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Te Kaporeihana Āwhina Hunga Whara

Pragmatic Evidence Based Review

The efficacy of acupuncture in the management of musculoskeletal pain

Reviewer	**Natalie Hardaker and Mark Ayson**
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Important Note:

- This report is not intended to replace clinical judgement, or be used as a clinical protocol.
- A robust evidence-based review of clinical guidelines, systematic reviews and high quality primary evidence relevant to the focus of this report was carried out. This does not however claim to be exhaustive.
- The document has been prepared by the staff of the research team, ACC. The content does not necessarily represent the official view of ACC or represent ACC policy.
- This report is based upon information supplied up to 31st July 2011

Purpose

The purpose of the report is to;

- Briefly describe traditional Chinese medicine (TCM) acupuncture and western medical acupuncture
- Report the efficacy of acupuncture for the treatment of injury-related spine, shoulder, knee & ankle conditions
- Report the comparative efficacy of acupuncture when considering alternative conservative treatment interventions for the spine, shoulder, knee & ankle
- Report any adverse reactions cited in the literature.

Scope

This report will be restricted to acupuncture involving various modes of needling (including electroacupuncture) for musculoskeletal pain from knee, spine, shoulder and ankle injuries. Treatment modalities of TCM like cupping, scraping, Chinese massage, and herbalism will not be addressed.

No distinction will be made between traditional Chinese medical acupuncture and western medical acupuncture

Summary Message

The evidence for the effectiveness of acupuncture is most convincing for the treatment of chronic neck and shoulder pain. In terms of other injuries, the evidence is either inconclusive or insufficient. The state of the evidence on the effectiveness of acupuncture is not dissimilar to other physical therapies such as physiotherapy, chiropractic and osteopathy.

Key findings

General

- There is insufficient evidence to make a recommendation for the use of acupuncture in the management of acute neck, back or shoulder pain
- There is emerging evidence that acupuncture may enhance/facilitate other conventional therapies (including physiotherapy & exercise-based therapies)
- There is a paucity of research for the optimal dosage of acupuncture treatment for treating shoulder, knee, neck and lower back pain
- Studies comparing effective conservative treatments (including simple analgesics, physical therapy, exercise, heat & cold therapy) for (sub) acute and chronic non-specific low back pain (LBP) have been largely inconclusive

Lower back

- The evidence for the use of acupuncture in (sub)acute LBP is inconclusive
- There is limited evidence to support the use of acupuncture for pain relief in chronic LBP in the short term (up to 3 months)
- The evidence is inconclusive for the use of acupuncture for long term (beyond 3 months) pain relief in chronic LBP
- There is no evidence to recommend the use of acupuncture for lumbar disc herniation related radiculopathy (LDHR)

Neck

- There is good evidence that acupuncture is effective for short term pain relief in the treatment of chronic neck pain
- There is moderate evidence that real acupuncture is more effective than sham acupuncture for the treatment of chronic neck pain
- There is limited evidence that acupuncture has a long term effect on chronic neck pain

Shoulder

- There is good evidence from one pragmatic trial that acupuncture improves pain and mobility in chronic shoulder pain
- There is limited evidence for the efficacy of acupuncture for frozen shoulder
- There is contradictory evidence for the efficacy of acupuncture for subacromial impingement syndrome

Knee

- There is no evidence to recommend the use of acupuncture for injury-related knee pain

Ankle

- There is no evidence to recommend the use of acupuncture for ankle pain

Background

Acupuncture has roots in ancient Chinese philosophy. Traditional Chinese Medicine (TCM) acupuncture is based on a number of philosophical concepts, one of which is that any manifestation of pain/dysfunction is a sign of imbalance of energy flow within the body. It is in this context that the TCM acupuncturist uses a holistic treatment approach. TCM acupuncture involves inserting needles into traditional meridian points with the intention on influencing energy flow within that meridian[1]. Acupuncture has been adopted into western medicine and treatments; many physicians currently practicing acupuncture reject such pre-scientific notions described above, using unnamed tender or trigger points to stimulate nerves or muscles[1]. Further to this acupuncture is also now regularly practiced globally by a specialist sub-group of physiotherapists and some other health professionals. New Zealand physiotherapists have been practicing acupuncture since 1972[2].

As a technique acupuncture includes the invasive or non-invasive stimulation of specific anatomical locations by means of needles or other thermal, electrical, light, mechanical or manual methods[3]. Acupuncture is most commonly used to treat chronic pain[4 5] and is currently used for a variety of conditions, including; spinal cord injury[6], visceral dysfunction The other two studies compared 'traditional acupuncture' with suprascapular nerve block and acupuncture 'according to Jing Luo' respectively[*6], headaches[4], addictions[6] emesis developing after surgery or chemotherapy in adults The other two studies compared 'traditional acupuncture' with suprascapular nerve block and acupuncture 'according to Jing Luo' respectively[†], nausea associated with pregnancy[6] and dental pain[7]; all of which fall outside the scope of this report. Acupuncture is also used to treat a number of musculoskeletal conditions, including shoulder[6], wrist, and lower back pain[4 6 7] The other two studies compared 'traditional acupuncture' with suprascapular nerve block and acupuncture 'according to Jing Luo' respectively[‡], knee pain[4 6], neck pain, tennis/golfers elbow and ankle pain[6].

Modern acupuncture includes manual stimulation of needles that are inserted into the skin. Various adjuncts are often used including: electrical acupuncture (electrical stimulator connected to acupuncture needle), injection acupuncture (herbal extracts injected into acupuncture points), heat lamps, and moxibustion with acupuncture (the moxa herb, Artemesia vulgaris, is burned at the end of a needle). Dry needling is a technique used to treat myofascial pain in any part of the body[8], by definition trigger point dry needling (TDN) and Intramuscular manual therapy (IMT) are acupuncture techniques[3]. Dry needling involves the insertion of a needle at specific trigger points, the needle being a solid acupuncture needle or a dry injection needle.

1. Methodology

Comprehensive literature searching was carried out focused on the efficacy of acupuncture for spine, knee, shoulder and ankle pain. The databases accessed for the search were, Medline®, CINAHL, EMBASE, AMED, PsychINFO, PubMed and Medline-in-process and Google. These databases will capture most, if not all, of the more robust clinical studies that may have been reported in the TCM-specific databases. In addition, the databases used here are used routinely in evidence-based research for complementary and alternative medicines. Of note, the TCM-specific databases contain many case series studies and other study designs that would be excluded from this report.

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* see Green 200537. Green S, et al. Acupuncture for shoulder pain. *Cochrane Database Syst Rev* 2005(2):CD005319. for more details

† see Green 200537. Green S, et al. Acupuncture for shoulder pain. *Cochrane Database Syst Rev* 2005(2):CD005319. for more details

‡ see Green 200537. Green S, et al. Acupuncture for shoulder pain. *Cochrane Database Syst Rev* 2005(2):CD005319. for more details

The search was run on the 31st July 2011 for the period 2000 to present. Manual searching of reference lists was also carried out. A pragmatic approach was taken initially searching for randomised controlled trials (RCTs), systematic reviews and meta-analyses, as the highest levels of evidence. RCT's are also the trial design of choice when investigating treatment efficacy.

The literature was critically appraised using SIGN[9] (see below) grading system for systematic reviews and RCTs.

SIGN – LEVELS OF EVIDENCE

1++ High quality meta-analyses, systematic reviews of RCTs, or RCTs with a very low risk of bias

1+ Well-conducted meta-analyses, systematic reviews, or RCTs with a low risk of bias

1- Meta-analyses, systematic reviews, or RCTs with a high risk of bias

2++ High quality systematic reviews of case control or cohort or studies
High quality case control or cohort studies with a very low risk of confounding or bias and a high probability that the relationship is causal

2+ Well-conducted case control or cohort studies with a low risk of confounding or bias and a moderate probability that the relationship is causal

2- Case control or cohort studies with a high risk of confounding or bias and a significant risk that the relationship is not causal

3 Non-analytic studies, e.g. case reports, case series

4 Expert opinion

3. Review of the Literature

Neck pain and lower back pain (LBP) are two conditions that can be problematic to treat. Studies examining effective conservative treatments for (sub)acute and chronic non-specific low back pain have been largely inconclusive. This is also true of neck and thoracic spine pain.

A lot of the literature focuses on chronic spinal pain; there are no high quality trials for the treatment of acute spinal pain.

There is limited evidence to suggest that acupuncture is not an appropriate treatment for any spinal condition with suspected neurological involvement[10 11].

3.1 Lower Back Pain

Chronic spinal pain presents a diagnostic and treatment challenge ,reaching a specific diagnosis is often difficult. Effective conservative treatments for (sub)acute and chronic non-specific LBP have been largely inconclusive[12]. Differing patient populations and methodologies make direct comparison of studies problematic often resulting in inconclusive findings.

Studies comparing spinal manipulation, medication, and acupuncture for chronic spinal pain revealed that spinal manipulation produced the greatest benefit both in the short[13] and long term [12]; within these studies acupuncture produced 'consistent' improvement in outcomes although this did not reach statistical significance. Outcome measures addressed both pain and function (Oswestrey scale, Visual Analogue Scale (VAS), lumbar flexion in sitting and standing); overall recovery was 27% of the patients receiving spinal manipulation, 9.4% of those receiving acupuncture and only 5% of those receiving medication. It is noteworthy

here that spinal manipulation is not appropriate for all LBP patients and a range of conservative treatment options must always be considered. In this study it was not possible to blind the patient and the therapist to the treatment allocation due to the 'hands on' nature of manipulation and acupuncture, therefore the placebo effect cannot be discounted.

In a study[14] comparing 3 different acupuncture approaches (individualised, standardised & sham) to standard care (inclusive of medications, primary care and physical therapy, non-study related), all groups treated with acupuncture demonstrated greater improvement in dysfunction than standard care[14]. The acupuncture groups included in this study all used different needle locations and depths, which suggests that this is unimportant in eliciting a therapeutic effect and may in-fact represent a placebo or non-specific effect. This was the only study reporting on function; the literature more frequently reports pain relieving effects.

Itoh et al[15] reported that a study group receiving trigger point acupuncture recorded significantly less pain (VAS) than a sham control group. This finding remained true when the groups were crossed over following a 3 week washout period. As acknowledged by the authors, the 3 week washout may have been insufficient and therefore a carry over treatment effect could not be discounted. This study does however support the notion that both sham and real acupuncture exert positive therapeutic effects on chronic LBP and that real acupuncture is more effective than sham.

A systematic review of acupuncture for chronic LBP[16] returned only 5 RCT's. A meta-analysis was not performed due to the wide disparities in design, groups, needling points, control groups and how & when pain relief outcomes were measured in these studies. The trials were examined individually, and did not provide definitive evidence to support or refute acupuncture as an effective treatment for chronic LBP. Closer examination of the articles included in the review reveals that the results of the RCT's show a trend towards study groups receiving some form of acupuncture intervention show improvement/positive treatment effects. However in agreement with the review author there are some methodological issues within the studies that prevent the drawing of definitive conclusions. A systematic review[8] concluded that in chronic LBP acupuncture is more effective than no treatment or sham treatment at up to 3 month follow up. It was also reported that acupuncture as an adjunct to conventional therapies is more effective than conventional therapies alone. Dry needling is also considered in this review and reported as a useful adjunct to other therapies for chronic LBP.

A larger systematic review [1] inclusive of both acute and chronic LBP focused on the primary outcome of short term pain relief reports that acupuncture is described as statistically significantly and clinically important and is more effective than sham acupuncture and concludes that acupuncture effectively relieves chronic LBP. It is noteworthy that of the 33 RCTs included in the review only 22 could be included in the meta-analysis due to the heterogeneity across the study samples and methodologies in the remaining 11 RCTs, 4 of which were related to chronic LBP. The quality of the studies included in the meta-analysis is variable, as such the findings from this review should only be considered as somewhat preliminary. Future publication of larger trials would have an impact on the evidence overall.

A more recent systematic review[17] inclusive of 6 RCTs not published when previous reviews[1 8] were carried out reported that there is moderate evidence that acupuncture is more effective than no treatment and strong evidence of no significant difference between acupuncture and sham acupuncture for short term pain relief for chronic LBP.

Considering 3 systematic reviews[1 8 17] of reasonable quality the evidence shows a trend towards acupuncture being more effective than no treatment, however the evidence remains limited. There are inconsistent findings for acupuncture versus sham acupuncture. There is consistent evidence that acupuncture is a useful adjunct to other conservative treatments

(physiotherapy, exercise based therapy, education, osteopathy). It remains unclear whether acupuncture is more effective than other aforementioned conservative treatments and this requires further investigation.

Six[12-14 18-22] RCT's of reasonable quality consistently reported that acupuncture has 'minimal' or 'some' positive effect on chronic LBP. Due to the differences in study population and methodologies it is difficult to compare these studies, therefore the evidence to support acupuncture for chronic LBP is limited.

There were only 2 studies which included (sub)acute LBP; 1 RCT[22] and 1 systematic review[8]. The RCT included a sham group and an acupuncture treatment group, the treatment group reported statistically significant improvement in pain at 3 months post treatment and reported taking less pain control medication. However this study is underpowered and alone offers little towards a definitive conclusion around the efficacy of acupuncture for (sub)acute LBP. The systematic review[8] reports that there is insufficient evidence to support the efficacy of acupuncture or dry needling in acute LBP. Based on this evidence it is not possible to draw definitive conclusions about the effect of acupuncture for treating (sub)acute LBP.

