



## Acupuncture in Physiotherapy

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*Acupuncture in Physiotherapy* is printed twice a year for the membership of AACP. It aims to provide information for members that is correct at the time of going to press. Articles for inclusion should be submitted to the clinical editor at the address below or by e-mail. All articles are reviewed by the clinical editor, and while every effort is made to ensure validity, views given by contributors are not necessarily those of the Association, which thus accepts no responsibility.

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### The Association

The British association for the practice of Western research-based acupuncture in physiotherapy, AACP is a professional network affiliated with the Chartered Society of Physiotherapy. It is a member-led organization, and with around 6500 subscribers, the largest professional body for acupuncture in the UK. We represent our members with lawmakers, the public, the National Health Service and private health insurers. The organization facilitates and evaluates postgraduate education. The development of professional awareness and clinical skills in acupuncture are founded on research-based evidence and the audit of clinical outcomes.

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## Acupuncture in Physiotherapy

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## Editorial

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Welcome to the Spring 2016 edition of *Acupuncture in Physiotherapy*. A few problems have delayed this issue, but I'm pleased to announce that these have all been resolved! I hope you enjoy this issue.

We are pleased to be able to reprint "Acupuncture and other physical treatments for the relief of pain due to osteoarthritis of the knee: network meta-analysis" by M. S. Corbett *et al.* (2013) from *Osteoarthritis and Cartilage* (see pp. 11–24). One of the authors of this important paper was Hugh MacPherson, and since he spoke of this work during his presentations at last year's AACCP Annual Conference (MacPherson 2015; Wilson 2015), we felt that this research deserved to be read in full. Please note that the continuing professional development (CPD) questions on this edition will be based on this paper. Taking an hour to answer these online is an easy and interesting way to swell your CPD portfolio!

We were also fortunate to persuade Karen Charlesworth to restructure her excellent poster, "An auricular acupuncture protocol for the attenuation of pain and anxiety in humanitarian aid environments: a consensus study to determine a theoretically safe and effective beta protocol", which was first seen at the 2015 Acupuncture Research Resource Centre conference (pp. 25–32). With the increase in the number of health professionals volunteering to work in dangerous places world-wide, it is good to note that interest is being taken in ways to lighten their emotional load.

Wayne Fish has allowed us to publish his MSc research work, "Does superficial dry needling improve hamstring muscle flexibility in normal subjects?", on the possible use of trigger points to influence muscle stretching (pp. 33–39).

Following in the excellent tradition set up by my predecessor, Helen Oakes, I have commissioned more meridian masterclasses. We have two valuable and contrasting examples in this issue that illustrate different approaches to meridian theory. John Wood has included some of the fascinating ideas and theories held by

the Chinese to support his work on the Heart meridian (pp. 41–48). Rachel Kyte has taken a different approach to the Bladder meridian, but nonetheless, she has included a wealth of information (pp. 49–56).

As always, AACP members have provided a number of clear and helpful case studies, and this issue, these mostly deal with musculo-skeletal issues. Nora Thompson will interest you in “Acupuncture for De Quervain’s disorder/tenosynovitis” (pp. 57–66), and Kathryn Fishlock & Garry Aldridge stay on the extremities, describing “Acupuncture for plantar fasciitis” (pp. 67–75). Andrew Davidson offers “A biopsychosocial approach to chronic mid-portion Achilles tendinopathy” (pp. 77–84). Ellen Louise Hellard writes about “Acupuncture for pain management of osteoarthritis in the glenohumeral joint” (pp. 85–91). Finally, Visweswaran N. Ramaswamy suggests a way to use “Acupuncture for cancer-related hot flashes and night sweating in a 44-year-old woman with breast cancer” (pp. 93–98).

In addition, this edition also includes the usual reports from our officers and staff (pp. 5–9), some book reviews (pp. 99–102), and some ideas on publishing your work (pp. 103–104). However, there are no news items in this issue. If you know of any controversies or problems that would interest your colleagues, please let us know so that we can investigate.

