



# Acupuncture Expert Reference Group: Consensus document

The effectiveness and safety of  
acupuncture for the treatment of  
musculoskeletal conditions

**August 2019**



## Important Notes

- This report is a consensus document summarising the opinions of the Acupuncture Expert Reference Group. It presents a summary of an evidence-based review of the effectiveness and safety of acupuncture treatments for musculoskeletal conditions and provides a contextual framework for the interpretation of the review findings.
- This document is not intended to be a clinical guideline, nor does it set out recommendations for clinical practice. It is not intended to replace clinical judgement or be used as a clinical protocol.
- The range of musculoskeletal conditions included in the evidence-based review was not pre-selected, provided inclusion criteria were met, but instead reflect what was reported in the literature.
- Sham acupuncture takes many forms. This report does not assess the quality of sham acupuncture interventions provided. However, it must be noted that research increasingly recognises that there are limitations regarding physiologically inert sham acupuncture procedures.
- Systematic reviews critiqued in the evidence-based review were critiqued as systematic reviews, the randomised controlled trials within systematic reviews were not separately critiqued.
- The document has been prepared by the staff of the Evidence Based Healthcare Group, ACC. The content does not necessarily represent the official view of ACC or represent ACC policy.
- This report is based upon information up to 28 February 2019.

## Acknowledgements

ACC would like to acknowledge the contribution of the external members of the Acupuncture Expert Reference Group (ERG) for this project.

The Acupuncture ERG was convened in December 2017 to support the development and interpretation of an evidence-based review of the effectiveness and safety of acupuncture modalities for the treatment of a range of musculoskeletal conditions. Group members were nominated by their organisations to represent the perspectives of acupuncture registering authorities, professional bodies, academic researchers in acupuncture, consumers and ACC. The composition of the group was as follows:

### External (to ACC) Members:

Professor Dave Baxter (University of Otago); Dr Grant Johnston (Royal College of General Practitioners); Susan Kohut (Auckland University of Technology; Physiotherapy Acupuncture Association of New Zealand); Tracey Lindsay (New Zealand Acupuncture Standards Authority); Dr John McDonald (external expert representative nominated by Acupuncture New Zealand and New Zealand Acupuncture Standards Authority); Kate Roberts (Acupuncture New Zealand); Dr Hilary Stace (University of Victoria, Wellington; Consumer Representative).

### ACC Members:

Fraser Wilkins and Shaun Westhead (Provider Services Delivery Operations); Kim Eland (Clinical Services); Dr Melissa Barry (Research and Evaluation; Clinical Services), and Meagan Stephenson (Research and Evaluation).

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## 1 Background

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To better understand how acupuncture can be used to treat injury-related musculoskeletal conditions, the Accident Compensation Corporation (ACC) convened the Acupuncture Expert Reference Group (ERG), a multi-disciplinary advisory group representing ACC, registering authorities, professional bodies, and academic researchers in the use of acupuncture for the management of musculoskeletal conditions. The Acupuncture ERG was asked to contribute their clinical and academic expertise and experience to assist with a review of the evidence for the effectiveness and safety of acupuncture for musculoskeletal conditions, and to provide advice to ACC regarding the application of the findings of the evidence-based review within the New Zealand context. Two previous ACC evidence-based reviews have examined the use of acupuncture for musculoskeletal conditions (Hodges and Maskill, 2002; Hardaker and Ayson, 2011). The current evidence-based review aimed to build on the evidence base presented in previous reviews, provide additional information regarding specific conditions and treatment modalities, and extract information on treatment dose, duration and frequency.

### 1.1 Approaches to acupuncture

Two broad approaches to acupuncture are widely known within the literature: Traditional Chinese Medicine (TCM) and Western biomedical acupuncture (White et al, 2009). The TCM approach is based on the various concepts of the balance of yin and yang, qi theory, five element theory, meridian theory, and traditional diagnostic methods of Oriental medicine (Birch & Kaptchuk, 1999; Lu & Needham, 2002). Traditional acupuncture training utilises a TCM approach but includes study of Western medical science, and biomedical assessment to contribute to the development of a diagnosis and treatment plan. The Western biomedical acupuncture approach utilises the scientific methodology of western medicine, integrating knowledge of anatomy, physiology, pathology, and evidence-based medicine to clinically reason treatment (Bradnam, 2011; White et al, 2008). Consequently, the biomedical acupuncture treatment for a specific condition may be very similar to those of TCM; however, the clinical reasoning behind treatment selection may be entirely different (White, 2006). Both approaches utilise the treatment of painful (ashi) points and needling of myofascial trigger points (Dommerholt, 2011; Fan, Zheng & Yang, 2016; Janz & Adams, 2011; Kohut, Larmer & Johnson, 2011; Zhu & Most, 2016). The needling of myofascial trigger points with an acupuncture needle has also developed within the musculoskeletal physical therapy-related literature under the name of Dry Needling (DN) (Dommerholt, 2011).

### 1.2 Acupuncture modalities currently funded by ACC

The Accident Compensation Corporation (ACC) includes acupuncture within the suite of allied health treatment modalities. Allied Health is the third major group in the New Zealand health and disability

workforce (alongside medical and nursing professionals), and includes physiotherapists, chiropractors, osteopaths, occupational therapists, speech therapists and acupuncturists ([www.ahanz.org.nz](http://www.ahanz.org.nz)).

ACC currently funds two sets of treatment modalities within acupuncture services, conventional therapies and adjunct therapies. The conventional therapies are comprised of traditional acupuncture, Western acupuncture, laser acupuncture, electroacupuncture, and auricular acupuncture; the adjunct therapies include cupping, Gua Sha scraping, tuina massage, and moxibustion. ACC does not fund herbal plasters, liniments, herbalism, nutritional supplements, and ion-pumping cords.

Acupuncturists have been recognised under ACC cost of treatment regulations since 1990. The Accident Compensation Act (AC Act) defines an acupuncturist as a person who is a) a full member of the New Zealand Register of Acupuncturists Incorporated (NZRA), now known as Acupuncture NZ (AcNZ), or the New Zealand Acupuncture Standards Authority Inc (NZASA) and b) who holds a current practising certificate.

Other Health Practitioners (as defined under the Health Practitioners Competence Assurance Act 2003) may utilise acupuncture interventions as determined under the scopes of practice within which they work.

### **1.3 ACC cover for musculoskeletal conditions**

Musculoskeletal conditions may be eligible for cover if it can be established that the condition is a personal injury caused by an accident (PICBA) or a work-related gradual onset condition (e.g. carpal tunnel syndrome) (WRGPDI). The criteria for each are described in the Accident Compensation Act 2001.

ACC does not cover musculoskeletal injuries which are considered to be wholly or substantially due to non-injury factors, such as disease or aging.

## **2 Scope and Purpose**

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### **2.1 Objectives**

This consensus document summarises the composition and processes of the Acupuncture ERG, and the methodology and findings of the acupuncture evidence-based review. It is designed to sit alongside the full evidence-based review (International Centre for Allied Health Evidence, 2018), which was developed by researchers at the International Centre for Allied Health Evidence (iCAHE) with support from the Acupuncture ERG (see section 4). This consensus document summarises the key findings of the evidence-based review, outlines the role of the expert reference group, and provides some context around the current provision of acupuncture services for musculoskeletal conditions in Aotearoa / New Zealand. This document is not intended to be a clinical guideline, nor does it set out recommendations for clinical practice.

## 2.2 Target Population

The evidence-based review focussed on adult patients (18 years and over) with musculoskeletal conditions being treated in primary care settings.

To that end, the following was considered out of scope:

- Acupuncture for the treatment of children under the age of 18 years
- Acupuncture for the treatment of non-musculoskeletal conditions, such as migraine, pain due to malignancy, mental health conditions or pregnancy-related conditions
- Acupuncture delivered outside of primary care settings, such as pre- or post-surgical inpatient care or emergency department care

## 2.3 Target users of the consensus document and evidence-based review

The primary audiences for this consensus document are ACC staff, patients, acupuncture practitioners who deliver services in a primary health care setting and the related professional and registering bodies. Additionally, this document may be of wider interest to acupuncture researchers, educators and students, other health professionals, New Zealand government health funding agencies, international government agencies (e.g. Australia's Medicare, Workers Compensation, Veterans Affairs), and international acupuncture organisations.