When considering back pain associated with lumbar disc herniation radiculopathy (LDHR) there is no evidence for the use of acupuncture[10]. As such acupuncture is not recommended as a treatment for this pathology.

Lower back		
Author/Study	**Level of evidence**	**Findings/Adverse effects**
1a. Lynton et al (2003) Chronic Spinal Pain: A Randomized Clinical Trial Comparing Medication, Acupuncture and Spinal Manipulation	1+	Acupuncture minimally effective Manipulation gives greater pain relief in short term Adverse effects – none reported for acupuncture
1b. Muller et al (2005) Long-term follow-up of a randomized clinical trial assessing the efficacy of medication, acupuncture, and spinal manipulation for chronic mechanical spinal pain syndromes	1+	Acupuncture minimally effective Manipulation gives greater pain relief in long term Adverse effects - none reported
2a. Cherkin et al (2008) Efficacy of acupuncture for chronic low back pain: protocol for a randomized controlled trial 2b. Cherkin et al (2009) A Randomised Trial Comparing Acupuncture and Usual Care	1-	Acupuncture produced short & long term improvement in function but not symptoms Acupuncture more effective than 'usual care' Site & depth of penetration appear unimportant in eliciting therapeutic benefit.

Lower back		
for Chronic Low Back Pain		May represent placebo or non-specific effects Adverse effects – none reported
3. Itoh et al (2006) Effects of trigger point acupuncture on chronic low back pain in elderly patients -- a sham-controlled randomised trial	1+	Trigger point acupuncture effective for short term relief of low back pain in elderly patients Trigger point acupuncture more effective than sham Adverse effects – none reported
4. Itoh et al (2004) Trigger point acupuncture treatment of chronic low back pain in elderly patients -- a blinded randomized control trial	1+	Deep needling to trigger points more effective in the treatment of low back pain in elderly patients than standard acupuncture or superficial needling to trigger points Adverse effects – None reported
5. Kennedy et al (2008) Acupuncture for acute non-specific low back pain: a pilot randomised non-penetrating sham controlled trial	1-	Acupuncture more effective than sham treatment for pain relief Adverse effects – none reported
6. Brinkhaus et al 2006 Acupuncture in patients with chronic low back pain: a randomized controlled trial	1+	Acupuncture is more effective in improving pain than minimal[§] acupuncture and no acupuncture treatment in patients with chronic low back pain Duration of treatment effects is unclear Adverse effects – none reported
7. Hahne et al (2010) Conservative management of lumbar disc herniation with associated radiculopathy: A systematic review	1++	Search returned no studies including acupuncture

[§] minimal acupuncture is where the needle is inserted into the skin at a lesser depth than 'normal' acupuncture

Lower back		
8. Henderson (2002) Acupuncture: evidence for its use in chronic low back pain	1+/2++	Inconclusive Adverse effects – none reported
9. Furlan et al (2005) Acupuncture and Dry-Needling for Low Back Pain: An Updated Systematic Review Within the Framework of the Cochrane Collaboration	1++	Insufficient evidence to support efficacy of acupuncture or dry needling in acute LBP Adverse effects – 13/245 patients (5%) experienced minor complications
10. Manheimer et al (2005) Meta-Analysis: Acupuncture for Low Back Pain	1+	Evidence inconclusive for acute LBP Acupuncture significantly more effective than sham acupuncture for short term pain relief in chronic LBP No evidence to that acupuncture is more effective than other conservative treatments No adverse effects reported
11. Yuan et al (2008) Effectiveness of Acupuncture for Low Back Pain. A Systematic Review	1++	Moderate evidence that acupuncture is more effective than no treatment Strong evidence that there is no significant difference between acupuncture and sham acupuncture for short term pain relief Strong evidence that acupuncture is a useful adjunct to other convservative treatment in the management of non-specific LBP

3.2 Neck

Historically conservative interventions for neck pain include: muscle relaxants, steroid injections, manual therapy, physical therapy, behavioural therapy, traction, cervical collar, electromagnetic therapy and proprioceptive exercises[23]. Evaluation of RCT's[24] shows there is currently little clear evidence to demonstrate one conservative modality to be most effective. More high quality studies are needed in this area.

Short term reduction of pain has been considered the primary outcome of treatment[23]. Positive results are reported for short term pain reduction[23]; however the effectiveness of acupuncture for treating disability and long term pain in the neck remains unproven.

A systematic review[25] conducting a single meta-analysis comparing acupuncture with sham acupuncture (2 studies), active treatment (4 studies), inactive treatment (8 studies) and wait list control (1 study) concluded that there is moderate evidence to support that acupuncture is more effective in providing both immediate and short term relief from neck pain than sham acupuncture and inactive treatments.

A further systematic review[23] including quantitative meta-analysis of 14 RCT's confirmed the short-term effectiveness and efficacy of acupuncture in the treatment of neck pain. The control groups included in this meta-analysis were sham acupuncture, physical therapy, massage, waiting list, anti-inflammatory medication and routine care. Eleven out of the fourteen studies highlighted that real acupuncture is significantly more effective in relieving pain than 'control' groups inclusive of sham, inactive treatment, massage and anti inflammatory medication. Conversely five of the fourteen studies found that there was no difference between acupuncture and control groups inclusive of sham acupuncture and physical therapy. In these studies both acupuncture and 'control' showed positive therapeutic effects. There is contradictory evidence when considering sham laser acupuncture; 2 high quality RCT's delivered conflicting outcomes.

Systematic reviews[23 25] report inconclusive findings around the long term effects of acupuncture on neck pain. However closer examination of the evidence reveals a positive trend towards acupuncture having a long term effect[11 26 27]. The strongest evidence of long term effects comes from He et al[26]. Interestingly within this study the dosage of treatment was quite intense; 10 sessions over a period of 3-4 weeks, which may contribute to the long term effects seen in this study. There was no detail of the length of each treatment session.

As previously noted, there is a lack of evidence specifically investigating optimal dosage for acupuncture treatment. This may influence the magnitude and duration of treatment effect. Where the literature does report dosage, frequency of sessions ranges from 1 to 14 sessions over a treatment period of 3-12 weeks.

Neck		
Author/Study	**Level of evidence**	**Findings/Adverse effects**
1. Itoh et al (2007) Randomised trial of trigger point acupuncture compared with other acupuncture for treatment of chronic neck pain	1+	Trigger Point acupuncture more effective for pain relief & improved Qualify Of Life compared to non-trigger point or sham acupuncture Trigger point acupuncture may be more effective on chronic neck pain in aged patients than standard acupuncture therapy Adverse effects – none reported
2. White et al (2004) Acupuncture versus placebo for the treatment of chronic mechanical neck pain: a	1-	Acupuncture was more effective than mock treatment for pain relief at short term follow up

randomized, controlled trial		Mock treatment demonstrates some therapeutic effect The beneficial effects of acupuncture for pain may be due to both nonspecific and specific effects Adverse effects – none reported
3. Zhu et al (2002) A controlled trial on acupuncture for chronic neck pain	1+	Sham & Chinese medicine acupuncture are effective for pain relief & increasing activity level for up to 16 weeks post treatment Chinese Medicine acupuncture is more effective than Sham acupuncture Acupuncture not applicable to those with neurological or psychosocial signs present Adverse effects – none reported
4. He et al 2005 Effect of intensive acupuncture on pain-related social and psychological variables for women with chronic neck and shoulder pain - a randomized control trial with six month and three year follow up	1-	Acupuncture more effective than sham for improving activity at work and social & psychological variables for women with chronic pain in the neck and shoulders The effect may last for at least 3 years Adverse effects – none reported
5. He et al (2004) Effect of acupuncture treatment on chronic neck and shoulder pain in sedentary female workers: a 6-month and 3-year follow-up study	1+	Acupuncture treatment may have long term effect in reducing chronic pain in neck & shoulders & related headache Acupuncture is more effective than sham Sham acupuncture may have immediate pain relieving effect on chronic neck & shoulder pain Adverse effects – none reported

5. Fu et al (2009) Randomized controlled trials of acupuncture for neck pain: systematic review and meta-analysis	1++	Acupuncture provides short term pain relief in chronic neck pain Adverse effects – reported in 6 studies (8-33%) none resulted in serious complications
6. Trinh et al (2007) Acupuncture for neck disorders	1++	1. Moderate evidence that acupuncture more effective for pain relief than some types of sham therapy post-treatment 2. Limited evidence that acupuncture significantly better than massage for pain relief at short term follow-up 3. Moderate evidence that acupuncture is more effective than inactive treatment for pain relief post treatment and at short term follow up 4. Moderate evidence that patients receiving acupuncture report less pain than those on a wait list control at short term follow up Adverse effects – reported in 4 studies, including increased pain, bruising & dizziness. None resulted in serious complication

3.3 Ankle

The search returned no RCT's or systematic reviews for the use of acupuncture in the treatment of ankle pain. At best 3 case studies[28-30] relating the ankle area were returned. One of which reported on Achilles tendinopathy[28], one on medial tibial stress syndrome[29], and one on bilateral heel pain due to plantar fasciitis[30].

3.4 Shoulder

Shoulder pain is a common complaint among adults in the general population[29] and may be due to rotator cuff disorders, adhesive capsulitis ('frozen shoulder') or osteoarthritis of the gleno-humeral joint[30]. It may also be caused by referred pain from the neck or thorax[31]. Many interventions are used for the treatment of shoulder pain, including non-steroidal anti-inflammatory drugs (NSAIDs), steroid injections, laser, heat, ice, and surgical tendon repair[31]. According to Guerra de Hoyos (2004)[31] et al, "though individual RCTs claim benefit, systematic reviews find little overall evidence of effectiveness".

With respect to shoulder pain, the best evidence comes from two RCTs[30 31]. One, a well-conducted pragmatic, multi-centre RCT[30] showed that that acupuncture improved pain and mobility compared to sham acupuncture or conventional therapy for up to three months post-intervention and the other[31] that reported that acupuncture improved pain in a mixed population significantly more than 'sham' acupuncture. This is contrasted with the finding from a Cochrane review[29] of nine RCTs that there is "little evidence to support or refute the use of acupuncture for shoulder pain although there may be short-term benefit with respect to pain and function."

The other two** RCTs[24 32 33] located for this report do not substantially change these conclusions as both have been assessed as having a high risk of bias.

There is a similar pattern of evidence for the efficacy of acupuncture for treating frozen shoulder. A systematic review[34] from 2011 which included 4 RCTs that used acupuncture as an intervention found moderate evidence from one small study that acupuncture plus exercise improved function in the short-term, and limited evidence from another study that electro-acupuncture improves pain and function.

Finally, there was contradictory evidence from one systematic review[35] for the efficacy of acupuncture in treating subacromial impingement syndrome. Another RCT[36] did not find that steroid injection or acupuncture in addition to a home exercise programme were superior to each other in improving pain or function.

Shoulder		
Author/Study	**Level of evidence**	**Findings/Adverse effects**
Johansson 2011 Subacromial corticosteroid injection or acupuncture with home exercises when treating patients with subacromial impingement in primary care - a randomized clinical trial.	1-	Neither treatment (steroid injection vs. acupuncture with home exercise programme) was superior in improving pain or function
Molsberger 2010 German Randomized Acupuncture Trial for chronic shoulder pain (GRASP) - A pragmatic, controlled, patient-blinded, multi-centre trial in an outpatient care environment	1+	Good evidence that acupuncture reduced pain and improved mobility significantly compared to sham acupuncture or conventional therapy at end of treatment and at 3 months follow-up
Lathia 2009 Efficacy of acupuncture as a treatment for chronic shoulder pain.	1-	Limited evidence from a small study of male veterans that both traditional and standardised acupuncture improve pain and disability significantly more than sham acupuncture
Guerra de Hoyos 2004 Randomised trial of long term	1+	Moderate evidence that acupuncture compared to sham acupuncture significantly

** one RCT was published as two papers

effect of acupuncture for shoulder pain.		improves shoulder pain
He 2004/5 Effect of acupuncture treatment on chronic neck and shoulder pain in sedentary female workers: a 6-month and 3-year follow-up study. Effect of intensive acupuncture on pain-related social and psychological variables for women with chronic neck and shoulder pain - an RCT with six month and three year follow up	1-	Unconvincing evidence from very small study that intensive acupuncture improves pain
Favajee 2011 Frozen shoulder: the effectiveness of conservative and surgical interventions - systematic review. Studies included: Sun 2001; Lin 1994; Yuan 1995 (acupuncture only)	1+	Moderate evidence from one small study that acupuncture and exercise improves function in the short term. Limited evidence from one study that electroacupuncture improves pain and function in short term (4 weeks) The other two studies compared 'traditional acupuncture' with suprascapular nerve block and acupuncture 'according to Jing Luo' respectively††
Green 2005 Acupuncture for shoulder pain. Studies included: Berry 1980; Ceccherelli 2001; Dyson-Hudson 2001; Kleinhenz 1999; Lin 1994; Moore 1976; Romoli 2000; Sun 2001; Yuan 1995	1++	Little evidence to support or refute the use of acupuncture for shoulder pain although there may be short-term benefit with respect to pain and function
Nyberg 2011 Limited evidence supports the use of conservative treatment interventions for pain and function in patients with subacromial impingement syndrome: Randomized control trials Studies included: Kleinhenz 1999 , Vas 2008, Johansson	1++	Contradictory evidence for the efficacy of acupuncture for treating subacromial impingement syndrome

†† see Green 200537. Green S, et al. Acupuncture for shoulder pain. *Cochrane Database Syst Rev* 2005(2):CD005319. for more details

2005 (acupuncture only)		

3.5 Knee

The research located for the efficacy of acupuncture for knee pain was all for people with knee pain due to osteoarthritis. As this has little relevance in the ACC setting, a detailed analysis was not done. To summarise: a systematic review[38] of 16 studies[‡‡] concluded that sham controlled trials show statistically significant benefits, however these benefits are small, probably not clinically relevant, and are probably due to, at least partially, placebo effects. The evidence tables have been included in Appendix 3 for completeness.