**Val Hopwood**  
*Clinical Editor*

## References

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- MacPherson H. (2015) Acupuncture compared to other physical therapies for osteoarthritis of the knee. [Abstract.] *Acupuncture in Physiotherapy* **27** (2), 107.
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## Chairman's report

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The past 6 months have been another busy period for AACP, and a number of key developments have taken place. One major advance has been the creation of the new full-time public relations and marketing officer role, which has been filled by Jennifer Hodges. Some of you may have met her at the Scottish Conference, where she acted as the master of ceremonies for the whole day and an acupuncture model during the practical demonstrations. Jennifer's role is crucial to the development of AACP and the promotion of acupuncture within physiotherapy across the UK. To this end, she has taken considerable steps to promote the practice of acupuncture within physiotherapy to the wider audience of the general public. Another aspect of Jennifer's role is to inform the public and commissioners of the key message of AACP, i.e. the integration of evidence-based acupuncture into physiotherapy for the benefit of the patient, which she is doing across a number of media platforms. She is also responsible for the new format of monthly e-newsletter, which will highlight media activity, training courses, innovations, upcoming events and member benefits as we progress through 2016.

As ever there is much to look forward to this year, including the Annual Conference on Friday 13 and Saturday 14 May 2016 in Coventry (see p. 9), and the third Scottish Conference on 1 October 2016, which, because of its success, has been expanded into a Scotland/Ireland event.

The 2016 Annual Conference boasts a truly outstanding line-up of international speakers, including Jim Chalmers and Andrew Hutton, who will be delivering workshop sessions covering auricular acupuncture and acupuncture for sports injuries, respectively. Dr Jay Shah will discuss his latest work on the underlying physiological mechanisms of pain. Dr Giovanna Franconi will talk about male fertility. Also in attendance will be Team GB physiotherapist Raphael Rinaldi, who will present his work on performance enhancement through auricular acupuncture. Other notable speakers will

include: consultant in pain management Dr Jacqueline Filshie, who will discuss acupuncture for symptom control in cancer pain; Dr Fokke Jonkman, who will talk about the use of acupuncture in cardiovascular disease; and the always-enlightening Peter Deadman. The evening's entertainment will also include an after-dinner speaker: broadcaster, naturalist, former Royal Marine, marine biologist, travel writer and leadership specialist Monty Halls, who is known internationally for his BBC *Great Escape* series and *Great Barrier Reef*, and the Discovery Channel's *Lost Worlds*.

Other notable developments for 2016 will include advanced modules in a variety of acupuncture-related areas, which will cover both traditional Chinese medicine and Western medical acupuncture. These will be available in blended learning formats, allowing both practical and online learning.

As AACP moves forward, it continues to build commercial relationships with a view to offering members more and more offers that represent a real-world saving for clinicians across the UK. Watch out for these in our monthly e-newsletters, and also look out for the upcoming AACP online store, which will stock key items for members at exclusive reduced prices. These savings are yet another good reason to be an AACP member.

On a personal note, I see my role as AACP chairman evolving as the year progresses, and our organization works to support chartered physiotherapists across the UK. As always, our aim is to ensure that we continue to integrate evidence-based acupuncture into physiotherapy for the benefit of the patient.

As ever, please feel free to get in touch with the AACP Office or me directly (e-mail: [chair@aacp.uk.com](mailto:chair@aacp.uk.com)), and let us know what our organization can do to support its members. It just remains for me to wish you all the best with your clinical practice. I look forward to meeting up with you at Conference.

**Jonathan Hobbs**  
*Chairman*

“WE NEED  
YOUR  
CASE REPORTS!”