## 3 Stakeholder Involvement

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### 3.1 The ACC Acupuncture Expert Reference Group (ERG)

The Acupuncture ERG was convened in December 2017 to support the development and interpretation of an evidence-based review of the effectiveness and safety of acupuncture modalities for the treatment of a range of musculoskeletal conditions. Group members were nominated by their organisations to represent the perspectives of acupuncture registering authorities and professional bodies, academic researchers in acupuncture, consumers and ACC. The composition of the group was as follows:

#### **External (to ACC) Members:**

Professor Dave Baxter (University of Otago); Dr Grant Johnston (Royal College of General Practitioners); Susan Kohut (Auckland University of Technology; Physiotherapy Acupuncture Association of New Zealand); Tracey Lindsay (New Zealand Acupuncture Standards Authority); Dr John McDonald (expert representative nominated by Acupuncture New Zealand and New Zealand Acupuncture Standards Authority); Kate Roberts (Acupuncture New Zealand); Dr Hilary Stace (University of Victoria, Wellington; Consumer Representative).

**ACC Members:**

Fraser Wilkins and Shaun Westhead (Provider Services Delivery Operations); Kim Eland (Clinical Services); and Dr Melissa Barry (Research and Evaluation; Clinical Services) and Meagan Stephenson (Research and Evaluation).

The Acupuncture ERG met five times between December 2017 and February 2019 for full day face-to-face meetings, linked by videoconference for ERG members based outside New Zealand. The first two meetings involved an in-depth discussion of the proposed methodology for the evidence-based review, including a discussion of search terms, inclusion and exclusion criteria, and key databases.

At subsequent meetings, the research team presented the findings for individual conditions and ERG members provided feedback on the accuracy of the search and study selection, appropriateness of the assessment of study quality, and the validity of the evidence synthesis.

Specifically, ERG members were asked to:

- Review and comment on the appropriateness of the review methodology, including the search terms, inclusion and exclusion criteria, and databases.
- Assess whether there were any studies missing
- Assess whether the assessment of study quality was correct, particularly whether the treatment regimens included in the study were appropriate
- Assess whether the interpretation of the findings and evidence synthesis was reasonable based on the included evidence

In addition, ERG members provided information about the context of the delivery of acupuncture services in New Zealand, including current standards of training and qualifications, expectations for the training and qualifications of acupuncture practitioners and their relationship to safety, the appropriateness of treatment regimens or provider behaviours, and what might be considered best clinical practice in a given situation. While, this document is not intended as a clinical guideline, the clinical context was an important consideration in the interpretation of findings.

#### 4 The evidence-based review of the effectiveness and safety of acupuncture for musculoskeletal conditions

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To provide a current assessment of the evidence base for the use of acupuncture to treat musculoskeletal conditions, ACC requested an evidence-based review of the effectiveness and safety of acupuncture modalities across a wide range of musculoskeletal conditions. After a standard internal procurement process and evaluation, the review was contracted to an external evidence-based health research group at the International Centre for Allied Health Evidence (iCAHE), University of South Australia.

Two previous ACC evidence-based reviews have examined the use of acupuncture for musculoskeletal conditions (Hodges and Maskill, 2002; Hardaker and Ayson, 2011). The current review aimed to update the evidence base for effectiveness and safety presented in previous reviews, provide additional information regarding the effectiveness of acupuncture for specific conditions and, where possible, extract information on treatment dose, duration and frequency.

#### **4.1 Research Questions**

The full evidence-based review was commissioned to identify, critically appraise and synthesise the best quality evidence for the effectiveness and safety of acupuncture for the treatment of adults with injury-related musculoskeletal conditions in primary care settings. The review used standard systematic review methodology to develop the research questions using a PICOT framework<sup>1</sup>. The full methods, including the PICOT framework, search strategy and databases, inclusion and exclusion criteria, critical appraisal checklists, and grading of evidence tools are described in the full report. Two primary research questions and five secondary questions were addressed by the review:

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

#### **4.2 Search Methods**

The evidence-based review was completed using internationally-accepted systematic review methodologies and standardized tools and checklists developed by the Scottish Intercollegiate Guidelines Network (SIGN) and Grading of Recommendations Assessment, Development and Evaluation (GRADE) working group. A wide range of health databases, including Chinese, Japanese and Korean databases, were searched for potentially eligible studies using a search strategy developed by an experienced information specialist. The full search

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<sup>1</sup> The PICOT framework outlines the inclusion and exclusion criteria for a review according to five domains: Population, Intervention, Comparator, Outcomes and Timeframe



strategy, including databases, search terms and full inclusion and exclusion criteria are described in the methods section and appendices of the full evidence-based review.

Key inclusion and exclusion criteria were:

#### **Inclusion criteria**

- Study Types: SRs, RCTs and Quasi-randomised controlled trials
- Participants: Patients receiving acupuncture interventions for the treatment of musculoskeletal conditions and injuries in primary care
- Intervention: Traditional Chinese acupuncture (TCA), Western acupuncture, electroacupuncture (EA), auricular acupuncture (AA), laser acupuncture (LA), dry needling (DN), moxibustion, cupping, Gua Sha scraping and traditional Chinese tuina massage
- Controls: Placebo/sham acupuncture, minimal acupuncture, usual care, standard care, waitlist, conservative treatments, exercise therapy, physical therapy, physiotherapy, manipulation, steroids, non-steroidal anti-inflammatory drugs (NSAID's), pain medication and analgesia
- Outcomes: Chronic pain, acute pain, function, return to work or other activity, absenteeism, presenteeism, safety, adverse events, risks, quality of life, range of movement and strength
- Publication criteria: English, Chinese, Japanese and Korean language, full text available, in peer reviewed journal. While the ERG acknowledged that predatory journals exist and are an important issue in the quality of peer reviewed publications, papers were not excluded based on the journal in which they were published. All papers went through a standard critical appraisal process.

#### **Exclusion criteria**

- Studies only available in abstract form e.g. conference presentations; grey literature
- Studies without an appropriate control group (e.g. studies comparing one acupuncture intervention with another acupuncture intervention with no non-acupuncture control)
- Studies that did not investigate clinical benefits in therapeutic or rehabilitation settings (e.g. those designed to investigate underlying physiological mechanisms)
- Study populations with non-musculoskeletal conditions or conditions which do not typically fall under ACC legislation e.g. studies reporting on pain due to malignancy or infection (e.g. post-herpetic neuralgia); dysmenorrhea; systemic inflammatory conditions; visceral pain; peripheral vascular disease; neurological conditions (e.g. Multiple Sclerosis) or pregnancy-related conditions
- Non-human studies

### **4.3 Evidence Selection Criteria**

The evidence-based review was completed using internationally-accepted systematic review methodologies and standardized tools and checklists developed by the Scottish Intercollegiate Guidelines Network (SIGN). A wide range of health databases, including Chinese, Japanese and Korean databases, were searched for potentially eligible studies using a search strategy developed by an experienced information specialist. The full search strategy, including databases, search terms and full inclusion and exclusion criteria are described in the methods section of the evidence-based review and presented in the appendices.

The search was developed using a standard PICOT structure. All study timeframes were considered within the review but for the analysis the timeframes were divided into short-term (< 6 weeks), medium term (6 to 12 weeks) and long term (> 12 weeks) outcomes. Only English, Chinese, Japanese and Korean articles published in peer-reviewed journals and accessible in full text, were included.

The titles and abstracts identified from the search strategy were assessed for eligibility by the iCAHE researchers. Full-text copies of eligible articles were retrieved for full examination and assessed for eligibility by iCAHE, with confirmation from ACC researchers regarding whether conditions were within the scope of ACC. Reference lists of included full-text articles were searched for relevant literature not located through database searching. The range of musculoskeletal conditions included in the evidence-based review was not pre-selected, provided inclusion criteria were met, but instead reflect what was reported in the literature.

#### **4.4 Critical Appraisal and Evidence Synthesis**

Studies which met inclusion criteria were appraised for quality using standard methodological checklists (Scottish Intercollegiate Guidelines Network). The SIGN checklist specific to each study design was used to assess the methodological quality of the included studies. The SIGN checklist asks several questions with yes, no, can't say, or not applicable response options. Studies received an overall grade for methodological quality based on the SIGN framework and scoring system of either high quality (HQ++), acceptable quality (AQ+), low quality (LQ-) or unacceptable. Copies of the SIGN checklist are provided in Appendix 2 of the full evidence-based review.