3.6 Adverse effects

A recent paper[4] reports of 'serious adverse effects' continually occurring as a result of acupuncture. However, this was based on a selection of case studies and cannot give estimate the true magnitude of the prevalence of adverse effects.

From the studies included in this report one systematic review of LBP reported 5% (13/245) of patients experienced minor complications[7], a systematic review of neck pain reported that in 6 studies 8-33% of patients experienced adverse effects, none of which resulted in serious complications[21], and a further systematic review of neck pain reported that in 4 studies, there were minor adverse effects including increased pain, bruising & dizziness; again none of which resulted in serious complication[23].

Further to this it was found that in 2 large series[39] mild adverse effects occurred at least in 10% of patients treated over 3 months. No serious events such as hospital admission, permanent disability or death occurred. There have been reports of pneumothorax or serious infection but these are very rare events[39].

This reflects a low prevalence of minor treatment adverse effects which do not appear to result in any long term complication.

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‡‡ 12 of which included only people with osteoarthritis of the knee and one a mix of people with osteoarthritis of the hip and/or knee

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5. Appendix 1: Criteria for the strength of evidence

Adapted from Fu (2009)[23]

1. Strong evidence: generally consistent findings in multiple high-quality RCTs.

2. Moderate evidence: generally consistent findings in one high-quality RCT and one or more low-quality RCTs, or generally consistent findings in multiple low-quality RCTs.

3. Limited or contradictory evidence: only one RCT (highor low-quality) or inconsistent findings in multiple RCTs.

4. No evidence: no RCTs.

6. Appendix 2: Evidence Tables for the spine (lower back and neck)

Author/Study	Study type/quality	Findings
Lower back		
1. Brinkhaus et al 2006 Acupuncture in patients with chronic low back pain: a randomized controlled trial Level of evidence 1+	N=298 randomized to treatment with 1. acupuncture 2. minimal acupuncture (superficial needling at non-acupuncture points) 3. waiting list control 1 & 2 administered by specialized acupuncture physicians in 30 outpatient centres; 12 sessions per patient over 8 weeks Patients completed standardized	Between baseline and week 8, pain intensity decreased in all 3 groups. The biggest change was in the acupuncture group Acupuncture more significant decrease than minimal acupuncture and waiting list group At 26 and 52 week follow up, pain did not differ significantly between the acupuncture and the minimal acupuncture group Acupuncture is more effective in improving

	questionnaires at baseline, 8, 26, and 52 weeks after randomization. Primary outcome variable was the change in low back pain (VAS) intensity from baseline to the end of week 8	pain than no acupuncture treatment in patients with chronic low back pain There was no significant differences between acupuncture and minimal acupuncture
2a. Lynton et al (2003) Chronic Spinal Pain: A Randomized Clinical Trial Comparing Medication, Acupuncture and Spinal Manipulation Level of evidence 1+	3 armed RCT (includes full spine) 1- medication 2–needle acupuncture 3-spinal manipulation (chiropractic) N=115 Outcome measures at 0,2,5,9 weeks treatment	Earliest asymptomatic status: Manipulation (27%) Acupuncture (9.4%) Medication (5%) Best overall results from outcomes were for manipulation Patients with chronic spinal pain results in greatest short term improvement. Data are not strong
2b. Muller et al (2005) Long-term follow-up of a randomized clinical trial assessing the efficacy of medication, acupuncture, and spinal manipulation for chronic mechanical spinal pain syndromes Level of evidence 1+	Extended follow-up (>1 year) of RCT N=62/69 N=40/62 patients who had received exclusively the randomly allocated treatment for the whole observation period since randomization	Comparisons of initial and extended follow-up questionnaires to assess absolute efficacy showed that only the application of spinal manipulation revealed broad-based long-term benefit In patients with chronic spinal pain syndromes, spinal manipulation, if not contraindicated, may be the only treatment modality of the assessed regimens that provides broad and significant long-term

		benefit
3a. Cherkin et al (2008) Efficacy of acupuncture for chronic low back pain: protocol for a randomized controlled trial	4 arm RCT, n=640	Protocol detail only
3b. Cherkin et al (2009) A Randomised Trial Comparing Acupuncture and Usual Care for Chronic Low Back Pain Level of evidence 1-	4 arm RCT, n=638 1-Individualised acupuncture 2-Standardised acupuncture 3-Simulated acupuncture 4-Usual care Outcome measures at 0,8,26,52 weeks post treatment onset	At 8 weeks grps 1,2,3 improvement in function At 1 year follow up grps 1,2,3 improved function but not symptoms Site and depth of penetration appear unimportant in eliciting therapeutic benefit. Raises question about physiological effect, may represent placebo or non-specific effects
4. Hahne et al (2010) Conservative management of lumbar disc herniation with associated radiculopathy: A systematic review Level of evidence 1++	Systematic review of randomized controlled trials for specific diagnosis of LDHR radiologically confirmed	Search returned no studies including acupuncture
5. Henderson (2002) Acupuncture: evidence for its use in chronic low back pain Level of evidence 1+/2++	Systematic review on Western countries (11 articles; 3 case studies, 5 randomized controlled trials & 2 cross-over trials)	No conclusive evidence to support or refute the use of acupuncture in Low back pain Increasing number of patients suffering from back pain seeking complementary therapies to supplement traditional medical treatments
6. Itoh et al (2006) Effects of trigger point acupuncture on chronic low back pain in elderly patients -- a sham-controlled randomised trial	RCT N=26 randomised to two groups Each group received one phase of trigger	At the end of the first treatment phase, Group A receiving trigger point acupuncture

Level of evidence 1+	point acupuncture and one of sham acupuncture with a three week washout period between them, over 12 weeks Group A (n = 13) trigger point acupuncture in first phase & sham acupuncture in the second Group B (n = 13) received the same interventions in the reverse order	had significantly less pain than the sham control group There were significant within-group reductions in pain in both groups during the trigger point acupuncture phase but not in the sham treatment phase Beneficial effects were not sustained These results suggest that trigger point acupuncture may have greater short term effects on low back pain in elderly patients than sham acupuncture
7. Itoh et al (2004) Trigger point acupuncture treatment of chronic low back pain in elderly patients -- a blinded RCT Level of evidence 1+	Double blind crossover RCT N=35 were randomised to 1 of 3 groups over 12 weeks Each group received 2 phases of acupuncture treatment with an interval between them 1. Standard acupuncture group received treatment at traditional acupuncture points for low back pain 2. Superficial treatment on trigger points	Deep resulted in less pain intensity and improved QoL compared to standard acupuncture or superficial needling to trigger points Reduction in pain intensity between the treatment & interval in the group that received deep needling (not the case in standard acupuncture or superficial needling to trigger points Deep needling to trigger points may be more

	3. Deep treatment on trigger points	effective in the treatment of low back pain in elderly patients than standard acupuncture or superficial needling to trigger points
8. Kennedy et al (2008) Acupuncture for acute non-specific low back pain: a pilot randomised non-penetrating sham controlled trial Level of evidence 1-	A pilot patient and assessor blinded randomized controlled trial N=48, 12 weeks treatment. 1. Placebo group with sham needle 2. Verum acupuncture Outcome measures at baseline, end of treatment & 3 months follow up	For pain, the only statistically significant difference was at the 3 months follow up At the end of treatment; verum acupuncture group were taking significantly fewer tablets of pain control medication This study has demonstrated 120 participants would be required in a fully powered trial. The placebo needle used in this study proved to be a credible form of control
9. Furlan et al (2005) Acupuncture and Dry-Needling for Low Back Pain: An Updated Systematic Review Within the Framework of the Cochrane Collaboration Level of evidence 1++	Systematic review of RCTs (1996-2003) Acupuncture for (sub) acute & chronic non-specific LBP Dry needling for myofascial trigger points, compared to; - No treatment - Sham therapy - Other therapy - Addition of acupuncture to other therapy	Insufficient evidence to support efficacy of acupuncture or dry needling in acute LBP For chronic LBP Acupuncture more effective than no treatment or sham treatment up to 3 months. For chronic LBP acupuncture is more effective than no treatment for improving function in the short term As an adjunct to other conventional therapies acupuncture relieves pain and improves function better than conventional therapies alone

		Dry needling is a useful adjunct to other therapies for chronic LBP
Neck		
5. Fu et al (2009) Randomized controlled trials of acupuncture for neck pain: systematic review and meta-analysis Level of evidence 1++	Systematic review and meta-analysis were conducted on randomized controlled trials of acupuncture for neck pain (14 RCT's included)	The quantitative meta-analysis conducted in this review confirmed the short-term effectiveness and efficacy of acupuncture in the treatment of neck pain. Further studies that address the long-term efficacy of acupuncture for neck pain are warranted.
6. Itoh et al (2007) Randomised trial of trigger point acupuncture compared with other acupuncture for treatment of chronic neck pain Level of evidence 1+	4 arm RCT pain and quality of life (QOL) n=40, 13 weeks 1. Trigger point acupuncture 2. Acupoints 3. Non-trigger point 4. Sham treatment	TrP group reported less pain intensity and improved QOL compared to SA or non-TrP group. There was significant reduction in pain intensity between the treatment and the interval for the TrP group but not for the SA or non-TrP group trigger point acupuncture therapy may be more effective on chronic neck pain in aged patients than the standard acupuncture therapy
7. Trinh et al (2007) Acupuncture for neck disorders Level of evidence 1++	Systematic review of RCT's (10 studies included) Categories: 1. Acupuncture versus Sham 2. Acupuncture versus active treatment	1. Moderate evidence that acupuncture more effective for pain relief than some types of sham therapy post-treatment 2. Limited evidence that acupuncture significantly better than massage for pain relief at short term follow-up

	3. Acupuncture versus inactive treatment 4. Acupuncture versus wait list control	3. Moderate evidence that acupuncture is more effective than inactive treatment for pain relief post treatment and at short term follow up 4. Moderate evidence that patients receiving acupuncture report less pain than those on a wait list control at short term follow up
8. White et al (2004) Acupuncture versus placebo for the treatment of chronic mechanical neck pain: a randomized, controlled trial Level of evidence 1-	Randomized, single-blind, placebo-controlled, parallel-arm trial with 1-year follow-up n=135, 4 weeks, 8 treatments 1. acupuncture 2. Mock transcutaneous electrical stimulation of acupuncture points using a decommissioned electroacupuncture stimulation unit	Both groups improved statistically from baseline Acupuncture was more effective than mock treatment for pain relief at short term follow up However, this difference was not clinically significant Limitations All treatments were provided by 1 practitioner, control did not mimic the process of needling, non-intervention group was not present Acupuncture reduced neck pain and produced a statistically, but not clinically, significant effect compared with placebo. The beneficial effects of acupuncture for pain may be due to both nonspecific and specific
9. Zhu et al (2002) A controlled trial on	Chinese medicine (CM) acupuncture for	Significant reduction in subjective pain

acupuncture for chronic neck pain Level of evidence 1+	chronic neck pain (CNP) Single blind, controlled, crossover, clinical trial n=29 2 groups received two phases of treatment with a washout period between the two phases Group A - CM acupuncture, washout, sham acupuncture Group B – Sham, washout, CM acupuncture 9 sessions over 3 weeks Manual twisting of the needle was applied on all points plus strong electrical stimulation of distal points in CM acupuncture. Sham acupoints (lateral to the real) and sham (weak) electrical stimulation was used in the control group. Outcome measures at baseline, after each phase of treatment, after washout, & at 16 week follow-up	intensity (VAS), pain hours per day, analgesic pill consumption & increased activity level following 9 session real CM acupuncture The same for sham but to a lesser degree Sham acupuncture has a therapeutic effect Acupuncture may be a suitable intervention for neck pain – not applicable to those with neurological or psychosocial signs present Acupuncture and sham treatment have a long term effect of neck pain lasting at least 16 weeks Neither Sham or real CM acupuncture had any significant effect on objective measures
He et al 2005 Effect of intensive acupuncture on pain-related social and psychological variables for women with chronic neck and shoulder pain - an RCT with six month and three year follow up Level of evidence 1-	This study examines whether intensive acupuncture treatment can improve several social and psychological variables for women with chronic pain in the neck and shoulders, and whether possible effects are long-lasting	The ‘pain-related activity impairment at work’ was significantly less in Acupuncture group than sham (control) by the end of treatment There were significant differences between the groups for; quality of sleep, anxiety, depression & satisfaction with life