- Writing a case report contributes several elements to your continuing professional development folder – experiential learning, research and publications, self-directed study, and reflective practice.
- Published case reports add to our database of accumulated evidence, and can be used in future searches and studies.
- Case reports can be published in full or as an abstract in the *Journal* and on the website – see your name in print!
- Published case reports will be entered into a competition and the winner will be awarded a free one-day place at the AACP Annual Conference.

We would like to invite our members to submit case reports describing acupuncture physiotherapy treatments using either a Western medical acupuncture or a traditional Chinese medicine approach. Contributions must be well written, of course, but help is at hand – we have a template and guidance that can be downloaded from our website ([www.aacp.org.uk](http://www.aacp.org.uk)), or contact the AACP Office (tel: 01733 390007; e-mail: [manager@aacp.uk.com](mailto:manager@aacp.uk.com)) for more details.

## Chief Executive Officer's report

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### Perception and reality

With around 6500 physiotherapists in its membership, AACP is shaping the future perception of acupuncture treatment in the UK.

Many misunderstandings arise because of a confusion between facts and perception in all kinds of areas and many subjects, including acupuncture. Logically, if people differentiate between facts and perception, and then align perception with the facts, they will be able to avoid or overcome such problems and misunderstandings, benefitting all involved.

What is even more important is that perception is often more influential than reality in shaping opinion.

### Acupuncture in the UK

Take acupuncture in the UK, for example. The perception of acupuncture, both by the public and others, is still often one of an alternative way of treating patients that is far removed from conventional protocols. It is seen as a form of treatment that only works when the patient really believes in it, and one that doesn't really have any measurable effect.

Worse, some would tell you that it's a kind of wizardry. Such an opinion is often fuelled by the practices of acupuncturists with no other medical background, who claim to be able to cure all kinds of ailments on the basis of ancient Oriental theories and beliefs.

The fact is that there is a whole host of current research and case studies, all based on Western medical principles, showing that acupuncture is a very effective treatment for a wide range of issues. In its *Evidence and Commissioning Resource* (Dascanio *et al.* 2015), which was sent to all of its members last year, AACP lists 160 systematic reviews and other pieces of evidence from this century alone that support the use of Western medical acupuncture, as practised by the physiotherapists who are members of the organization.

Acupuncture as a part of physiotherapy is also very cost-effective. This is because, following training, little, if any, additional therapeutic time is needed during treatment, meaning that there are minimal or no additional costs involved in achieving a better outcome.

### The Acupuncture Association of Chartered Physiotherapists

Take AACP, for example. It is the oldest and largest organization representing acupuncture in the UK. Nevertheless, when members of the public, journalists or other professionals look for information on acupuncture, it is often the traditional Chinese acupuncture information that they obtain. This is because it is what they know and are familiar with, and it is based on the incorrect perception of acupuncture described above.

The fact is that, on the basis of 3 years of undergraduate physiotherapy education and more than 300 h of acupuncture training, every AACP member is ideally suited and best qualified to deliver acupuncture; their broad knowledge of physiology forms a sound basis for their acupuncture treatments. Therefore, AACP should be the first port of call not only for acupuncture treatment, but also for any acupuncture information, all of which will be based on clear, evidence-based Western medical data.

### Changing perception

This year saw the beginning of some thorough work by AACP to create better awareness of acupuncture in physiotherapy among both the public, and health journalists and editors. In doing so, we aim to identify and promote the special and professional position that acupuncture physiotherapists have in the UK.

We encourage media professionals to contact AACP for further information when writing their articles, and members of the public to

### *Chief Executive Officer's report*

look for their nearest acupuncture physiotherapist via the online search function on the AACP website.

It is time to make sure that the reality of an organization with approximately 6500 physiotherapists as members is shaping future opinions on acupuncture treatment in the UK.

If you're looking for support in your drive for more awareness, or have suggestions about how to do this best, please don't hesitate to

contact me directly at the AACP Office (e-mail: [ceo@aacp.uk.com](mailto:ceo@aacp.uk.com)).