Two criteria from the Standards for Reporting Interventions in Clinical Trials of Acupuncture (STRICTA) guidelines and the National Institute for Complementary Medicine Acupuncture Network (NICMAN) scale were adapted and added to the core SIGN appraisal questions:

- 1) Was the treatment rationale (or differential diagnosis for TCM approaches) explained and followed through? Yes/No/Unclear
- 2) Did the acupuncture practitioners administering the intervention meet one of the following criteria: a) registered with a regulatory authority or b) met at least the minimum WHO standard for acupuncturists? Yes/No/Unclear

Data were extracted from the identified publications using a data extraction tool developed for this review using STRICTA (MacPherson et al. 2010) and NICMAN (Smith et al. 2017) tool criteria as a guide. A summary of each included study was presented in evidence tables (Appendix 3 of the full evidence review).

The following was extracted from each included study:

- Evidence source (Author, Date, Country)
- Study design
- Level of evidence
- Research question

- Funding
- Characteristics of participants
- Style of acupuncture
- Treatment rationale
- Interventions
- Treatment regimen
- Practitioner qualifications and background
- Control or comparator interventions
- Outcome measures
- Results
- Adverse events

In addition, outcomes were summarized according to short-term, medium-term and long-term timeframes. The definitions for these timeframes were based on standard pain medicine definitions and are presented in table 1.

**Table 1. Definitions of short-, medium- and long-term outcome timeframes utilized in the evidence-based review**

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

#### **4.5 Formulation of Evidence Statements**

Evidence statements were developed which provided an overall summary of the quality, consistency and clinical significance of the evidence base for each musculoskeletal condition. The evidence-based review was intended as a systematic review of the evidence of effectiveness and safety, but not as a clinical guideline. Therefore, evidence statements were developed to reflect the quality, consistency and clinical impact of the evidence without making any recommendations for best practice. The wording of the statements was developed in line with SIGN and GRADE methodology, so that both the overall level of evidence for each condition was considered alongside the impact and importance of any benefits or harms.

Where possible, the most commonly used treatment regimens, including the dose, duration and frequency of treatments, were described. The treatment framework, rationale and regimens were not well-reported across the studies and varied substantially. Therefore, the evidence statements around treatment regimens

reflect the range of information provided in the included research studies for each condition and may not necessarily reflect current clinical practice in New Zealand.

#### **4.6 External Review**

The evidence-based review was evaluated according to standard criteria by two peer reviewers external to the Acupuncture ERG. Both were academic researchers with experience in acupuncture research and the completion of systematic reviews. Both peer reviewers also had previous experience as acupuncture practitioners.

Reviewers were asked to comment on the accuracy, completeness of content, methodology of the review, whether they considered the report to be balanced and fair in its interpretation of the subject, and whether they considered the evidence statements to reflect the evidence provided.

## **5 Findings**

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The search for all musculoskeletal conditions using eleven databases yielded 13,165 articles. The final search date was December 15, 2017. After removal of duplicates from the search, 7,864 studies were screened for inclusion using title and abstract initially and full text when a decision could not be made based on the title and abstract. Following screening, 7,768 studies were excluded for failing to meet the inclusion criteria, leaving 96 studies that fitted all inclusion criteria for the report. Figure 1 in the full evidence review illustrates the process involved in study selection.

### **5.1 Strengths and Limitations of the Evidence**

Both the volume and quality of evidence varied widely across different conditions and for different acupuncture modalities. Most of the literature focussed on acupuncture treatments with an overall lack of studies in adjunct modalities, such as moxibustion, Gua Sha, tuina, and cupping. For some conditions, such as knee osteoarthritis and non-specific low back pain, the volume of studies was substantial with some high-quality systematic reviews available. However, the quality of the primary studies included within the systematic reviews was predominantly in the low to moderate range, with a moderate to high risk of bias. It was also difficult to provide strong indications of treatment dose, duration and frequency because of the variability across included studies. Lack of long term follow up was common. While most of the effects for acupuncture were short-term, there was a lack of long-term follow-up in studies and therefore a lack of evidence on long-term benefits of treatment.

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

#### Systematic reviews

- Very few studies addressed the potential for publication bias in reporting their reviews.
- Limited databases were often sourced during the search process.
- The included studies were mostly of poor quality, with a high risk of bias.

- Conflicts of interest were often not identified or reported.
- The studies often did not stratify results into clinically relevant subgroups such as type of acupuncture or musculoskeletal condition treated.
- Heterogeneous comparison groups were often used.
- The studies often lacked valid and reliable outcome measures.
- Studies frequently reported details of the intervention and control inadequately.
- Studies often did not adopt sham controls to blind the participants, practitioners and outcome assessors.
- Where sham controls were used, there was no discussion on the physiological inert or active acupuncture property status.
- Significant variability in treatments were common within the reviews and some of the treatment protocols may not have been clinically relevant.
- Not all studies screened for methodological quality of trials using validated critiquing tools.

#### Randomised controlled trials

- With the small numbers reported in the RCTs it was difficult to ensure that the effect of confounders was dealt with.
- Power calculations were often not conducted and many of the studies involved small numbers of participants which may have resulted in a lack of statistical power to detect differences between groups.
- Many studies failed to report the use of intention to treat analysis when reporting findings.
- Studies often did not use valid and reliable primary outcome measures.
- Convenience sampling was frequently used, with participants' often self-selecting following attendance at a clinic for treatment.
- Studies rarely controlled for the patient's involvement in co-interventions, such as exercise/medication, and did not report what other interventions participants had received.
- Subjects and outcome assessors were rarely blinded to the intervention involved.
- Often the same individuals were responsible for delivering the treatment and control interventions as well as assessing outcomes.
- Studies often did not include a no intervention control group or sham technique.
- Drop outs and cause of attrition were infrequently reported.
- The expertise of practitioners administering the intervention was heterogeneous and often not reported. Lower levels of training/competence can lead to poor research design and poor delivery of intervention. There is a need to interpret outcomes taking account of the training/experience of the practitioners
- Dry Needling regimens were not reported consistently, and included trigger point pecking needling to myofascial trigger points and sustained needling practices up to 20 minutes
- Lack of long term follow up was common. While most of the effects for acupuncture were short-term, there was a lack of long-term follow-up in studies and therefore a lack of evidence on long-term benefits of treatment with acupuncture.

- While some studies adhere well to the use of STRICTA criteria for reporting, there are still many studies which do not report important details of the treatment rationale, regimen and training/experience of practitioners. This made it difficult to interpret the results, identify any potential dose-response relationships, comment on best practice for treatment regimens for individual conditions or comment on the relationship between safety and training/experience of practitioners.
- Adverse events were not well-reported
- Interpretation of results is difficult due to the lack of reported information in studies.

## 6 Key findings of the effectiveness of acupuncture for musculoskeletal conditions

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The high-level findings of the evidence-based review indicate that:

- Conventional acupuncture modalities are effective for the short-term (up to 6 weeks) relief of pain associated with some musculoskeletal conditions but there is little evidence of medium (6 – 12 weeks) or long-term pain relief. While it is less consistent, there is evidence that for some conditions acupuncture modalities also improve functional outcomes in the short-term.
- Interventions were often reported as being 15 – 30 minutes long. A treatment regimen of 5 – 15 treatment sessions delivered weekly or twice weekly was common in the included studies. It was not always clear if the reported times reflected total treatment or needle retention time because of inconsistencies in the way studies were reported.
- Overall, insufficient evidence was available to determine whether adjunct therapy modalities, including moxibustion, cupping, Gua Sha and tuina, are effective for the relief of pain or functional outcomes associated with musculoskeletal conditions.
- There remain significant gaps in the evidence base for some conventional and most adjunct therapy modalities, and for medium and long-term follow-up of pain and functional outcomes and this should be a focus of future research.
- There is a lack of consistency in the rationale for and application of both needle and non-needle modalities in the literature, with wide variability in point selection, stimulation of needles, number of treatment sessions and the frequency and duration of treatment.
- Serious adverse events associated with needling practices such as acupuncture and dry needling are rare and usually resolve after treatment, however, these practices are not risk-free. Safety and adverse events are not consistently reported across studies, making it difficult to assess the true rate of adverse events.
- Needle based acupuncture interventions have a low rate of adverse events, when conducted amongst licensed and qualified practitioners. Several possible adverse events, including allergies, burns and infection are associated with moxibustion and cupping, meaning they are not entirely risk-free and should be monitored with a degree of caution.