	N=24 female office workers Acupuncture was applied 10 times during 3-4 weeks 1. Acupuncture points 2. Sham points (control group) In addition, acupressure was given to patients between treatments, at either real or sham points. Questionnaires for social and psychological variables were completed before treatment, just after the course, 6 months & 3 years follow up	At 6 month & 3 year follow ups the acupuncture group showed further improvements in most variables and was again significantly different from the control group Intensive acupuncture treatment may improve; activity at work and social & psychological variables for women with chronic pain in the neck and shoulders The effect may last for at least 3 years
He et al (2004) Effect of acupuncture treatment on chronic neck and shoulder pain in sedentary female workers: a 6-month and 3-year follow-up study Level of evidence 1+	Randomized single blind controlled trial N= 24 female office workers randomly assigned to 1. Test Group (TG) - anti-pain acupoints 2. Control Group (CG) - placebo-points Acupuncture was applied 10 times during 3-4 weeks	The intensity & frequency of pain decreased more for TG than CG during treatment period At 3 year follow up, TG reported less pain than pre treatment Headache decreased during treatment period for both groups, but more for TG than for CG At 3 year follow up TG still had decrease in headaches

	Outcome measures; pain threshold (PPT) in the neck and shoulders with algometry before first treatment, after the last treatment & at 6 month follow up. Questionnaires on muscle pain and headache were answered at the same time points & at 3 years follow up	In CG headache returned to pre-treatment level PPT of some muscles increased during the treatment period for TG & remained higher 6 months post treatment Acupuncture treatment may have long term effect in reducing chronic pain in neck & shoulders & related headache Acupuncture more effective than sham Sham acupuncture may have immediate pain relieving effect on chronic neck & shoulder pain

7. Appendix 3: Evidence tables for shoulder, knee and pain

SHOULDERS

Reference and study design	Studies	Intervention/comparison	Outcome measure	Results/effect size	Conclusions
Favejee MM, Huisstede BM, Koes BW, Huisstede BMA. Frozen shoulder: the effectiveness of conservative and surgical interventions--systematic review. *BJSM online* 2011;45(1):49-56. Netherlands Included studies looking at acupuncture: Cheing 2008, Sun 2001, Lin 1994, Yuan 1995.	N = 5 Cochrane reviews & 18 RCTs [1 Cochrane review and 1 RCT for acupuncture] Total number of patients in the studies: not reported Inclusion criteria: patients with frozen shoulder, not caused by acute trauma or systemic disease; an intervention for treating frozen shoulder; pain, function or recovery outcomes were reported; in English, French, German or Dutch. Exclusion criteria: none reported	Interventions: oral medications, injection therapy, physiotherapy, acupuncture, arthrographic distension & suprascapular nerve block Length of treatment: variable Comparison (placebo): variable Co-interventions: variable	Pain Function Quality scores: Cheing 2008, 33% [low] Sun 2001, 55% [high] Lin 1994, 36% [low] Yuan 1995, 36% [low]	**Cheing 2008** (n=70) • electroacupuncture vs. interferential electrotherapy vs.placebo. • Significant differences were found between both treatment groups and the control group, on pain and function (all p<0.001) at 4 weeks. **Sun 2001** (n=35) • acupuncture + exercises vs. exercises alone • significant difference in favour of acupuncture + exercises on shoulder function at 20 weeks • 9.40 WMD; 95% CI 0.52 to 18.28	In the short term, moderate evidence from one small study was found for the effectiveness of acupuncture and exercises with respect to shoulder function [Sun 2001] Limited evidence for effectiveness of electroacupuncture compared to placebo on pain and function at 4 weeks [Cheing 2008]

	Databases used: Cochrane library, PubMed, EMBASE, CINAHL, PeDro Description of the methodological assessment of studies: score adapted from Cochrane review handbook No meta-analysis Qualitative ('best-evidence') analysis			**Lin 1994** (n=100) • suprascapular nerve blocks (SSNB) vs. acupuncture • significant differences in favour of SSNB on pain and ROM 30 min after treatment • WMD (pain) 1.33; 95% CI 1.22 to 1.44) • WMD (flexion) −7.00; −11.17 to −2.83) **Yuan 1995** • significant difference in favour of acupuncture according to Jing Luo over traditional acupuncture on recovery • RR 1.50; 95% CI 1.08 to 2.09 • follow-up time not reported	
Study type: Systematic review with qualitative analysis **Quality:** SIGN 1+					

Comments: Wide range of interventions; good search and methodology appraisal; qualitative analysis appropriate; heterogeneity not formally reported; some reporting not sufficient enough (due to inability to access online supplementary appendices)

Reference and study design	Participants	Intervention/comparison	Outcome measure	Results/effect size	Conclusions
Molsberger AF, Schneider T, Gotthardt H, Drabik A. German Randomized Acupuncture Trial for chronic shoulder pain (GRASP) - A pragmatic, controlled, patient-blinded, multi-centre trial in an outpatient care environment. *Pain* 2010;151(1):146-54. Germany Multicentre study	n=424 participants • 135 'sham' group • 154 acupuncture group • 135 'COT' group <u>Inclusions</u>: one-sided shoulder pain ≥6 weeks and up to two years; an average pain score of ≥50 mm on a VAS in the past week; age between 25 and 65 years; the ability to communicate in German <u>Exclusions:</u> injections or cortisone of any kind; neurological disorders causing shoulder pain; referred pain from the cervical spine; OA of the gleno-humeral joint or systemic bone and joint	1. Acupuncture: 15 treatments (1-3 per week, lasting 20 mins) 2. 'Sham" acupuncture: as above 3. 'COT': conventional orthopaedic therapy with 50mg diclofenac daily and 15 treatment sessions individually selected from physiotherapy, physical exercise, heat/cold therapy, ultrasound and TENS <u>Length of treatment:</u> 6 weeks Selection of acupuncture points: 1. Acupuncture: consensus agreement from experts to use	Pain (VAS) ['Responder' = reduction of pain by ≥50% on VAS from initial score] Shoulder mobility (Jobe test; degree of abduction; % full elevation of arm possible)	**Primary end-point:** 'Responders' at 3 months: 1. 64.9% 2. 23.7% 3. 37.0% 1 vs. 2 p<0.01 1 vs. 3 p<0.01 OR (1 vs. 2) = 5.96 [95%CI: 3.45-10.35] OR (1 vs. 3) = 3.15 [95%CI: 1.90-5.23] **Secondary end-point:** 'Responders'	In people with chronic shoulder pain, 'true' acupuncture reduced pain and improved mobility significantly more than 'sham' acupuncture or conventional therapy at 6 weeks and 3 months.

	disorder (e.g. rheumatoid arthritis); history of shoulder surgery; other current therapy involving analgesics; overt psychiatric illness; pregnancy; incapacity for work >3 months preceding the trial, and pending compensation procedure Randomisation & allocation concealment reported <u>Blinding</u>: • patients blinded to whether in acupuncture or sham group but not to COT group • statisticians blinded to allocation group • observers not blinded • those administering treatment not blinded	particular points ± others (5-10 needles) 2. 'Sham': 8 needles at defined non-acupuncture points near both tibia		immediately after treatment ended: 1. 68.1% 2. 39.3% 3. 28.1% 1 vs. 2 p<0.001 1 vs. 3 p<0.001 OR (1 vs. 2) = 2.30 [95%CI: 1.40-3.78] OR (1 vs. 3) = 3.77 [95%CI: 2.24-6.41] **Post hoc analyses of shoulder mobility:** Acupuncture group all significantly improved at 6 weeks & 3 months compared to sham or COT (see full text for details)	

	<u>Dropouts at 3 months:</u> • 61/135 (45%) 'sham' group • 26/154 (17%) acupuncture group • 29/135 (22%) 'COT' group • overall drop-out rate ~ 27% <u>Follow-up</u>: at end of treatment and at 3 months after <u>Characteristics:</u> Mean age: 51 (sham); 50 (acupuncture); 51 (COT) years % Male: 33; 43; 33% Duration: 12; 11; 10 months No significant differences between groups in any characteristic reported i.e. affected shoulder,				

	pain intensity Secondary care (outpatients) Power calculation ITT analysis Mixed diagnoses: 40% bursitis subacromialis, 29.4% bursitis calcarea, 3.9% frozen shoulder & 2.5% biceps tendinitis				
Study type: multi-centre pragmatic RCT **Quality:** 1+					

Comments: Well conducted pragmatic, three-armed, patient-blinded, multi-centre RCT. Not observer blinded for acupuncture or sham & not blinded for COT therefore possibility of bias present. At 3 months ~27% participants dropped out but ITT analysis i.e. drop-outs considered 'non-responders'. 'Mixed' population.

Reference and study design	Participants	Intervention/comparison	Outcome measure	Results/effect size	Conclusions
Guerra de Hoyos JA, Andres Martin Mdel C, Bassas y Baena de Leon E, Vigara Lopez M, Molina Lopez T, Verdugo Morilla FA, et al. Randomised trial of long term effect of acupuncture for shoulder pain. Pain 2004;112(3):289-98. Spain	n=130 • 65 in acupuncture arm • 65 in placebo ("sham") arm Inclusions: Clinical diagnosis of soft tissue shoulder lesions; no swelling signs; no recent trauma (previous 3 months); no previous acupuncture treatments; age of 18 or older Exclusions: critical physical or mental condition, febrile condition, systemic dermatological conditions, neoplasms, allergy to diclofenac, referred pain from neck or thorax, rupture of tendons or bone fractures, pregnancy, litigation, no intention to participate or follow	Treatment: "standardised" electro-acupuncture i.e. all patients had same 4 acupuncture points used Length of treatment: 8 weeks Comparison: "sham" acupuncture with needles not penetrating skin and no electrical current Co-interventions: diclofenac 50mg every 8 hours, if needed and famotidine 20mg every 12 hors if needed for dyspepsia ITT analysis	Primary outcome: Pain (VAS) Secondary outcomes: Lattinen index (pain) ROM SPADI (pain & disability) COOP/WONCA (quality of life) Adverse effects	Mean difference VAS (95%CI): 7 weeks: • 1.5 (0.8-2.3) p<0.0005 3 months: • 1.5 (0.6-2.5) p<0.0005 6 months: • 2.0 (1.2-2.9) p<0.0005 Similar results for all secondary outcomes (see table 3 below) Adverse events: Intervention group: 2 fainted during treatment; 3 reported	"All results consistently suggested that real acupuncture is more effective than placebo-acupuncture to treat pain and disability in patients with shoulder pain from different causes, mainly rotator cuff disease and capsulitis."

	instructions. Blinding: patient and evaluators blinded to allocation Dropouts: 10 in both groups i.e. 15% at 6 months Follow-up: weekly for the 7 weeks of treatment, then 3 and 6 months Characteristics (treatment/placebo): Mean age: 60/ 59yrs % Female: 49 /48% Duration of symptoms: 5.7/6.8 months Additional data: marital status, education, working, exercise, diagnosis, location pain…			dizziness; 5 bruising at puncture site 5 reported dyspepsia (1 intervention , 4 in control group) 3 reported anxiety reaction (1 intervention, 2 in control group)	

	Setting: primary care				
Study type: RCT **Quality:** SIGN 1+ **Comments:** Well conducted RCT. Randomisation method and allocation concealment good. Power calculation done.					

Table 3
Secondary outcomes for placebo and acupuncture groups, at baseline, seven weeks (7 w), three months (3 m) and six months (6 m) after treatment: improvement of pain (Lattinen index[a], SPADI questionnaire[b]), range of motion, quality of life[c] and credibility[d]

Outcome/time	Mean (SD)		Difference between groups		
	Placebo $N=55$	Acupuncture $N=55$	Mean[e]	CI 95%	P
Lattinen index					
Baseline	10.6 (3.4)	10.0 (3.5)	NA	NA	NA
7 w	6.2 (4.4)	7.9 (3.9)	2.2	1.1–3.3	<0.0005
3 m	6.2 (4.9)	8.3 (4.0)	2.6	1.3–3.8	<0.0005
6 m	5.4 (5.2)	8.0 (3.9)	3.0	1.6–4.3	<0.0005
Range of motion (degrees)					
Baseline	96.1 (29,3)	102.5 (28.9)	NA	NA	NA
7 w	26.2 (29.7)	51.0 (27.6)	27.2	16.9–37.5	<0.0005
3 m	23.2 (34.7)	54.6 (30.1)	33.9	22.8–45.0	<0.0005
6 m	21.2 (36.2)	56.9 (32.1)	38.1	26.5–49.7	<0.0005
SPADI, global index					
Baseline	76.5 (24.3)	67.6 (28.9)	NA	NA	NA
7 w	48.5 (29.7)	60.9 (28.0)	17.0	8.6–25.4	<0.0005
3 m	46.7 (33.2)	59.6 (28.0)	18.3	9.7–26.9	<0.0005
6 m	41.8 (34.1)	59.0 (28.0)	22.1	13.2–13.2	<0.0005
SPADI, pain index					
Baseline	31.0 (10.1)	27.2 (11.3)	NA	NA	NA
7 w	20.7 (13.5)	24.0 (11.5)	6.4	3.1–9.7	<0.0005
3 m	19.6 (14.2)	23.6 (12.2)	6.9	3.5–10.4	<0.0005
6 m	17.3 (14.1)	23.2 (11.9)	8.1	4.4–11.2	<0.0005
SPADI, disability index					
Baseline	44.7 (16.9)	40.4 (19.5)	NA	NA	NA
7 w	28.3 (19.3)	36.8 (18.4)	11.7	6.2–17.2	<0.0005
3 m	27.1 (21.1)	36.0 (18.0)	11.9	6.4–17.3	<0.0005
6 m	24.4 (21.3)	35.8 (18.0)	13.4	7.8–19.0	<0.0005
Credibility					
Baseline	16.1 (7.1)	16.0 (2.6)	NA	NA	NA
6 m	15.5 (3.3)	18.3 (2.2)	2.7	1.7–3.7	<0.0005
Quality of life					
Baseline	16.9 (3.7)	16.6 (3.9)	NA	NA	NA
6 m	16.3 (3.9)	13.3 (4.1)	2.6	1.2–3.9	<0.0005

Values are means (SD).
[a] Lattinen index (0–22).
[b] Shoulder pain and disability Index: Global index (0–130), Pain index (0–50) and Disability index (0–80).
[c] Credibility: Borkovek-Nau Scale (0–20).
[d] Quality of life: COOP/WONCA CHARTS (30–0): lower scores mean higher quality of life. Differences between groups are calculated by analysis of covariance.
[e] Adjusted differences: positive favours acupuncture. NA, not applicable.