**Caspar van Dongen**  
*Chief Executive Officer*

### **Reference**

Dascanio V., van Dongen C., Ireland C. M. & Wilson A. J. (2015) *The Evidence and Commissioning Resource*. Acupuncture Association of Chartered Physiotherapists, Peterborough.



## Conference Coordinator's report

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We are pleased to announce that our 2016 Annual Conference will be held at the Hilton Hotel in Coventry (Fig. 1) on Friday 13 and Saturday 14 May 2016. The venue has ample space for car parking, as well as an on-site spa for you to use, if time allows.

Enjoy 2 days of lectures, discussions and demonstrations, with distinguished lecturers on research, developments and techniques in medical acupuncture. This year, there will be an impressive line-up of renowned speakers with an international flavour covering a number of topics.

Speakers include:

- Dr Jay P. Shah;
- Dr Fokke Jonkman;

- Dr Jacqueline Filshie
- Andrew Hutton;
- Peter Deadman;
- Jim Chalmers; and
- Dr Giovanna Franconi.

The evening gala dinner on Friday 13 May 2016 will offer an opportunity to talk to speakers and delegates, as well as enjoying an inspirational speech from adventurer Monty Halls!

To book your place online, please visit the AACP website ([www.aacp.org.uk](http://www.aacp.org.uk)). We hope to welcome you at Conference in May.

**Lisa Stephenson**  
*Office Manager*



**Figure 1.** The Hilton Coventry Hotel.



**META-ANALYSIS**

# **Acupuncture and other physical treatments for the relief of pain due to osteoarthritis of the knee: network meta-analysis**



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## **Abstract**

*Objective:* To compare the effectiveness of acupuncture with other relevant physical treatments for alleviating pain due to knee osteoarthritis.

*Design:* Systematic review with network meta-analysis, to allow comparison of treatments within a coherent framework. Comprehensive searches were undertaken up to January 2013 to identify randomized controlled trials in patients with osteoarthritis of the knee, which reported pain.

*Results:* Of 156 eligible studies, 114 trials (covering 22 treatments and 9709 patients) provided data suitable for analysis. Most trials studied short-term effects and many were classed as being of poor quality with high risk of bias, commonly associated with lack of blinding (which was sometimes impossible to achieve). End-of-treatment results showed that eight interventions: interferential therapy, acupuncture, transcutaneous electrical nerve stimulation, pulsed electrical stimulation, balneotherapy, aerobic exercise, sham acupuncture, and muscle-strengthening exercise produced a statistically significant reduction in pain when compared with standard care. In a sensitivity analysis of satisfactory and good-quality studies, most studies were of acupuncture (11 trials) or muscle-strengthening exercise (nine trials); both interventions were statistically significantly better than standard care, with acupuncture being statistically significantly better than muscle-strengthening exercise (standardized mean difference = 0.49; 95% credible interval = 0.00–0.98).

*Conclusions:* As a summary of the current available research, the network meta-analysis results indicate that acupuncture can be considered as one of the more effective physical treatments for alleviating osteoarthritis knee pain in the short-term. However, much of the evidence in this area of research is of poor quality, meaning there is uncertainty about the efficacy of many physical treatments.

*Keywords:* knee, network meta-analysis, osteoarthritis, pain, physical treatments.

\*Now at: Perinatal Institute, Birmingham, UK.

## **Introduction**

The objective of treating osteoarthritis of the knee is usually the alleviation of pain and improving quality of life. Failure to control pain may result in reduced mobility and reduced participation in daily activities, which may further exacerbate symptoms. The regular use of pharmacological agents for pain may be associated with significant side effects (such as gastrointestinal bleeding) (Tramèr *et al.* 2000), and many patients want non-pharmacological treatments for pain relief (Arthritis Care 2004; Pound *et al.* 2005). Effective alternatives to pharmacological pain relief are therefore desirable.