## 6.1 Evidence summary for each included musculoskeletal condition

The following sections summarise the findings of the evidence-based review for each musculoskeletal condition. The range of included musculoskeletal conditions was not preselected, but instead reflects what was reported in the literature. Included studies have not been cited individually in this summary, however, full citations and a description of the methods, main findings, and results of the critical appraisal of each included study are reported in the full evidence-based review.

### Arthritic Neck Pain

Included Evidence: four systematic reviews, which included nine individual RCTs of low to moderate quality.

Included studies investigated treatments which used mainly a TCM framework and delivered acupuncture treatments including traditional acupuncture and tuina therapy. Most interventions were not combined with other treatments and were generally compared to traction, wait-list, manual therapy, sham acupuncture or sham TENSs.

Acupuncture interventions were often of 20 – 30-minutes duration with many studies conducting between 7 – 9 sessions, with a course of treatment of approximately 2 – 4 weeks.

There is conflicting evidence regarding the benefits of traditional acupuncture on the outcomes of pain and function over the short-term in patients with arthritic neck pain when compared to sham interventions.

The evidence suggests that acupuncture may have little to no effect in improving pain and disability in the long term for patients with arthritic neck pain when compared to sham interventions. Based on two HQ++ SRs of level 1 and 1+ evidence and one AQ+ SR of level 1 evidence. The SRs included 4 relevant RCTs.

The evidence suggests that tuina massage provides mostly positive effects on pain and disability for patients with arthritic neck pain when compared to manual therapy and traction. Based on one AQ+ SR of level 1+ evidence. The SR included 6 relevant RCTs.

Insufficient evidence is available on dry needling and other acupuncture therapies including electroacupuncture, auricular acupuncture, laser acupuncture, moxibustion, cupping and Gua Sha scraping for patients with arthritic neck pain.

### Non-specific Neck Pain

Included evidence: eight systematic reviews which included 16 individual RCTs. Two additional RCTs were identified which were not included in the systematic reviews. Studies varied significantly in quality ranging from low to high quality.

Included studies investigated treatments using a variety of frameworks and delivered a large variety of interventions including traditional acupuncture, electroacupuncture, auricular acupuncture, laser acupuncture, cupping and dry needling.

Needle-based acupuncture and dry needling interventions were mainly compared with sham and placebo controls (sham acupuncture, sham electrostimulation such as TENSs and placebo) however, such treatment was also compared to the conservative therapies in isolation or in combination (physical therapy, exercise, analgesics, traction, manipulation and stretching) or no treatment/waitlist. Cupping was mainly compared to a usual care control or a wait-list control. Gua Sha was compared to wait-list control and heat therapy.

Included studies investigated a wide range of patients with shoulder and neck region pain, which were classified into the diagnosis of non-specific neck pain, making generalisability questionable when results are transposed to an individual patient's neck pain related condition.

The reported number, duration and frequency of needle-based acupuncture/dry needling sessions were approximately 20 – 45 minutes long, with 5 – 10 sessions delivered over 3 – 5 weeks. Cupping interventions were not reported well, however, were often between 10 – 20 minutes long, with sessions every 3 – 4 days for a total of between 24 and 84 days.

Length of follow-up was adequate for needle-based acupuncture/dry needling with a number of studies reporting short and long term functional and pain outcomes, however, interventions such as Gua Sha and cupping had mostly short-term follow up with few studies reporting long-term functional or pain outcomes.

The evidence indicates that traditional acupuncture and electroacupuncture is likely to be more effective than sham/placebo control in the short-term for reducing pain and improving function for patients with non-specific neck pain however, there is conflicting evidence regarding the long-term effect. Based on two HQ++ SRs of level 1+ evidence, one AQ+ SR of level 1- evidence and one LQ- SR of level 1 evidence. The SRs included six relevant RCTs.

The evidence suggests that dry needling may be more effective than sham dry needling in reducing pain in patients with non-specific neck pain at short-term follow up. Based on two AQ+ SRs of level 1 evidence and one AQ+ RCT. The SRs included 1 relevant RCT.

The evidence indicates that laser acupuncture may be more effective than placebo for reducing pain in the short to medium term in patients with non-specific neck pain but does not improve function. Based on one HQ++ SR of level 1+ evidence. The SRs included two relevant RCTs.

The evidence suggests that Gua Sha scraping may be effective in improving pain in patients with non-specific neck pain when compared to waiting list or heat pack. Based on one HQ++ SR of level 1+ quality. The SR included two relevant RCTs.

The evidence indicates that acupuncture interventions may be effective in reducing pain and improving function for patients with non-specific neck pain in the short-term, however, there is little evidence supporting its sustained effect over the long term.

Insufficient evidence is available on other acupuncture therapies including auricular acupuncture, moxibustion, cupping and traditional Chinese tuina massage for patients with non-specific neck pain.

## **Mechanical Neck Pain**

Included evidence: seven systematic reviews, which included eight individual RCTs, and one additional RCT were identified. Study quality varied, however most were of moderate to high quality.

Included studies investigated treatments using either a TCM or western medical framework and delivered traditional acupuncture, electroacupuncture, dry needling and cupping. Acupuncture interventions were mainly compared with sham acupuncture, wait-list or inactive treatment (e.g. sham laser or TENs).

Participants within the included studies varied significantly regarding the duration and severity of neck pain, with conditions ranging from acute to chronic durations.

The reported number, duration and frequency of treatment sessions was often 15 – 30 minutes long, with 5 - 15 sessions delivered over 3 – 5 weeks of treatment.

Length of follow-up was mostly short to medium term with a small number of studies reporting long-term functional or pain outcomes.

There is conflicting evidence suggesting that traditional acupuncture may be more effective at reducing pain and improving disability in the short-term for patients with mechanical neck pain when compared to



sham acupuncture, however, the evidence does not provide support for a long-term effect. Based on two HQ++ SRs of level 1+ evidence and one LQ- SR of level 1- evidence. The SRs included 4 relevant RCTs.

There is conflicting evidence regarding the benefits of dry needling and electroacupuncture on the outcome of pain over the short-term in patients with mechanical neck pain when compared to control interventions. Based on one HQ++ SR of level 1+ evidence, three AQ+ SRs of level 1 evidence and one HQ++ RCT. The SRs included three relevant RCTs, two on dry needling and one on electroacupuncture.

Insufficient evidence is available on other acupuncture therapies including auricular acupuncture, laser acupuncture, moxibustion, cupping and Gua Sha scraping for patients with mechanical neck pain.

### **Cervicogenic headache**

Included evidence: No systematic reviews and only one RCT investigating the effectiveness of acupuncture treatments on cervicogenic headache.

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

### **Radicular Neck Pain**

Included evidence: three systematic reviews, which included 11 low quality RCTs with a high risk of bias, and one additional low-quality RCT. Overall the systematic reviews were of fairly high quality, however, the majority of included RCTs were subject to many forms of bias, reducing their quality level.

Included studies investigated treatments which used mainly a TCM framework and delivered a variety of acupuncture treatments including traditional acupuncture, tuina and moxibustion. The majority of interventions were used solely by themselves and were not combined with other treatments and were generally compared to traction, wait-list or placebo control where all duration was varied amongst the different studies.

The included studies all varied in relation to patient characteristics, however, commonly inclusion criteria included participants >17 years and all conditions associated with neck pain and lower back pain, however, only neck pain was used in this context.

Duration within the included studies varied, however similar interventions used similar duration lengths and treatment schedules. Acupuncture interventions were often of 15 - 30-minutes duration with most studies conducting between 8 - 20 sessions, with a course of treatment of approximately 2 - 4 weeks.

The evidence suggests that tuina massage provides mostly positive effects on pain, function and disability for patients with radicular neck pain when compared with traction. Based on one AQ+ SR of level 1 evidence. The SR included nine relevant RCTs.

The evidence indicates that traditional acupuncture interventions may be more effective than wait-list or sham interventions for reducing pain at immediate to short-term follow-up for patients with radicular neck pain. Based on two HQ++ SRs of level 1 + evidence. The SRs included two relevant RCTs.

Insufficient evidence is available on dry needling and other acupuncture therapies including auricular acupuncture, laser acupuncture, moxibustion, electroacupuncture, cupping and Gua Sha scraping for patients with radicular neck pain.

