1+

Study	Methodology	Results	Comments and evidence level
	Board-certified Korean medicine doctors or postgraduate Traditional Korean medicine doctors who had at least 2 years of clinical experience following the standard 6 years of education in Korean Medicine **Control or comparator interventions** Usual care as above	at 13 weeks (p=0.68) All results of the physical performance tests showed relatively small effect sizes at 5 weeks (0.0021 in the timed-stand test and 0.0008 in six-minute walk test) and 13 weeks (0.0307 and 0.0004 respectively) **Patient-reported outcomes:** K-WOMAC global score Intervention: Baseline - 34.16 ± 16.80 5 weeks - 25.42 ± 19.26 13 weeks - 26.70 ± 18.82 Control: Baseline - 34.15 ± 18.01 5 weeks - 33.60 ± 17.91 13 weeks - 34.69 ± 18.67 Significant difference between the two groups at 5 weeks and 13 weeks (p<0.01) with a small to medium effect size observed at 5 weeks (0.0477) and 13 weeks (0.0518). However, when results were grouped by severity of OA the result was only statistically significant for mild severity (p<0.01 at 5 and 13 weeks) and not moderate to severe severity (p=0.2554 at 5 weeks and p=0.3021 at 13 weeks) **Adverse effects** From 1158 moxibustion treatments there was a reported 121 adverse events including first (n = 6) and second degree (n = 113) burns, pruritus and fatigue (n = 2). One severe adverse effect.	
Hinman, R, McCrory, P, Pirotta, M, Relf, I, Forbes, A, Crossley, K, Williamson, E, Kyriakides, M, Novy, K, Metcalf, B, Harris, A, Reddy, P, Conaghan, P, Bennell, K **Acupuncture for chronic knee pain: A randomized clinical trial** **2014** Research question **What is the efficacy of laser and needle acupuncture for chronic knee pain?** Funding **Funded by the National Health and Medical Research Council (project 566783). Drs Hinman and Bennell are both funded in**	**Participants** n=282 Age (mean): Control: 62.7 years, Needle: 64.3 years, Laser 63.4 years, Sham Laser 63.8 years Inclusion: - 50 years or older - Knee pain of longer than 3 months duration - Knee pain most days with average severity of 4 or more out of 10 on NRS - Morning stiffness lasting less than 30 minutes Exclusion: - History of any systemic arthritic condition - History of knee arthroplasty or wait-listed for any knee surgery - History of any knee surgery in past 6 months - Any other condition affecting lower limb function (e.g. trauma, malignancy, neurological condition) - History of any knee injection in past 6 months - Current use of anticoagulant medication - Use of acupuncture in past 12 months - Any bleeding disorder or allergy to light - Referral to pain clinic or use of morphine or pethidine within past 6 months	**Pain response in each group** NRS Pain (0-10): Baseline: Control: 5.1 ± 2.1 Needle: 5.3 ± 1.9 Laser: 4.9 ± 1.9 Sham Laser: 5.0 ± 2.1 12 weeks: Control: 4.4 ± 2.4) Needle: 3.3 ± 2.2 Laser: 3.4 ± 2.2 Sham Laser: 3.4 ± 2.3 1 year: Control: 4.6 ± 2.6 Needle: 4.0 ± 2.7 Laser: 4.0 ± 2.5 Sham Laser: 3.9 ± 2.5 Needle (p=0.002) and laser (p=0.03) groups statistically significant at 12 weeks compared to control, however, not at 1 year (p=0.14 and p=0.19 respectively). Neither needle nor laser significantly improved pain compared with sham at 12 weeks or 1 year (p>0.05) WOMAC pain (0-20): Baseline: Control: 7.8 ± 3.4 Needle: 9.0 ± 3.3	**Reviewer comments** Well conducted and thoroughly reported Zelen-deign RCT. Low risk of recruitment bias - The design used reduces the risk of bias due to knowledge of the intervention influencing recruitment e.g. only people with positive attitudes to the intervention volunteer. Power calculations conducted. Subject and investigator blinding utilised. At 12 weeks and 1 year, 9% and 18% of participants were lost to follow-up, respectively. However, intention to treat analysis was conducted. Valid and reliable outcome measured used for primary outcomes. Between group comparisons useful and clinically relevant. **Grade:** HQ (++) **Quality**: 1+

Study	Methodology	Results	Comments and evidence level
part by Australian Research Council Future Fellowships (FT130100175 and FT0991413, respectively). DrMcCrory is funded in part by a National Health and Medical Research Council Practitioner Fellowship (1026383). Dr Pirotta is funded in part by a National Health and Medical Research Council Career Development Fellowship (1050830). Dr Williamson was funded in part by a National Health and Medical Research Council grant (1004233)	- Any other medical condition precluding participation in the trial (e.g. kidney or liver disease, deep vein thrombosis) - Knee pain subject to compensation claim **Style of acupuncture:** Needle, Laser and sham Laser **- Treatment Rationale:** Combined western and traditional Chinese medicine styles of acupuncture **- Treatment variation:** Standardised set of acupuncture points, however, other points were used at the acupuncturist's discretion depending on clinical examination **Intervention** **- Number of needles inserted per subject per session:** Initial treatment permitted a maximum of 6 points (4 on the study limb and 2 additional points chosen per protocol). In subsequent treatments, points were added and varied as clinically indicated **- Names of points used:** SP9, 10, ST34, 35, 36 LR7, 8, 9, KI10, BL39, 40, 57, GB34, 35, 36, ST40 LR3, SP6, GB41, BL60, BL21, 22, 23, GB30, 31, DU20, Li11, GV14, BL11 **- Depth of insertion:** Not reported **- Response sought:** Not reported **- Needle stimulation:** Not reported **- Needle retention time:** 20 minutes **- Needle/Laser type:** Single-use Seirin needles (0.25 × 40 mm), Laser and sham acupuncture - custom manufactured Acupak (Melbourne) laser machines. Standard Class 3B laser devices were used (measured output 10m W and energy output 0.2 J/point **Treatment Regimen** - Number of treatment sessions: 8 to 12 - Frequency and duration: 20 minute sessions, once or twice a week for 12 weeks **Other components of treatment** Nil **Practitioner qualifications and background** Eight family physicians registered as acupuncturists (mean, 33.3 years of clinical practice and 19.6 years of acupuncture experience). All were members of the Australian Medical Acupuncture College, had completed university-level acupuncture training, and were formally accredited (by examination and supervised clinical experience) and registered as medical practitioner acupuncturists by the Medical Board of Australia **Control or comparator interventions** Control (no acupuncture). Who were also unaware of the clinical trial, Plus, sham acupuncture group	Laser: 8.3 ± 3.1 Sham Laser: 8.6 ± 3.5 12 weeks: Control: 7.3 ± 3.9 Needle: 6.7 ± 3.8 Laser: 6.6 ± 3.9 Sham Laser: 6.6 ± 3.9 1 year: Control: 7.4 ± 4.1 Needle: 6.7 ± 4.0 Laser: 7.1 ± 4.1 Sham Laser: 6.9 ± 4.0 Needle compared with control group statistically different (p=0.05) at 12 weeks and 1 year. No differences in the rest of the WOMAC pain outcomes (p>0.05) **Functional outcomes in each group:** WOMAC function (0-68): Baseline: Control: 26.1 ± 12.4 Needle: 31.3 ± 11.8 Laser: 27.0 ± 11.3 Sham Laser: 27.5 ± 12.4 12 weeks: Control: 23.0 ± 13.2 Needle: 22.5 ± 13.1 Laser: 21.9 ± 12.3 Sham Laser: 21.7 ± 12.0 1 year: Control: 23.6 ± 13.4 Needle: 22.4 ± 14.1 Laser: 22.6 ± 13.1 Sham Laser: 21.6 ± 13.6 Needle compared with control group statistically different (p=0.04) at 12 weeks, however, not maintained at 1 year (p=0.11) Nil other statistical differences (p>0.05) Pain on walking (NRS 0-10): - Statistically significance at 12 weeks when comparing needling to control groups (p=0.003), however, no other significant differences at 12 weeks (p>0.05). No statistical differences remain at 1 year follow up for any comparisons (p>0.05) Activity restriction (NRS 0-10) - No statistically significant difference when comparing any of the groups at 12 weeks (p>0.05). Needling group when compared to control statistically significant at 1 year (p=0.02). **Patient reported outcomes:** Assessment of Quality of Life Instrument (AQoL-6D) (−0.04 to 1.00) Baseline: Control: 0.77 ± 0.16 Needle: 0.72 ± 0.15 Laser: 0.70 ± 0.16	

Study	Methodology	Results	Comments and evidence level
		Sham Laser: 0.73 ± 0.15 12 weeks: Control: 0.79 ± 0.16 Needle: 0.75 ± 0.18 Laser: 0.73 ± 0.17 Sham Laser: 0.78 ± 0.12 1 year: Control: 0.77 ± 0.16 Needle: 0.74 ± 0.17 Laser: 0.73 ± 0.17 Sham Laser: 0.74 ±0.16 Nil significant difference between groups (p>0.05) **Adverse effects** Increased knee pain: Needling 10% of participants, Laser 12%, Sham 3% Pain in other areas: All groups 2% Tingling: All groups 2% Nausea/dizziness: Needle 0%, Laser and Sham 2% Tiredness: Needle 2%, Laser 0%, Sham 3% Swelling: Needle 2%, Laser and Sham 0% Sensitive skin: Laser 2%, Needle and Sham 0%	
Teut, M, Kaiser, S, Ortiz, M, Roll, S, Binting, S, Willich, S, Brinkhaus, B **Pulsatile dry cupping in patients with osteoarthritis of the knee - a randomized controlled exploratory trial** **2012** Research question **Is cupping an effective method for relieving the symptoms of knee osteoarthritis?** Funding **This study was partly funded by Hevatech GmbH, Grafenberg, Germany**	**Participants** n= 40 Age: Inv: 68.1 ± 7.2 years, Con: 69.3 ± 6.8 years **Inclusion:** - Male and female patients between 40 and 80 years with knee OA according to the American College of Rheumatology criteria X-ray classification: Kellgren-Lawrence Grading Scale: 2 – 4 - Subjective pain intensity at baseline > 40 mm on the VAS - No other OA therapy except NSAID in the previous 4 weeks **Exclusion:** - Current use of anticoagulants (e.g. Phenprocoumon, Heparin) or coagulopathy - Any form of cupping therapy in the previous 12 months - Intra-articular injection of corticosteroids or NSAID into the knee joint in the previous 4 months or arthroscopy of the knee joint in the previous 12 months - Use of systemic corticosteroids in the previous 4 weeks - Physical therapy, leeches or acupuncture in the previous 4 months or other CAM therapies for osteoarthritis in the previous 4 weeks **Style of acupuncture:** Cupping **Treatment Rationale:** Western Medical **Intervention**	**Pain response in each group** WOMAC Pain Subscale Intervention: Baseline: 37.4 ± 17.3 4 weeks: 25.8 (19.3-32.3 95% CI) 12 weeks: 30.4 (22.5-38.4 95% CI) Control: Baseline: 40.2 ± 15.3 4 weeks: 40.2 (33.4-47.1 95% CI) 12 weeks: 40.5 (32.1-48.8 95% CI) Statistically significant at 4 weeks (p=0.041). Not statistically significant at 12 weeks (p=0.086). VAS Pain: Intervention: Baseline: 60.2 ± 12.2 4 weeks: 38.4 (30.5-46.2 95% CI) 12 weeks: 41.0 (30.7-51.4 95% CI) Control: Baseline: 57.9 ± 8.0 4 weeks: 55.0 (46.8-63.2 95% CI) 12 weeks: 57.2 (46.3-68.0 95% CI) Statistically significant at 4 weeks (p=0.005). Statistically significant at 12 weeks (p=0.036). **Functional outcomes in each group** WOMAC Physical Function Subscale	**Reviewer comments** Relevant characteristics of study population are not sufficiently combined with results. Blinding of patients and study therapist was not possible and therefore was not reported. Acceptable concealment with random allocation being determined through the use of SAS 9.2 generated software. Dropout data was provided, however no participants dropped out during the course of this study. Good use of reliable and validated outcome measures WOMAC and VAS which were performed by analysis of covariance (ANCOVA). 95% confidence intervals (CI) are presented. In addition, it was noted that this cupping device used in this study has never been used in a randomised controlled trial before and therefore further studies would be needed to compare and validate the efficacy of these results.

Study	Methodology	Results	Comments and evidence level
	- Details: Pulsatile cupping was administered by a mechanical cupping device to the low back, followed by cupping the entire affected knee with a big adaptable silicone cup fork **- Number of cups per subject per session:** 4 x low back, 1 x knee **- Names of points used:** 1 x cup over entire knee **- Depth of insertion:** N/A **- Response sought:** Not reported **- Cup stimulation:** Vacuum: 100-200 mbar, interval: 2 seconds, pulse: 30-50%) **- Retention time:** 5 minutes for low back, 10 minutes for knee **- Cup type:** Mechanical cupping device: PRV02, HeVaTec, GmbH) with flexible silicone cups to the knee joint and plastic glasses to the skin of the lower back region **Treatment Regimen** **- Number of treatment sessions:** 8 sessions **- Frequency and duration:** 2 x week for 4 weeks **Other components of treatment** Patients in both groups were allowed to take Paracetamol on demand with a maximum dosage of 2 g/day according to the NICE guidelines for 4 weeks **Practitioner qualifications and background** Not reported **Control or comparator interventions** Patients randomised into the control group received no cupping intervention for the duration of the study (12 weeks)	Intervention: Baseline: 39.1 ± 17.2 4 weeks: 27.0 (21.1-32.6 95% CI) 12 weeks: 30.4 (24.3-36.6 95% CI) Control: Baseline: 41.1 ± 16.6 4 weeks: 42.1 (36.2-47.9 95% CI) 12 weeks: 40.3 (33.9-46.8 95% CI) Statistically significant at 4 weeks (p=0.001). Statistically significant at 12 weeks (p=0.031). **Patient-reported outcomes** SF-36 Physical Component Scale Intervention: Baseline: 30.6 ± 8.5 4 weeks: 36.0 (33.5-38.6 95% CI) 12 weeks: 36.3 (32.9-39.8 95% CI) Control: Baseline: 32.2 ± 8.9 4 weeks: 31.9 (29.2-34.6 95% CI) 12 weeks: 30.2 (26.6-33.9 95% CI) Statistically significant at 4 weeks (p= 0.030). Statistically significant at 12 weeks (p=0.019). SF-36 Mental Component Scale Intervention: Baseline: 58.2 ± 7.2 4 weeks: 56.0 (52.3-59.7 95% CI) 12 weeks: 53.2 (49.5-56.9 95% CI) Control: Baseline: 51.1 ± 11.1 4 weeks: 52.7 (48.8-56.6 95% CI) 12 weeks: 52.6 (48.7-56.5 95% CI) Not statistically significant at 4 weeks (p=0.233). Not statistically significant at 12 weeks (p= 0.831). **Adverse effects** No serious adverse events or effects were observed	**Grade:** AQ (+) **Quality:** 1
Khan, A, Jahangir, U & Urooj, S **Management of knee osteoarthritis with cupping therapy** **2013** Research question **What is the effectiveness of cupping therapy at a clinical setting for knee osteoarthritis?**	**Participants** n=27 - 7 drops outs Knee OA Age: The patients belonging to age group 30-40 (n = 3, 7.5%) the patients of 40-50 years is n = 15, 37.5%. 50-60 years n = 22, 55%. **Inclusion:** - Subjects with osteoarthritis aged between 30 and 60 years old - Subjects who did not receive cupping to the knee region before or to any other region of the body 6 months prior to the study **Exclusion:** - Subjects with gross deformity - Osteoarthritis of joints other than the knee	**Pain response in each group:** The effect of both the cupping and acetaminophen was statistically significant in relieving pain with P value in both the cases being <0.0001. The percentage change in pain after treatment for cupping group was observed as 46.37% while Group B had 43.055%. The comparable percentage change was 3.32% higher with Group A **Morning stiffness response in each group:** The effect of both the cupping and acetaminophen was significant with P value in both the cases being <0.0001. The percentage change for cupping group was observed as 49.09% while Group B had 42.30%. The comparable percentage change was 6.79% higher with Test Group A **Disability response in each group:**	**Reviewer comments** Poorly reported RCT. Outcomes are not measured in a standard, valid and reliable way – Example: Pain scale G1- no pain, G2 – Aching intermittent pain, G3 - Constant severe pain, G4 - Pain with restricted movement, G5 - Movement difficult without assistance, Movement disability scale G1 - No movement disability, G2 - Occasional movement disability, G3 - Disability in flexion, G4 - Disability while climbing, G5 - Disability while walking. Small number of participants, nil power

Study	Methodology	Results	Comments and evidence level
Funding **Nil**	**Style of acupuncture:** Cupping therapy - Basic Cupping therapy equipment was utilized including a hand suction pump, plastic cups of the same size and anti-septic tools **Intervention. (Group A)** **- Number of cups per subject per session:** Not reported **- Names of points used:** vastus lateralis, vastus intermedius, tibialis anterior and biceps femoris insertion laterally, medially it was done on tendons of Sartorious, gracilis and semitendinosus inferiorly and superiorly on vastus medialis **- Depth of insertion:** N/A **- Response sought:** Not reported **- Needle stimulation:** N/A **- Retention time:** 15 min **Treatment Regimen** **- Number of treatment sessions:** 11 **- Frequency and duration:** Cupping was done on 0-6th day; 9-11th day and 14th day **Other components of treatment** Nil **Practitioner qualifications and background** Not reported **Control or comparator interventions. (Group B)** Acetaminophen 650 mg thrice a day orally	The effect of both the cupping and acetaminophen was significant with P value in Group A <0.0010, whereas in Group B was = 0.0248. The percentage change for cupping group was observed as 40.42% while Group B had 21.42%. The comparable percentage change was 19% higher with Group A. **Adverse effects** - Blister formation n=5 - Echymosis n=7 - Five volunteers dropped out because of excessive pain	calculation. Unable to determine randomisation method. No intention to treat analysis. 30 patients consented to take part in the study, however, only 20 completed the trial. **Grade:** LQ (-) **Quality**: 1-
Zhang, Y, Bao, F, Wang, Y, Zhihong, W **Influence of acupuncture in treatment of knee osteoarthritis and cartilage repairing** **2016** Research question **What is the effectiveness of acupuncture and physiotherapy on knee OA?**	**Participants** n=50 (100 knees) 12 males, 38 females Inv age: 54.38 +/- 8.05 Duration of condition: Inv – 6.9 +/- 5.65 years **Inclusion:** - Age: 30-80 years old - Clinically diagnosed as having knee OA by experienced orthopaedist according to the OA criteria proposed by American College of Rheumatology in 1995 **Exclusion:** - Acute knee injury - Had ever accepted therapy as hormone or injection in articulation cavity	**Patient-reported outcomes:** WOMAC total: Baseline – Inv: 34.44 +/- 22.38 4th weekend - Inv: 13.63 +/- 12.06 Baseline – Con: 35.7 +/-20.58 4th weekend – 24.11 +/- 16.6 Significant difference at 4th weekend compared with physiotherapy group WOMAC pain: Baseline – Inv: 6.96 +/- 4.25 4th weekend - Inv: 2.71 +/- 2.32 Baseline – Con: 7.41 +/- 4.33	**Reviewer comments** Adequately conducted prospective, randomised controlled trial. Well reported according to Revised Standards for Reporting Interventions in Clinical Trials of Acupuncture (STRICTA) and New Standard International Acupuncture Nomenclature. No power calculation conducted. No intention-to-treat analysis performed. Small sample size and small period of observation limits confidence of results.