Five guidelines [American College of Rheumatology (ACR; Hochberg *et al.* 2012), American Academy of Orthopaedic Surgeons (AAOS 2008), Osteoarthritis Research Society International (OARSI; Zhang *et al.* 2008), European League Against Rheumatism (EULAR; Jordan *et al.* 2003), and the National Institute for Health and Clinical Excellence (NICE, now the National Institute for Health and Care Excellence; NCCCC 2008)] have evaluated treatment effects on key outcomes of knee osteoarthritis (including pain, function and disability). All recommend treatment with muscle-strengthening and aerobic exercise, education, weight loss (if required), and where necessary, paracetamol and/or topical non-steroidal anti-inflammatory drugs (NSAIDs); when these are ineffective, a choice of one or more options from a range of pharmacological and non-pharmacological treatments is sometimes recommended, including transcutaneous electrical nerve stimulation (TENS), thermal (heat/cooling) treatments, insoles and braces. The OARSI guideline recommended using acupuncture, AAOS found the acupuncture evidence to be inconclusive, and the ACR conditionally recommended acupuncture only for patients with moderate-to-severe pain who are unable or unwilling to undergo total knee arthroplasty. EULAR and NICE did not recommend use of acupuncture; one of the reasons

for the commissioning of this review – as part of a programme of projects on acupuncture and chronic pain, funded by the National Institute for Health Research (NIHR) under its Programme Grant for Applied Research Programme – was the uncertainty within the NICE decision-making process with regard to the level of evidence on acupuncture for osteoarthritis relative to other physical treatments. The rationale for this systematic review was to compare acupuncture with available alternative physical treatments that might be prescribed by a general practitioner, or used by a physiotherapist, since uncertainty exists regarding which treatments are best.

Although numerous reviews have evaluated individual types of physical treatment, few randomized trials have directly compared these treatments. One way to overcome this limitation is to use network meta-analysis, which allows assessment of relative efficacy when direct treatment comparisons are insufficient or unavailable. In the context of the present review, it should enable all relevant physical treatments to be compared with each other. The purpose of this systematic review, therefore, was to conduct a comprehensive synthesis using network meta-analysis methods in order to compare the effectiveness of acupuncture with other relevant physical treatments for alleviating pain due to osteoarthritis of the knee.

## **Methods**

A systematic review was conducted following the general principles outlined in the Centre for Reviews and Dissemination (CRD) Guidance (CRD 2009) and the PRISMA Statement (Moher *et al.* 2009). This paper reports an update of a systematic review and network meta-analysis conducted in 2011, which is available on the CRD website (Corbett *et al.* 2012).

### **Literature search**

A range of resources was searched for published and unpublished studies, grey literature, and ongoing research [see “eMethods 1”: [http://www.oarsijournal.com/article/S1063-4584\(13\)00800-5/addons](http://www.oarsijournal.com/article/S1063-4584(13)00800-5/addons)]. We searched 17

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electronic databases from inception to January 2013, without language restrictions. A combination of relevant free-text terms, synonyms and subject headings relating to osteoarthritis of the knee and named physical treatments were included in the strategy. Bibliographies of relevant reviews and guidelines were also checked, and Internet searches were made of websites relating to osteoarthritis.

### **Study selection and intervention definitions**

Two reviewers independently screened all abstracts and full papers, with disagreements resolved by discussion, or a third reviewer. We included randomized controlled trials (RCTs) assessing pain (as a primary or secondary outcome) in adults with knee osteoarthritis (with a population mean age of  $\geq 55$  years). Eligible treatments were any of the following: acupuncture, balneotherapy, braces, aerobic exercise, muscle-strengthening exercise, heat treatment, ice/cooling treatment, insoles, interferential therapy, laser/light therapy, manual therapy, neuromuscular electrical stimulation (NMES), pulsed electrical stimulation (PES), pulsed electromagnetic fields (PEMFs), static magnets, Tai Chi, TENS and weight loss. The following were excluded: predominantly home-based and unsupervised exercise interventions, surgical interventions, pharmaceutical interventions, interventions which combined two or more physical treatments, and studies comparing only different regimens/durations/modalities of the same intervention. Populations with varus/valgus malalignment were excluded, as were studies which did not report data in a format suitable for network meta-analysis (see the “Outcomes and data transformations” section below).