### **Whiplash-associated disorders (WAD)**

Included evidence: five systematic reviews which included six individual RCTs were identified that reviewed the effectiveness of acupuncture for WAD. Quality of the RCTs varied significantly, with studies ranging from low to high quality.

The included studies varied significantly in terms of methodological design, WAD grades, style of acupuncture and control groups. Included studies investigated treatments which used a variety of frameworks including TCM and western and mainly delivered traditional acupuncture, electroacupuncture and dry needling. Acupuncture interventions were mainly compared with sham acupuncture/electroacupuncture, usual care and medication.

WAD grading was not well reported in studies, however, the majority of studies recruited patients with WAD grade I or II.

The reported number, duration and frequency of treatment sessions were often between 6 – 12 sessions delivered over 2 – 6 weeks. The length of time of individual treatment sessions was often not well reported, however, ranged from 15 to 30 minutes. Length of follow-up was mostly short to medium-term with few studies reporting long-term functional, QOL or pain outcomes.

The evidence indicates that acupuncture and electroacupuncture, alone or in combination with standard treatments may be effective in reducing pain in the short to medium term when compared with usual care, sham electroacupuncture/acupuncture or medication for patients with whiplash associated disorders. However, the evidence does not provide support for improving function and disability. Based on one HQ++ SR of level 1+ evidence and one AQ+ SR of level 1- evidence. The SRs included 4 relevant RCTs.

The evidence indicates that acupuncture and electroacupuncture interventions may be effective in reducing pain in the short-term, however, there is little evidence supporting its sustained effect over the long term and its effect on improving function and disability.

The evidence suggests that there is little or no difference between dry needling and sham interventions for the outcomes of pain and function in patients with whiplash associated disorder in the short and long term. Based on one HQ++ SR of level 1+ evidence and three AQ+ SRs, two of level 1 and one of level 1- evidence. The SRs included 2 relevant RCTs.

Insufficient evidence is available on other acupuncture therapies including auricular acupuncture, laser acupuncture, moxibustion, cupping, Gua Sha scraping and traditional Chinese tuina massage for patients with whiplash associated disorder.

### **Rotator Cuff Pathology +/- Bursitis**

Included evidence: three systematic reviews, which included six individual RCTs, and seven additional RCTs. Quality of the RCTs was low to moderate.

Included studies investigated treatments which mainly delivered traditional acupuncture, laser acupuncture or dry needling alone or in combination with the control intervention. Acupuncture interventions were mainly compared with sham acupuncture/placebo, exercise and physiotherapy.

Most studies included a mixed cohort of patients diagnosed with rotator cuff tendinopathy / disease or subacromial pain syndrome which made the generalisability of the results to certain clinical presentations difficult.

The reported number, duration and frequency of treatment sessions were often between 4 – 10 sessions delivered over 4 – 7 weeks with the length of time of individual treatment sessions being 15 – 30 minutes. Length of follow-up was short, medium and long term for a number of outcomes within studies.

The evidence indicates that the addition of traditional acupuncture or electroacupuncture to an exercise programme may have little or no effect on outcomes for function, disability and range of motion in patients with rotator cuff pathology. Based on one HQ++ RCT.

The evidence suggests that acupuncture and electroacupuncture may be more effective than sham/placebo acupuncture in reducing pain and improving function and quality of life in the short and long term for patients with rotator cuff pathology. Based on one AQ+ SR of level 1+ evidence, one LQ- SR of level 1 evidence and one LQ- RCT. The SRs included four relevant RCTs.

The evidence indicates that there is no significant difference between treatment with acupuncture and cortisone injection for the outcomes of pain and function in patients with rotator cuff pathology, but that acupuncture may not be as effective as platelet rich plasma injections. Based on two AQ+ RCTs, one on acupuncture and one on dry needling.

There is conflicting evidence regarding the benefits of dry needling in combination with exercise/physiotherapy on the outcomes of function and disability in patients with rotator cuff pathology when compared to exercise/physiotherapy alone. The evidence suggests that there is little or no effect on the reduction of pain. Based on two AQ+ RCTs.

There is limited and conflicting evidence regarding the benefits of laser acupuncture when compared to sham/placebo on the outcomes of pain, range of motion, disability and function in patients with rotator cuff pathology. Based on one HQ++ SR and one LQ- RCT. The SR included one relevant RCT.

Insufficient evidence is available for other acupuncture therapies including moxibustion, cupping, Gua Sha scraping and traditional Chinese tuina massage for patients with rotator cuff pathology.

### **Frozen Shoulder**

Included evidence: four systematic reviews, which included six RCTs, and one additional RCT. Studies were of low to moderate quality.

Included studies investigated treatments which mainly used a TCM framework and delivered a combined or individual treatment of acupuncture (traditional acupuncture, cupping, electroacupuncture, tuina therapy and laser acupuncture) and rehabilitation, physiotherapy or electrotherapy. These interventions were mainly compared with physiotherapy, electrotherapy and injections alone.

Patients were commonly aged in their 50's and in varying and poorly reported stages of the condition. The number, duration and frequency of treatment sessions were around 30 - 40 minutes long, with 8 - 10 sessions delivered over 4 – 6 weeks of treatment.

The evidence suggests that acupuncture or electroacupuncture, alone or in combination with physiotherapy or electrotherapy may be effective for reducing pain, improving range of motion and function in patients with frozen shoulder when compared to physiotherapy or electrotherapy alone. Based on one LQ- SR of level 1- evidence containing three RCTs and one LQ- RCT.

Insufficient evidence is available on other acupuncture therapies including auricular acupuncture, laser acupuncture, dry needling, moxibustion, cupping, tuina massage and Gua Sha scraping for patients with frozen shoulder.

### **Lateral Epicondylitis/Lateral Elbow Pain**

Included evidence: six systematic reviews, which included 20 individual RCTs, and two additional RCTs. While there was a sizable evidence base, included RCTs within the systematic reviews were generally of low to moderate quality.

Included studies mainly investigated treatments which used a TCM framework and delivered traditional acupuncture and laser acupuncture. Acupuncture interventions were mainly compared with sham acupuncture, ultrasound and placebo. Patients were generally outpatients aged greater than 40 years old.

The number, duration and frequency of treatment sessions were about 20 - 30 minutes long, with around 10 sessions delivered over 2 - 6 weeks.

Length of follow-up was mostly short-term, however, some studies reported long-term functional, strength and pain outcomes.

The evidence suggests that traditional acupuncture provides short-term reductions of pain and improvements in strength and function in patients with lateral elbow pain/lateral epicondylitis when compared to placebo, sham and ultrasound, however, there is conflicting evidence regarding the medium to long term effect. Based on one HQ++ SR of level 1 evidence and two AQ+ SRs of level 1 evidence. The SRs included 14 relevant RCTs.

The evidence indicates that there is little or no difference between treatment with laser acupuncture and placebo/sham for the outcomes of pain and strength in patients with lateral elbow pain/lateral epicondylitis. Based on one HQ++ SR of level 1+ evidence, one AQ+ SR of level 1 evidence and one LQ- SR of level 1- evidence. The SRs included eight relevant RCTs.

Insufficient evidence is available on other acupuncture therapies including auricular acupuncture, electroacupuncture, dry needling, moxibustion, cupping, Gua Sha scraping and traditional Chinese tuina massage for patients with lateral epicondylitis/lateral elbow pain.

### **Carpal Tunnel Syndrome (CTS)**

Included evidence: three systematic reviews, which included seven individual RCTs, plus four additional RCTs. Quality of the included studies was mainly low to moderate.

Included studies investigated treatments which used a TCM framework and delivered traditional acupuncture, electroacupuncture and laser acupuncture. Acupuncture interventions were mainly compared with sham acupuncture/placebo, night wrist splinting and medication.

Most studies were concerned with patients diagnosed as having mild to moderate CTS.

The number, duration and frequency of treatment sessions were often between 8 – 10 sessions delivered over 4 – 6 weeks with the length of time of individual treatment sessions being around 30 minutes. Length of follow-up was mostly short to medium-term with few studies reporting long-term outcomes.

There was limited and conflicting evidence regarding the benefits of acupuncture on patient's symptoms and nerve conduction study results in patients with mild to moderate CTS when compared to placebo and conventional medication. Based on two AQ+ SRs of level 1 and 1+ evidence and one AQ+ RCT. The SRs included six relevant RCTs.