Reference and study design	Participants	Intervention/comparison	Outcome measure	Results/effect size	Conclusions
Lathia AT, Jung SM, Chen LX. Efficacy of acupuncture as a treatment for chronic shoulder pain. *J Altern Complement Med* 2009;15(6):613-8. USA	n= 31 • 11 traditional acupuncture • 9 standardised acupuncture • 11 sham acupuncture <u>Inclusion:</u> ≥18 years old; SPADI score ≥30; shoulder pain ≥8 weeks; acupuncture naïve; either no previous treatment or failed conventional treatment ≥1 month prior to enrolment <u>Exclusion</u>: inflammatory or infectious arthritis; shoulder fracture; stroke; pregnancy; any corticosteroid injections in last 3 months <u>Blinding:</u> subjects blind to intervention; SPADI questionnaire investigator blind to allocation; acupuncturists not blinded	1. <u>Traditional acupuncture:</u> individualized acupuncture treatment according to the approaches established by TCM; at each session, the patient was evaluated, and different treatment points were chosen according to the patient's symptoms; the points used varied between patients and between treatment sessions for each patient. 2. <u>Standardised acupuncture:</u> treatment based on fixed, standard point protocols.; 7 acupuncture points relevant to shoulder pain were used and remained the same for each session. 3. <u>Sham acupuncture:</u>	SPADI (Shoulder Pain & Disability Index)	Change from baseline SPADI score (see Table 2 below): reported that after 6 weeks treatment the traditional and standard groups showed at clinically significant* change in SPADI scores from baseline **Treatment Effect** (see Table 3 below)**:** Difference in mean SPADI score (95%CI) from sham acupuncture group: <u>Pain</u> 1. -16.2 (-2.7, -29.7) p=0.021 2. -17.2 (-4.9, -29.6) p=0.009 <u>Disability</u> 1. -11.6 (-2.5, -20.6)	"Acupuncture may be an alternative and adjunctive treatment to help improve pain and function in patients with chronic, non-rheumatologic shoulder pain." <u>Reviewer's conclusion:</u> Statistically and clinically significant reduction in SPADI score after 6 weeks treatment for both the traditional acupuncture group and standard acupuncture group compared to sham acupuncture. The effect size was similar for both the traditional acupuncture group and standard acupuncture groups.

	to allocation Allocation concealment: not reported Drop-outs: 3 in sham group failed to complete intervention because of time constraints (2) or increased pain (1) i.e. 10% drop-out rate; only 8 participants filled out SPADI questionnaire at 6 months i.e. 74% 'drop-out' rate Follow-up: 6 weeks (end of treatment) and 6 months Characteristics (traditional/standard/sham): Mean age: 62/65/59 yrs Men: 100/100/73%* Duration pain: 48/28/51 months Diabetes: 18/51/30% Unilateral pain:	carried out with sham acupuncture needles and the same points as the standard point acupuncture group. Subjects in each group received the relevant acupuncture treatment twice per week for 6 weeks. For the acupuncture, 8–16 single-use, disposable, sterile 36-gauge needles were used and were left in place for 20 minutes. Each session lasted about 30 minutes. Co-interventions: any medications were to be continued and not changed for 3 months prior and during study		p=0.015 2. -10.6 (1.1, -22.3) p=0.073 Total SPADI 1. -13.8 (-3.0, -24.7) p=0.015 2. -13.9 (-3.3, -24.5) p=0.013 Results from the 6 month follow-up were only available foe 8 subjects, of which, only 2 reported improvement in pain and disability since last treatment (no figures reported) *Clinically significant worsening in shoulder pain and function is an increase of ≥10 points.	

	100/78/70% Setting: Secondary care *[p=0.05]				
Study type: RCT **Quality:** SIGN 1- **Comments:** Small study in mainly male veterans with no power calculation. Long-term follow-up severely limited. Cannot entirely rule out bias from non-blinding of acupuncturists to allocation group. The significance of a similar effect size for both the traditional and standard acupuncture groups is unclear.					

Reference and study design	Studies	Intervention/comparison	Outcome measure	Results/effect size	Conclusions
Green S, Buchbinder R, Hetrick S. Acupuncture for shoulder pain. Cochrane Database Syst Rev 2005(2):CD005319. Australia Included studies: Berry 1980 (n=60); Ceccherelli 2001 (n=44); Dyson-Hudson 2001(n=20); Kleinhenz 1999 (n=52); Lin 1994 (n=150); Moore 1976 (n=42); Romoli 2000 (n=24); Sun 2001 (n=35); Yuan 1995 (n=98)	N=9 (Inclusion: All RCTs or quasi-randomised controlled trials; adults >16yrs; shoulder pain or disorder >3 weeks Exclusion criteria: a history of significant trauma or systemic inflammatory conditions such as rheumatoid arthritis, polymyalgia rheumatica and fracture, hemiplegic shoulders, postoperative and peri-operative shoulder pain and pain in the shoulder region as part of a complex myofacial neck/shoulder/arm pain Databases: MEDLINE, EMBASE, CINAHL, Science Citation Index	Intervention: 'Traditional' or 'classic' acupuncture Length of treatment: variable Comparison: Placebo (Berry 1980; Kleinhenz 1999; Moore 1976); ultrasound & steroid injection (Berry 1980); nerve block (Lin 1994); mobilisation (Romali 2000); exercise (Sun 2001); Trager (Dyson-Hudson 2001) NB: Ceccherelli 2001 compared deep with shallow acupuncture, and Yuan 1995 compared acupuncture with sites determined by TCM compared to the distribution of Jing-Luo	See Table below	See Table below for summary of results	"Due to a small number of clinical and methodologically diverse trials, little can be concluded from this review. There is little evidence to support or refute the use of acupuncture for shoulder pain although there may be short-term benefit with respect to pain and function." Reviewer's conclusion: One small study (n=35) showed that exercise and acupuncture together was more efficacious than exercise alone for the treatment of adhesive capsulitis both post-intervention and at 20 weeks. The results from the rest of the studies are conflicting or mixed, for

	Methodological assessment: descriptive (including appropriate randomisation, allocation concealment, blinding, number lost to follow up and intention to treat analysis), quantitative scoring for allocation concealment only No meta-analysis due to clinical heterogeneity Fixed effects model	Co-interventions: see summary table below			example, One study (n=52) found that acupuncture was more efficacious than placebo in improving the Constant-Murley score for rotator cuff disease at 4 weeks and 4 months. This is in contrast with another study (n=60) that found that acupuncture was less efficacious than placebo for rotator cuff disease when measuring treatment 'success'. However, because these two studies used different outcomes, they ability to directly compare them is limited, at least.
Study type: Systematic review **Quality:** SIGN 1++ **Comments:** Well conducted SR with narrative synthesis. The paper by Moore (1976) was not used to construct forest plot. Nine studies of varying methodological quality, most with small numbers of participants. Heterogeneity of populations, interventions, comparators and outcomes.					

Study (condition)	Intervention vs. comparator	Outcome	Summary statistic (95%CI[8]) [fixed effects model]	Trend
Berry 1980 (rotator cuff disease)	Acupuncture vs. placebo	Pain	MD[9] = 12.0 (-10.23, 34.43)	favours placebo
		Range of abduction	MD = -17.30 (-44.11, 9.51)	favours placebo
		Success rate (short term)	RR = 0.56 (0.26, 1.17)	placebo
	Acupuncture vs. steroid injection	Pain	MD = 7.50 (-12.47, 27.47)	favours injection
		Range of abduction	MD = 2.90 (-26.83, 32.63)	favours acupuncture
		Success rate (short term)	RR[10] = 0.83 (0.35, 2.00)	injection
	Acupuncture vs. ultrasound	Pain	MD = -7.10 (-32.90, 18.70)	favours acupuncture
		Range of abduction	MD = 7.90 (-21.59, 37.39)	favours acupuncture
		Success rate (short term)	RR = 0.83 (0.35, 2.00)	ultrasound
Kleinhenz 1999 (rotator cuff disease)	Acupuncture vs. placebo	Overall success[11] (at 4 weeks)	MD = 17.30 (7.79, 26.81)	acupuncture
		Overall success (at 4 months)	MD = 3.53 (0.74, 6.32)	acupuncture
Lin 1994 (adhesive capsulitis)	Electro-acupuncture vs. nerve block	Pain (at 30 hrs)	MD = 1.33 (1.22, 1.44)	nerve block
		Time to maximum pain relief	MD = 64.96 (60.50, 69.42)	nerve block
		Range of flexion (after treatment)	MD = -7.00 (-11.77, -2.83)	nerve block
Romoli 2000 (general shoulder pain)	Acupuncture + mobilisation vs. mobilisation	Pain at rest	MD = -0.37 (-1.85, 1.11)	favours acupuncture
		Pain on movement	MD = 0.25 (-1.87, 2.37)	favours mobilisation

[8] 95% confidence interval
[9] mean difference
[10] risk ratio
[11] Constant-Murley Score (measure of shoulder function)

		Active flexion Active abduction	MD = -13.13 (-39.79, 13.53) MD = -14.37 (-49.94, 21.20)	favours mobilisation favours mobilisation
Sun 2001 (adhesive capsulitis)	Acupuncture vs. exercise	Constant[12] (post-intervention): Constant (20 weeks):	MD = 9.20 (0.54, 17.86) MD = 9.40 (0.52, 18.28)	acupuncture acupuncture
Dyson-Hudson 2001 (general shoulder pain)	Acupuncture vs. Trager	Wheelchair index[13] (post-intervention): Wheelchair index (5 weeks):	MD = 1.70 (-21.91, 25.31) MD = 16.00 (-9.03, 41.03)	favours Trager favours Trager
Ceccherelli 2001 (general shoulder pain)	Deep vs. shallow acupuncture	McGill Pain[14] (post-intervention): McGill Pain (3 months):	MD = -10.31 (-15.44, -5.18) MD = -8.00 (-12.20, -3.80)	deep deep
Yuan 1995 (peri-arthritis)	Traditional vs. Jing Luo acupuncture	Recovery:	RR = 1.50 (1.08, 2.09)	Jing Luo

[12] Constant-Murley Score (measure of shoulder function)
[13] Wheelchair Users Shoulder Pain Index (WUSPI)
[14] McGill Pain Questionnaire

Reference and study design	Participants	Intervention/comparison	Outcome measure	Results/effect size	Conclusions
Johansson K, Adolfsson L, Foldevi M. Effects of acupuncture versus ultrasound in patients with impingement syndrome: randomized clinical trial. *Physical Therapy* 2005;85(6):490-501. Sweden	n=85 • 44 in acupuncture group • 41 in ultrasound group <u>Inclusions:</u> 30 - 60yrs of age; 'typical' history of shoulder impingement; positive Neer impingement test; ≥2 months duration; 3 of 4 of Hawkins-Kennedy impingement sign, Jobe supraspinatus test, Neer impingement sign or painfull arc between 60 and 120° active abduction <u>Exclusions</u>: X-ray findings of malignancy, G-H joint OA, bony spurs/osteophytes decreasing subacromial space; polyarthritis, rheumatoid arthritis, fibromyalgia; history of surgery, fracture or	<u>Intervention:</u> 'standardised' acupuncture at 4 points (10 sessions)* + home exercise programme <u>Length of treatment</u>: 5 weeks <u>Comparison:</u> standardised ultrasound (10 sessions)* + home exercise programme <u>Co-interventions</u>: unclear, but "additional" pain medication reported *twice weekly for 5 weeks	Constant-Murley Score Adolfsson-Lysholm Shoulder score UCLA End-Result Score Combined Score of all above scales	Individual score changes not reported Combined score showed larger change (p=0.045) at all 4 time points for acupuncture No differences were found across the 4 time points when ITT analysis	"The results suggest that acupuncture is more efficacious than ultrasound in patients with impingement syndrome." <u>Reviewer's conclusion:</u> Acupuncture no more effective than ultrasound on ITT analysis.

	dislocation in shoulder; history/present instability any shoulder joint; suspicion of frozen shoulder; cervical spine problems; previous ultrasound or acupuncture for same problem; steroid injection; ruptured rotator cuff clinically; acute subacromial bursitis; communication difficulty <u>Dropouts:</u> none post-treatment; 3.5% (2 acupuncture group/1 ultrasound group) at 3 months; 5.9% (0/2) at 6 months; 12.9% (2/4) at 12 months <u>Follow-up:</u> immediately post-intervention; 3, 6 & 12 months <u>Blinding</u>: observer blinded <u>Characteristics</u>				

	(acupuncture/ultrasound): Mean age: 49/49 yrs % Male: 27/34% No significant differeence in duration, occupation, sick leave taken, analgesic use, exercise frequency or smoking status Setting: Primary care				
Study type: RCT **Quality:** SIGN 1- **Comments:** Smallish study with inappropriate analysis showing a (barely) significant result. Complicated selection criteria. Reported “concealed” randomisation but only observers blinded. Comparator of dubious therapeutic value. Power calculation done. ITT analysis.					