Study	Methodology	Results	Comments and evidence level
Funding **Supported by Traditional Chinese Medicine Science & Technology Research Program (No. 0607LP01) and National "Twelfth Five-Year" Plan for Science & Technology Support Program (No. 2012BAI10B02), which was respectively funded by State Administration of Traditional Chinese Medicine and National Natural Science Foundation of China**	- Had ever accepted treatment as oral medicine, physiotherapy, acupuncture or massage during the past three months - Anyone with cardiac pacemaker or any metal object in body - Other severe diseases such as heart, lung, liver, kidney or cerebrum failure, tumors, gastrointestinal hemorrhage and so on - Pregnant or lactating woman - Anyone unable to tolerate or cooperate with treatment **Style of acupuncture:** EA **- Treatment Rationale:** TCM **- Treatment variation:** Standardised routine **Intervention:** EA **- Number of needles inserted per subject per session:** 12 **- Names of points used:** EX-LE4 Neixiyan, EX-LE5 Waixiyan, EX-LE2 Heding, SP10 Xuehai, SP11 Jimen, ST34 Liangqiu and ST36 Zusanli **- Depth of insertion:** 0.8-3.5 cm **- Response sought:** De qi **- Needle stimulation:** EA - the needles in EX-LE4 and EX-LE5 were connected with electric acupuncture apparatus (KWD-808II Multi-Purpose Health Device, Yingdi®, Changzhou, China), and continuous wave was selected with the stimulation of 20 HZ frequency and tolerated current strength by participants **- Needle retention time:** 20 mins **- Needle type:** Disposable stainless-steel acupuncture needles (0.30 × 40 mm, Hanyi®, Tianjin Huahong medical Co. Ltd., Tianjin, China) **Treatment Regimen** **- Number of treatment sessions:** 28 **- Frequency and duration:** 1 x daily for 4 weeks **Other components of treatment** Nil reported **Practitioner qualifications and background** Acupuncturists with practice experience of over twenty years **Control or comparator interventions** Physiotherapy group received physiotherapy treatment five times a week for four weeks. The treatment was given for 30 min each time. K824 Computer Intermediate Frequency Therapy Apparatus (Xiangyun®, Beijing, China) was used to give the No.9 prescription which alternately output sine, triangular and exponential wave with 3000 HZ intermediate frequency and 0.5-120 HZ low	4th weekend – 4.00 +/- 3.09 Significant difference at 4th weekend compared with physiotherapy group WOMAC stiffness: Baseline – Inv: 2.38 +/- 1.7 4th weekend - Inv: 0.83 +/- 0.95 Baseline – Con: 2.43 +/- 1.53 4th weekend – 1.78 +/- 1.15 Significant difference at 4th weekend compared with physiotherapy group WOMAC physical function: Baseline – Inv: 23.75 +/- 15.83 4th weekend - Inv: 9.58 +/- 8.43 Baseline – Con: 24.46 +/- 14.22 4th weekend – 17.37 +/- 11.99 Significant difference at 4th weekend compared with physiotherapy group **Adverse effects** Both acupuncture and physiotherapy were well tolerated in this study, and all the participants completed the trial except three for their personal reasons.	**Grade:** AQ (+) **Quality**: 1

Study	Methodology	Results	Comments and evidence level
	frequency. The maximum stimulation was given to participants based on their tolerance. Silica gel electrodes were put on the pain points around knee		
Kizhakkeveettil, A, Rose, K, Kadar, G & Hurwitz, L **Integrative Acupuncture and Spinal Manipulative Therapy Versus Either Alone for Low Back Pain: A Randomized Controlled Trial Feasibility Study** **2017** Research question **What is the feasibility of conducting a large-scale RCT examining whether an integrative care model combining spinal manipulative therapy and acupuncture can lead to better outcomes for LBP than either therapy alone?** Funding **Funding for this study was provided by SCU and Parker College of Chiropractic research grants. No conflicts of interest were reported for this study**	**Participants** n=101 Low back pain Duration: 60 days Age: mean 40.8 (14.9) Sex: Male, 56 (56%), Female, 44 (44%) **Inclusion:** - Participants who were 18 years of age or older and had a current episode of LBP **Exclusion:** - Candidates who had received chiropractic or acupuncture treatment within the previous 6 months, or those with the following: visceral, systemic, or joint inflammatory disease; referred pain to the back or pelvis; non-mechanical LBP; history of low back surgery, osteoporosis, spondylolisthesis, coagulation disorder, or use of anticoagulant medication; prolonged use of systemic corticosteroid medication; progressive unilateral lower limb muscle weakness; symptoms or signs of cauda equina syndrome (eg, bowel or bladder dysfunction); severe concurrent illness (eg, cancer, heart diseases, psychiatric disorders); and known pregnancy **Style of acupuncture:** Treatment involved acupuncture needling, moxibustion, electrical acupuncture (EA), Tui Na, and cupping **- Treatment Rationale:** TCM **- Treatment variation:** Standardised routine **Intervention** Needling, moxibustion, EA, Tui and cupping **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** **- Depth of insertion:** 10-30mm **- Response sought:** Not reported **- Needle stimulation:** Manual stimulation, 5-20 seconds **- Needle retention time:** 30 mins **- Needle type:** stainless steel, sterilized Seirin J type (Seirin America, Weymouth, MA) with guide tubes (Needles were 0.25 mm, in thickness and either 30 mm or 40 mm in length **Treatment Regimen** **- Number of treatment sessions:** Not reported but over a 60-day period **- Frequency and duration:** 30-40 min visit,	**Roland Morris LBP disability score** Acupuncture 10.8 (5.6) SMT 11.1 (6.0) Integrative 9.7 (6.4) **Numeric rating scale (NRS) 0-10** **Current LBP (0-10 NRS)** Acupuncture 4.2 (2.2) SMT 4.5 (2.1) Integrative 4.2 (2.1) **Typical LBP last wk (0-10 NRS)** Acupuncture 5.3 (2.1) SMT 5.0 (1.9) Integrative 5.5 (1.9) **Lowest LBP last wk (0-10 NRS)** Acupuncture 2.8 (1.7) SMT 2.9 (1.9) Integrative 2.5 (1.9) **Highest LBP last wk (0-10 NRS)** Acupuncture 7.0 (2.1) SMT 6.8 (2.0) Integrative 7.3 (1.7) **Missed days last week because of LBP** Acupuncture 0.2 (0.5) SMT 0.2 (0.8) Integrative 0.4 (1.3) **SF-36 Physical function** Acupuncture 77.7 (20.6) SMT 74.6 (24.7) Integrative 73.8 (25.4) **SF-36 Mental health**	**Reviewer comments** Participants and providers were not blinded to the assigned treatment intervention, which reduces the overall quality of the RCT due to high risk of bias. Also, no concealment methods were reported, which adds to the high levels of bias, but also reduced the statistical significance of results. No power calculations were conducted which can limit the reliability the dedicated chosen sample being right for the trial. In addition, due to this study being a single site design, findings were not able to be generalised to other settings and populations. This along with the 20% loss of participants to follow-up reduced to integrity of the results. **Grade:** 1- **Quality**: LQ (-)

Study	Methodology	Results	Comments and evidence level
	Other components of treatment Nil reported **Practitioner qualifications and background** Licensed doctors of chiropractic and acupuncturists with more than 5 years of experience **Control or comparator interventions** - 15-20 min visits for 60 days - Spinal manipulative therapy (SMT) - Integrative acupuncture group	Acupuncture 74.2 (16.7) SMT 78.1 (15.1) Integrative 71.9 (23.4) **Adverse effects:** No adverse events were reported by participants in any of the 3 treatment groups	
Glazov, G, Yelland, M & Emery, J **Low-dose laser acupuncture for non-specific chronic low back pain: a double-blind randomized controlled trial** **2014** Research question **What is the analgesic effect of infrared laser acupuncture on pain and disability in the treatment of chronic low back pain?** Funding **Commonwealth Government of Australia; PHCRED bursary awarded in 2008**	**Participants** n=144 Chronic NSLBP Duration of pain – Median 10 years **Inclusion:** - Participants had chronic non-specific LBP with duration of at least 3 months, and were aged 18–75 years - English literate and non-pregnant - Baseline pain over the previous week was ≥3.0 on a numerical rating scale, with maximal pain located between the 12th rib and gluteal fold **Exclusion:** - Fibromyalgia - Regular opioid analgesics (≥2 times a week) or opioid patches - Disability support pension for back pain, current worker compensation or motor vehicle insurance claim - Any form of acupuncture for musculoskeletal problems in previous 6 months - Previous involvement in an acupuncture trial - Previous injections for back pain such as facet joint blocks, nerve root or epidural steroid injection within previous year - Previous lumbar spine surgery **Style of acupuncture:** Western **- Treatment Rationale:** Western anatomical approach to acupuncture **- Treatment variation:** Varied per subject **Intervention** 1. Low dose: laser 'on' with 10 s (0.2 J) stimulation given per point	**Pain response in each group:** NPRS: (0-10) <u>Baseline</u> Sham: 4.9 (48, 1.4) Low dose: 4.9 (48, 1.5) High dose: 5.3 (48, 1.6) <u>1 week</u> Sham: 3.8 (48, 2.3) Low dose: 3.2 (48, 1.7) High dose: 3.7 (48, 1.9) <u>6 weeks</u> Sham: 3.4 (46, 2.1) Low dose: 3.7 (46, 2.2) High dose: 4.1 (47, 2.4) <u>6 months</u> Sham: 4.0 (39, 2.7) Low dose: 3.7 (44, 2.3) High dose: 4.4 (44, 2.4) <u>1 year</u> Sham: 3.7 (42, 2.2) Low dose: 3.5 (40, 2.3) High dose: 3.9 (45, 2.0) **Disability outcomes in each group:** ODI <u>Baseline</u> Sham: 26 (47, 12)	**Reviewer comments** Well conducted and reported double-blind sham laser controlled trial. Trial registration occurred. The participants, therapists and data entry personnel remained blind to treatment allocation. Gold standard randomisation used. Intention to treat analysis conducted. Multiple exclusion criteria (patients on disability support, regular users of any opioid and with previous back surgery or spinal injections) that may have reduced the external validity of this trial. Good follow up rate of 90% at 12 months for the whole group. Placebo effect and Hawthorne effect evident from the use and results of the sham group. **Grade:** HQ (++) **Quality**: 1+

Study	Methodology	Results	Comments and evidence level
	2. High dose: laser 'on' with 40 s (0.8 J) stimulation given per point 3. Sham: laser 'off ' with 10 or 40 s (0 J) stimulation given per point **- Number of points used per subject per session:** Average of 9 points used per session **- Names of points used:** Frequently used points were situated on acupuncture lines which traversed the low back area in the midline (Governing Vessel meridian), paramedially (Bladder meridian) and laterally (Gall Bladder meridian) comprising 13%, 37% and 13%, respectively of all points used. Points on other meridians, ah shi points (unclassified tender points) and Extraordinary points comprised 16%, 14% and 7% of total **- Depth of insertion:** N/A **- Response sought:** Not reported **- Needle stimulation:** Laser (20 mW, 840 nm diode, power density 0.1 W/cm2) **- Needle retention time:** 15 minutes **- Needle type:** Ga-Al-As infrared laser diode (830 nm) with power output of 20 mW and power density at probe skin interface of 0.1 W/cm2 **Treatment Regimen** **- Number of treatment sessions:** 8 max **- Frequency and duration:** 1 x weekly for 8 weeks **Other components of treatment** All patients continued with their usual therapies and analgesics according to their pain, but were requested not to start any acupuncture during the year of follow-up. No cointervention was used except for general support and information provided as part of each session **Practitioner qualifications and background** All therapists were experienced GPs and members of AMAC **Control or comparator interventions** Sham (0 joules/point), low dose (0.2 J/point) and high dose (0.8 Joules/point)	Low dose: 27 (48, 12) High dose: 27 (47, 12) <u>1 week</u> Sham: 22 (40, 12) Low dose: 23 (45, 12) High dose: 22 (43, 11) <u>6 weeks</u> Sham: 22 (45,13) Low dose: 23 (46, 13) High dose: 24 (45,15) <u>6 months</u> Sham: 22 (40, 13) Low dose: 24 (45, 15) High dose: 23 (43, 13) There was no significant difference between groups for pain or disability (ODI) score at any other time point. All three treatment groups showed reduction in pain and ODI scores across all time points ($p<0.0005$). In the cohort there was a clinically significant 28% reduction in pain immediately after treatment, maintained at 26% at 1 year. There was only an approximate 4% reduction in mean ODI scores in the whole cohort, which was maintained at 6 months. **Adverse effects** One subject pulled out due to an exacerbation of pain. In the whole cohort there was a flare-up of backpain in the week following 28% of treatments and some other adverse effect after 25% of treatments. However, there was no significant difference in the frequency of flare of pain or other adverse effects between treatment groups.	
Zhong, M & Wu, S **Clinical observation of triple needling combined with traction for treatment of lumbar intervertebral disc herniation** **[Chinese]**	**Participants** n=66 Lumbar intervertebral disc herniation **Inclusion:** - meeting the mentioned diagnostic standards - complete sufficient number of treatments - fulfill the doctor's requests to complete the various surveys	**Pain response in each group:** Not reported **Functional outcomes in each group:** JOA score Intervention: - Baseline: 13.45 +/- 1.64 - After treatment: 22.24 +/- 3.81	**Reviewer comments** Randomised controlled trial reported in Chinese.

Study	Methodology	Results	Comments and evidence level
2013 Research question **What is the effect of triple needling combined with traction for the treatment of lumbar intervertebral disc herniation?** Funding **Not mentioned**	**Exclusion:** - huge intervertebral disc herniation, accompanied by Cauda Equina suppression symptoms, severe spinal canal stenosis, having severe osteophyma - having severe cardiovascular, liver, kidney, hemopoietic system, or mental diseases - pregnant or post-natal women - having malignant tumor, tuberculosis, fracture or acute infection **Style of acupuncture:** Acupuncture **- Treatment Rationale:** TCM **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Major point: A shi, jia ji Other points depending on the symptoms: If showing blood stasis, ge yu; weak kidney, shen yu; Cold and wet: yao yu - **Depth of insertion** 1-1.5 inch, after de qi, 0.5 inch left and right side, angle acupuncture Ge yu angle 0.5 inch, Shen yu vertical 1-1.5 inch, Yao yu upward angle 0.5-1 inch **- Response sought:** First the points that feel radiating pain upon pressure is located, after the needling, and de qi, at 0.5 inch left and right of a shi, a needle was applied at an angle **- Needle stimulation:** Nian zhuan xie method **- Needle retention time:** 30 mins **- Needle type:** Hanyi brand disposable sterile needles **Treatment Regimen** **- Number of treatment sessions:** 5 **- Frequency and duration:** 1 x every 2 days for 10 days **Other components of treatment** Traction treatment **Practitioner qualifications and background** Not mentioned **Control or comparator interventions** Traction	Control: - Baseline: 13.67 +/- 2.16 - After treatment: 20.03 +/- 4.63 Significant difference between groups ($p<0.05$) **Patient-reported outcomes:** Not reported **Adverse effects** Not mentioned	

Study	Methodology	Results	Comments and evidence level
Gazi, M, Issy, A, Avila, I, & Sakata, R **Comparison of Acupuncture to Injection for Myofascial Trigger Point Pain** **2011** Research question **What is the analgesic effect of acupuncture compared to trigger point injection combined with cyclobenzaprine chlorhydrate and sodium dipyrone?** Funding **Not reported**	**Participants** n=30 Myofascial pain syndrome > 3 months Duration: mean 28.7 months Age: ranging from 18-65 y.o **Inclusion:** - Patients diagnosed with myofascial pain syndrome established via history and physical examination - The symptoms and physical findings were: local tenderness, trigger points, referred pain, taut bands, muscle shortening, and limited motion - Patients with pain rating > 3/10 **Exclusion:** - Patients with disk herniation, fibromyalgia, osteoarthritis, vertebral collapse, TMJ dysfunction, infection, cancer, coagulopathy, psychiatric disease, and cognitive disorder - Patients who had used any type of analgesic or muscle relaxant agent 15 days before the study and those taking anticoagulants **Style of acupuncture:** Classical trigger point acupuncture with electrical stimulation **- Treatment Rationale:** TCM **- Treatment variation:** Standard routine **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** SI3, BL62, GB41, TW5, GB20, GB21, BL10, BL11, TW15, BL23, BL24, BL25, GB25, SI12, SI13, and SI14 **- Depth of insertion:** 10 to 25 mm, deep enough to penetrate the body of the muscle mass **- Response sought:** tingling sensation (known as teh-chi) associated with the stimulation of the classic point was obtained as a condition sine qua non of successful treatment **- Needle stimulation:** moved in a twirling fashion until a painful stimulus was obtained, EA: High-frequency electrical stimulation (20 Hz) was evoked with the help of Multiple Electronic Acupunctoscope (Chinese WQ10DI) **- Needle retention time:** 15 minutes **- Needle type:** Stainless steel spring handle single PKG size 0.25 x 40 acupuncture needles with tube **Treatment Regimen** **- Number of treatment sessions:** 8 **- Frequency and duration:** 2 x weekly for 4 weeks	**Pain response in each group:** NPRS: (0-10) <u>Before treatment:</u> Injection: 5.8 +/- 1.8 (4.7–6.8) Acupuncture: 5.8 +/- 1.4 (5.0–6.6) <u>After 4 weeks</u> Injection: 0.93 +/- 1.4 (0.1–1.7) Acupuncture: 1.9 +/- 2.1 (0.7–3.1) - Both groups experienced a significant reduction in pain intensity 4 weeks after treatment - No significant difference between groups at 4 weeks after treatment **Functional outcomes in each group:** Nil utilised **Patient-reported outcomes:** SF-36 - Functional capacity <u>Before treatment:</u> Injection: 67.6 +/- 28.0 (52.1–83.2) Acupuncture: 70.0 +/- 16.1 (61.0–78.9) <u>After 4 weeks</u> Injection: 86.0 +/- 16.5 (76.8–95.1) Acupuncture: 82.3 +/- 13.6 (74.8–89.9) - Both groups experienced a significant improvement - No significant difference between groups at 4 weeks after treatment SF-36 - Pain <u>Before treatment:</u> Injection: 47.2 +/- 14.9 (38.9–55.5) Acupuncture: 44.2 +/- 14.1 (36.3–52.0) <u>After 4 weeks</u> Injection: 65.6 +/- 15.0 (57.3–74.0) Acupuncture: 59.3 +/- 16.1 (50.3–68.3) SF-36 – Mental health <u>Before treatment:</u> Injection: 61.1 +/- 17.7 (51.2–0.9) Acupuncture: 50.9 +/- 14.9 (42.7–59.2) <u>After 4 weeks</u> Injection: 75.5 +/- 14.4 (67.2–83.2)	**Reviewer comments** Adequately conducted RCT. Very small sample size. Convenience sampling impacts generalisability of results. Sample consisted mainly of women and patients below the age of 50, which is inconsistent with published literature. Study design had the inability to blind subjects to group allocation as the treatments differ significantly. The 2 intervention methods have not been compared with placebo, the improvement could be because of physiotherapy or, in 1 group, the analgesic and muscle relaxant. The conclusion of the study is limited by the short follow-up time. **Grade:** AQ (+) **Quality**: 1