Insufficient evidence is available for dry needling and other acupuncture therapies including auricular acupuncture, laser acupuncture, moxibustion, Gua Sha scraping and traditional Chinese tuina massage for patients with CTS.

### **De Quervain's Tenosynovitis (DeQT)**

Included evidence: No systematic reviews and only one RCT was identified investigating the effectiveness of acupuncture treatments on De Quervain's Tenosynovitis.

The single moderate quality RCT compared five sessions of acupuncture plus a splint, with a steroid injection plus a splint in patients with De Quervain's Tenosynovitis.

The evidence indicates that there may be little or no difference between treatment with traditional Chinese acupuncture and injection in the short-term for the outcomes of pain and disability in patients with De Quervain's Tenosynovitis.

Insufficient evidence is available on dry needling and other acupuncture therapies including electroacupuncture, auricular acupuncture, laser acupuncture, moxibustion, cupping, Gua Sha scraping and traditional Chinese tuina massage for patients with De Quervain's Tenosynovitis.

## Non-Specific Low Back Pain (NSLBP)

Included evidence: 15 systematic reviews and two additional RCTs were identified that reviewed the effectiveness of acupuncture interventions for NSLBP. Study quality varied from low to high quality.

Included studies investigated treatments which used mainly a TCM framework and delivered a variety of acupuncture treatments including traditional acupuncture, laser acupuncture, electroacupuncture, tuina, Gua Sha and cupping therapies.

Acupuncture interventions were mainly compared with sham acupuncture, sham TENS, medication, no treatment or waiting list. The included studies varied significantly with regard to age of participants, duration (varied from acute within a week, to 3-12 months or greater than 5 years) and severity of condition, which makes it difficult to draw clinically meaningful results.

Acupuncture interventions were often of 20 to 30-minute duration with the large majority of studies conducting between 10-20 sessions, with a course of treatment of 3 – 7 weeks. Studies focusing on acute low back pain typically conducted 3 – 12 sessions over 1 – 6 weeks. Studies utilising laser acupuncture conducted 3 – 15 treatment sessions over a 1 – 12-week period. Tuina interventions were often sessions of 30-minutes duration over a 1 to 4-week period. A history of traumatic injury was often an exclusion criterion, so this may limit the relevance of the findings for ACC.

Length of follow-up was mostly short-term with few studies reporting long-term functional or pain outcomes.

The evidence suggests that traditional acupuncture is probably effective in reducing pain in the short-term for patients with non-specific low back pain when compared to a waiting list/no treatment control, however, its effect on function and quality of life remains unclear and conflicting. Based on four AQ+ SRs of level 1 and 1+ evidence and two LQ- SR of level 1 and 1- evidence. The SRs included 15 relevant RCTs.

There is conflicting evidence suggesting that acupuncture may be more effective at reducing pain in the short-term for patients with non-specific low back pain when compared to sham acupuncture, placebo and conventional medication. However, acupuncture may have little or no effect on function and quality of life. Based on one HQ++ SR of level 1+ evidence, four AQ+ SRs of level 1 and 1+ evidence and two LQ- SRs of level 1 and 1- evidence. The SRs included 26 relevant RCTs.

Limited evidence suggests that the addition of acupuncture to usual care or medication may improve outcomes for pain and function in the short-term for patients with non-specific low back pain when compared with those who received usual care or medication alone.

The evidence indicates that electroacupuncture may be effective in reducing pain immediately post intervention and in the short-term when compared with conventional medication and exercise. Based on two AQ+ SRs of level 1 and 1+ evidence. The SRs included six relevant RCTs.

The evidence suggests that cupping may be effective in reducing pain in the short-term compared with conventional medications for patients with non-specific low back pain. Based on one HQ++ SR of level 1+ evidence and two AQ+ SR of level 1 and 1- evidence. The SRs included nine relevant RCTs.

The evidence suggests that the effectiveness of acupuncture treatments on non-specific low back pain is affected by the patient's age and duration of the condition, with the evidence indicating a relationship between increased patient age or increased chronicity of condition (> 3 months) and reduced treatment outcomes.

Insufficient evidence is available on dry needling and other acupuncture therapies including auricular acupuncture, laser acupuncture moxibustion, Gua Sha scraping and traditional Chinese tuina massage for patients with non-specific low back pain.

## Lumbar Disc Herniation

Included evidence: two systematic reviews which included 14 individual RCTs. Studies were reported to be of low quality.

One looked at the effectiveness of tuina manual therapy while the other looked at the interventions of acupuncture and electroacupuncture. Tuina manual therapy was also used in conjunction with other interventions, mostly oral drugs, traction and intravenous injections. The control groups were mainly oral drugs and traction using varied duration periods which were different to the intervention in most cases.

The included studies that reported treatment schedules averaged  $11.3 \pm 8.1$  sessions (range 1–36) and the length of each session was  $25.3 \pm 5.7$  minutes (range 15–30).

Follow up length was only reported within two of the included RCTs and ranged between 1 day to 60 weeks.

There was low quality evidence that tuina, alone or used alongside traction, may be effective for the relief of pain due to lumbar disc herniation, but the clinical impact of the treatment is uncertain.

The evidence indicates that traditional acupuncture plus traction may be effective in reducing pain post treatment for patients with lumbar disc herniation when compared to traction alone. Based on one LQ- SR of level 1- evidence. The SR included five relevant RCTs.

The evidence suggests that tuina massage may be effective in improving pain and function for patients with lumbar disc herniation when compared to conventional medication and traction, however, the evidence for functional improvement was not as strong as pain relief. Based on one AQ+ SR of level 1+ evidence. The SR included eight relevant RCTs.

Insufficient evidence is available on other acupuncture therapies including electroacupuncture, auricular acupuncture, laser acupuncture, dry needling, moxibustion, cupping and Gua Sha scraping for patients with lumbar disc herniation.

## Sciatica

Included evidence: three systematic reviews, which included 13 individual RCTs, were identified that reviewed the effectiveness of acupuncture interventions for sciatica. Studies were of low to moderate quality.

Included studies mainly investigated treatments which used a TCM framework and delivered traditional acupuncture and electro-acupuncture. Acupuncture interventions were mainly compared with conventional medication (Ibuprofen, Prednisone, Meloxicam and Diclofenac).

Patient age and duration of condition significantly varied between the included studies ranging from 18 – 79 years of age and reported durations of 4 days to 18 years.

The number, duration and frequency of treatment sessions was well-reported, with sessions often of 20 – 45 minutes long, with 5 - 20 sessions delivered over a short period of 1 – 3 weeks. Length of follow-up was mostly short-term with few studies reporting long-term functional or pain outcomes.

The evidence indicates that traditional acupuncture and electroacupuncture are probably effective in reducing pain in the short-term when compared with conventional medication. However, there is little evidence on its sustained effect over the medium and long-term and its effect on function and quality of life. Based on two SRs of HQ++ and one SR of AQ+, all of level 1 evidence. The SRs included thirteen relevant RCTs.

Insufficient evidence is available on other acupuncture therapies including dry needling, auricular acupuncture, laser acupuncture, moxibustion, cupping, Gua Sha scraping and traditional Chinese tuina massage for patients with sciatica.

## Myofascial Pain

Included evidence: 13 systematic reviews which included 55 individual RCTs, plus three additional RCTs were identified that reviewed the effectiveness of acupuncture treatments for myofascial pain. Studies were of low to moderate quality.

Due to the difficulty of identifying pure myofascial pain studies a decision was made to discuss findings as a whole and not incorporate the studies into relevant body sites during the analysis.

Included studies mainly investigated treatments which delivered dry needling, traditional acupuncture and laser acupuncture. Acupuncture interventions were mainly compared with sham, placebo, injection, exercise, manual therapy and no treatment.

Patients were generally aged between 30 and 60 years of age and suffered from myofascial pain in the neck and shoulders or low back for greater than six months, however, the included studies varied significantly.

The number, duration and frequency of treatment sessions were 4 - 20 sessions of approximately 30 minutes duration, delivered over 3 - 10 weeks of treatment. Length of follow-up was mostly short to medium term with few studies reporting long-term functional and pain outcomes.

The evidence suggests that dry needling improves pain intensity and range of motion post- intervention and at short-term follow up when compared with no intervention, sham or placebo for patients with myofascial pain. However, the improvement was not sustained over the long term. Based on two HQ++ SRs of level 1 and 1+ evidence, six AQ+ SRs two of level 1+ and four of level 1 evidence and one LQ- SR of level 1- evidence. The SRs included 32 relevant RCTs.