Reference and study design	Participants	Intervention/comparison	Outcome measure	Results/effect size (see fig 1 below)	Conclusions
He D, Veiersted K, Hostmark A, Medbo J. Effect of acupuncture treatment on chronic neck and shoulder pain in sedentary female workers: a 6-month and 3-year follow-up study. *Pain* 2004;109(3):299-307. Norway	N=24 • 14 in acupuncture group • 10 in control group <u>Inclusions:</u> Women office workers with chronic (≥3 months in previous year) pain in the shoulder and neck region; 20-50yrs of age; pain was severe enough to interfere with work/spare time activities; <u>Exclusions:</u> diabetes, neurological, rheumatological or other diseases; pregnancy, breast-feeding <u>Dropouts</u>: none	<u>Intervention:</u> electroacupuncture, acupuncture, & ear acupressure of standardised points* <u>Length of treatment:</u> 3 treatments per week with a total of 10 treatments over 2-4 weeks; each treatment lasted 45 min <u>Comparison:</u> electroacupuncture without any voltage applied, acupuncture 10-40mm distal to actual points, & ear acupressure 4-6mm below actual points <u>Co-interventions:</u> none *16 body acu-points, 6 ear acu-points	Pain (intensity, frequency) Pain threshold Headache Blood variables	**Pain intensity** (mean intervention vs. mean control group) At end of treatment: 15 vs. 36 units; p=0.02 At 6 months: 24 vs. 36; p=0.15 At three years: 19 vs. 44; p<0.04 **Frequency of pain:** (intervention vs. control group) At end of treatment: not reported	"The main finding in this study was that adequate acupuncture treatment reduced the intensity and frequency of muscle pain, the degree of headaches, and a number of trigger points became less tender." <u>Reviewer's conclusion:</u> Some statistically significant differences in outcomes in favour of intervention at differing timepoints. However, due to this being a very small study and questions about validity of outcome measures and variation in results, the reviewer cannot exclude that the results seen are due largely to bias.

	Blinding: Participants and examiner blinded to allocation; acupuncturist not blinded Follow-up: 6 months, 3 yrs Characteristics (acupuncture/control): Mean age: 49/45 yrs Sex: all women Pain duration: 12/12 yrs Total days pain: 4.3/4.5 days per week All other variables similar Setting: secondary care			At 6 months: 24 vs. 31; p=0.18 At three years: 19 vs. 46; p=0.003 **Pain threshold (PPT)** used algometry on particular trigger points (13); unclear but reported " several improvements but no impairments in the PPT for the [treatment group] during the study." The control group showed no improvements. **Headache** no significant difference at end of treatment or 6 months; significant difference at 3 years **Blood variables**	

				blood platelet concentration increased by 15% just after treatment in intervention group; no change in control group; no change in any other measured blood variable	
Study type: RCT **Quality:** 1- **Comments:** Small study in women office workers from Norway. Acupuncture carried out by one of the authors. Unsure of validity of questionnaires although VAS well accepted. Complex acupuncture intervention. Utility of trigger point pain threshold uncertain. Three subjects (21%) in the intervention group and 5 (50%) in the control group had other treatments during the 3 year follow-up period.					

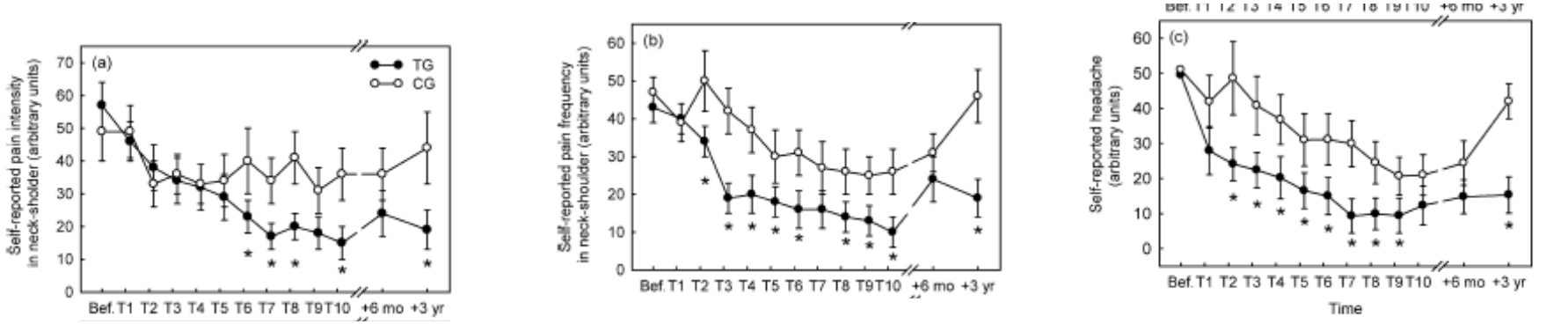

Fig. 1. Self-reported intensity of pain (upper panel), frequency of pain (middle panel) and headache (lower panel) before the first treatment, after each treatment (T1–T10) and 6 months and 3 years after the treatments for the test group (TG) and the control group (CG). The scores are arbitrary units on a scale from 0 to 100. The data are mean ± SEM for 14 (TG) and 10 (CG) subjects. * denotes significant difference between the two groups.

Reference and study design	Participants	Intervention/comparison	Outcome measure	Results/effect size	Conclusions
He D, Hostmark A, Veiersted K, Medbo J. Effect of intensive acupuncture on pain-related social and psychological variables for women with chronic neck and shoulder pain - an RCT with six month and three year follow up. *Acupuncture in Medicine* 2005;23(2):52-61. Norway	N=24 • 14 in acupuncture group • 10 in control group Inclusions: Women office workers with chronic (≥3 months in previous year) pain in the shoulder and neck region; 20-50yrs of age; pain was severe enough to interfere with work/spare time activities; Exclusions: diabetes, neurological, rheumatological or other diseases; pregnancy, breast-feeding Dropouts: none	Intervention: electroacupuncture, acupuncture, & ear acupressure of standardised points* Length of treatment: 3 treatments per week with a total of 10 treatments over 2-4 weeks; each treatment lasted 45 min Comparison: electroacupuncture without any voltage applied, acupuncture 10-40mm distal to actual points, & ear acupressure 4-6mm below actual points Co-interventions: none *16 body acu-points, 6 ear acu-points	Pain-related activity impairment at home and work Quality of sleep Degree of irritability & anxiety Degree of satisfaction with life Frequency of depression	**Pain-related activity impairment** Work: significant difference after 6th & 10th treatment [p values not reported], and at 3 years [p=0.04] Home: significant differeence at 3 years [p=0.03] **Quality of sleep** Significant difference after 9th treatment and 6 months and 3 years [p<0.01; p<0.03; p<0.03] **Degree of irritability & anxiety** significant difference between groups after 6th treatment and at 6 months and 3 years follow-up [p<0.02;	"Intensive acupuncture treatment may improve activity at work and several relevant social and psychological variables for women with chronic pain in the neck and shoulders. The effect may last for at least three years." Reviewer's conclusion: Some statistically significant differences in outcomes in favour of intervention at differing timepoints. However, due to this being a very small study and questions about validity of outcome measures and variation in results, the reviewer cannot exclude that the results seen are due largely to bias.

	Blinding: Participants and examiner blinded to allocation; acupuncturist not blinded Follow-up: 6 months, 3 yrs Characteristics (acupuncture/control): Mean age: 49/45 yrs Sex: all women Pain duration: 12/12 yrs Total days pain: 4.3/4.5 days per week All other variables similar Setting: secondary care			p=0.02; p=0.02] **Degree of satisfaction with life** significant difference between groups after the 8th treatment [p value not reported] and at 6 months [p<0.01] and 3 years [p value not reported] follow-up **Frequency of depression** significant difference between groups after the 5th-9th treatments and at 6 months and 3 years follow-up [all p=0.04]	
Study type: RCT **Quality:** 1-					

Comments: as He 2004 above

Reference and study design	Participants	Intervention/comparison	Outcome measure	Results/effect size	Conclusions
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. *Fam Pract* 2011;28(4):355-65. Sweden	n=117 • 65 in corticosteroid group • 58 in acupuncture group Inclusions: 30-65 yrs old; presented at one of 5 primary health care centres with shoulder pain and a 'typical' history of shoulder impingement; positive Neer impingement test; ≥2 months duration; 3 of 4 of Hawkins-Kennedy impingement sign, Jobe supraspinatus test, Neer impingement sign or painfull arc between 60 and 120° active abduction Exclusions: X-ray findings of malignancy, G-H joint OA, bony spurs/osteophytes	Intervention: injection methylprednisolone + local anaesthetic (if requested they could get another injection) Comparator: manual acupuncture (standardised acu-points) + home exercise programme Length of treatment: acupuncture treatment was 2x weekly for 5 weeks (30 min session); Co-interventions: none reported Acupuncture administered by 3 physiotherapists; corticosteroid injection by 3 GPS	Pain & shoulder function (Adolfsson-Lysholm shoulder assessment score) Health-related quality of life (EQ-5D) Patients' global assessment of change	No significant differences between two groups with respect to pain and function as measured by the Adolfsson-Lysholm shoulder assessment score No significant differences between two groups with respect to other secondary outcomes (QoL; global assessment)	"Neither treatment was superior in decreasing pain and improving shoulder function" Reviewers' conclusion: Neither treatment was superior, however, cannot exclude selection bias and/or performance bias i.e. baseline characteristics dissimilar, no blinding to allocation

	decreasing subacromial space; polyarthritis, rheumatoid arthritis, fibromyalgia; history of surgery, fracture or dislocation in shoulder; history/present instability any shoulder joint; suspicion of frozen shoulder; cervical spine problems; previous ultrasound or acupuncture for same problem; steroid injection; ruptured rotator cuff clinically; acute subacromial bursitis; communication difficulty <u>Dropouts:</u> 123 participants randomised but 6 developed frozen shoulder and were excluded, therefore 117 participants; 26 (22%) of theses 117 were lost to follow-up <u>Follow-up</u>: 12 months				

	Blinding: treatment practitioners (3 GPs and 3 physiotherapists) ITT analysis: those who changed treatment groups but still continued assessments as per protocol Relevant characteristics (steroid vs. acupuncture): Mean age: 50 vs. 51 yrs % women: 27 vs. 26% Duration 2-3 months: 24 vs. 48% Setting: Primary care				
Study type: RCT **Quality:** 1- **Comments:** Multi-centre pragmatic RCT; patients and treatment providers not blinded to allocation; 22% lost to follow-up; ITT analysis included those who had changed treatment groups but not other 'drop-outs'; sample size estimation done; 8 participants changed treatment groups (6 from steroid group; 2 from					

acupuncture group)

Reference and study design	Studies	Intervention/comparison	Outcome measure	Results/effect size	Conclusions
Nyberg A, Jonsson P, Sundelin G. Limited scientific evidence supports the use of conservative treatment interventions for pain and function in patients with subacromial impingement syndrome: Randomized control trials. *Physical Therapy Reviews* 2010;15(6):436-52. Sweden Studies included that were investigating acupuncture: Kleinhenz et al. (1999) , Vas et al. (2008), Johansson et	N = 20 studies Total number of patients in the studies: not reported Inclusion criteria: RCTs of patients diagnosed with subacromial impingement syndrome (SAIS) and/or established signs and symptoms consistent with SAIS; conservative treatment* (alone or in combination) vs. any/placebo/no intervention; *interventions other than surgery, pharmacological treatment and steroid injections	Interventions: acupuncture, electrotherapy modalities, exercises, mixed modalities, changing posture, functional brace Length of treatment: variable Comparison (placebo): variable Co-interventions: variable	Pain Function Quality scores: Kleinhenz 1999, 9/10 [high] Vas 2008, 8/10 [high] Johansson 2005, 8/10 [high]	**Kleinhenz 1999** (n=52) • acupuncture vs. placebo acupuncture • Constant-Murley score significantly improved in treatment group post-intervention [p<0.014]; pain intensity significantly higher in placebo group at 3 months follow-up [p<0.05] **Vas 2008** (n=425) • single point acupuncture + physiotherapy vs. mock-TENS + physiotherapy • Constant-Murley score significantly improved [p<0.001] in treatment group	"The result of this systematic review indicates contradictory scientific evidence to support the use of acupuncture for pain and function in SAIS patients."

al. (2005),	<u>Exclusion criteria</u>: shoulder diagnoses other than SAIS; multiple diagnoses <u>Databases used:</u> Cochrane library, PubMed, CINAHL; English only <u>Description of the methodological assessment of studies:</u> as per PEDro scale No meta-analysis Qualitative ('best-evidence') analysis			post-intervention and at 3 month follow-up **Johansson 2005** (n=85) • acupuncture + home exercise programme vs. ultrasound + home exercise programme • no significant differences between groups on ITT analysis; per protocol analysis acupuncture group better [p=0.045]	
Study type: Systematic review with qualitative analysis **Quality:** SIGN 1++ **Comments:** Wide range of interventions; good search and methodology appraisal; qualitative analysis appropriate; heterogeneity not formally reported					