Study	Methodology	Results	Comments and evidence level
	Other components of treatment All patients received guidance from a physiotherapist in performing stretching exercises of the muscle groups 4 times a day for 10 to 15 minutes as soon as the pain symptoms improved **Practitioner qualifications and background** Physician: specialist in acupuncture in the pain clinic with > 15 years' experience **Control or comparator interventions** Patients were submitted to a trigger point injection of 0.25% bupivacaine without epinephrine (1 mL/point) twice a week in combination with 10 mg cyclobenzaprine chlorhydrate administered at night and 500 mg oral sodium dipyrone every 8 hours for 4 weeks. The needles used for trigger point injection were 1.5 in .22 gauge	Acupuncture: 68.4 +/- 19.0 (57.9–79.0) - Significant improvement in QOL scores for the domains of pain and mental health in the 2 groups, whereas no difference between the 2 groups were observed after treatments **Adverse effects** Injection group: - Sleepiness n=6 - Local pain n=3 - Dry mouth n=2 Acupuncture groups: - Local pain n=1 - Lipothymia n= 1 - Epigastralgia n=1	
Segura-Ortí, E, Prades-Vergara, S, Manzaneda-Piña, L, Valero-Martínez, J & Polo-Traverso, J **Trigger point dry needling versus strain–counterstrain technique for upper trapezius myofascial trigger points: a randomised controlled trial** **2016** **Research question** **What are the differences in the effects of upper trapezius trigger point dry needling and strain–counter strain techniques versus sham strain-counter strain technique** **Funding** **Not reported**	**Participants** n= 39 Mean age years (SD), Dry needling - 30.0 (9.5) Strain counter strain - 34.1 (11.5) Sham strain counter strain - 32.9 (9.5) **Inclusion:** - Presence of active symptomatic MTPs in the upper trapezius - Participants suffering from neck pain **Exclusion:** - Medical diagnosis of fibromyalgia - Spinal radicular findings - Blood coagulation disorders - Chronic pain syndrome - Cancer, allergies, aversion to needles - History of cervical spine or shoulder surgery within the preceding 3 years - Use of anticoagulants, opioids or antiepileptic medications - Daily alcohol intake over 27.4 g for men or 13.7 g for women, and pregnancy **Style of acupuncture:** Dry needling **Treatment Rationale:** Not reported **Intervention** *Group A: 1 weekly session, 3-week period*	**VAS (0-100mm)** Dry needling Pre-mean (SD) - 36.2 (22.5) Post mean (SD) - 17.7 (14.7) SCS Pre-mean (SD) - 46.9 (20.9) Post mean (SD) - 18.6 (10.3) Sham SCS Pre-mean (SD) - 34.2 (17.5) Post mean (SD) - 12.3 (9.3) * no significant differences *P value time x treatment 0.638* *P Value time - <0.001* **VAS elicited pain (0-100mm)** Dry needling Pre-mean (SD) - 55.1 (14.9) Post mean (SD) - 43.2 (22.5) SCS Pre-mean (SD) - 64.7 (17.5) Post mean (SD) - 45.7 (16.0) Sham SCS Pre-mean (SD) - 75.0 (8.4) Post mean (SD) - 50.6 (28.3) * no significant differences	**Reviewer comments** Generally, a well reported RCT, using relevant statistical data and outcome measures in a reliable and valid way in order to assess the research question. Adequate concealment methods were used, as well as appropriate blinding and randomisation to ensure biases were kept to a minimum. Having said this, the study did not receive a high-quality grade due to potential attrition bias of 50%, as a result of there being no outcome data available for participant drop outs. In addition, sample size was fairly small, which limited the ability to determine effect between the different groups. **Grade:** AQ (+) **Quality:** 1

Study	Methodology	Results	Comments and evidence level
	- Details: Dry needling **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Not reported **Depth of insertion:** Not reported **- Response sought:** Local twitch response **- Needle stimulation:** **- Needle retention time:** Not reported **- Needle type:** Stainless steel acupuncture needles (0.25 diameter, 25 mm length) **Treatment Regimen** **- Number of treatment sessions:** Once weekly **- Frequency and duration:** over a total of 3 weeks **Other components of treatment:** Not reported **Practitioner qualifications and background** Not reported **Control or comparator interventions** Strain counters strain (group B) and strain counter strain sham (group C) - Number of treatment sessions: twice weekly - Frequency and duration: over a 3-week period	*P value time x treatment 0.503* *P value time <0.001* **Neck disability index** Dry needling Pre-mean (SD) - 7.2 (3.4) Post mean (SD) - 5.8 (4.2) SCS Pre-mean (SD) - 10.2 (7.7) Post mean (SD) - 4.8 (3.1) Sham SCS Pre-mean (SD) - 8.8 (4.0) Post mean (SD) - 7.0 (3.7) * no significant differences *P value time x treatment 0.254* *P value time 0.016* **Adverse effects** Nor reported	
Cerezo-Tellez, E, Torres-Lacomba, M, Fuentes-Gallardo, I, Perez-Munoz, M, Mayoral-Del-Moral, O, Lluch-Girbes, E, Prieto-Valiente, L & Falla, D **Effectiveness of dry needling for chronic nonspecific neck pain: a randomized, single blinded, clinical trial** **2016** Research question **What is the effectiveness of deep dry needling of myofascial trigger points in people with chronic nonspecific neck pain?**	**Participants** n=130 Nonspecific neck pain Duration: mean 28.7 months Age: 48 +/- 15.7 years **Inclusion:** - Chronic nonspecific neck pain had been diagnosed by their primary care doctor - Chronic nonspecific neck pain was diagnosed as cervical pain (with or without radiation) for at least 6 months - Subjects who presented with at least 1 active MTrP in one of the muscles according to the diagnostic criteria established by Simons et al. **Exclusion:** - Neck pain with a known pathological basis (neurological, trauma induced, etc) as the underlying cause of the complaints - Major trauma documented from the medical history, pregnancy, widespread pain, inflammatory, hormonal, and neurological disorders, tendinopathy in the	**Pain response in each group:** VAS: (0-10) Before treatment: Intervention: 5.1 +/- 1.6 Control: 5.1 +/- 1.4 Follow up after 2 sessions (1 weeks) Intervention: -3.73 +/- 0.22 Control: -1.06 +/- 0.16 MD: 2.67 (2.14-3.20) P= 0.00000 Follow up after 4 sessions (2 weeks) Intervention: -4.81 +/- 0.2 Control: -1.57 +/-0.17 MD: 3.24 (2.72-3.77) P=0.00000 Follow up after 6 months	**Reviewer comments** Well conducted randomised, parallel-group, blinded, controlled clinical trial. Adequate randomisation method. Trail was registered prior to being conducted. Comprehensively reported RCT. Conflicts of interest declared. Power calculation conducted. Extended follow up times up to 6 months. Treatment time was slightly different between groups as the subjects in the DDN group received an additional procedure and spent more time with the physical therapist than did the subjects in the control group, possibly contributing to a placebo effect thus influencing outcomes. **Grade:** AQ (+)

Study	Methodology	Results	Comments and evidence level
Funding **Physiotherapy in Women's Health Research Group of the Physical Therapy Department at Alcala´ University, Madrid provided material required for the study and the Primary Healthcare Regency and Primary Healthcare Centre Juan de Austria provided facilities to develop the study**	upper extremities, severe psychiatric illness, or if the subject was unable to speak or write Spanish to complete the questionnaires - Participants using anti-inflammatory, analgesic, anticoagulant, muscle relaxant, or antidepressant medication 1 week before the study commenced, had fibromyalgia syndrome, or had any contraindication to conservative or invasive physiotherapy (infection, fever, hypothyroidism, wounds in the area of the puncture, metal allergy, cancer or systemic disease, or fear of needles) **Style of acupuncture:** Deep dry needling **Treatment Rationale:** Western **Treatment variation:** Standardised routine **Intervention** **- Number of needles inserted per subject per session:** Dependant on number of TPs **- Names of points used:** Every active MTrP found in trapezius (all 3 divisions), cervical multifidi, splenius cervicis, and levator scapulae muscles **- Depth of insertion:** Not reported **- Response sought:** 4 to 5 local twitch responses **- Needle stimulation:** Multiple rapid insertions of the needle, in and out of the MTrP, in a way similar to Hong's fastin and fast-out technique **- Needle retention time:** NA **- Needle type:** 40 x 0.32mm acupuncture needle with guided tube (ASP. A1040P; Agu-punt S.L. acupuncture–physical therapy, Barcelona) **Treatment Regimen** **- Number of treatment sessions:** 4 **- Frequency and duration:** 2 x weekly for 2 weeks **Other components of treatment** Passive stretching as below **Practitioner qualifications and background** 2 physical therapists with more than 10 years of experience **Control or comparator interventions** Passive stretching: A passive stretch of splenius cervicis, cervical multifidi, levator scapulae, and all 3 divisions of the trapezius muscles was applied whenever they showed active MTrPs. The stretch was applied in the positions described by Simons et al. During the stretch, the physical therapist took up the slack, avoiding pain elicitation, maintaining the tension for 4 seconds, and releasing the tension for 8 seconds; this cycle was repeated 3 times, completing a stretch of 36 seconds. This stretch was repeated 4 times.	Intervention: -4.08 +/- 0.25 Control: -1.6 +/- 0.25 MD: 3.24 (1.77-3.18) P=0.00000 - Statistically significant difference in favour of the intervention group at all follow-ups - The decrease of pain intensity in the DDN group was clinically meaningful **Functional outcomes in each group:** <u>Cervical ROM:</u> - Neck active ROM significantly increased in the DDN group for all movement directions, whereas no significant change was observed for the control group - At all measurement points, apart from baseline, the DDN group showed significantly larger neck ROM compared with that of the control group (95% confidence interval 8.2-19.4; P=0.000001) <u>Neck strength:</u> - At all measurement points, apart from baseline, the DDN group showed significantly greater neck muscle strength compared with that of the control group (95% confidence interval 22.3-36.6; P= 0.000001). - The increase in strength was clinically meaningful at session 2 and 4 and also at 6 month follow up **Patient-reported outcomes:** NDI <u>Follow up after 2 sessions (1 weeks)</u> Intervention -10.5 +/- 2.31 Control: -4.52 +/- 1.44 MD: 5.98 (0.3-11.6) P=0.04 <u>Follow up after 4 sessions (2 weeks)</u> Intervention: -17.3 +/- 2.06 Control: -6.47 +/- 1.77 MD: 11.9 (5.49-16.2) P= 0.0001 <u>Follow up after 6 months</u> Intervention: -18.5 +/- 2.27 Control: -8.43 +/- 1.84 MD: 10.1 (4.4-15.7) P=0.0006 - Mean values decreased significantly (P =0.00001) after treatment in both groups - All the results were clinically meaningful after intervention and at medium (3 months) and long-term follow-up (6 months) for the DDN group as opposed to the control group **Adverse effects**	**Quality**: 1

Study	Methodology	Results	Comments and evidence level
		Soreness and local haemorrhages at the needling site occurred after DDN in some cases, but they resolved within 1 week. No collateral effects or adverse effects were reported by participants or observed by the physical therapist after DDN	
MacPherson, H, Tilbrook, H, Richmond, S, Woodman, J, Ballard, K, Atkin, K, Bland, M, Eldred, J, Essex, H, Hewitt, C, Hopton, A, Keding, A, Lansdown, H, Parrott, S, Torgerson, D, Wenham, A & Watt, I **Alexander Technique Lessons or Acupuncture Sessions for Persons with Chronic Neck Pain** **2015** Research question **What is clinical effectiveness of Alexander Technique lessons or acupuncture versus usual care for persons with chronic, nonspecific neck pain?** Funding **Arthritis research UK**	**Participants** n=517 Chronic neck pain Duration of pain – Median 6 years Mean age: 53.2 years **Inclusion:** - Persons with neck pain > 3 months and a score of > 28% on the Northwick Park Questionnaire (NPQ) for neck pain and associated disability, and no serious underlying pathology - Aged > 18 y.o **Exclusion:** - Serious underlying pathology - Prior cervical spine surgery - History of psychosis - Rheumatoid arthritis, Ankylosing spondylitis and Osteoporosis - Hemophilia, Cancer, HIV or hepatitis - Current or recent alcohol or drug dependency - Actively pursuing compensation or with litigation pending - Unable to communicate in English - Participation in another clinical trial that might interfere with the current study - Currently receiving acupuncture for neck pain - Attendance at 1-to-1 Alexander Technique lessons in the past 2 years **Style of acupuncture:** TCM **- Treatment Rationale:** Experience from the pilot study combined with a consensus process involving participating acupuncturists provided a framework for a treatment protocol for a pragmatic trial designed to evaluate acupuncture as provided routinely to patients with chronic neck pain **- Treatment variation:** Individualized treatments were given by 18 acupuncturists who among them provided 1770 treatments to 160 participants. The acupuncturists documented the theoretical frameworks of traditional Chinese medicine that guided the treatment for each patient **Intervention** **- Number of points used per subject per session:** On average, 14 needles were inserted per session (range, 5–35) **- Names of points used:** In total, 259 different points were used, with 25696 points used across all sessions. The most commonly used points were GB-20, GB-21, LI-4, LIV-3, BL-10, SP-6, and SI-3, which were used within a course of treatment on 95%, 89%, 65%, 63%, 57%, 54%, and 53% of participants, respectively	**Pain response in each group:** Pain intensity (0-8) - Text Message Pain Scores: - 365 (70.6%) consented to receive and send text messages; 347 returned pain ratings, with a median of 17 text messages per participant - Standard effects with acupuncture and Alexander lessons versus usual care alone were significant (P < 0.001) and moderate in size (0.60 and 0.46, respectively). **Patient reported outcomes in each group:** NPQ <u>Baseline</u> Acupuncture: 39.64 (9.71) Alexander technique: 39.38 (11.91) Usual care: 40.46 (11.60) <u>Acupuncture vs usual care</u> <u>3 months</u> Acupuncture: 37.23 (30.35 to 44.11) Usual care: 43.46 (35.40 to 51.52) MD: −6.22 (−8.75 to −3.70) P value: <0.001 <u>6 months</u> Acupuncture: 35.35 (28.73 to 41.96) Usual care: 40.90 (32.94 to 48.87) MD: −5.56 (−8.33 to −2.78) P value: <0.001 <u>12 months</u> Acupuncture: 37.07 (30.35 to 43.79) Usual care: 40.99 (33.01 to 48.96) MD: −3.92 (−6.87 to −0.97) P value: 0.009 <u>Alexander technique vs usual care</u> <u>3 months</u> Alexander technique: 38.62 (31.62 to 45.61) Usual care: 42.22 (34.07 to 50.37) MD: −3.60 (−6.08 to −1.13) P value: 0.004 <u>6 months</u>	**Reviewer comments** 3-group, parallel, open, pragmatic, randomised, controlled trial with 1:1:1 allocation. The trial was informed by a pilot study and followed a published protocol. Power calculations conducted. Thoroughly reported. Details of the acupuncture treatment reported based on the reporting guidelines of STRICTA. Intention to treat analysis conducted. **Grade:** AQ (+) **Quality**: 1

Study	Methodology	Results	Comments and evidence level
	- Depth of insertion: Practitioners provided information on the range of depths used, with mode of the shallowest at 0.5 cm and mode of the deepest at 1.0 cm **- Response sought:** The needle response sought varied; most commonly, de qi was sought by 90% of acupuncturists **- Needle stimulation:** The most commonly used method of needle stimulation was the even method (used by 39% of acupuncturists), followed by a mix of Tonifying, Even, and Reducing methods (28%) **- Needle retention time:** Median needle retention time was 20 min (range, 1–60 min) **- Needle type:** Needles were stainless steel (100%); length of needle commonly ranged from 15–40 mm, and needle diameter commonly ranged from 0.16–0.25 mm **Treatment Regimen** **- Number of treatment sessions:** Participants were offered 12 sessions and completed an average of 10 sessions (median, 12; range, 0–12); 72% (125/173) attended all 12 acupuncture sessions; 6% (11/173) attended none. Discontinuations from acupuncture were low and evenly spread over the course of the 12 sessions **- Frequency and duration:** Average period over which sessions were delivered was 18 wk. Average duration of overall contact time per individual session was 53 min. Appointment scheduling involved both the acupuncturist's discretion and the participant's preference **Other components of treatment** Acupuncturists were allowed to use moxibustion, electroacupuncture, ear seeds, cupping, acupressure (brief and no more than 10 min), and heat lamps. Most commonly used were acupressure (used at least once with 68% of patients), cupping (26%), heat lamp (25%), moxa (24%), and EA (4%). Acupuncturists were allowed to provide acupuncture theory–based lifestyle advice. In total, 84% of participants received lifestyle advice, most commonly related to exercise (45%), relaxation (37%), diet (34%), and rest (29%). Advice unrelated to acupuncture theory, as well as herbs and magnets, was proscribed **Practitioner qualifications and background** Practitioners were members of the British Acupuncture Council, with >3 y post qualification experience and commitment to continuing professional development. Selection of acupuncturists was by invitation to those practicing within close proximity to the participating primary care practices. Selected practitioners were 83% female and had been in practice a mean of 15 y. Participants were almost all treated by the same practitioner throughout the intervention period. Practitioners treated patients from >1 GP and potentially from >1 practice **Control or comparator interventions**	Alexander technique: 32.65 (25.92 to 39.38) Usual care: 37.64 (29.58 to 45.69) MD: −4.98 (−7.72 to −2.25) P value: <0.001 <u>12 months</u> Alexander technique: 33.39 (26.73 to 40.05): Usual care: 37.18 (29.16 to 45.19) MD: −3.79 (−6.66 to −0.91) P value: 0.010 SF-12v2 – physical component <u>Baseline</u> Acupuncture: 39.99 (9.83) Alexander technique: 39.87 (9.75) Usual care: 40.98 (9.49) SF-12v2 – mental component <u>Baseline</u> Acupuncture: 45.07 (11.00) Alexander technique: 45.63 (12.22) Usual care: 46.59 (10.87) - No significant differences between the interventions and usual care for the physical component score of the SF-12v2 at 6 or 12 months (acupuncture, 0.68 [CI, -1.08 to 2.44] [P = 0.44]; Alexander lessons, 0.38 [CI, -1.54 to 2.30] [P =0.69]), or for the mental component score at 6 months. However, significantly larger improvements in the mental component score occurred in the intervention groups than in the usual care group at 12 months (acupuncture, 1.76 [CI, 0.15 to 3.37] [P = 0.033]; Alexander lessons, 2.12 [CI, 0.42 to 3.82] [P = 0.016]) **Adverse effects** During the trial, a total of 80 adverse events in 73 participants were reported. Thirty events (37%) were classified as serious, and 50 (63%) were classified as non-serious. No reported serious adverse events were considered probably or definitely related to either intervention. Serious or non-serious adverse events categorized as possibly related to acupuncture were bruising, swelling, or numbness; muscle spasms; pain; and respiratory problems. Pain and incapacity, knee injury, and muscle spasms were considered to be possibly related to Alexander lessons; pain and incapacity and complications after surgery were considered to be possibly related to usual care. 3 withdrawals each due to serious adverse events within the acupuncture and Alexander technique groups, with the usual care group having 0 withdrawals	