The evidence indicates that there is little or no difference between treatment with dry needling or acupuncture and other treatments such as manual therapy, pharmaceutical injections and conventional medication for the outcomes of pain and function in patients with myofascial pain. Based on three HQ++ SRs, one of level 1 and two of level 1+ evidence, six AQ+ SRs two of level 1+ and four of level 1 evidence, one LQ- SR of level 1- evidence and three RCTs, two of AQ+ and one of LQ-. The SRs included 32 relevant RCTs.

There is conflicting evidence about the benefits of dry needling on the outcomes of quality of life and function over the short-term in patients with myofascial pain. Based on two HQ++ SRs of level 1 and 1+ evidence, five AQ+ SRs two of level 1+ and three of level 1 evidence and one LQ- SR of level 1- evidence. The SRs included 31 relevant RCTs.

The evidence indicates that traditional acupuncture may be more effective than control or placebo for reducing pain and improving function at immediate to short-term follow-up for patients with myofascial pain. Based on two HQ++ SRs of level 1+ evidence. The SRs included six relevant RCTs.

The evidence suggests that laser acupuncture may be more effective than placebo in reducing pain in patients with myofascial pain at short to long term follow up. Based on one SR of HQ++ and level 1+ evidence and one LQ- SR of level 1- evidence. The SRs included 17 relevant RCTs.

Insufficient evidence is available on other acupuncture therapies including auricular acupuncture, moxibustion, Gua Sha scraping and traditional Chinese tuina massage for patients with myofascial pain.

## Upper and Lower Limb Fractures

Included evidence: one systematic review which included four individual RCTs, plus two additional RCTs were identified which reviewed the effectiveness of acupuncture for upper and lower limb fractures. Quality of the included studies was low to moderate.

The included studies investigated treatments using a TCM framework and included laser acupuncture, electroacupuncture and tuina massage. Laser acupuncture plus rehabilitation was compared with rehabilitation alone for patients with distal radius fracture, while electroacupuncture was compared with

splinting plus traditional Chinese herbal formula for patients with fractures of the middle and lower third of the tibiofibular. Tuina massage was compared with surgery for patients with humeral and calcaneal fractures.

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

There is insufficient and conflicting evidence for traditional Chinese tuina massage for the treatment of upper and lower limb fractures.

### **Sacrococcygeal Pain**

Included evidence: one systematic review which included one relevant RCT. The study was of low quality.

The single included study investigated treatments which used a TCM framework and delivered tuina manual therapy. The tuina manual therapy was compared to oral medication.

The number, duration and frequency of treatment sessions was six sessions delivered over two weeks, however, the session times were not reported. The follow up period was three months.

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

### **Hip Osteoarthritis**

Included evidence: one systematic review which included three individual RCTs was identified that reviewed the effectiveness of acupuncture on hip OA. Studies were of low quality.

The included RCTs within the systematic review mainly investigated the effect of acupuncture compared to sham acupuncture.

The included studies conducted between 6 – 10 sessions over a period of 3 – 6 weeks. The length of each session was between 20 – 30 minutes. Long term follow-up periods were collected by the studies, however the attrition rate was so high (almost 50% for at least one of the comparison groups), the data was not used within the meta-analysis of the systematic review.

The evidence indicates that treatment with traditional acupuncture may have little or no effect compared with sham acupuncture for the outcomes of pain and function in patients with hip osteoarthritis. Based on one AQ+ SR of level 1+ evidence, which included three relevant RCTs.

Insufficient evidence is available on other acupuncture therapies including electroacupuncture, dry needling, auricular acupuncture, laser acupuncture, moxibustion, cupping, Gua Sha scraping and traditional Chinese tuina massage for patients with hip osteoarthritis.

### **Greater Trochanteric Pain Syndrome**

Included evidence: no systematic reviews and one low quality RCT was included.

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



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

### Patellofemoral Pain

Included evidence: one systematic review, which included one RCT, and one additional RCT was identified. Studies were of moderate to high quality.

The two studies delivered different acupuncture treatments and used different comparisons. One RCT used a TCM framework and delivered traditional acupuncture compared with no treatment. The second used a western medical framework and delivered trigger point dry needling along with manual therapy and exercise in a multimodal therapy program. This intervention was compared with manual therapy plus exercise alone.

Patients were generally around 30 years old and were experiencing chronic anterior knee pain of greater than three months' duration.

The number, duration, and frequency of treatment sessions varied significantly between the studies with Jensen et al. (1999) delivering two 20-25-minute sessions per week for four weeks and Epsi-Lopez et al (2017) delivering three 30-40 sessions over three weeks which included 15 to 20 minutes of manual therapy, 10 to 15 minutes of exercises, and 2 to 5 minutes of trigger point dry needling.

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

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

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

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

### Knee Osteoarthritis

Included evidence: 15 systematic reviews, which included 78 RCTs, plus nine additional RCTs were identified, that reviewed the effectiveness of acupuncture interventions for knee OA. Studies were of low to moderate quality.

Included studies mainly investigated treatments which used a TCM framework and delivered traditional acupuncture, trigger point acupuncture or moxibustion. Acupuncture interventions were mainly compared with sham acupuncture, no treatment or conservative therapies. Moxibustion was mainly compared with drug therapies such as diclofenac, or sham moxibustion.

Patients were generally recruited from hospital clinics, were aged greater than 50 years old and suffered from knee OA of chronic duration and moderate severity, however, the included studies varied significantly. A history of traumatic injury was often an exclusion criterion, so this may limit the relevance of the findings for ACC.

The number, duration and frequency of treatment sessions was not well-reported, but where it was, sessions were about 20 - 30 minutes long, with 5 - 20 sessions delivered over 5 - 9 weeks of treatment or daily treatments over a short period of 7 – 10 days. Length of follow-up was mostly short-term with few studies reporting long-term functional or pain outcomes.

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

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

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

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

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

## Ankle Sprain

Included evidence: three systematic reviews which included 18 individual RCTs. Studies were generally of low quality and lacked validated outcome measures for the primary and secondary outcomes of interest within this review including pain, function and QOL.

Included studies mainly investigated treatments which used a TCM framework and delivered traditional acupuncture, auricular acupuncture, electroacupuncture and warm acupuncture. Acupuncture interventions were mainly compared with usual care/standard physiotherapy (bandage and/or ice pack), massage, topical NSAIDs and oral medication.

The included studies considered three main types of comparisons: acupuncture versus no treatment or placebo, acupuncture versus another standard non-surgical intervention and acupuncture used in conjunction with other treatments to assess its effectiveness as an add-on treatment. Patients were generally between 18 and 25 years of age and had suffered an acute ankle sprain of less than a week's duration. Most studies within the SRs included ankle sprains of mixed severity or did not detail severity.

The number, duration and frequency of treatment sessions was commonly between 5 and 15 sessions over 1 to 2 weeks. Length of follow-up was mostly of short-term.

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

## Achilles Tendinopathy

Included evidence: one systematic review, which included one individual RCT, plus one additional RCT was identified. Studies were of low to moderate quality.

Included studies investigated treatments which used a TCM framework and delivered electroacupuncture and traditional acupuncture. Acupuncture interventions were compared with low frequency impulse treatment and eccentric exercise.

Patients were all between 18 and 65 years of age and were generally over 40 years of age and suffering from chronic Achilles tendinopathy.

The number of sessions ranged from 12 to 24 with one study utilising 12 sessions over 6 weeks and the other utilising 24 sessions over 8 weeks. Length of follow-up was only in the short-term.

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

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

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

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

## Plantar Heel Pain

Included evidence: seven systematic reviews, which included 12 individual RCTs, plus 1 additional RCT was identified that reviewed the effectiveness of acupuncture for plantar heel pain. Studies were of low to moderate quality and mostly reported on follow up times in the short and medium term.

Included studies investigated treatments which used TCM or western framework and delivered traditional acupuncture, trigger point dry needling, electroacupuncture and warm needling acupuncture. Acupuncture interventions were mainly compared with exercise, sham acupuncture, insoles or steroid injections.

Patients were generally diagnosed with plantar fasciitis however, several studies used the words plantar fasciitis and plantar heel pain interchangeably. Plantar fasciitis is a common cause of plantar heel pain, but plantar heel pain can also include wider issues which may affect results. The patients were commonly aged between 35 and 60 years old.