KNEES

Reference and study design	Studies	Intervention/comparison	Outcome measure	Results/effect size	Notes
Manheimer, E., K. Cheng, et al. (2010). "Acupuncture for peripheral joint osteoarthritis." Cochrane Database of Systematic Reviews(1): CD001977. US, UK, Netherlands, China, Korea, Germany Included studies: 16 RCTs (Christensen 1992; Molsberger 1994; Takeda 1994; Berman 1999; Fink 2001; Haslam 2001; Sangdee 2002; Berman 2004; Stener-Victorin 2004; Tukmachi 2004; Vas 2004; Witt 2005; Scharf 2006; Witt 2006; Foster 2007;	N =16 studies (n = 3498 subjects) Inclusion: RCTs in any language of at least 6 weeks observation; people with osteoarthritis (OA) of 1 or more peripheral joints i.e. knee, hip, or hand; traditional acupuncture compared to a sham, other active treatment or waiting list control group Exclusions: only OA of spine; dry needling/trigger point therapy; laser or electro-acupuncture with no needle insertion; comparison of one form of acupuncture with another	Treatment/procedure: traditional (needle) acupuncture Length of treatment: Short-term = 8 weeks Long-term = 26 weeks Description of comparison (placebo): sham, other active treatment or waiting list control group Co-interventions: diclofenac or placebo tablet in one study	Pain Function Symptom severity	**Acupuncture vs. Sham acupuncture (all joints):** Pain Short-term: Standardized mean difference (SMD) = -0.28 95% confidence interval (95%CI): -0.45 to -0.11 9 trials; 1773 subjects I^2 = 64% Long-term (6 months) SMD = -0.10 95%CI: -0.21 to 0.01 4 trials; 1399 subjects	Sham-controlled trials show statistically significant benefits; however, these benefits are small, do not meet our pre-defined 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.

Williamson 2007)	Databases: Cochrane Central Register of Controlled trials, MEDLINE, and EMBASE Methodological assessment: used the following criteria (adequate sequence generation, allocation concealment, blinding, incomplete outcome data addressed, free of selective reporting) plus prognostic factors similar at baseline, co-interventions avoided or similar, compliance acceptable in all groups, timing of outcome assessment similar, and intention to treat analysis. Random effects model			I^2 = 0% <u>Function</u> Short-term: SMD = -0.28 95%CI: -0.46 to -0.09 9 trials; 1829 subjects I^2 = 69% Long-term: SMD = -0.11 95%CI: -0.22 to 0.00 4 trials; 1398 subjects I^2 = 6% <u>Symptom severity</u> Short-term: SMD = -0.29 95%CI: -0.50 to -0.09 9 trials; 1767 subjects I^2 = 74%	

				Long-term: SMD = -0.11 95%CI: -0.22 to 0.00 4 trials; 1398 subjects I^2 = 2% **Acupuncture vs. Sham acupuncture (Knee OA only)** <u>Pain</u> Short-term: SMD = -0.29 95%CI: -0.48 to -0.10 8 trials; 1773 subjects Long-term: SMD = -0.10 95%CI: -0.21 to 0.01 4 trials; 1399 subjects <u>Function</u> Short-term:	

				SMD = -0.29 95%CI: -0.49 to -0.08 8 trials; 1767 subjects Long-term: SMD = -0.11 95%CI: -0.21 to 0.00 4 trials; 1398 subjects <u>Symptom severity</u> Short-term: SMD = -0.29 95%CI: -0.50 to -0.09 8 trials; 1767 subjects Long-term: SMD = not estimable 4 trials; 1398 subjects	
Study type: systematic review with meta-analysis **Quality:** SIGN 1++					

Comments: Well conducted SR; focussed question; good search but only 3 databases; clear inclusion/exclusion criteria; methodological appraisal good; random effects appropriate; tested for heterogeneity

Table of results from Manheimer 2010: statistically significant result

Table: Acupuncture vs. sham acupuncture for knee OA

Outcome	Number of studies	Number of participants	SMD [95%CI]
Short term (time point ≤3 months & closest to 8 weeks post-randomisation)			
Pain	8	1773	-0.29 [-0.48, -0.10]
Function	8	1767	-0.29 [-0.49, -0.08]
Total score	8	1767	-0.29 [-0.50, -0.09]
Long term (26 weeks after baseline)			
Pain	4	1399	-0.10 [-0.21, 0.01]
Function	4	1398	-0.11 [-0.22, 0.00]
Total score	4	1398	Not estimable

Table: Acupuncture vs. waiting list or other active controls for knee OA

Outcome	Number of studies	Number of participants	SMD [95%CI]
Short term (time point ≤3 months & closest to 8 weeks post-randomisation)			
Pain	**8**		**subtotals only**
• Acupuncture vs. waiting list	4	615	-0.96 [-1.21, -0.70]
• Acupuncture vs. supervised OA education	1	294	-0.53 [-0.76, -0.29]
• Acupuncture + physiotherapy vs. physiotherapy	1	218	-0.19 [-0.46, 0.07]
• Acupuncture vs. exercise + advice leaflet	1	121	-0.30 [-0.66, 0.05]
• Acupuncture vs. supervised exercise	1	120	-0.20 [-0.56, 0.16]
• Acupuncture vs. consultation (physiotherapy as a co-intervention)	1	623	-0.67 [-0.83, -0.50]
Function	**7**		**subtotals only**
• Acupuncture vs. waiting list	3	587	-0.93 [-1.16, -0.69]
• Acupuncture vs. supervised OA education	1	294	-0.48 [-0.72, -0.25]
• Acupuncture + physiotherapy vs. physiotherapy	1	218	-0.17 [-0.44, 0.09]
• Acupuncture vs. exercise + advice leaflet	1	121	-0.28 [-0.64, 0.07]
• Acupuncture vs. supervised exercise	1	120	-0.13 [-0.49, 0.23]

• Acupuncture vs. consultation (physiotherapy as a co-intervention)	1	622	-0.60 [-0.76, -0.44]
Total score	**7**		**subtotals only**
• Acupuncture vs. waiting list	3	581	-0.96 [-1.17, -0.74]
• Acupuncture vs. supervised OA education	1	294	-0.52 [-0.76, -0.29]
• Acupuncture +physiotherapy vs. physiotherapy	1	218	-0.18 [-0.45, 0.08]
• Acupuncture vs. exercise + advice leaflet	1	121	-0.37 [-0.73, -0.01]
• Acupuncture vs. supervised exercise	1	120	-0.20 [-0.56, 0.16]
• Acupuncture vs. consultation (physiotherapy as a co-intervention)	1	622	-0.61 [-0.78, -0.45]
Long term (26 weeks after baseline)			
Pain	**3**	**1087**	**-0.37 [-0.68, -0.06]**
• Acupuncture vs. supervised OA education	1	250	-0.56 [-0.81, -0.30]
• Acupuncture + physiotherapy vs. physiotherapy	1	213	-0.01 [-0.28, 0.26]
• Acupuncture vs. consultation (exercise based physiotherapy as a co-intervention)	1	623	-0.51 [-0.67, -0.35]
Function	**3**	**1083**	**-0.36 [-0.55, -0.18]**
• Acupuncture vs. supervised OA education	1	250	-0.42 [-0.67, -0.17]
• Acupuncture + physiotherapy vs. physiotherapy	1	209	-0.14 [-0.41, 0.13]
• Acupuncture vs. consultation (exercise based physiotherapy as a co-intervention)	1	624	-0.46 [-0.62, -0.31]

Total score	**3**	**1083**	**-0.38 [-0.62, -0.15]**
• Acupuncture vs. supervised OA education	1	250	-0.46 [-0.71, -0.20]
• Acupuncture + physiotherapy vs. physiotherapy	1	209	-0.12 [-0.39, 0.15]
• Acupuncture vs. consultation (exercise based physiotherapy as a co-intervention)	1	624	-0.52 [-0.68, -0.36]

Reference and study design	Participants	Intervention/comparison	Outcome measure	Results/effect size	Conclusions
Miller E, Maimon Y, Rosenblatt Y, Mendler A, Hasner A, Barad A, et al. Delayed Effect of Acupuncture Treatment in OA of the Knee: A Blinded, Randomized, Controlled Trial. *Evid Based Complement Alternat Med* 2009. Israel	55 participants • treatment arm = 28 • control arm = 27 Inclusions: ≥45 yrs; diagnosis of OA knee ≥6 months; moderate-severe pain most days in last month for which analgesics were used for at least 1 month Exclusions: intra-articular steroid injection into knee(s) within 4 weeks; severe unstable chronic illness e.g. CHF, CRF, cancer	Intervention: acupuncture needles placed in points selected by team of TCM practitioners (see full paper for details); needles in place for 20mins and manually manipulated every 5mins Comparison: sham acupuncture (no insertion into skin) at same points as in treatment group at same frequency Length of treatment: twice weekly for 8 weeks	Knee Society Score (KSS) [acupuncture vs. sham] • total score • pain score • function score Patient satisfaction [acupuncture vs. sham]	<u>8 weeks:</u> 61.6 vs. 56.8; p=0.15 23.7 vs. 24.4; p=0.7 65 vs. 59.7; p=0.23 <u>12 weeks:</u> 63.54 vs. 53.6; p=0.036 24.0 vs. 21.1; p=0.31 67.4 vs. 54.7; p=0.01 4.87 vs. 3.75; p=0.005	"Adjunctive acupuncture seems to provide some added improvement to standard care in elderly patients with OA of the knee." <u>Reviewer's conclusion:</u> Acupuncture added to "standard care" may improve total knee score and knee function at 12 weeks after commencement of therapy but not at 8 weeks. However, cannot rule out bias or the effect of co-intervention, as this is poorly reported.

	Dropouts: 25% 10 during treatment (18%) [4 in acupuncture group & 6 in control] 4 lost during follow-up (7.7%) [3 in acupuncture group & 1 in control] Follow-up: 12 weeks Blinding: reported as being "applied successfully" Relevant characteristics: Mean age: 70.3yrs [acupuncture], 72.2yrs [control] Sex: 75% women [acupuncture], 63% [control] Stage of disease: not reported Co-morbidity: not	Co-interventions: "standard therapy (e.g. NSAIDs)	Adverse effects	None reported	

	reported Secondary care				
Study type: RCT **Quality:** SIGN 1- **Comments:** Small study; possible confounders not reported; co-intervention not reported clearly; no controls of therapist behaviour e.g. time spent, communication; high drop-out rate; drop-outs may be different from completers i.e. KSS function score lower					

PAIN

Reference and study design	Studies	Intervention/comparison	Outcome measure	Results/effect size	Conclusions
Hopton A, MacPherson H. Acupuncture for chronic pain: is acupuncture more than an effective placebo? A systematic review of pooled data from meta-analyses. Pain pract 2010;10(2):94-102. UK Studies included: Furlan 2005; Manheimer 2005; Kwon 2006; Bjordal 2007; Manheimer 2007; White 2007; Davis 2008; Sun 2008	N= 8 systematic reviews See table below for more details Inclusion: systematic reviews of acupuncture and chronic pain (knee, back, head) in English with meta-analyses and statistically pooled data Exclusion: reviews of shoulder, neck, elbow or leg pain, myofascial trigger point pain, chronic pain from RA, circulatory disorders, cancer or other terminal illness; injection of substances alone e.g. bee venom	Intervention: Acupuncture Comparison: "Sham" acupuncture (variable methods[15]) Length of treatment: for this review, defined as: Short-term = <3 months Long-term = ≥3 months No co-interventions reported	Pain	**<u>Knee pain only</u>** **Kwon 2006** • Short-term • N=2 studies (264 subjects) • SMD = 0.24, 95% CI: 0.01 to 0.47 **Bjordal 2007** All short-term <u>Manual acupuncture</u> • N=4 studies (746 subjects) • WMD = 1.3, 95% CI: -2.7 to 4.7 <u>Electroacupuncture</u> • N=3 studies (242 subjects) • WMD = 21.9, 95% CI: 17.3 to 25.3	"The meta-analyses of all recent systematic reviews of acupuncture for the most commonly occurring chronic pain conditions show that there is consistent evidence that acupuncture is more effective than sham acupuncture for chronic osteoarthritis of the knee and headache in both the short term and longer term." "However, the results for back pain are mixed." <u>Reviewer's conclusion:</u> Overall, the evidence from 4 good quality systematic reviews show that acupuncture reduces pain compared

[15] including superficial insertion of needles at inappropriate sites and the use of blunt devices to apply pressure without penetration of skin

	Databases: Medline, Allied & Complementary Medicine database, Cochrane library, Web of Science, authors' database and reference list (2005-2008). Methodological assessment: based on 14 questions derived from the Oxman and Guyatt index and the AMSTAR tool No pooling of results from individual systematic reviews			**Manheimer 2007** Short-term • N=6 (1636 subjects) • SMD = 0.35, 95% CI: 0.15 to 0.55 Long-term • N=3 (1304 subjects) • SMD = 0.13, 95% CI: 0.01 to 0.24 **White 2007** Short-term • N=5 (1334 subjects) • WMD = 1.54, 95% CI 0.49 to 2.60 Long-term • N=3 (1178 subjects) • WMD = 0.54, 95% CI 0.05 to 1.04	to 'sham' acupuncture both in the short- and long-term [NB: except for the manual acupuncture 'arm' of the Bjordal study]. However, the effect size is small with lower confidence limits near zero.
Study type: Systematic review of systematic reviews **Quality:** 1++					

Comments: Selected reviews that contained pooled data for meta-analyses from **high-quality trials** that compare sham and true acupuncture for specific, common pain conditions. Well conducted search and methodological assessment. Qualitative analysis of results appropriate. Each SR formally assessed the internal validity of each study, applied strict inclusion & exclusion criteria, and tested for heterogeneity. Three of the 4 knee studies conducted a sensitivity analysis and considered publication bias.