Study	Methodology	Results	Comments and evidence level
	Participants continued to receive usual care as an adjunct to primary care, NHS hospitals, and private treatment according to need, based on a need to evaluate the effect of acupuncture plus usual care vs usual care alone. Usual care consisted of general and neck pain–specific treatments routinely provided to primary care patients, such as prescribed medications and visits to physical therapists and other health care professionals		
Wen, G, Yan, J & Wu, L **Intensive stimulation tuina at tender points plus medication for cervical intervertebral disc herniation** **2015** Research question **What is clinical efficacy of tuina with intensive stimulation at tender points plus medication in treating cervical intervertebral disc herniation?** Funding **Not reported**	**Participants** n=158 Cervical intervertebral disc herniation Duration: 23.0±14.5 years Age: mean 39.5±10.5 years Affected intervertebral disc: C3-4: n=22, C4-5: n=24, C5-6: n=61, C6-7: n=51 **Inclusion:** - Patients diagnosed with cervical intervertebral disc herniation according to the diagnostic criteria of the Criteria of Diagnosis and Therapeutic Effects of Diseases and Syndromes in Traditional Chinese Medicine stipulated by the State Administration of Traditional Chinese Medicine: major symptoms including dizziness, pain, heaviness, numbness in neck, back and arm; cervical MRI examination showing degeneration and herniation of intervertebral disc, and compression of dural sac or spinal cord - Aged 18 to 65 years' old - Signed the informed consent form **Exclusion:** - The herniated disc is comparatively big, accompanied by paralysis of lower limbs or urinary and fecal incontinence - Aged over 65 or below 18 years old - Presenting hypertension or other severe internal diseases during the intervention; with abnormal imaging findings, but without symptoms of cervical spondylosis - Pregnant women - Those with poor compliance **Style of acupuncture:** Tuina **- Treatment Rationale:** TCM **Intervention** - Location of tender points: Beginning point of trapezius; attachment points of multifidus and spinal rotators of the affected vertebrae; attachment points of splenius capitus and semispinalis capitus at laminae of cervical vertebrae; the endpoint of musculi levator scapulae; trapezius between neck and shoulder	**Pain response in each group:** VAS: (0-10) <u>Pre-treatment:</u> Tuina + medication: 6.98±2.05 Medication: 6.90±1.97 <u>Following treatment (14 days)</u> Tuina + medication: 2.06±0.53 Medication: 3.28±1.15 After treatment, VAS scores dropped markedly in both groups (both P＜0.01), and there was a significant difference between the two groups (P ＜ 0.01), indicating that the improvement of pain in the observation group was more significant than that in the control group **Functional outcomes in each group:** Nil utilised **Patient-reported outcomes:** Nil utilised **Adverse effects** Not reported	**Reviewer comments** Poorly reported RCT which limits interpretation of results. Convenience sampling impacts generalisability of results with subjects being recruited from the Orthopedics Department of Yuhang District No.2 People's Hospital, Hangzhou. Difficult to tell if the assignment of subjects to treatment groups is truly randomised with the reported randomisation method being visit sequence. Those with poor compliance listed as an exclusion criterion. No reporting of patient or therapist blinding. **Grade:** LQ (-) **Quality**: 1-

Study	Methodology	Results	Comments and evidence level
	- The tender points were pressed by the tip of the thumb with the thumb and index finger of the operator opposed to each other, and the force was increased gradually but within the patient's tolerance to reach the profound layer of the muscles - The force was performed perpendicularly to the muscles, tendons or nerves, with a rhythmic pause - The treatment lasted 15-30 s for each tender point **Treatment Regimen** **- Number of treatment sessions:** 14 **- Frequency and duration:** 1 x daily for 14 days **Other components of treatment** Oral administration of Meloxicam tablets, 7.5 mg for each dose, once each day **Practitioner qualifications and background** Not reported **Control or comparator interventions** Oral administration of Meloxicam tablets, 7.5 mg for each dose, once each day		
Zhang, S, Chiu, T & Chiu, S **Long-term efficacy of electroacupuncture for chronic neck pain: a randomised controlled trial** **2013b** Research question **What is the long-term efficacy of EA for chronic neck pain?** Funding **Supported by the Health and Health Services Research Fund, Food and Health Bureau, Hong Kong SAR Government project number: 04060191. The School of Chinese Medicine of Hong Kong Baptist University provided additional funding**	**Participants** n=206 Chronic neck pain Duration: mean 75.4 months Age: mean 45.8 years **Inclusion:** - Adult subjects with chronic mechanical neck pain for ≥3 months **Exclusion:** - Patients with surgery to the neck, neurological deficits, a history of malignancy, congenital abnormality of the spine, systemic diseases, and those treated by acupuncture in the last 6 months **Style of acupuncture:** EA **- Treatment Rationale:** TCM **- Treatment variation:** Standardised routine **Intervention** EA **- Number of needles inserted per subject per session:** 12	**Pain response in each group:** NPRS: (0-10) <u>Pre-treatment</u> EA: 54.7 (50.9-58.4) Sham: 51.6 (47.6-55.7) <u>1 month</u> EA: 50.8 (46.6-54.9) Sham: 46.9 (42.4-51.4) Between group effect: p=0.813 *Non-significant <u>3 months</u> EA: 46.6 (42.2-51.0) Sham: 45.1 (40.5- 49.6) Between group effect: p=0.617 *Non-significant <u>6 months</u> EA: 46.8 (42.0-51.5) Sham: 43.6 (38.8-48.4) Between group effect: p=0.813 *Non-significant Northwick park neck pain questionnaire: <u>Pre-treatment</u>	**Reviewer comments** Well conducted but inadequately reported double-blind, randomised controlled trial. Patients, practitioners, and the assessor were blind to the treatments. No second control arm, in which participants received no treatment, therefore, unable to assess the efficacy of the treatment procedure compared to spontaneous remission. No power calculation conducted. Intention-to-treat analysis was performed. Concealment of electroacupuncture as the real treatment was successful, as the number of subjects who correctly guessed the nature of treatment received was not significantly different in the two groups (P=0.108). All patients suffered from chronic neck pain which limits the generalisability of

Study	Methodology	Results	Comments and evidence level
	- Names of points used: Hegu (LI4, x2), Houxi (SI3, x2), Feng Chi (GB20, x2), Jiangjing (GB21, x2), and Bailao, two additional points could be chosen from tender points or acupuncture points immediately near the tender points **- Depth of insertion:** Not reported **- Response sought:** Not reported **- Needle stimulation:** EA **- Needle retention time:** 45 mins **- Needle type:** Sterile acupuncture needles 25 to 40 mm long with a diameter of 0.25 to 0.30 mm **Treatment Regimen** **- Number of treatment sessions:** 9 **- Frequency and duration:** 3 x weekly for 3 weeks **Other components of treatment** Nil reported **Practitioner qualifications and background** Not reported **Control or comparator interventions** Sham laser acupuncture was delivered via a mock laser pen that only emitted a red light. Each point was treated for 2 minutes, with the pen at a distance of 0.5 to 1 cm from the skin	EA: 40.7 (38.5-42.9) Sham: 41.1(38.7-43.5) <u>1 month</u> EA: 35.1 (32.7-37.6) Sham: 35.7 (32.8-38.6) Between group effect: p=0.791 *Non-significant <u>3 months</u> EA: 32.9 (30.3-35.4) Sham: 33.3 (30.1-36.5) Between group effect: p=0.664 *Non-significant <u>6 months</u> EA: 33.5 (30.7-36.4) Sham: 34.3 (31.1-37.6) Between group effect: p=0.808 *Non-significant **Functional outcomes in each group:** Nil utilised **Patient-reported outcomes:** SF-36 – Physical <u>Pre-treatment</u> EA: 52.5 (51.5-53.4) Sham: 52.7 (51.9-53.6) <u>1 month</u> EA: 52.6 (51.7-53.5) Sham: 53.0 (52.1-53.9) Between group effect: p=0.396 *Non-significant <u>3 months</u> EA: 52.8 (53.0-53.7) Sham: 53.3 (52.4-54.2) Between group effect: p=0.982 *Non-significant <u>6 months</u> EA: 53.0 (52.0-53.9) Sham: 53.2 (52.3-54.0) Between group effect: p=0.559 *Non-significant SF-36 – Mental <u>Pre-treatment</u> EA: 43.8 (42.9-44.8) Sham: 43.7 (42.6-44.8)	results to acute conditions of neck pain. **Grade:** HQ (++) **Quality**: 1

Study	Methodology	Results	Comments and evidence level
		1 month EA: 45.3 (44.2-46.4) Sham: 44.4 (43.3-45.5) Between group effect: p=0.389 *Non-significant 3 months EA: 45.9 (46.0 46.8) Sham: 45.3 (44.2-46.4) Between group effect: p=0.444 *Non-significant 6 months EA: 45.4 (44.5-46.3) Sham: 44.4 (43.4-45.4) Between group effect: p=0.246 *Non-significant **Adverse effects** No severe adverse events were noted Neck pain – 1 x inv, 2 x control Headache – 2 x inv, 1 x control Dizziness – 1 x inv, 1 x control Bruise at acupoints – 2 x inv, 0 x control Pain at acupoint after treatment – 1 x inv, 0 control Chest discomfort after treatment – 1 x inv, 0 control Itching palm after treatment– 0 x inv, 1 x control Warm-feeling at the back after treatment – 0 x inv, 1 x control	
Jiang, G, Lin, M & Wang, L **Comparative study on effect of acupuncture and lidocaine block for lumbar myofascial pain syndrome** **[Chinese]** **2013** Research question **What is the effect of acupuncture and lidocaine block for lumbar myofascial pain syndrome?**	**Participants** n=66 Myofascial pain syndrome **Inclusion:** - Aged between 20 to 60 - Those who signed the consent form **Exclusion:** - Organic disease or other pathological changes, such as lumbar intervertebral disc protrusion, lumbar spinal stenosis, tuberculosis of lumbar spine, lumbar vertebra degeneration, ankylosing spondylitis, lumbar metastatic metastases, lumbar muscle strain, psychalgia - Suffering from severe angiocardiopathy and respiratory disease or those who have allergy history to medicine, acupuncture or injection - Those who are taking other medications treating the disease - Patients who have affective or mental disorder	**Pain response in each group:** VAS Baseline: - Intervention 7.58 +/- 1.0 - Control 7.88 +/- 1.22 3 treatments: - Intervention 4.42 +/- 1.2 - Control 4.52 +/- 4.68 5 treatments: - Intervention 1.45 +/- 1.52 - Control 1.42 +/- 1.54 No significance difference between groups at 3 or 5 treatments (p>0.05) **Functional outcomes in each group:** ODI – Oswestry disability index Baseline:	**Reviewer comments** Randomised controlled trial reported in Chinese.

Study	Methodology	Results	Comments and evidence level
Funding **Not reported**	- Pregnant women - Those who do not cooperate **Style of acupuncture:** Acupuncture **- Treatment Rationale:** TCM **Intervention** **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Jiaji (EX-B 2) plus local needling of MTrPs **- Depth of insertion:** Jiaji point – perpendicular needling 15mm; shen yu, ta ch'ang shu perpendicular 15-25mm; Weizhong, kunlun perpendicular needling 15mm **- Response sought:** Patients report special pleasant feeling radiating from local to relevant areas, the needling then returned to shallow level **- Needle stimulation:** mild reinforcing and attenuating **- Needle retention time:** 20 minutes **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** 5 **- Frequency and duration:** 1 x every 2 days for 5 treatments **Other components of treatment** Not reported **Practitioner qualifications and background** Not reported **Control or comparator interventions** Lidocaine injection at local trigger points	- Intervention 21.18 +/- 7.38 - Control 23.85 +/- 8.28 3 treatments: - Intervention 12.3 +/- 5.26 - Control 12.79 +/- 6.01 5 treatments: - Intervention 5.42 +/- 5.99 - Control 5.06 +/- 5.44 No significance difference between groups at 3 or 5 treatments (p>0.05) **Patient-reported outcomes:** Not reported **Adverse effects** No adverse events reported	
Hsu, C, Lee, K, Huang, H, Chang, Z & Yang, T **Manipulation Therapy Relieved Pain More Rapidly Than Acupuncture among Lateral Epicondylalgia (Tennis Elbow) Patients: A Randomized Controlled Trial with 8-Week Follow-Up**	**Participants** n=25 Lateral epicondylalgia for more than 2 months Duration: 66.91 ± 136.09 weeks Age: Inv - 44.81 ± 7.30 years **Inclusion:** - Patients with lateral epicondylalgia with the follow criteria: (1) aggravation of the lateral elbow pain during wrist extension and relief at rest, (2) tenderness of the lateral epicondyle, and (3) positive Cozen's test - elbow pain for >2 months	**Pain response in each group:** VAS Improved scores were observed in the pain VAS for both daily activity and during work in both groups *Manipulation daily:* baseline: 53.01 ± 21.70 8-week follow-up: 15.97 ± 12.62, $p < 0.001$ *Manipulation work:* baseline: 62.13 ± 16.28 8- week follow-up: 25.01 ± 15.74, $p < 0.00$	**Reviewer comments** Single-centre, prospective, randomized controlled trial. Trail was registered prior to being conducted. Adequate randomisation method. Inadequately reported. No power calculation conducted. Small sample size. Authors reported no conflicting interests. Compared two interventions with no placebo control.

Study	Methodology	Results	Comments and evidence level
2017 Research question **What is the effectiveness of radial bone adjustment therapy compared to acupuncture on pain relief during rest, daily activity, and work in patients with lateral epicondylalgia?** Funding **Not reported**	- unilateral elbow pain - no improvement in the condition despite receiving treatment in previous 4 weeks - Visual analog scale (VAS) score >30 millimetres **Exclusion:** - patients who had central or peripheral nervous system diseases, radial nerve entrapment, inflammatory rheumatic disease, gout, or radiocapitellar osteoarthritis, underwent operation for lateral epicondylalgia, or were pregnant **Style of acupuncture:** Acupuncture **Treatment Rationale:** TCM **- Treatment variation:** Standardised routine **Intervention** **- Number of needles inserted per subject per session:** 6 **- Names of points used:** Ashi point, LI10, LI11, LU5, LI4, and SJ5 **- Depth of insertion:** inserted into the muscle layer **- Response sought:** De qi **- Needle stimulation:** twisting **- Needle retention time:** 25 mins **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** 4 **- Frequency and duration:** 2 x weekly for 2 weeks **Other components of treatment** Nil **Practitioner qualifications and background** Not reported **Control or comparator interventions** Patients in the manipulation group received radial bone adjustment to reverse positional fault and relieve the biceps brachii muscle tension. The physician placed one hand on the patient's elbow and the other hand on the wrist. Then, the physician rotated the radial bone internally and extended the biceps brachii muscle simultaneously. The physician performed the manipulation procedure twice in 1 minute with an interval of 30 seconds.	*Acupuncture daily:* baseline: 51.72 ± 23.04 8-week follow-up: 29.68 ± 21.51, p = 0.002 *Acupuncture work:* baseline: 65.03 ± 25.48 8-week follow-up: 33.57 ± 24.05, $p < 0.001$) No significant changes were observed in pain VAS scores at rest in the acupuncture group during 10-week period (baseline: 35.18 ± 24.36 versus 8-week follow-up: 24.95 ± 18.90, $p = 0.165$). In contrast, significant changes were observed in pain VAS scores during rest in the manipulation group (baseline: 36.81 ± 24.94 versus 8-week follow-up: 13.49 ± 11.62, $p = 0.001$) **Functional outcomes in each group:** <u>Grip strength</u> A significant difference was observed in grip strength (pain- free) at the 8-week follow-up in both groups (acupuncture: baseline: 13.87 ± 7.87 versus 8-week follow-up: 19.50 ± 8.16, $p = 0.002$; manipulation: baseline: 15.20 ± 10.92 versus 8-week follow-up: 19.52 ± 9.67, $p = 0.015$), whereas a significant difference was observed only in the acupuncture group for grip strength (maximum) (acupuncture: baseline: 19.21 ± 9.06, versus 8-week follow-up: 23.17 ± 8.85, $p = 0.005$, versus manipulation: baseline: 21.79 ± 12.10, versus 8-week follow-up: 24.26 ± 10.70, $p = 0.163$) **Patient-reported outcomes:** <u>DASH</u> A significant difference was observed in the DASH questionnaire at the 8-week follow-up in both groups Acupuncture baseline: 33.56 ± 17.26 8-week follow-up: 20.49 ± 9.82, $p = 0.001$ Manipulation: baseline: 31.80 ± 21.49 8-week follow-up: 15.72 ± 12.31, $p < 0.001$) The manipulation group exhibited rapid improvement in functional impairment at the end of treatment (baseline: 31.80 ± 21.49 versus end of treatment 19.78 ± 13.16, $p = 0.001$) **Adverse effects** No serious adverse event was observed in both groups. Light hemorrhage or hematoma was the most common adverse event in the acupuncture group and was treated by compression with an aseptic oral cotton swab. Local pain occurred in the manipulation group; however, it was relieved spontaneously after treatment	**Grade:** LQ (-) **Quality**: 1-
Uygur, E, Aktas, B, Ozkut, A, Erinc, S & Yilmazoglu, E	**Participants** n=92 Age: inv 47.7 years	**Pain response in each group:** *PRTEE pain score* Mean (SD) <u>Pre-treatment</u>	**Reviewer comments** Inadequately reported RCT. Poor inclusion/exclusion criteria. Adequate

Study	Methodology	Results	Comments and evidence level
Dry needling in lateral epicondylitis: a prospective controlled study **2017** Research question **What is the effectiveness of dry needling in terms of pain relief and improvement in functional disability compared to first-line treatment in patients with lateral epicondylitis?** Funding **No funding was received for the study**	**Inclusion:** - patients who had pain at the lateral epicondyle for more than three months and who had pain during forced forearm supination, forced wrist extension, and forced third finger extension on physical examination - direct x-rays of the elbow were obtained to rule out radio-humeral joint arthritis, osteochondritis dissecans, or osteonecrosis **Exclusion:** - patients with cervical radiculopathy or posterior interosseous nerve entrapment **Style of acupuncture:** Dry needling **Treatment Rationale:** Western **- Treatment variation:** Standardised routine **Intervention** **- Number of needles inserted per subject per session:** 5 **- Names of points used:** In the trigger point regions, which were the most painful areas at the lateral epicondyle **- Depth of insertion:** The needles were directed through the skin and fascia to the bone (3–5 mm) **- Response sought:** Not reported **- Needle stimulation:** Rotated three to four times **- Needle retention time:** Left in place for ten minutes **- Needle type:** 0.25 × 25-mm stainless steel needles (Yao Tong, Barcelona, Spain) **Treatment Regimen** **- Number of treatment sessions:** 5 **- Frequency and duration:** 2 x weekly for 5 sessions **Other components of treatment** Patients were not allowed to take any other medication during the trial **Practitioner qualifications and background** Study reports: All interventions were performed by a single, experienced physiotherapist **Control or comparator interventions** The first-line treatment group was given non-steroidal anti-inflammatory drug (ibuprofen 100 mg, 2 twice per day) and a proximal forearm brace for three weeks. Patients were advised to wear their brace continuously, except while sleeping and showering. The patients were told not to use any other treatment,	DN: 30.84 (6.70) Control: 32.43 (11.27) <u>Post treatment</u> DN: 16.03 (5.44) Control: 26.9 (9.46) <u>6th months</u> DN:10.76 (8.94) Control: 34.09 (10.90) Significant difference in favour of DN group post treatment and at 6 month follow up **Patient-reported outcomes:** *PRTEE functional score* Mean (SD) <u>Pre-treatment</u> DN: 60.90 (12.89) Control: 58.95 (16.57) <u>Post treatment</u> DN: 17.05 (6.06) Control: 52.04 (15.95) <u>6th months</u> DN: 10.60 (4.98) Control: 60.17 (14.04) Significant difference in favour of DN group post treatment and at 6 month follow up **Adverse effects** Three patients (5.8%) from the DN group had complications: two patients could not tolerate the pain during the intervention and one had a local haemorrhage	randomisation. Power calculation conducted, however, enrolled participants were less. Not all patients were examined with ultrasonography to determine diagnosis. No prior trial registration. High dropout rate. Lack of quality reporting severely effects generalisability and confidence in study results. **Grade:** LQ (-) **Quality**: 1-