The number, duration and frequency of treatment sessions were often of two different treatment schedules, one of daily treatments over 1 – 2 weeks and the other of weekly sessions over 4 – 8 weeks.

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

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

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

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

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

## 7 Key findings for the safety of acupuncture treatments for musculoskeletal conditions

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Included evidence: three low quality systematic reviews of level 1- and 2- evidence on adverse events, 26 systematic reviews of acupuncture and dry needling interventions, four systematic reviews of moxibustion interventions, four systematic reviews of cupping interventions and 22 additional randomised trials.

Safety and adverse events were not consistently reported in the literature. From the data, it would appear that adverse events are relatively rare, but this may reflect under-reporting in the literature.

Serious adverse events associated with needling practices such as acupuncture and dry needling are rare and usually resolve after treatment however, these practices are not risk-free.

Needle based acupuncture interventions have a very low rate of adverse events, when conducted amongst licensed and qualified practitioners.

Several possible adverse events, including allergies, burns and infection are associated with moxibustion, meaning it is not entirely risk-free and should be monitored with a degree of caution.

Minor complications such as scarring, burns and bullae associated with cupping are not uncommon. Most adverse events associated with cupping are minor.

## 8 Discussion and Implications

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### 8.1 General comments on the evidence base of acupuncture for musculoskeletal conditions

There is some evidence that acupuncture modalities are effective for the short-term (up to 6 weeks) relief of pain associated with some musculoskeletal conditions but there is little evidence of medium or long-term pain relief. While it is less consistent, there is evidence that for some conditions acupuncture modalities also improve functional outcomes in the short-term. There is overall a lack of available evidence regarding the effectiveness for other modalities, such as moxibustion, Gua Sha, tuina and cupping. Treatments were often reported as being 15 – 30 minutes long, although it was not always clear if this represented total treatment or needle retention time. These findings are consistent with other recent systematic reviews and clinical guidelines for the management of low back pain and knee osteoarthritis (Yin et al, 2017; Nahin et al 2016; Chou et al, 2017).

The findings of the evidence-based review were limited by a lack of high-quality studies for many acupuncture modalities, particularly adjunct modalities, such as cupping, tuina massage, Gua Sha scraping and moxibustion. There was also a focus on outcome measures for pain, with a lack of functional, disability, quality of life, or patient-centred outcomes. This means that for many conditions the reviewers were unable to comment on the functional impact of treatment with acupuncture.

Most studies restricted the length of follow-up to short-term timeframes only (< 6 weeks) and some only collected outcomes during the treatment period or immediately after. Follow-up time during the studies was often not sufficient to evaluate the extended effectiveness of acupuncture. To investigate any long-term benefits in pain or function, high quality studies with appropriate medium- and long-term follow-up are needed.

While some studies adhere well to the use of STRICTA criteria for reporting, there are still many studies which do not report important details of the treatment regimen and training/experience of practitioners. This means that it is very difficult to determine any dose – response relationship or to provide recommendations on the relationship between effectiveness or safety/risk outcomes and the training and experience of the acupuncture practitioner. This remains the area of future research.

The ACC Acupuncture ERG also noted that articles published in predatory open-access journals, which publish academic articles for a fee without adequate peer-review or editorial processes, may have inadvertently been included in the current evidence-based review. While no journals were excluded from eligibility for the review, all included systematic reviews and additional primary studies were critically appraised for quality.

Studies often did not adopt sham controls to blind the participants and outcome assessors. Where sham controls were used, there was no discussion on the physiological inert or active acupuncture property status. The current evidence-based review included both controlled trials, which adopted a sham or placebo intervention in the control group, and pragmatic comparative studies, which compared acupuncture interventions with other common treatment options for musculoskeletal conditions, to mitigate the possible limitations of sham or placebo-controlled trials (McDonald, 2019). Significant variability in treatments were common within the studies and some of the treatment protocols may not have been clinically relevant.

The definition of dry needling in many studies was ambiguous, and the specific intervention used, for instance whether needles were retained or briefly inserted, was not always provided or well-described. Given the background of numerous litigations recently and currently ongoing in the USA around whether dry needling is regarded as part of acupuncture or separate from acupuncture, and whether it falls within the scope of practice of health professions apart from licensed acupuncturists, some studies may describe the intervention as dry needling because of the potential legal implications of calling it acupuncture.

Likewise, needle retention time and total treatment time was not well reported within studies. The evidence statements referring to treatment length and duration reflect the most commonly reported treatment characteristics within the included studies for each condition, but the reviewers were unable to develop recommendations regarding the optimal dose of treatment. Similarly, the framework utilised for treatment (Traditional Chinese Medicine / Western Acupuncture / Dry Needling) was not outlined well in many studies.

Safety and adverse events were not consistently reported in the literature. From the data, it would appear that adverse events are relatively rare, but this may reflect under-reporting in the literature. Other

systematic reviews have reported similar findings regarding safety and adverse events (MacPherson et al 2001; White et al 2001; Zhang et al 2010), with a common conclusion being that acupuncture is relatively safe in the hands of appropriately trained and licensed practitioners. Patients and practitioners should refer to the websites of relevant regulatory and professional bodies for current clinical and safe practice standards and guidelines:

- [Acupuncture New Zealand](#)
- [New Zealand Acupuncture Standards Authority Inc.](#)
- [Osteopathic Council of New Zealand](#)
- [Physiotherapy Acupuncture Association of New Zealand](#)
- [Physiotherapy Board of New Zealand](#)
- [Royal New Zealand College of General Practitioners](#)

## **8.2 High level findings**

The high-level findings of the evidence-based review indicate that:

- Acupuncture modalities are effective for the short-term (up to 6 weeks) relief of pain associated with some musculoskeletal conditions but there is little evidence of medium (6 – 12 weeks) or long-term pain relief. While it is less consistent, there is evidence that for some conditions acupuncture modalities also improve functional outcomes in the short-term.
- Interventions were often reported as being 15 – 30 minutes long. A treatment regimen of 5 – 15 treatment sessions delivered weekly or twice weekly was common in the included studies. It was not always clear if the reported times reflected total treatment or needle retention time because of inconsistencies in the way studies were reported.
- Overall, insufficient evidence was available to determine whether adjunct therapy modalities, including moxibustion, cupping, Gua Sha and tuina, are effective for the relief of pain or functional outcomes associated with musculoskeletal conditions.
- There remain significant gaps in the evidence base for some acupuncture and adjunct therapy modalities, and for medium and long-term follow-up of pain and functional outcomes and this should be a focus of future research.
- There is a lack of consistency in the application of both needle and non-needle modalities in the literature, with wide variability in point selection, stimulation of needles, number of treatment sessions and the frequency and duration of treatment.
- Serious adverse events associated with needling practices such as acupuncture and dry needling are rare and usually resolve after treatment, however, these practices are not risk-free. From the data, it would appear that adverse events are relatively rare, but this may reflect under-reporting in the literature.
- Needle based acupuncture interventions have a low rate of adverse events, when conducted amongst licensed and qualified practitioners.

- Several possible adverse events, including allergies, burns and infection are associated with moxibustion, meaning it is not entirely risk-free and should be monitored with a degree of caution.
- Practitioners and patients should refer to the websites of professional bodies and regulatory authorities for current clinical and safe practice standards and guidelines.

*See the evidence-based review for a full list of included studies.*

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Appendix A:

**Table 2. Levels of evidence based on the Scottish Intercollegiate Guideline Network (SIGN) level of evidence system**

Levels of evidence	
1++	High quality meta analyses, systematic reviews of randomised controlled trials (RCTs), or RCTs with a very low risk of bias
1+	Well conducted meta analyses, systematic reviews of RCTs, or RCTs with a low risk of bias
1-	Meta analyses, systematic reviews of RCTs, or RCTs with a high risk of bias
2++	High quality systematic reviews of case-control or cohort studies
2+	High quality case-control or cohort studies with a very low risk of confounding, bias, or chance and a high probability that the relationship is causal
2+	Well conducted case control or cohort studies with a low risk of confounding, bias, or chance and a moderate probability that the relationship is causal
2-	Case control or cohort studies with a high risk of confounding, bias, or chance and a significant risk that the relationship is not causal
3	Non-analytic studies, e.g. case reports, case series
4	Expert opinion