We classified adjunctive components of the experimental interventions into five categories, based on what was reported in the trials: “treatment as usual”, “treatment as usual” plus specified home exercise or education, “treatment as usual” plus specified (trial-specific) analgesics, no medication, and no medication plus specified home exercise or education. Eligible comparators included any form of standard/usual care or waiting list control (which could incorporate

analgesics, education and exercise advice), all of which we called “standard care”. Placebo interventions, no intervention and sham acupuncture were also eligible. Sham acupuncture was treated as a separate comparator because of evidence suggesting it is more active than an inert “placebo” (Lund *et al.* 2009; Linde *et al.* 2010). All pain scales were eligible.

### **Assessment of trial quality and data extraction**

Trial quality was assessed using an adaptation of a checklist (14 questions) from a previous review by CRD (Rodgers *et al.* 2008). Using an algorithm, studies were then graded as excellent, good, satisfactory or poor, and also given an assessment based on the Cochrane risk of bias tool (Higgins *et al.* 2011) [see eTables 1a and 1b: [http://www.oarsijournal.com/article/S1063-4584\(13\)00800-5/addons](http://www.oarsijournal.com/article/S1063-4584(13)00800-5/addons)]. Data extraction and quality assessments were performed by one reviewer and independently checked by a second. Disagreements were resolved by discussion or a third reviewer.

### **Outcomes and data transformations**

The Western Ontario and McMaster Universities Arthritis Index (WOMAC) [using a visual analogue (VAS) or Likert scale] was the preferred pain measure. When studies did not measure WOMAC pain, another pain scale was included in the analysis with prioritization of scales made on a clinical, or prevalence, basis (further details in the 2011 report) (Corbett *et al.* 2012). Hedges’ *g* standardized mean differences (SMDs) were calculated for the meta-analyses (studies reporting medians could not be analysed). Results for different doses/regimens of the same type of treatment within a study were pooled. In an initial analysis, only final values were used. However, we included more studies by calculating final values for trials reporting change from baseline data, provided trial baseline data together with variance estimates (e.g. standard deviations) were also reported. In order to present more clinically meaningful results, we present both SMDs, and SMDs converted to the WOMAC pain VAS 0–100 scale.

## **Synthesis**

A network meta-analysis draws on both direct evidence (treatments compared in the same trial) and indirect evidence (different treatments studied in separate trials, but compared when they use a common comparator), with the benefit of randomization in each study retained. For indirect and direct evidence to be consistent, population and intervention characteristics must be similar across comparisons (Lu & Ades 2004; Caldwell *et al.* 2005; Salanti *et al.* 2008; Cooper *et al.* 2009; Welton *et al.* 2009; Dias *et al.* 2010). Inconsistency between direct and indirect evidence was assessed using the node-splitting method (Caldwell *et al.* 2005; Lu & Ades 2006; Salanti *et al.* 2008; Cooper *et al.* 2009; Welton *et al.* 2009; Dias *et al.* 2010). The SMD was assumed to be normally distributed and a random effects network meta-analysis model was selected since clinical and methodological heterogeneity within treatments appeared likely (Ades *et al.* 2007). Analyses were conducted using WinBUGS software (Version 1.4, MRC Biostatistics Unit, Cambridge Institute of Public Health, Cambridge, UK). Further method detail can be found in “eMethods 2” [[http://www.oarsijournal.com/article/S1063-4584\(13\)00800-5/addons](http://www.oarsijournal.com/article/S1063-4584(13)00800-5/addons)].