Study	Methodology	Results	Comments and evidence level
	including ice application, topical nonsteroidal anti-inflammatory drugs, or other oral medications		
Michalsen, A, Bock, S, Lu, R, Rampp, T, Baeckerm, J, Bachmann, J, Langhorst, J, Musial, F & Dobosz, G **Effects of Traditional Cupping Therapy in Patients with Carpal Tunnel Syndrome: A Randomized Controlled Trial** **2009** Research question **What is the evidence of short term effectiveness of cupping for treating carpal tunnel syndrome?** Funding **Supported by a grant of the Karl and Veronica Carstens Foundation, Germany**	**Participants** n=52 Duration: Inv mean 49 +/- 49 months Age: mean 58.5 ± 8.0 years - The most frequent treatment, a wrist splint, had been applied in 70% of the patients in each group - The right side of the body was affected in 61.5% of the cupping therapy group and in 57.7% of the control group **Inclusion:** - Patients of both sexes were eligible if they were between 18 and 70 years old and suffered from manifest CTS as confirmed by neurological examination and electroneurography - Only patients who had connective tissue alterations in a predefined zone at the shoulder triangle overlying the trapezius muscle **Exclusion:** - Patients that were receiving anticoagulants or had hemophilia, anemia, polyneuropathy, or a coexisting serious illness - Patients who were participating in another study, had undergone previous surgery for CTS, or had had intra-articular injections within the previous 3 months - Patients regularly taking NSAIDs or analgesics as rescue medication were not excluded if the mean weekly dosage and type of administration had not been altered during the preceding 3 months **Style of acupuncture:** Cupping **- Treatment Rationale:** Western **- Treatment variation:** Standardised routine **Intervention** Cupping The skin overlying the trapezius muscle was disinfected; scarification (puncturing) of the skin was carried out by repeatedly puncturing it superficially with sterile 20-gauge microlancets (number of incisions: 5 to 10); the vacuum cups (size 75 and 100 cm) were applied and the air within the cup was rarefied by manual mechanical suction; the cupping glasses were removed after 5 to 10 minutes (or when they became partially filled with capillary blood); and the treated area was then bandaged. Each patient was cupped only once at each of 2 locations. The area overlying the trapezius muscle with the poorest microcirculation by inspection and the area where subcutaneous adhesions were most pronounced and/or discomfort was greatest when the examiner lifted the skin and rubbed it between his fingers were chosen for cupping	**Pain response in each group:** Pain at rest (VAS) Cupping therapy - Baseline: 61.5 +/- 24.9 - Day 7: 25.2 +/- 25 Thermal therapy - Baseline: 58.6 +/- 25.1 - Day 7: 47 +/- 27.7 Group difference: -22.9 (-35.3; -10.5) P value: < .001 NPQ Cupping therapy - Baseline: 39.3 +/- 11.7 - Day 7: 22.6 +/- 13.8 Thermal therapy - Baseline: 44.2 +/- 15.3 - Day 7: 39.4 +/- 16.6 Group difference: -12.6 (-18.8 +/- -6.4) P value: < .001 **Functional outcomes in each group:** DASH Cupping therapy - Baseline: 36.3 +/- 13.3 - Day 7: 23.7 +/- 14.2 Thermal therapy - Baseline: 44.5 +/- 19 - Day 7: 43.4 +/- 19.9 Group difference: -11.1 (-17.1, -5.1) P value: < 0.001 **Patient-reported outcomes:** Levine CTS Score - Symptom severity Cupping therapy - Baseline: 3.1 +/- 0.6	**Reviewer comments** Randomized, controlled open trial. Adequate randomisation: nonstratified block-randomisation with various block lengths and by preparing sealed, sequentially numbered opaque envelopes containing the treatment assignments. Placebo and unspecific treatment effects cannot be well controlled and precisely assessed. Trained, unblinded research assistants collected patient-reported data, and research personnel blinded to group allocation entered and monitored the data. Statistical adjustment of the treatment effects for baseline outcome expectation did not affect the overall results. Thus, there was no indication that outcome was largely affected by the patients' expectations. Study is limited by its brief duration and follow up. Patients were recruited from the outpatient department of the Kliniken Essen-Mitte, an academic teaching hospital of the University of Duisburg-Essen, Germany. Patients were recruited by press release. **Grade:** AQ (+) **Quality**: 1

Study	Methodology	Results	Comments and evidence level
	- Number of needles inserted per subject per session: N/A **- Names of points used:** N/A **- Depth of insertion:** N/A **- Response sought:** Not reported **- Needle stimulation:** N/A **- Needle retention time:** N/A **- Needle type:** N/A **Treatment Regimen** **- Number of treatment sessions:** 1 **- Frequency and duration:** 1 session **Other components of treatment** The use of oral analgesics was comparable in both groups throughout the study **Practitioner qualifications and background** Not reported **Control or comparator interventions** The control group treatment consisted of applying heat by means of a heating pad (Zappsack, Fa COOC, Bonen, Germany) once for 15 minutes to the shoulder areas bilaterally with the patient in the supine position	- Day 7: 2.4 +/- 0.8 Thermal therapy - Baseline: 3.2 +/- 0.8 - Day 7: 3.0 +/-0.7 Group difference: -0.6 (-0.8, -0.3) P value: 0.002 Levine CTS Score - Functional status Cupping therapy - Baseline: 2.5 +/- 0.8 - Day 7: 1.9 +/- 0.6 Thermal therapy - Baseline: 2.6 +/- 0.8 - Day 7: 2.6 +/- 0.8 Group difference: -0.6 (-0.8, -0.3) P value: < 0.001 **Adverse effects** There were no serious adverse events in either study group. A regular minor adverse effect was a hematoma at the site of application of a cupping glass. All scarified wounds healed without complication. None of the patients rated the cupping procedure as painful, and all patients in both groups perceived their study treatment as very tolerable	
Yao, E, Gerritz, P, Henricson, E, Abresch, T, Kim, J **Han, J, Wang, K & Zhao, H** **Randomized controlled trial comparing acupuncture with placebo acupuncture for the treatment of carpal tunnel syndrome** **2012** Research question **What is the efficacy of acupuncture for the treatment of mild to moderate carpal tunnel syndrome (CTS)?**	**Participants** n=41 – 7 subjects dropped out, 3 from acupuncture and 4 from placebo Mild to moderate CTS Duration of symptoms: inv: 74.4 +/- 65.4 (3-240) Age: inv: 53.6 +/- 7.65 **Inclusion:** - Clinical diagnosis of CTS by electrodiagnostic findings - Moderate CTS is defined as having motor nerve conduction abnormalities (distal latency >4.5ms and/or compound motor action potential amplitude <5 mV) in addition to sensory abnormalities without abnormal needle electromyographic findings **Exclusion:** - Evidence of severe CTS on the basis of physical examination or electrodiagnostic testing (ie, positive sharp waves, fibrillation potentials, reduced motor unit action potential recruitment, or increase of both motor unit action potential duration and amplitude on needle electromyography of abductor pollicis brevis)	**Pain response in each group:** Not reported **Functional outcomes in each group:** Tip pinch at baseline (lb) Placebo: 10.9 +/- 5.2 (4.3-27) Inv: 10.5 +/- 4.1 (5-21) P= .81 Tip pinch 3 mo after treatment (lb) Placebo: 10.5 +/- 4.0 (5.7-20) Inv: 10.9 +/- 4.6 (4.3-22.8) P=.75 Key pinch at baseline (lb)	**Reviewer comments** Adequately conducted single centre, prospective, randomized, placebo-controlled, double-blinded study. STRICTA criteria used. No trial registry reported. Conflicts of interest declared. No power calculation conducted. Short follow up periods. No third parallel arm which used only nightly wrist bracing was used which could have shown whether improvements are attributable to wrist bracing alone or to effects of acupuncture or placebo needling. **Grade:** AQ (+) **Quality**: 1

Study	Methodology	Results	Comments and evidence level
Funding **Funded by the Department of Physical Medicine & Rehabilitation, University of California, Davis Medical Center, Sacramento, CA, and the National Institute of Disability and Rehabilitation Research grant 133B090001**	- Previous carpal tunnel release; a history of wrist or hand fracture on the affected side - A current pregnancy or >3 months postpartum status - Treatment with a corticosteroid injection in the carpal tunnel within the past 3 months - A history of generalized peripheral neuropathy or mononeuropathy multiplex - A history of other neurologic disorders that may cause confusion with the diagnosis of CTS (including but not limited to stroke, cervical radiculopathy, myelopathy, brain tumor, inflammatory articular disease, or tendonitis of the hand or wrist) - A history of other disorders known to predispose to CTS - Being the recipient of workman's compensation **Style of acupuncture:** Acupuncture **Treatment Rationale:** TCM **- Treatment variation:** Standardised routine **Intervention** **- Number of needles inserted per subject per session:** 7 **- Names of points used:** affected limb MH6, MH7, and SP6 and opposite limb TH5, LI4, LI11, and GB34 **- Depth of insertion: not reported** **- Response sought:** De qi **- Needle stimulation:** manual stimulation **- Needle retention time:** 20 mins **- Needle type:** individually wrapped sterile acupuncture needles (Seirin No. 5 [0.25] x 40 mm), along with the same plastic ring and Steri-strip tape as for the placebo needles **Treatment Regimen** **- Number of treatment sessions:** 6 **- Frequency and duration:** 1 x weekly for 6 weeks **Other components of treatment** Wrist braces were provided to both groups to wear at night **Practitioner qualifications and background** One acupuncturist was trained in medical acupuncture, and the other spent a full year at a Traditional Chinese Medicine Masters program. Each had 3 years of experience at the start of the study **Control or comparator interventions** Streitberger placebo acupuncture needles	Placebo: 13.2 +/- 4.9 (5.4-24) Inv: 11.4 +/- 3.2 (6.0-22) P=.17 Key pinch 3 mo after treatment (lb) Placebo: 13.8 +/- 4.9 (8-24) Inv: 14.0 +/- 5.4 (6.9-30) P=.87 No statistically significant difference was found between the groups treated with acupuncture and placebo acupuncture with respect to improvement in tip/key pinch, or combined sensory index **Patient-reported outcomes:** <u>Carpal Tunnel Self-Assessment Questionnaire (CTSAQ) Symptom scale</u> - Compared with pretreatment baseline, subjects in the acupuncture group had a 0.58 improvement (p=.03) on the CTSAQ symptom score at 3 months after the last treatment, versus 0.81 improvement (P=.001) in the placebo acupuncture group - No statistically significant difference was found between the groups treated with acupuncture and placebo acupuncture <u>Carpal Tunnel Self-Assessment Questionnaire (CTSAQ) function scale</u> - At 3 months after the last treatment, the acupuncture group had a 0.45 improvement (P=.17) on the CTSAQ Function scale versus 0.48 improvement (P = .02) in the placebo group - No statistically significant difference was found between the groups treated with acupuncture and placebo acupuncture **Adverse effects** No serious adverse effects for either group were reported	

Study	Methodology	Results	Comments and evidence level
Yang, C, Hsieh, C, Wang, N, Li, T, Hwang, K, Yu, S & Chang, M **Acupuncture in patients with carpal tunnel syndrome: A randomized controlled trial** **2009** Research question **What is the efficacy of acupuncture compared with steroid treatment in patients with mild-to-moderate carpal tunnel syndrome (CTS) as measured by objective changes in nerve conduction studies (NCS) and subjective symptoms assessment?** Funding **Supported by KTGH grant**	**Participants** n=77 Age – 18 to 85 y.o Duration – Inv: 7.6 (3.8) months **Inclusion:** - CTS was diagnosed clinically based on the presence of at least one of the following primary symptoms: (1) numbness, tingling pain, or paresthesia in the median nerve distribution (2) precipitation of these symptoms by repetitive hand activities, which could be relieved by resting, rubbing, and shaking the hand (3) nocturnal awakening by such sensory symptoms - The diagnosis was often supported by a positive Tinel sign - All patients with clinically diagnosed CTS demonstrated median neuropathy at the wrist, confirmed by the presence of 1 or more of the following standard electrophysiologic criteria: (1) prolonged distal motor latency (DML) to the abductor pollicis brevis (APB) (abnormal Z4.7 ms, stimulation over the wrist, 8 cm proximal to the active electrode) (2) prolonged antidromic distal sensory latency (DSL) to the second digit (abnormal Z3.1 ms; stimulation over the wrist, 14 cm proximal to the active electrode) (3) prolonged antidromic wrist-palm sensory nerve conduction velocity (W-P SNCV) at a distance of 8 cm (W-P SNCV, abnormal <45 m/s) **Exclusion:** - Symptoms occurring less than 3 months before the study or symptoms improving during the 1-month initial observation period (to exclude patients who might have spontaneous resolution of symptoms) - Severe CTS that had progressed to visible muscle atrophy CTS patients with the presence of either fibrillation potentials or reinnervation on needle EMG in the APB - Clinical or electrophysiologic evidence of accompanying conditions that could mimic CTS or interfere with its evaluation, such as cervical radiculopathy, proximal median neuropathy, or significant polyneuropathy - Evidence of obvious underlying causes of CTS such as diabetes mellitus, rheumatoid arthritis, hypothyroidism (acromegaly), pregnancy, alcohol abuse or drug usage (steroids or drugs acting through the central nervous system), use of vibrating machinery, and suspected malignancy or inflammation or autoimmune disease - Recent peptic ulcer or history of steroid intolerance - Prior unpleasant experience with acupuncture or a bleeding diathesis - Cognitive impairment interfering with the patient's ability to follow instructions and describe symptoms **Style of acupuncture:** Acupuncture	**Patient-reported outcomes:** Global symptoms score (0-50) <u>Baseline:</u> Inv – 16.0 (8.8) Con – 14.3 (7.5) <u>Change from baseline</u> Week 2: Acupuncture: -8.6 (6.3) Steroid: -7.3 (5.7) Week 4: Acupuncture: -11.7 (7.6) Steroid: -9.3 (6.7) - The evaluation of GSS showed that there was a high percentage of improvement in both groups at weeks 2 and 4 (P<0.01), though statistical significance was not demonstrated between the 2 groups (P=0.15). Of the 5 main symptoms scores (pain, numbness, paresthesia, weakness/clumsiness, nocturnal awakening), only 1, nocturnal awakening, showed a significant decrease in acupuncture compared with the steroid group at week 4 (P=0.03) - Patients with acupuncture treatment had a significant decrease in distal motor latency compared with the steroid group at week 4 (P=0.012) **Adverse effects** No serious adverse effects were noted. In the acupuncture treatment group, side effects were reported by 5% of the patients. Most adverse effects were related to the local insertion of the needles, such as local pain after session, ecchymosis, and local paresthesia during session. Acupuncture was well tolerated by patients and no one discontinued prematurely because of needle-related side effects. In the steroid treatment group, the most frequently noted adverse effects were nausea and epigastralgia. Side effects from steroid were reported by 18% of the patients. Four patients dropped out due to intolerance of severe epigastralgia with nausea	**Reviewer comments** Well conducted prospective, randomized clinical study under conditions similar to routine care. Good reporting. Strengths include that interventions were based on expert consensus by qualified and experienced medical acupuncturists; assessment of the credibility of interventions, and outcome measurements as recommended in guidelines for trials on CTS; the acupuncturist was asked to have the least possible communication with patients to minimize bias, to decrease confounding effect; any patient whose symptoms occurred less than 3 months before the study or whose symptoms improved during the first observation period was excluded from the study. Intention-to-treat analysis performed. The study leaves some questions unanswered: Is acupuncture therapy effective for long-term symptom relief of CTS? Do symptoms recur once acupuncture is discontinued? **Grade:** AQ (+) **Quality**: 1

Study	Methodology	Results	Comments and evidence level
	- Treatment Rationale: TCM **- Treatment variation:** Fixed points **Intervention:** Acupuncuture **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** PC-7 (Daling), PC-6 (Neiguan) on the affected side in their 8 sessions without modification for the specific symptoms of the patients **- Depth of insertion:** PC-6 to a depth of 1.0 to 1.5 inch and at PC-7 they were inserted from 0.5 to 1.0 inch according to the thickness of the patient's wrist **- Response sought:** De qi **- Needle stimulation:** Twirling with lifting-thrusting methods **- Needle retention time:** 30 mins **- Needle type:** Sterile disposable steel needles (gauge and size: 0.25x40 mm) **Treatment Regimen** **- Number of treatment sessions:** 8 **- Frequency and duration:** 2 x weekly for 4 weeks **Other components of treatment** None: no herbs, moxibustion, cupping, rehabilitation advice regarding dietary or lifestyle modifications. Additional treatments (such as splinting and local injections) or alterations in daily activities were not permitted during the study **Practitioner qualifications and background** License-certificated **Control or comparator interventions** 2 weeks of prednisolone 20 mg daily followed by 2 weeks of prednisolone 10 mg daily		
Chung, V, Ho, R, Liu, S, Chong, M, Leung, A, Yip, B, Griffiths, S, Zee, B, Wu, J, Sit, R & Lau, A **Electroacupuncture and splinting versus splinting alone to treat carpal tunnel syndrome: a randomized controlled trial** **2016**	**Participants** n=181 Patients with primary carpal tunnel syndrome, chronic mild to moderate symptoms and no indication for surgery Avg age: inv – 51 +/- 10.2 years Duration of symptoms: inv – 50 +/- 52.7 months **Inclusion:** - Patients aged 18–70 years - Patients with primary idiopathic carpal tunnel syndrome who fulfilled the following criteria: satisfying classic or probable criteria for carpal tunnel syndrome by Katz hand diagram (tingling or numbness in ≥ 2 of 4 radial fingers),	**Pain response in each group:** NRS mean difference in change from baseline to week 17 between the 2 groups was: -0.7 (95% CI -1.34 to -0.06) P=0.03 **Functional outcomes in each group:** Tip pinch strength: (lb) mean difference in change from baseline to week 17 between the 2 groups was: 1.17 (95% CI 0.48 to 1.86)	**Reviewer comments** Well conducted randomized parallel-group assessor-blinded 2-arm controlled trial on patients with clinically diagnosed primary carpal tunnel syndrome. Adequate block randomisation and concealment. Prior trials registration occurred. Intention to treat analysis utilised. Sample size calculations conducted.