Table 2. Summary of Results:—Acupuncture vs. Sham Controls for Chronic Pain

Reference	Total Number Studies Reviewed	Number Trials Pooled with Sham Acupuncture (Number Pooled Participants)	Time Point Measured (Outcome)	Favors Acupuncture or Not	Standardized Mean Difference (SMD), Weighted Mean Difference (WMD), or Relative Risk (RR), 95% Confidence Interval (CI)
Back pain					
Furlan et al.[15]	35	4 (314)	Short term (pain)	Yes	WMD = 10.21, 95% CI 5.44 to 14.99
		2 (154)	Long term (pain)	No	WMD = 5.74, 95% CI −3.25 to 14.72
Manheimer et al.[16]	33	4 (343)	Short term (pain)	Yes	SMD = 0.54, 95% CI 0.35 to 0.73
		4 (247)	Long term (pain)	Yes	SMD = 0.61, 95% CI 0.21 to 1.01
Knee pain					
Kwon et al.[17]	18	2 (264)	Short term (pain)	Yes	SMD = 0.24, 95% CI 0.01 to 0.47
Bjordal et al.[18]	36	4 (746)	Short term (pain)	No (manual acupuncture)	WMD = 1.3, 95% CI −2.7 to 4.7
		3 (242)	Short term (pain)	Yes (electro acupuncture)	WMD = 21.9, 95% CI 17.3 to 25.3
Manheimer et al.[19]	11	6 (1,636)	Short term (pain)	Yes	SMD = 0.35, 95% CI 0.15 to 0.55
		3 (1,304)	Long term (pain)	Yes	SMD = 0.13, 95% CI 0.01 to 0.24
White et al.[20]	13	5 (1,334)	Short term (pain)	Yes	WMD = 1.54, 95% CI 0.49 to 2.60
		3 (1,178)	Long term (pain)	Yes	WMD = 0.54, 95% CI 0.05 to 1.04
Head ache					
Davis et al.[21]	8	5 (838)	During treatment (headache days per month)	No	WMD = 2.93, 95% CI −1.64 to 7.49
		4 (723)	Long term (headache days per month)	Yes	WMD = 1.83, 95% CI 0.64 to 3.01
Sun et al.[22]	31	14 (1,790)	Short term (headache response rate)	Yes	RR: 1.19, 95% CI = 1.08 to 1.30
		2 (428)	Long term (headache response rate)	Yes	RR: 1.22, 95% CI = 1.04 to 1.43

Reference and study design	Studies	Intervention/comparison	Outcome measure	Results/effect size	Conclusions
Madsen MV, Gotzsche PC, Hrobjartsson A. Acupuncture treatment for pain: systematic review of randomised clinical trials with acupuncture, placebo acupuncture, and no acupuncture groups. Bmj 2009;338:a3115. Denmark Included studies: Melchart 2005; Linde 2005; Lin 2002; Sprott 1993; Fanti 2003; Wang 1997; Witt 2005; Scharf 2006; Foster 2007; Molsberger 2002; Brinkhaus 2006; Leibing 2002; Kotani 2001 Relevant to report: Witt 2005 (OA knee); Scarf	N=13 studies (3025 subjects) Inclusion criteria: all trials labelled "acupuncture"; any placebo interventions used by authors e.g. non-penetrating needles, insertion into non-acupuncture points; pain measured by VAS or another scale; two control groups (placebo and no acupuncture) Exclusion criteria: TENS, manual acupressure; different co-interventions in each group Databases: Cochrane library, Medline, EMBASE, Biological	Intervention: acupuncture Length of treatment: 1 day to 12 weeks Comparison: both a placebo acupuncture and a no acupuncture control group Co-interventions: all patients were supplied with standard care which was analgesics in 13 trials and physiotherapy in 5	Pain	**Pooled results** Acupuncture vs. placebo acupuncture (see fig 1 below): SMD = -0.17 (95%CI: -0.26 to -0.08) 13 trials*; 3025 subjects I^2 = 36% Funnel plot: symmetrical with clear peak (data not reported) *one trial excluded as an outlier [Kotani 2001] i.e. % weight = 0 Placebo acupuncture	"We found a small analgesic effect of acupuncture that seems to lack clinical relevance and cannot be clearly distinguished from bias. Whether needling at acupuncture points, or at any site, reduces pain independently of the psychological impact of the treatment ritual is unclear." Reviewer's conclusions: Both meta-analyses show a statistically significant benefit with regards to pain and moderate degree of heterogeneity. Whether this effect is clinically significant is debatable, however, if it reflects a true effect then it is small.

2006 (OA knee); Foster 2007 (OA knee)	Abstracts, and PsycLit <u>Assessment of bias:</u> adequate allocation concealment; patients were blinded; drop-outs <15% [if all 3 present then low risk of bias]; funnel plot to assess small sample size bias Meta-analysis <u>Fixed or variable effects:</u> "used a random effects model if heterogeneity existed (P<0.10) and a fixed effect model otherwise."			<u>vs. no acupuncture</u> (see fig 2 below) SMD = -0.42 (95%CI: -0.60 to -0.23) 12 trials; 3025 subjects I^2 = 66% Funnel plot: broad peak as large trials reported both large and small effects of placebo; small trials tended to report small effects **Individual results (All OA knee)** Acupuncture vs. placebo acupuncture <u>Witt 2005</u> -0.52 (-0.80 to -0.23) <u>Scharf 2006</u> -0.13 (-0.28 to 0.02)	

				Foster 2007 -1.66 (-2.34 to -0.98) Placebo acupuncture vs. no acupuncture Witt 2005 -0.68 (-1.02 to -0.34) Scharf 2006 -0.42 (-0.58 to -0.27) Foster 2007 -0.21 (-0.47 to 0.06)	
Study type: Systematic review with meta-analysis **Quality:** SIGN 1- **Comments:** Due to moderate levels of statistical heterogeneity i.e. I^2 = 25-75%, probably not appropriate to conduct a meta-analysis. In addition, considerable heterogeneity is present in the populations, treatments and outcome measures. The results need to be interpreted in this light.					

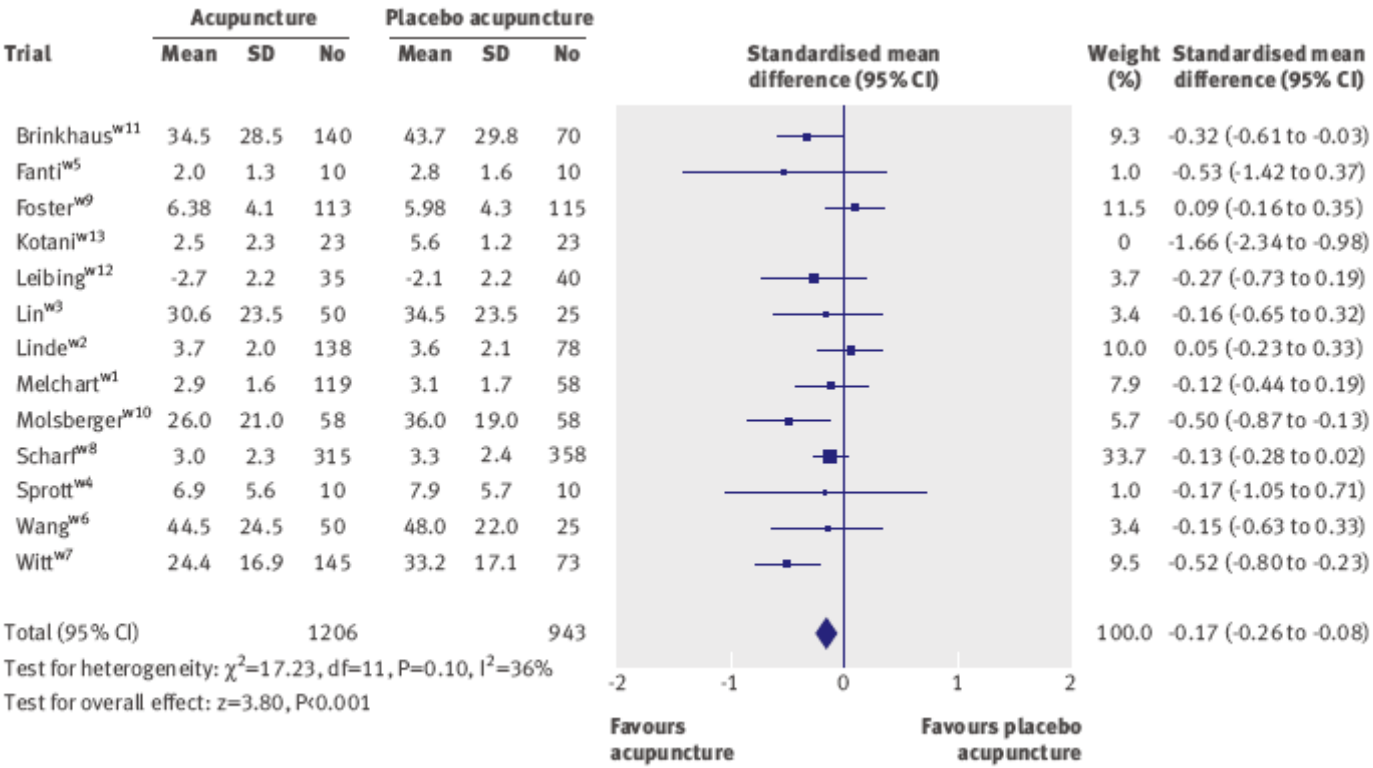

Fig 1| Meta-analysis of acupuncture versus placebo acupuncture

Trial	Placebo acupuncture Mean	SD	No	No acupuncture Mean	SD	No	Weight (%)	Standardised mean difference (95% CI)
Brinkhaus[w11]	43.7	29.8	70	58.6	25.1	74	9.9	-0.54 (-0.87 to -0.21)
Fanti[w5]	2.8	1.6	10	2.7	1.4	10	3.5	0.06 (-0.81 to 0.94)
Foster[w9]	5.98	4.3	115	6.86	4.2	105	11.2	-0.21 (-0.47 to 0.06)
Kotani[w13]	5.6	1.2	23	6.3	1.7	24	0	-0.47 (-1.05 to 0.11)
Leibing[w12]	-2.1	2.2	40	-1.0	1.7	39	7.9	-0.55 (-1.00 to -0.10)
Lin[w3]	34.5	23.5	25	33.9	18.3	25	6.4	0.03 (-0.53 to 0.58)
Linde[w2]	3.6	2.1	78	5.6	2.1	66	9.7	-0.95 (-1.29 to -0.60)
Melchart[w1]	3.1	1.7	58	4.6	1.5	63	9.1	-0.93 (-1.31 to -0.56)
Molsberger[w10]	36.0	19.0	58	39.0	21.0	58	9.4	-0.15 (-0.51 to 0.22)
Scharf[w8]	3.3	2.4	358	4.3	2.3	309	13.2	-0.42 (-0.58 to -0.27)
Sprott[w4]	7.9	5.7	10	7.4	4.5	10	3.5	0.09 (-0.78 to 0.97)
Wang[w6]	48.0	22.0	25	44.0	32.0	26	6.4	0.14 (-0.41 to 0.69)
Witt[w7]	33.2	17.1	73	44.9	17.2	67	9.8	-0.68 (-1.02 to -0.34)
Total (95% CI)			943			876	100.0	-0.42 (-0.60 to -0.23)

Test for heterogeneity: $\tau^2=0.06$, $\chi^2=32.51$, df=11, P<0.001, $I^2=66\%$

Test for overall effect: z=4.39, P<0.001

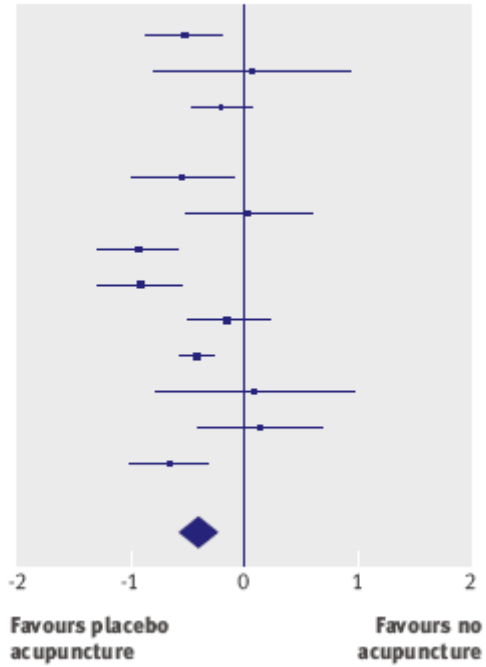

Fig 2 | Meta-analysis of placebo acupuncture versus no acupuncture