Study	Methodology	Results	Comments and evidence level
Research question **What is the effectiveness of electroacupuncture combined with nocturnal splinting compared to nocturnal splinting alone for patients with carpal tunnel syndrome?** Funding **This trial was funded by the Health and Health Services Research Fund, Hong Kong SAR Government (Reference no. 09100681)**	positive in at least 2 of 3 clinical tests (i.e., Phalen maneuver test, Tinel sign test, and the wrist flexion and median nerve compression test) - Able to respond to questionnaires in Cantonese and able to provide written informed consent **Exclusion:** - Patients with symptoms and signs suggestive of median nerve denervation with axonal loss, including thenar muscular atrophy or weakness, or persistent numbness - Patients with secondary carpal tunnel syndrome owing to coexisting polyneuropathy, inflammatory arthropathy, pregnancy, diabetes mellitus, hypothyroidism, malignancy, rheumatoid arthritis, alcoholism, infections, spaceoccupying lesions (tumours, hypertrophic synovial tissue, fracture callus and osteophytes) and familial neuropathy - Patients who had previous carpal tunnel release surgery, who were taking oral steroids or warfarin, who had received treatment with local steroid injections or acupuncture for carpal tunnel syndrome, or patients with other serious diseases requiring inpatient care - Patients with cervical radiculopathy **Style of acupuncture:** EA **Treatment Rationale:** TCM **- Treatment variation:** Standardised routine **Intervention:** EA with splinting **- Number of needles inserted per subject per session:** 8 **- Names of points used:** TW-5, PC-7, HT-3, PC-3, SI-4, LI-5, LI-10 and LU-5 on the affected side **- Depth of insertion:** 1-3 cm **- Response sought:** De qi **- Needle stimulation:** bidirectional rotations **- Needle retention time:** 20 mins **- Needle type:** single use filiform needles (Dongbang Acupuncture Needle DB100, 0.25x40 mm, Dong Bang Acupuncture Inc, Chungnam, Korea) **Treatment Regimen** **- Number of treatment sessions:** 13 **- Frequency and duration:** 1-2 sessions a week over 17 weeks, maximum of 13 sessions **Other components of treatment** Prefabricated wrist splint (Medex Carpal Tunnel Splint W09) with neutral positioning. Plus 10-minute structured education by the investigator about the use of splints	P<0.01 **Patient-reported outcomes:** <u>BCTQ score - SSS</u> mean difference in change from baseline to week 17 between the 2 groups was: –0.20 (95% CI –0.36 to –0.03) P=0.02 <u>BCTQ score - FSS</u> mean difference in change from baseline to week 17 between the 2 groups was: -0.22 (95% CI -0.38 to -0.05) P=0.01 <u>DASH</u> mean difference in change from baseline to week 17 between the 2 groups was: -6.72 (95% CI -10.9 to -2.57) P<0.01 **Adverse effects** Three patients (5.8%) from the DN group had complications: two patients could not tolerate the pain during the intervention and one had a local haemorrhage	Generalizability of the results may be limited because this trial was performed at a single centre. No sham control group. Study used low needle numbers and less frequent sessions which may have affected the effect size. The positive effects of acupuncture observed based on outcomes reported by participants could be biased by participant expectancy and lack of blinding of participants in the study. **Grade:** AQ (+) **Quality**: 1

Study	Methodology	Results	Comments and evidence level
	Practitioner qualifications and background Two Chinese medicine practitioners fully registered with the Chinese Medicine Council of Hong Kong performed the electroacupuncture treatment, both of which possessed 10 years of clinical experience and 5 years of full time training in Chinese medicine **Control or comparator interventions** Patients assigned to the splinting only group received splints and the structured education as for the electroacupuncture group		
Asheghan, M, Aghda, A, Hashemi, E & Hollisaz, M **Investigation of the Effectiveness of Acupuncture in the Treatment of Frozen Shoulder** **2016** Research question **What is the effectiveness of acupuncture to remedy patients suffering from frozen shoulder?** Funding **Not reported**	**Participants** n=40 Age: 55 years (44 - 71) Condition duration: 4.05±2.06 months **Inclusion:** - All patients referred to Baghiatallah hospital in 2013 with pain in the shoulder and approved to have frozen shoulder on clinical examination - Restrictions in active and inactive movements of shoulder in flexion, extension, external rotation, and also night pains - Patients should had the symptoms for 4-6 weeks **Exclusion:** - Patients with background disorders such as renal, hepatic, and hematic disorders, patients under shoulder surgeries, patients with painful arc syndrome, patients with a fracture background, patients with neurologic and pathologic joint symptoms in the graphs of upper limb on the same side of painful shoulder **Style of acupuncture:** Acupuncture **Treatment Rationale:** TCM **- Treatment variation:** Not reported **Intervention** Acupuncture + Physiotherapy **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** Not reported **- Depth of insertion:** Not reported **- Response sought:** Not reported **- Needle stimulation:** Not reported **- Needle retention time:** Not reported **- Needle type:** Not reported **Treatment Regimen** **- Number of treatment sessions:** 10	**Pain response in each group:** VAS: (0-10) <u>Before treatment</u> Inv: 8 +/- 1 Con: 7.9 +/- 1 P= 0.900 <u>Post treatment</u> Inv: 5 +/- 1 Con: 5.8 +/- 1 P= 0.15 <u>6 week follow up</u> Inv: 3.3 +/- 1 Con: 4/4 +/- 1 P= 0.041 **Functional outcomes in each group:** <u>AROM:</u> Significant improvement compared to control post treatment and at 6 week follow up for the movements of flexion and abduction, however not adduction, extension, internal rotation and external rotation <u>PROM:</u> Significant improvement compared to control post treatment and at 6 week follow up for the movements of flexion and abduction, however not adduction, extension, internal rotation and external rotation **Patient-reported outcomes:** SPADI <u>Before treatment</u> Inv: 87.9±15 Con: 88.8±14 Between group difference P= 0.84	**Reviewer comments** Poorly reported RCT that lacks methodological detail and reasoning. Quality of reporting limits interpretation of results. No reporting of patient or therapist blinding. Treatment rationale not explained. Nil power calculation. Limited sample size. **Grade**: LQ (-) **Quality**: 1-

Study	Methodology	Results	Comments and evidence level
	- Frequency and duration: 2 x weekly for 5 weeks **Other components of treatment** Physiotherapy If intolerable pain: ibuprofen 400 mg per day – both groups **Practitioner qualifications and background** Not reported **Control or comparator interventions** Physiotherapy alone	<u>Post treatment</u> Inv: 62.1±14 Con: 67.8±9 P= 0.15 <u>6 week follow up</u> Inv: 41.9±16 Con: 49.7±13 P= 0.11 Non-significant **Adverse effects** Not reported	
Rueda Garrido, J, Vas, J & Lopez, D **Acupuncture treatment of shoulder impingement syndrome: A randomized controlled trial** **2016** Research question **What is the short and medium-term effectiveness of acupuncture on individuals with impingement syndrome of the shoulder, in comparison to the use of acupuncture at sham points?** Funding **Not reported**	**Participants** n=68 Duration: minimum of 3 months Age: 33.4 years mean **Inclusion:** - Diagnosed with impingement syndrome, with compatible clinical symptoms of more than 3 months of progression - Patients presenting with a unilateral injury - Signed informed consent form **Exclusion:** - Previous surgery of the injured shoulder - Previous luxation or fracture - Neurological injuries or illnesses with musculoskeletal disorders **Style of acupuncture:** Acupuncture **Treatment Rationale:** TCM **- Treatment variation:** Standardised routine **Intervention** **- Number of needles inserted per subject per session:** 6 **- Names of points used:** local points LI15 Jian Yu, LI16 Ju Gu, SJ14 Jian Liao and SI9 Jian Zhen, and to the distal points S38 Tiao kou and LI4 He Gu **- Depth of insertion:** 2-3 cm **- Response sought:** Qi sensation was sought by consistent manipulations **- Needle stimulation:** Rotation of the needles in both senses and scratching of the handle every 5 minutes	**Pain response in each group:** VAS: (0-100) <u>Before treatment:</u> Inv: 64 (18.3) Con: 63.03 (19.8) <u>Post treatment</u> Inv: 19.85 (15.1) Con: 43.18 (23.2) <u>3 month follow up</u> Inv: 26.42 (23.2) Con: 43.03 (26.2) **Functional outcomes in each group:** UCLA shoulder score: Before treatment: Inv: 18.88 (5.16) Con: 21 (3.59) Post treatment Inv: 30.54 (4.17) Con: 25.81 (5.22) 3 month follow up Inv: 29.34 (5.28) Con: 25.39 (5.51) **Patient-reported outcomes:** Not reported	**Reviewer comments** A prospective, controlled, randomized study Inadequate inclusion/exclusion criteria. Trial registration occurred. Poorly reported. Power calculation conducted. Adequate randomisation. Standard protocol for all participants. Control group utilises sham acupoints. **Grade:** LQ (-) **Quality**: 1-

Study	Methodology	Results	Comments and evidence level
	- Needle retention time: 20 mins **- Needle type:** 40 mm long and 0.25 mm in diameter **Treatment Regimen** **- Number of treatment sessions:** 4 **- Frequency and duration:** 1 x weekly for 4 weeks **Other components of treatment** Not reported **Practitioner qualifications and background** The application of the acupuncture treatment was carried out by the main researcher, a physician specialist in acupuncture with more than five years of experience **Control or comparator interventions** Acupuncture needles on sham points	**Adverse effects** During the study, no significant adverse effects related to the treatments were registered. Only two participants (2.9%) in the control group reported residual pain after a treatment session. This pain disappeared spontaneously in the following 24 hours	
Arias, J, Fernandez-de-Las-Penas, C, Palacios-Cena, M, Koppenhaver, S & Salom-Moreno, J **Exercises and Dry Needling for Subacromial Pain Syndrome: A Randomized Parallel-Group Trial** **2017** Research question **What is the effectiveness of exercise versus exercise plus trigger point (TrP) dry needling (TrP-DN) in subacromial pain syndrome?** Funding **Not reported**	**Participants** n=50 Duration: mean inv: 6.2 +/- 1.9 years Age: 48 +/- 6 years **Inclusion:** - patient with diagnosed subacromial pain syndrome using the Dutch Orthopedic Association Clinical Practice Guideline - unilateral nontraumatic shoulder pain - shoulder pain for at least 3 months - pain intensity of at least 4 points on an 11-point numeric pain rating scale **Exclusion:** - bilateral shoulder symptoms - younger than 18 or older than 65 years - history of shoulder fractures or dislocation - diagnosis of cervical radiculopathy - previous interventions with steroid injections in the shoulder area - fibromyalgia syndrome - previous history of shoulder or neck surgery - any type of intervention for the neck-shoulder area during the previous year - patients with fear of needles and coagulation disorders **Style of acupuncture:** Dry needling	**Pain response in each group:** NRPS – mean intensity of shoulder pain *Exercise only group* Before treatment 6.6 6 1.5 (6.0–7.2) Post intervention 6.0 6 2.4 (5.0–7.0) 3 months 3.4 6 1.6 (2.4–4.5) 6 months 2.1 6 1.9 (1.3–2.9) 12 months 1.6 6 1.5 (.8–2.3) *TrP DN + exercise* Before treatment 7.2 6 1.6 (6.6–7.9) Post intervention 5.9 6 2.5 (4.9–6.9) 3 months 3.8 6 1.5 (2.7–4.8) 6 months	**Reviewer comments** Randomised parallel-group trial, with 1-year follow-up. Comprehensive inclusion/exclusion criteria. Adequate concealment and randomisation. Strengths included that the study was prospectively registered, adhered to strict Consolidated Standards of Reporting Trials guidelines, used blinded outcome assessment, concealed allocation, and intention to treat analysis. Also had high retention rates at the 12-month follow-up (At 12 months, 47 patients (94%) completed follow-up). Weaknesses included consecutive sampling used at local hospital single clinic which may decrease the generalization of the results, did not include a no-intervention control group or sham needling group. Nil conflicts of interest declared by authors. Only two TrP DN treatment sessions conducted. Sample size calculation conducted. **Grade:** AQ (+)

Study	Methodology	Results	Comments and evidence level
	Treatment Rationale: Western **- Treatment variation:** Individualised **Intervention** TrPDN to active TrPs in shoulder muscles that referred pain or reproduced shoulder symptoms during the second and fourth treatment sessions + exercise program the same as control group **- Number of needles inserted per subject per session:** Dependant on number of TPs **- Names of points used:** The muscles included in physical examination included the anterior and middle deltoid, supraspinatus, infraspinatus, teres minor and major, and subscapularis **- Depth of insertion:** The depth of the needle depended on the muscle and ranged from 10 to 15mm for the infraspinatus or deltoid muscles to 30 to 35 mm for the supraspinatus and teres major and minor muscles **- Response sought:** Local twitch response **- Needle stimulation:** fast-in and fast-out technique **- Needle retention time**: 5-10 mins **- Needle type:** disposable stainless-steel needles of .32mmx 40mm (Novasan, Madrid, Spain) **Treatment Regimen** **- Number of treatment sessions:** 4 **- Frequency and duration:** 1 x weekly for 4 weeks **Other components of treatment** Participants in both groups were asked to perform an exercise program of the rotator cuff muscles twice daily for 5 weeks **Practitioner qualifications and background** TrP-DN was applied by a physical therapist with 10 years of clinical experience in this therapeutic approach **Control or comparator interventions** Exercise program - 3 sets of 12 repetitions - 3 exercises focusing on supraspinatus, infraspinatus, and scapular stabilizer musculature - four 20 to 25 minute sessions with physical therapist to teach exercises	1.9 6 2.0 (1.2–2.8) 12 months 1.5 6 1.4 (.9–2.2) No significant differences in shoulder pain were observed, rather, both groups experienced similar improvements from baseline at all follow-up periods **Functional outcomes in each group:** Not reported **Patient-reported outcomes:** DASH score 0-100 *Exercise only group* Before treatment 62.0 6 8.1 (59.0–65.0) Post intervention 43.8 6 6.4 (41.5–46.1) 3 months 33.8 6 12.0 (30.2–37.4) 6 months 26.9 6 12.8 (23.2–30.7) 12 months 15.5 6 11.1 (12.2–18.8) TrP DN + exercise Before treatment 61.3 6 6.5 (58.3–62.3) Post intervention 23.2 6 4.8 (20.9–25.4) 3 months 10.6 6 3.8 (7.0–14.2) 6 months 3.4 6 2.5 (1.5–5.4) 12 months 1.6 6 1.8 (.6–2.8) Patients receiving exercise plus TrP-DN exhibited higher improvements in function at all follow-up periods (immediately after: -20.6 [95% CI -23.8 to -17.4]; 3 months: -23.2 [95% CI 28.3 to -18.1]; 6 months: -23.6 [95% CI -28.9 to -18.3]; and 12 months: -13.9 [95% CI -17.5 to -10.3]; all P < .001) than those receiving the exercise protocol alone **Adverse effects**	**Quality**: 1

Study	Methodology	Results	Comments and evidence level
		Five patients assigned to the exercise plus TrP-DN (25%) experienced muscle soreness after the first DN session, which resolved spontaneously within 24 to 36 hours No clinical adverse events were reported by the participants	
Kibar, S, Konak, H, Evcik, D & Ay, S **Laser Acupuncture Treatment Improves Pain and Functional Status in Patients with Subacromial Impingement Syndrome: A Randomized, Double-Blind, Sham-Controlled Study** **2017** Research question **What is the effectiveness of laser acupuncture in patients with subacromial impingement syndrome?** Funding **Not reported**	**Participants** n=73 Age: inv 64.5 (31–75) years **Inclusion:** - Age 18–70 years - Patients who had experienced shoulder pain for at least three months and had at least one score pain measurement of 4 cm or more on the visual analog scale (VAS) at rest, at night, or during physical activity - Patients were diagnosed as SAIS via the Neer and Hawkins-Kennedy impingement tests + MRI **Exclusion:** - Patients with stage III SAIS, complete tear of the rotator cuff, adhesive capsulitis, calcific tendinitis, acromioclavicular arthritis, any rheumatic disorder (such as rheumatoid arthritis or spondyloarthropathy), a history of acute shoulder trauma, any intra-articular injection, or no physical therapy during the previous six months - A history of shoulder surgery, history of malignancy, acute infection, any neurologic disorder, and pregnancy - Patients with any cognitive deficit that could negatively affect the evaluation process **Style of acupuncture:** LA A gallium-aluminium-arsenide (GaAlAs, infrared laser) continuous wave diode laser device (Chattanooga Group, Vista, California, USA) with a wavelength of 850nm (invisible), a power output of 100 mV, and a spot area of 0.07cm2 was used **Treatment Rationale:** TCM **Intervention** **- Number of needles inserted per subject per session:** 11 **- Names of points used:** GB 21, LI 4, LI 11, LI 14, LI 15, LI 16, SI 9, SI 10, SI 11, TE 14, and TE 15) **- Depth of insertion:** N/A **- Response sought:** Not reported **- Needle stimulation:** N/A Laser acupuncture **- Needle retention time:** N/A **- Needle type:** Galliumaluminium-arsenide continuous wave diode-laser, with a wavelength of 850nm and a power output of 100m. The laser acupuncture	**Pain response in each group:** VAS: (0-10) at rest Intervention <u>Before treatment:</u> 2.36 +/- 2.20 <u>Following treatment:</u> 0.56 +/- 0.93 Sham <u>Before treatment:</u> 2.84 +/- 2.39 <u>Following treatment:</u> 3.62 +/- 1.93 P=0.00 Effect size cohen d 2.01 VAS: (0-10) activity Intervention <u>Before treatment:</u> 7.0 +/- 1.59 <u>Following treatment:</u> 2.30 +/- 1.48 Sham <u>Before treatment:</u> 6.5 +/- 1.31 <u>Following treatment:</u> 6.03 +/- 1.37 P=0.00 Effect size cohen d 2.61 **Patient-reported outcomes:** SPADI Intervention <u>Before treatment:</u> 77.66 +/- 21.98 <u>Following treatment:</u> 31.23 +/- 14.7	**Reviewer comments** Adequately conducted randomized, double-blind, sham-controlled study. Set at a physical medicine and rehabilitation outpatient clinic. Inadequate pseudo randomization method used. Trail was registered prior to being conducted. Authors declared no conflict of interest. Lack of follow-up evaluations with longer follow-up periods are necessary. **Grade:** LQ (-) **Quality**: 1-

Study	Methodology	Results	Comments and evidence level
	treatment at each acupuncture point was administered at 4 joules/cm2 (total dose 5 40 joules). **Treatment Regimen** **- Number of treatment sessions:** 15 **- Frequency and duration:** 5 x weekly for 3 weeks **Other components of treatment** Hot pack - A hot pack was applied for 20 minutes following each treatment session in both groups. Patients underwent exercise training, including pendulum exercises, posterior capsule stretching, and isometric shoulder exercises (15 repetitions in all directions, three times daily for three weeks). Excessive physical activity was forbidden at the onset of the treatment **Practitioner qualifications and background** Inadequately reported **Control or comparator interventions** Sham laser acupuncture - Sham laser was administered in the control group as in the treatment group, but with the device turned off	Sham <u>Before treatment:</u> 81.65 +/- 16.76 <u>Following treatment:</u> 76.12 +/- 18.6 P=0.00 Effect size cohen d 2.67 **Adverse effects** 6 patients, 2 from laser acupuncture and 4 from control group discontinued intervention due to medical reasons.	
Perez-Palomares, S, Olivan-Blazquez, B, Perez-Palomares, A, Gaspar-Calvo, E, Perez-Benito, M, Lopez-Lapena, E, Beldarrain, M & Magallon-Botaya, R **Contribution of dry needling to individualized physical therapy treatment of shoulder pain: a randomized clinical trial** **2017** Research question **What is the effectiveness of dry needling in addition to evidence-based personalized physical therapy treatment in the treatment of shoulder pain?** Funding	**Participants** n=120 Nonspecific shoulder pain consistent with RC tendinopathy or SIS Duration of symptoms: Not reported Age: inv - 52.74 ± 11.81 years **Inclusion:** - aged 18 years or older - have nonspecific shoulder pain considered by the general practitioner to be consistent with rotator cuff tendinopathy or subacromial impingement syndrome - have a range of movement greater than 50% (90°) of full range (180°) of flexion, abduction, or scapular plane elevation - 91% of the sample underwent a diagnostic imaging test (ultrasound) and 50% underwent magnetic resonance imaging (MRI) to confirm their eligibility to participate **Exclusion:** - prior surgery for subacromial syndrome; disability, pain, or sudden loss of strength after an injury that suggested another condition - glenohumeral instability - symptoms that suggested a systemic disease	**Pain response in each group:** <u>VAS</u> <u>Baseline</u> Physical therapy: 6.75 ± 1.50 Physical therapy + DN: 6.58 ± 1.52 <u>Posttreatment</u> Physical therapy: 4.71 ± 2.28 Physical therapy + DN: 3.81 ± 2.20 Between group differences: 0.86 (0.06, 1.67) <u>3 month follow up</u> Physical therapy: 3.59 ± 2.61 Physical therapy + DN: 3.00 ± 2.44 Between group differences: 0.52 (–0.37, 1.42) **Functional outcomes in each group:** <u>Range of motion:</u> There were no clinically or statistically significant differences between the intervention groups, in terms of range of motion at 3-month follow-up Flexion – no significant difference post treatment and at 3 months	**Reviewer comments** Well conducted multicentre, parallel randomized clinical trial with 3 month follow up. Participants recruited from 5 primary health care centres in Zaragoza, Spain. Trial was retrospectively registered. Adequate concealment and randomisation. Assessor blinding occurred. Power calculation conducted. Intention to treat analysis conducted. Study limitation was that the diagnosis was by a primary care physician based on clinical symptoms (although a large percentage of the subjects had their pathology confirmed via ultrasound or MRI). **Grade:** AQ (+) **Quality**: 1

Study	Methodology	Results	Comments and evidence level
Funded by a grant from the Spanish Government's Ministry of Health (grant number PI07/90924)	- impossibility of attending intervention sessions or refusal to participate - any illness or condition that might interfere with trial completion, or harm to the patient that could result from participation **Style of acupuncture:** Dry needling **Treatment Rationale:** Western **- Treatment variation:** Individualised routine **Intervention – Dry needling + physical therapy** **- Number of needles inserted per subject per session:** Dependant on number of TPs **- Names of points used:** Dry needling of active MTrPs identified by the treating physical therapists in the participants' supraspinatus, infraspinatus, subscapularis (medial, lateral superior, and lateral inferior), teres minor, and deltoid (anterior, medial, and posterior) muscles **- Depth of insertion:** Not reported **- Response sought:** Muscle twitch response **- Needle stimulation:** Needling was performed using the Hong technique ("fast in, fast out"), accompanied by the subsequent application of cold spray to diminish any pain sensation after needling **- Needle retention time:** Not reported **- Needle type:** Acupuncture needles measuring 0.25 × 25 mm, 0.30 × 50 mm, and 0.30 × 75 mm, with a guide tube **Treatment Regimen** **- Number of treatment sessions:** 3 **- Frequency and duration:** 1 x every 8 days for 4 weeks **Other components of treatment** Physical therapy treatment sessions same as control group **Practitioner qualifications and background** The treating physical therapists, as well as the evaluators, were physical therapists with over 5 years of experience in physical therapy diagnosis and treatment, including the treatment of MTrPs. They also underwent an additional 4 sessions of protocol standardization with an expert in dry needling treatment **Control or comparator interventions** 10 personalized physical therapy treatment sessions, each lasting 30 minutes and distributed twice weekly. Personalized physical therapy treatment was based on the most appropriate manual therapy techniques after physical	Abduction – no significant difference post treatment and at 3 months IR – significant improvements in both groups at the end of the treatment period and at 3 months ER – Physical therapy group improved, however, physical therapy plus DN did not. Significant improvement in favour of the physical therapy group post treatment, however, not at 3 month follow up **Patient-reported outcomes:** <u>Functionality (Constant Murley Score)</u> <u>Baseline</u> Physical therapy: 47.39 ± 11.53 Physical therapy + DN: 50.30 ± 11.75 <u>Posttreatment</u> Physical therapy: 57.29 ± 13.74 Physical therapy + DN: 61.44 ± 12.00 Between group differences 3.04 (–1.36, 7.44) <u>3 month follow up</u> Physical therapy: 61.77 ± 16.18 Physical therapy + DN: 62.89 ± 12.91 Between group differences: –0.07 (–5.19, 5.04) No significant differences **Adverse effects** Not reported	

Study	Methodology	Results	Comments and evidence level
	evaluation of the patient: articular gliding or restoration of the glenohumeral and scapulothoracic translational joint movement, stretching of the shortened peri-articular muscle tissue directly or indirectly involved in the shoulder joint movement, isometric exercises, exercises for proprioceptive re-education and scapular control, range-of-motion stretching at home, and postural recommendations for everyday activities		
Lewis, J, Sim, J & Barlas, P **Acupuncture and electro-acupuncture for people diagnosed with subacromial pain syndrome: A multicentre randomized trial** **2017** Research question **What are the benefits of group exercise, group exercise and acupuncture, and group exercise and electro-acupuncture in the treatment of people with musculoskeletal shoulder pain classified as subacromial pain syndrome?** Funding **This work was partially funded by a grant from the Westminster Medical School Research Trust, Chelsea and Westminster Hospital NHS Trust, London, UK**	**Participants** n=227 Duration: median 6 months Age: 53.48 +/- 13.49 years **Inclusion:** - Unilateral shoulder pain in the C5/6 dermatome - No difficulty reading, writing or communicating in English - 18 years of age or older **Exclusion:** - Pain referred from the neck (cervical physiological movements or combined movements reproduces shoulder pain) - A history of shoulder instability, subluxations, dislocations - Mal-union or non-union of fractures involving the shoulder - Inability to participate in an exercise programme - Systemic diseases such as: rheumatoid arthritis, diabetes, uncontrolled blood pressure, cardiac disease, renal disease, respiratory disease, cardiac pacemakers, hearing aids - Participants who are pregnant, or attempting to become pregnant - Fear of needles - Infections - Fragile, swollen, thin or inflamed skin - Post-surgical lymphoedema - Known allergy to metals - Oral steroid therapy or shoulder injections within the past year - Epilepsy or fainting spells - Participants receiving anti-coagulation therapy - Participants with haemophilia (if not on factor replacement therapy) - Loss of sensation in areas to be treated - Previous treatment for the shoulder in the preceding 12 months - Any acupuncture treatments in the past 12 months - Seeking concurrent additional treatment for the shoulder problem **Style of acupuncture:** Acupuncture or EA **Treatment Rationale:** TCM	**Patient-reported outcomes:** *Oxford shoulder score* Exercise only Baseline 32.59 (5.89) Post intervention 39.28 (6.41) 6 months 43.35 (5.20) 12 months 43.82 (6.17) Exercise & acupuncture Baseline 33.20 (6.68) Post intervention 39.12 (6.04) 6 months 42.75 (6.58) 12 months 43.23 (6.75) Exercise & electro-acupuncture Baseline 31.40 (6.30) Post intervention 39.28 (6.54) 6 months 41.82 (7.72) 12 months 44.22 (5.11) Between-group comparisons yielded small and non-significant effects for all variables *SPADI* Exercise only Baseline 39.73 (19.18) Post intervention 15.00 (9.00, 30.50) 6 months 4.00 (0.80, 14.50) 12 months 3.00 (0.75, 10.50) Exercise & acupuncture Baseline 42.76 (21.80) Post intervention 17.50 (5.40, 30.00) 6 months 3.00 (0.00, 9.00) 12 months 3.00 (0.00, 9.00) Exercise & electro-acupuncture Baseline 44.09 (19.15) Post intervention 13.00 (7.00, 27.50) 6 months 7.00 (1.00, 14.50)	**Reviewer comments** Well conducted and reported prospective, multicentre, three-arm parallel-group randomized clinical trial, with assessor blinding. Study adhered to STRICTA criteria. Adequate concealment and randomisation. Sample size calculation conducted. Intention to treat analysis conducted. Large number of drop outs. The onset of pain had in most cases (68%) was non-traumatic which may limit the generalisability for ACC. The nature of the interventions did not permit the therapists providing the intervention or the participants receiving the intervention to be unaware of group allocation. However, assessors who collected all the outcome data were blind to participants' group allocation at every data collection time point. No placebo acupuncture group was utilised which could have introduced an element of participant blinding. **Grade:** HQ (++) **Quality**: 1+

Study	Methodology	Results	Comments and evidence level
	- Treatment variation: Three acupuncture protocols were used, comprising: (1) an anterolateral shoulder pain protocol; (2) a posterolateral shoulder pain protocol; and (3) a general shoulder pain protocol Group II: Shoulder advice and weekly exercise group (six 50–55-min sessions) together with six treatments of acupuncture Group III: Shoulder advice and weekly exercise group (six 50–55-min sessions) together with six treatments of electro-acupuncture **Intervention** **- Number of needles inserted per subject per session:** Needles were inserted unilaterally, on the side of symptoms, and up to six local needles were used as well as two distal needles (forearm or lower leg) **- Names of points used:** 3 separate protocols used depending on site of pain: Anterolateral shoulder pain protocol, Posterolateral shoulder pain protocol & General shoulder pain protocol Points used: TE 14, LI 15, GB 21, SI 9, LI 10, SI 9, SI 10, SI 11, Anterior deltoid trigger point, Posterior deltoid trigger point, Pectoralis major trigger point, LI 4, SI 3, LI 4, TE 5, TE 5, ST 36 & ST 38 **- Response sought:** De qi **- Needle stimulation:** stimulated all points every 3–5 min **- Needle retention time:** 30 mins **- Needle type:** single-use Seirin 0.25 x 40 mm W/T, Seirin 0.25 x 50 mm W/T, Seirin 0.25 x 40 mm metal and Seirin 0.25 x 50 mm metal (supplied by Scarsboroughs Ltd, Somerset, UK) **Treatment Regimen** **- Number of treatment sessions:** 6 **- Frequency and duration:** 2 x weekly for 3 weeks **Other components of treatment** A generic shoulder advice and exercise class that might be classified as light to moderate level of exercise, attended by all participants, was conducted once a week for 6 weeks as a circuit program. The class included: (1) warm-up exercises (e.g. static exercise bike); (2) shoulder range of movement exercises; (3) resisted internal and external rotation exercises; (4) generalized shoulder strengthening exercises (e.g. pulling and pushing against resistance); (5) weight-bearing exercises (e.g. pushing Swiss ball against wall, weight through arms on Swiss ball); (6) lower limb exercises (e.g. step-ups with concomitant upper limb elevation); and (7) cool-down exercises **Practitioner qualifications and background**	12 months 2.00 (0.00, 11.00) Between-group comparisons yielded small and non-significant effects for all variables **Functional outcomes in each group:** *Range of motion:* Post intervention, 6 months and 12 month follow up of shoulder flexion, shoulder abduction and shoulder rotation all showed non-significant difference between group comparisons *Analgesic use:* Between-group comparisons yielded non-significant effects at all follow ups **Adverse effects** There were no significant adverse events reported as a result of exercise, or in either of the acupuncture groups. However, the reasons for participants leaving the study were not available for all those dropping out, and the reasons for dropping out may have related to adverse events, such as an increase in pain and/or other symptoms	

Study	Methodology	Results	Comments and evidence level
	All physiotherapists providing acupuncture and electro-acupuncture treatments had completed a minimum of 80 h training in acupuncture. This period of training is based upon the UK Department of Health recommendation for health professionals (doctors, physiotherapists) wishing to provide acupuncture in the NHS. This is also the requirement of the UK Chartered Society of Physiotherapy and the UK Health and Care Professions Council. These practitioners do not use the protected title 'acupuncturist' unless registered with the British Acupuncture Council. Although having expert musculoskeletal knowledge with respect to anatomy, pathology and physiology, the physiotherapists providing the acupuncture treatment were not required to make a Traditional Chinese Medicine diagnosis or apply specialist techniques such as moxa. All practitioners were very familiar with all the points used in the protocols. As a requirement of the AACP, all physiotherapists who provided the acupuncture treatment participated annually in continuing professional development training **Control or comparator interventions** Shoulder advice and weekly exercise group (six 50–55-min sessions)		
Johansson, K, Bergstrom, A, Schroder, K & Foldevi, M **Subacromial corticosteroid injection or acupuncture with home exercises when treating patients with subacromial impingement in primary care – a randomized clinical trial** **2011** Research question **What is efficacy of subacromial corticosteroids injected by a GP compared to physiotherapy combining acupuncture and home exercises for subacromial impingement syndrome?** Funding **Supported by Medical Research Council of Southeast Sweden (F-2001-117, F2002-127, F2003-158)**	**Participants** n=92 Age: mean 50 +/- 9 years **Inclusion:** - 30–65 years of age - typical history; pain located in the proximal lateral aspect of the upper arm (C5-dermatome), especially during arm elevation - a positive Neer impingement test (subacromial injection of anaesthetic) - at least 2-month duration of the current episode Three of the following four inclusion criteria must be positive: - Hawkins–Kennedy impingement sign - Jobe supraspinatus test (in 90 degrees of abduction in the scapular plane) - Neer impingement sign - Painful arc between 60 and 120 degrees during active abduction **Exclusion:** - radiological findings: malignancy, osteoarthritis of the glenohumeral joint, skeletal abnormalities decreasing the subacromial space (bony spurs and osteophytes) - known or suspected polyarthritis, rheumatoid arthritis or diagnosed fibromyalgia - previous fractures of any bone in the shoulder complex and/or shoulder surgery on the affected side - dislocation of the glenohumeral or the clavicular joints on the affected side - history of instability or current clinical findings of hyperlaxity in any joint of the shoulder complex	**Pain response in each group:** Not assessed **Functional outcomes in each group:** The Adolfsson–Lysholm shoulder assessment <u>Baseline</u> Acupuncture: 70 (67,74) Corticosteroid: 70 (67,74) <u>6 week follow up</u> Acupuncture: 81 (77,85) Corticosteroid: 81 (77,85) <u>3 month follow up</u> Acupuncture: 88 (84,91) Corticosteroid: 84 (79, 88) <u>6 month follow up</u> Acupuncture: 90 (86, 94) Corticosteroid: 84 (80, 89) <u>12 month follow up</u> Acupuncture: 91 (88, 95) Corticosteroid: 88 (84, 92) There were no significant differences in the primary outcome, pain and shoulder function measured by AL-score **Patient-reported outcomes:** EuroQol-five dimensions	**Reviewer comments** A randomized clinical trial conducted at five primary health care centres in south-eastern Sweden. Study reported in line with the Consort 2010 checklist. The inclusion and exclusion criteria used in the study resulted in a patient population that was as homogenous as possible without using magnetic resonance imaging or a diagnostic ultrasound. Allocation concealment occurred. Power calculation conducted. Intention to treat analysis used. Large number of drop outs within the study. Randomizing patients into one of two groups with active treatments, makes it impossible to conclude the size of the specific treatment effect. The acupuncture group had 10 visits whereas the corticosteroid group had only one, and it is possible that more visits could be a positive factor that played into a placebo effect. Standardised home exercise program lacked individual progression. **Grade:** AQ (+)

Study	Methodology	Results	Comments and evidence level
	- suspicion of the diagnosis frozen shoulder - problems from the cervical spine - having received acupuncture for the current shoulder problem - having received similar exercises for the current shoulder problem - having received a corticosteroid injection during the last 2 months for the current shoulder problem - a clinical picture of ruptured rotator cuff (trauma, pronounced weakness and atrophy) - acute subacromial bursitis, making a clinical examination impossible due to pain - difficulty participating in data collection due to communication problem **Style of acupuncture:** Acupuncture **- Treatment Rationale:** TCM **- Treatment variation:** Standardised routine **Intervention** Acupuncture **- Number of needles inserted per subject per session:** Not reported **- Names of points used:** LI 4 Hegu, LI 14 Binao, LI 15 Jianyu, LU 1 Zhongfu, TE 14 Jianliao **- Depth of insertion:** 0.5-1 cun **- Response sought:** De qi **- Needle stimulation:** Manual **- Needle retention time:** 30 mins **- Needle type:** HEGU (HEGU, Svenska AB, PO Box 89, SE-570 12 Landsbro, Sweden) sterile, single-packaged one time use needle no. 8 (30 mm long and 0.30 mm diameter) **Treatment Regimen** **- Number of treatment sessions:** 10 **- Frequency and duration:** 2 x weekly for 5 weeks **Other components of treatment** Home exercise programme - The first part was targeted towards maintaining or restoring motion and to stimulate circulation in the rotator cuff using many low-intensity repetitions without provoking pain from the tissues involved - The second part was targeted towards strengthening the rotator cuff with the arm in a neutral position to avoid impingement **Practitioner qualifications and background** Not reported	<u>Baseline</u> Acupuncture: 0.66 (0.58, 0.73) Corticosteroid: 0.69 (0.64, 0.75) <u>6 week follow up</u> Acupuncture: 0.78 (0.71–0.84) Corticosteroid: 0.8 (0.75, 0.84) <u>3 month follow up</u> Acupuncture: 0.81 (0.75, 0.87) Corticosteroid: 0.80 (0.74,0.86) <u>6 month follow up</u> Acupuncture: 0.84 (0.79, 0.89) Corticosteroid: 0.83 (0.78, 0.88) <u>12 month follow up</u> Acupuncture: 0.84 (0.76–0.91) Corticosteroid: 0.84 (0.78, 0.90) No significant differences between groups EuroQol VAS <u>Baseline</u> Acupuncture: 73 (67, 80) Corticosteroid: 71 (65, 76) <u>6 week follow up</u> Acupuncture: 81 (76, 87) Corticosteroid: 75 (70, 81) <u>3 month follow up</u> Acupuncture: 85 (80, 90) Corticosteroid: 78 (72, 83) <u>6 month follow up</u> Acupuncture: 84 (78–89) Corticosteroid: 79 (73, 84) <u>12 month follow up</u> Acupuncture: 82 (76, 88) Corticosteroid: 80 (74, 85) No significant differences between groups **Adverse effects** Only minor complications that were associated with the needle penetration were reported. If pain or a bruise occurred, it resolved in a couple of days. Tiredness, aggravation of existing symptoms for a few days, was defined as a common response to acupuncture treatment	**Quality**: 1

Study	Methodology	Results	Comments and evidence level
	Control or comparator interventions Subacromial corticosteroid injections: - The patients were assigned to a GP within 1 week of inclusion for an injection of 1 ml Depomedrone (40 mg methylprednisolone) + 8–10 ml of 1% prilocaine - After the injection, the patients were then advised to refrain from heavy arm activities for the next 2 weeks. After this, patients were allowed to return to normal activities but advised to avoid activities that clearly provoked impingement. They were also informed that if the first injection would result in a doubtful effect, the patients could get a second injection by contacting the treating GP		
Rha, D, Park, G, Kim, Y, Kim, M & Lee, S **Comparison of the therapeutic effects of ultrasound-guided platelet-rich plasma injection and dry needling in rotator cuff disease: a randomized controlled trial** **2012** Research question **What is the effectiveness of platelet-rich plasma injection compared to dry needling on shoulder pain and function in patients with rotator cuff disease?** Funding **This research was supported by Basic Science Research Program through the National Research Foundation of Korea (NRF) funded by the Ministry of Education, Science and Technology (2011-0005611)**	**Participants** n=39 Rotator cuff disease - 15 patients presented partial-thickness tears (9 articular surface tears, 4 bursal surface tears, and 2 intra-substance tears) - 24 patients presented tendinosis in sonographic findings of the supraspinatus tendon Duration: Inv mean 9.2 +/- 3.2 months Age: mean 53.9 +/- 11.6 years **Inclusion:** Patients to meet the following criteria: - had more than six months of shoulder pain - had a pain score measured by the visual analogue scale in the affected shoulder greater than 5 (on a numeric scale of 0–10) - had a painful arc and/or an impingement sign - demonstrated no weakness on resisted testing of musculotendinous units of the rotator cuff - were diagnosed with supraspinatus tendon disease, such as a tendinosis or a partial-thickness tear of less than 1.0 cm upon sonographic examination - no or little response to conservative therapy for at least three months **Exclusion:** - presence of other obvious pathology for the rotator cuff pain, such as a fracture or rheumatic diseases - referred pain from the neck - prior surgery to either the shoulder or neck region - a history of NSAID use during the most recent two weeks and/or steroid injection within six weeks - hypersensitivity to lidocaine - presence of an unstable medical condition or a known uncontrolled systemic disease	**Pain response in each group:** SPADI Pain – total pain score <u>Baseline</u> PRP: 24.4 (1.6) Dry needling: 24.6 (1.6) <u>1 Two weeks after the first injection</u> PRP: 19.0 (1.6) Dry needling: 20.2 (1.6) <u>Three-month follow-up</u> PRP: 7.6 (1.5) Dry needling: 12.8 (1.5) <u>Six-month follow-up</u> PRP: 6.2 (1.4) Dry needling: 10.9 (1.5) - No significant difference between the two groups when the total pain score of the SPADI was analysed separately **Functional outcomes in each group:** <u>ROM:</u> A group difference in internal rotation and flexion of the shoulder was observed and they were more improved at 3 and 6 month follow up in the platelet-rich plasma group compared to the dry-needling group. Improvements in external rotation and abduction were not different between the two groups at each time point ($P < 0.05$) **Patient-reported outcomes:** Shoulder Pain and Disability Index Pain – total pain score <u>Baseline</u> PRP: 62.3 (4.1) Dry needling: 62.8 (4.2) <u>Two weeks after the first injection</u>	**Reviewer comments** Well conducted single-centre, prospective, randomized, double-blinded, controlled study. Stratified randomization procedure used. Both the participating patients and outcome investigator who evaluated the outcome measures were blinded to the treatment allocation. Investigator who performed the platelet-rich plasma injection and dry needling was not blinded. Conducted at a university rehabilitation hospital setting. Both groups received two treatment sessions. The main limitation of the study is the small sample size and follow-up loss (25% drop-out rate). Intention-to-treat analysis was not performed. **Grade:** AQ (+) **Quality**: 1

Study	Methodology	Results	Comments and evidence level
	- any conditions or situations that might place the patient at significant risk during the study **Style of acupuncture:** U/S guided dry needling **- Treatment Rationale:** Western **- Treatment variation:** Standardised routine **Intervention** U/S guided dry needling - Using a sterile technique with a sterile probe cover, real-time ultrasound guidance was provided during the dry needling procedure. A sterile field was set up and maintained throughout the procedure. The lesion was localized under ultrasound and the target area was then adjusted according to the site of maximal tenderness. A 25-gauge needle was used to anaesthetize the supraspinatus tendon with less than 1 mL of 0.5% lidocaine. After anaesthetizing the target, an investigator (SCL) confirmed whether the shoulder pain was reduced. Then, dry needling into the abnormal portion of the tendon was performed. The needle was passed through the lesion of the tendon approximately 40–50 times under ultrasound guidance. **- Number of needles inserted per subject per session:** 1 **- Names of points used:** N/A **- Depth of insertion:** a/a **- Response sought:** Not reported **- Needle stimulation:** Manual **- Needle retention time:** N/A **- Needle type:** a/a **Treatment Regimen** **- Number of treatment sessions:** 2 **- Frequency and duration**: 2 x at a 4-week interval **Other components of treatment** To control post-injection pain, acetaminophen or hydrocodone was prescribed if needed. A self-exercise protocol was provided to all participants and no other therapy was allowed during the study period except self-exercise and posture correction **Practitioner qualifications and background** Not reported **Control or comparator interventions** Platlet-rich plasma injections at 4-week intervals x 2	PRP: 48.2 (4.2) Dry needling: 51.1 (4.3) <u>Three-month follow-up</u> PRP: 21.1 (3.9) Dry needling: 34.6 (4.0) <u>Six-month follow-up</u> PRP: 17.7 (3.7) Dry needling: 29.5 (3.8) The reduction in the platelet-rich plasma group was more significant than that in the dry needling group ($P < 0.05$). Post-hoc analysis revealed that the clinical effect of the platelet-rich plasma injection was superior to the dry needling at times 3 and 6 month follow up ($P < 0.05$) **Adverse effects** No severe adverse events were observed in either group	

Study	Methodology	Results	Comments and evidence level
Acosta-Olivo, C, Siller-Adame, A, Tamez-Mata, Y, Vilchez-Cavazos, F & Peña-Martinez, V **Laser Treatment on Acupuncture Points Improves Pain and Wrist Functionality in Patients Undergoing Rehabilitation Therapy after Wrist Bone Fracture. A Randomized, Controlled, Blinded Study** **2017** Research question **What is the effectiveness of a laser beam on acupuncture points on the rehabilitation of patients with a diagnosis of distal radius fracture (1.5 inches proximal to distal articular surface of the radius) when applied with active conventional physical therapy exercises?** Funding **Not reported**	**Participants** n=26 Age: 54.8 +/- 13.07 years **Inclusion:** - Patients with a distal radius fracture treated with closed reduction, percutaneous pinning, and a short cast for six weeks - Type A2, A3, B1 and B2 fractures - Fracture managed with closed reduction, percutaneous pinning and cast - Mentally intact **Exclusion:** - Previous wrist or hand injuries - Neurological disorders - Pregnancy - Cancer - Those who abandoned treatment or who developed adverse reactions to laser acupuncture were excluded **Style of acupuncture:** Laser beam on acupuncture points **Treatment Rationale:** TCM **Intervention** A low power infrared 980 nm, 50 rnW laser (Diller & Diller Laser Performance) electric energy, was used; each acupuncture point was irradiated for 30 seconds at 8,000 Hz at each therapy sessio. Treatment was applied to the following points: Ipsilateral- Yanggu (S15), Yangchi (SJ4), Waiguan (SJ15), Yangxi (L15), Daling (PC7); Bilateral- Hegu (LI4); Contralateral- Shenmail (VL62), Kulun (V60), Taixi (KID3) **Treatment Regimen** **- Number of treatment sessions:** 10 **- Frequency and duration**: 3 x weekly for 4 weeks **Other components of treatment** 3 x daily wrist exercises via pamphlet **Practitioner qualifications and background** Not reported **Control or comparator interventions** Simulated laser acupuncture with the laser off	**Pain response in each group:** VAS: (0-10) <u>Before treatment:</u> Laser 5.9 +/- 1.7 Control 5 +/- 2.2 <u>1 week post 4 weeks of treatment:</u> Laser 1.1 +/- 1.4 Control 2.6 +/- 1.9 Significant difference p=0.02 **Functional outcomes in each group:** Wrist range of motion: - Significant improvement in the treatment group at the final assessment for wrist flexion - Non-significant difference at the final assessment for wrist extension, pronation, supination, ulna deviation **Patient-reported outcomes:** Patient-Rated Wrist Evaluation (PRWE) <u>Before treatment:</u> Laser 69.1 +/- 12.2 Control 70.9 +/- 13.6 <u>1 week post 4 weeks of treatment:</u> Laser 15.2 +/- 11.8 Control 30.4 +/- 22.4 Significant difference p= 0.048 **Adverse effects** Not reported, however, 10 patients dropped out either due to abandoning treatment or development of adverse reactions.	**Reviewer comments** Controlled, randomised, longitudinal, comparative, prospective double blind clinical trial. Adequate randomisation method. Trail was registered prior to being conducted. 10 patients lost to follow up with no ITT analysis: Those who abandoned treatment or who developed adverse reactions to laser acupuncture were excluded. Short term follow-up only. Limited number of participants included. **Grade:** LQ (-) **Quality**: 1-

Study	Methodology	Results	Comments and evidence level
Li, N, Liu, J & Zhang, M **Clinical observation of Tuina Therapy for Cervicogenic Headache** **2009** Research question **What is evidence of effectiveness of Tuina therapy for Cervicogenic headache?** Funding **Not reported**	**Participants** n=54 Age: Inv – mean: 41 ± 10 years Duration: Inv – mean 14.15 ± 7.87 years **Inclusion:** - Patients with Cervicogenic headache diagnosed according to the guideline (ICHD-Ⅱ) set by the International Headache Society - Featured by unilateral occipitaltemporal pain which, can be increased by neck movement, accompanied by cervical hypomobility, postural changes and increased muscle tone, abnormal posture and degeneration of the cervical spine found in the radiological examination - No history of peptic ulcer; not currently taking nonsteroidal anti-inflammatory drug (NSAIDs) or anticoagulant therapy; no allergy to NSAIDs; no serious complications, e.g. cardiac, liver or renal failure **Exclusion:** - Serious spinal or craniocerebral diseases such as metastatic, inflammatory or infective diseases, bone fracture **Style of acupuncture:** Tuina **- Treatment Rationale:** TCM **Intervention** Tuina Patients allocated to this group received traditional Chinese tuina therapy. The manipulation was focused on cervical, occipital and facial muscles, especially for trapezius, sternocleidomastoid, rectus capitis posterior major and minor muscles. Active cervical movement was performed. It included forward-backward bend, side bend, rotation and cervical traction **- Number of needles inserted per subject per session:** N/A **- Names of points used:** The main acupoints were Fengchi (GB 20), Fengfu (GV 16), Jianjing (GB 21), Touwei (ST 8), Jiaosun (TE 20), Baihui (GV 20) and Taiyang (Ex-HN 5) **- Depth of insertion:** N/A **- Response sought:** Not reported **- Needle stimulation:** N/A **- Needle retention time:** N/A **- Needle type:** N/A **Treatment Regimen** **- Length of treatment:** 30 mins **- Number of treatment sessions:** 10 **- Frequency and duration:** 1 x daily for 10 days	**Pain response in each group:** Headache degree (VAS) Tuina – Baseline: 64.74 ± 5.56 Medicine – Baseline: 60.46 ± 7.91 Tuina – 2 weeks post treatment: 19.81 ± 8.71 Medicine – 2 weeks post treatment: 36.35 ± 8.46 **Functional outcomes in each group:** Nil utilised **Patient-reported outcomes:** NDI Tuina – Baseline: 19.18 ± 3.41 Medicine – Baseline: 18.26±3.97 Tuina – 2 weeks post treatment: 6.78 ± 4.09 Medicine – 2 weeks post treatment: 14.12 ± 2.76 Headache frequency Tuina – Baseline: 2.34 ± 0.75 times/week Medicine – Baseline: 2.02 ± 0.63 times/week Tuina – 2 weeks post treatment: 0.63 ± 0.29 times/week Medicine – 2 weeks post treatment: 1.21 ± 0.37 times/week Results: The headache VAS, frequency of headache occurrence and NDI were all improved in the two groups. The improvement was better in tuina group ($P < 0.01$) **Adverse effects** Not reported	**Reviewer comments** Randomised controlled trial. Well reported intervention. Randomisation method unknown. No concealment methods were reported, which adds to the level of bias. Patients, practitioners, and the assessors were not blind to the treatments. No power calculation conducted. All participants were out-patients of the rehabilitation clinic of Jiangsu Provincial Hospital of Integrated Traditional Chinese and Western Medicine. **Grade:** LQ (-) **Quality**: 1-

Study	Methodology	Results	Comments and evidence level
	Other components of treatment Nil reported **Practitioner qualifications and background** Not reported **Control or comparator interventions** Patients divided into this group were asked to take ibuprofen 200 mg orally every time, 2 times every day, for 5 days, and then changed to ibuprofen 200 mg, 1 time every day, for 5 days		
Hadianfard, M, Ashraf, A, Fakheri, M & Nasiri, A **Efficacy of Acupuncture versus Local Methylprednisolone Acetate Injection in De Quervain's Tenosynovitis: A Randomized Controlled Trial** **2014** Research question **What is the effectiveness of acupuncture on disability and pain in individuals with De Quervain's tenosynovitis?** Funding **Nil reported**	**Participants** n=35 – 5 drop outs Duration: 5 weeks Age: 40.7 years (range 22 - 76 years) **Inclusion:** - Any age and either sex - Clinical diagnosis of De Quervain's tenosynovitis - Patients who had symptoms and signs of disease (pain and/or swelling around the styloid process of the radius and positive finkelstein test) **Exclusion:** - Pain less than 4 weeks, recent history of taking NSAIDs, injection or surgery around the styloid process of the radius, history of direct trauma, fracture of the wrist, uncontrolled concomitant disease (such as diabetes mellitus or coagulopathy), abnormal findings in blood tests or radiography of the wrist, and also pregnant or lactating mothers **Style of acupuncture:** Acupuncture **Treatment Rationale:** TCM **- Treatment variation:** Standardised routine **Intervention** **- Number of needles inserted per subject per session:** 3 + maximum of 4 Ahshi points **- Names of points used:** LI-5 (Yangxi), LU-7 (Lieque), and LU-9 (Taiyuan) **- Depth of insertion:** 0.5 cun **- Response sought:** De Qi **- Needle stimulation:** Nil **- Needle retention time:** 30 mins **- Needle type:** disposable, sterilized, flexible stainless-steel needles (size: 0.25 mm x 40 mm)	**Pain response in each group:** VAS: (0-10) <u>Baseline</u> Injection: 6.67 +/- 1.75 Acupuncture: 7.13 +/- 1.55 P= 0.071 <u>2 weeks</u> Injection: 2.53 +/- 1.72 Acupuncture: 3.9 +/- 1.75 P= 0.021 significant in favour of injection <u>6 weeks</u> Injection: 1.20 +/- 1.61 Acupuncture: 2.07 +/- 2.05 P= 0.129 non-significant **Patient-reported outcomes:** Q-DASH: <u>Baseline</u> Injection: 61.2 +/- 15.72 Acupuncture: 64.4 +/- 15.06 P= 0.185 non-significant <u>2 weeks</u> Injection: 13.7 +/- 9.38 Acupuncture: 24.3 +/- 12.65 P= 0.083 significant in favour of injection <u>6 weeks</u> Injection: 6.1 +/- 8.52 Acupuncture: 9.8 +/- 9.93 P= 0.227 non-significant	**Reviewer comments** Adequately conducted RCT. STRICTA criteria used. Comprehensively reported RCT. Random allocation software used. Power calculation not conducted. Nil blinding occurred for participants and outcome assessor. Prescription of the thumb spica splint for patients in both groups may have had a confounding effect in outcomes assessments. Short term follow-up time only. **Grade:** AQ (+) **Quality**: 1

Study	Methodology	Results	Comments and evidence level
	Treatment Regimen **- Number of treatment sessions:** 5 **- Frequency and duration:** 5 treatments over a week **Other components of treatment** - All the patients were advised to avoid mechanical overload on their hands - Thumb spica splint was prescribed for patients in both groups - Encouraged patients not to take analgesic drugs during the course of the study **Practitioner qualifications and background** Well-trained physiatrist **Control or comparator interventions** 1 mL of (40 mg) methylprednisolone acetate (Iran Hormone Pharmaceutical Company) and 1 mL of 2% lidocaine (Caspian Tamin Pharmaceutical Company) was injected around the APL and EPB tendons sheath	**Adverse effects** The adverse events of acupuncture were minimal and none of the patients required discontinuation of the sessions. Mild pain and bruises rarely occurred at the acupuncture sites and were transient	
Brennan, K, Allen, B & Maldonado, Y **Dry Needling Versus Cortisone Injection in the Treatment of Greater Trochanteric Pain Syndrome: A Noninferiority Randomized Clinical Trial** **2017** Research question **What is the effectiveness of dry needling compared to cortisone injection in reducing lateral hip pain and improving function in patients with GTPS?** Funding **Internal grant support was provided by Baylor Scott & White Health**	**Participants** n=43 with 50 hips observed Age: Inv - 61.3 ± 16.5 **Inclusion:** - 18 years of age or older - having lateral hip pain (pain anywhere from the iliac crest to the mid iliotibial band) - having an active e-mail account **Exclusion:** - low back pain associated with hip pain, motor and/or sensory impairment consistent with radiculopathy, active infection or malignancy of the hip, connective tissue disease, lack of proficiency in spoken English, and pregnancy **Style of acupuncture:** Dry needling **Treatment Rationale:** Western **- Treatment variation:** Individualised routine **Intervention** **- Number of needles inserted per subject per session:** The number of needle insertions per muscle depended on the number of MTrPs to be dry needled, the participant's tolerance of needle insertion, responsiveness of the tissue to dry needling, and level of postneedle soreness in a specific muscle. Hips treated in the DN group received 3 to 7 treatments (mean, 5.4), based on provider recommendations	**Pain response in each group:** Pain score NPRS <u>Baseline</u> Dry needling 5.4 ± 1.8 Cortisone injection 6.1 ± 2.1 <u>1 week post intervention</u> Dry needling 3.6 ± 2.1 Cortisone injection 2.6 ± 2.7 <u>3 week post</u> Dry needling 4.0 ± 2.2 Cortisone injection 2.7 ± 2.9 <u>6 week post</u> Dry needling 2.8 ± 2.4 Cortisone injection 3.9 ± 3.7 Nil significance at 6 weeks Difference, –1.12; 95% CI: –2.99, 0.74 **Patient-reported outcomes:** PFPS – Patient specific functional scale <u>Baseline</u> Dry needling 3.9 ± 1.0 Cortisone injection 3.4 ± 1.7 <u>1 week post intervention</u>	**Reviewer comments** Adequately conducted prospective, randomized, partially blinded RCT. Inadequate inclusion criteria. Trail was registered prior to being conducted. Sample size calculation conducted. Block randomisation used. Patient blinded. Dropouts within study where replaced and no ITT analysis conducted. A sham DN procedure was not applied. Because both groups received treatment, the study cannot comment on the placebo effect. A larger sample size would allow smaller confidence intervals. **Grade:** AQ (+) **Quality**: 1

Study	Methodology	Results	Comments and evidence level
	- Names of points used: Exact location of needle insertion and number of penetrations within the region of the involved posterolateral hip were determined by the treating therapist. Muscles assessed first included those harboring MTrPs that might have been responsible for the participant's pain, including the piriformis, gluteus medius, gluteus minimus, tensor fascia latae (with or without the ITB), and gluteus maximus. Synergists and antagonists of these muscles also were assessed for MTrPs as indicated. These included the adductor longus, adductor magnus, adductor brevis, semitendinosus, semimembranosus, and biceps femoris muscles. Additionally, muscles that might have influenced the participant's loading and/or neurologically facilitated tone of the aforementioned muscles were needled if indicated. These included the lumbar multifidi, paraspinals, and quadratus lumborum **- Depth of insertion:** Not prespecified **- Response sought:** Dry needling of an MTrP attempted to elicit sensations such as aching, soreness, pressure, and reproduction of symptoms and, if possible, a local twitch response **- Needle stimulation:** Following insertion, the needle was withdrawn partially and advanced repeatedly **- Needle retention time:** The needle remained in the muscle for as long as it took to produce an appropriate response and was tolerated by the participant; the needle then was left in situ for approximately 5 to 7 minutes **- Needle type:** Seirin J-type (SEIRIN Corporation, Shizuoka, Japan) or tai chi (Suzhou Shenlong Medical Apparatus Co, Ltd, Suzhou, China). Needle length typically ranged from 50 to 100 mm, with a diameter of 0.30 to 0.50 mm **Treatment Regimen** **- Number of treatment sessions:** The number of follow-up visits within 6 weeks of initiation of study treatment was determined by the therapist **- Frequency and duration:** 6-week duration **Other components of treatment** Nil **Practitioner qualifications and background** Certified in DN, had 17 years of clinical practice experience, and 4 years of experience in DN **Control or comparator interventions** Cortisone injection - 2 mL methylprednisolone acetate (Depo-Medrol; Pfizer Inc, New York, NY), 40 mg/mL; 4 mL 1% lidocaine; 4 mL 0.25% marcaine (10 mL total). Point of maximal tenderness identified on the lateral aspect of the greater trochanter	Dry needling 5.2 ± 2.2 Cortisone injection 6.5 ± 2.8 <u>3 week post</u> Dry needling 5.7 ± 2.0 Cortisone injection 6.5 ± 2.8 <u>6 week post</u> Dry needling 7.3 ± 2.3 Cortisone injection 6.1 ± 3.0 Difference of 0.2 (95% CI: –0.57, 0.96; P<.01) Not significant **Medication intake:** Medication intake for pain associated with the involved hip did not differ between the 2 groups at 6 weeks (P = .74) or at any other time (P = .19 at 1 week; P = .11 at 3 weeks). **Adverse effects** No adverse effects were observed by the clinicians or reported by any of the subjects for either group. The typical side effects associated with needle penetration/injection, such as temporary pain, bruising, and posttreatment soreness, were not documented as adverse effects.	