We conducted analyses with interventions categorized both with, and without, any adjunct treatments. Furthermore, in order to attempt to assess both the immediacy and durability of effects, we planned analyses for three time points: end of treatment (our primary time point), as defined in the studies; 3 months from the start of treatment (the time point closest to 3 months from the start of treatment, excluding outcomes recorded at less than 4 weeks from the start of treatment); and 3 months after the end of treatment (the time point closest to 3 months, but between 8 and 16 weeks, from end of treatment). However, due to a lack of medium- and long-term data, we report here results for the end-of-treatment time point only.

To evaluate the impact of study quality on the results, two sets of analyses were performed: one including all studies regardless of quality (“any quality”), and a primary sensitivity analysis including studies of satisfactory, or

better, quality (“better quality”). Studies with atypical populations, interventions or results were excluded in a second sensitivity analysis. When possible, examination of funnel plots was used to assess for publication bias.

## **Results**

One hundred and fifty-six original trials (of 22 distinct interventions and comparators) met the inclusion criteria. Four of 10 foreign language papers which appeared eligible based on their English abstracts could not be translated, so had to be excluded from our analyses (Jezek *et al.* 1990; Jensen *et al.* 1997; Durmuş *et al.* 2005; Salli *et al.* 2006). One retracted study was removed from all analyses (Ni *et al.* 2010; Schumacher 2010). Twenty-two new studies were identified from the 2013 update searches. A study selection flow diagram is presented in eFig. 1 [[http://www.oarsijournal.com/article/S1063-4584\(13\)00800-5/addons](http://www.oarsijournal.com/article/S1063-4584(13)00800-5/addons)].

### **Study characteristics**

An overview of all eligible studies – regardless of whether they reported data suitable for network meta-analysis – is presented in Table 1. The range of mean treatment durations (and timing of end-of-treatment assessment) varied widely from just a single session (TENS) to 69.3 weeks (weight loss interventions), although a majority of interventions were administered over a 2–6-week period. Most studies were classified as having recruited a general knee osteoarthritis population, although weight loss trials (as expected) recruited only overweight or obese participants. The mean body mass indices (BMIs) of some studies recruiting a general population fell into the overweight or obese classification, although most studies did not report BMI.

Around three-quarters of the studies were classed as being of poor quality (110 of 152). The remainder were “satisfactory” (33 studies) or “good” (nine studies), together classed as “better quality”. In the network meta-analyses, only 12 trials were considered to be at low risk of bias. Most trials were hampered by a lack of adequate blinding, and small sample sizes

**Table 1.** Summary characteristics of trials included in the systematic review: (TENS) transcutaneous electrical nerve stimulation; (PES) pulsed electrical stimulation; (NMES) neuromuscular electrical stimulation; and (PEMFs) pulsed electromagnetic fields

Intervention	Number of trials eligible for the review (number of patients*)	Type of population recruited (number of studies)	Range of mean ages (years)	Range of percent female	Comparators (number of treatment armst)
Acupuncture	25 (2794)	General (23), both knees affected (1), awaiting surgery (1)	58–85	50–96	Sham acupuncture (15), standard care (13), TENS (3), muscle-strengthening exercise (1), ice/cooling (1)
Balneotherapy	14 (1008)	General (12), both knees affected (2)	54–70‡	47–100	Placebo (8), standard care (6), heat treatment (1)
Braces	1 (24)	General (1)	59.5	63	Insoles (1)
Aerobic exercise	13 (1136)	General (9), both knees affected (2), overweight or obese (2)	54–75‡	50–100	Standard care (13), muscle-strengthening exercise (2), weight loss (1)
Muscle-strengthening exercise	34 (3013)	General (26), both knees affected (5), awaiting surgery (2)	53–77‡	31–100	Standard care (22), placebo (4), no treatment (2), aerobic exercise (2), heat treatment (1), TENS (1), acupuncture (1), PES (1), manual therapy (1), NMES (2)
Heat treatment	7 (412)	General (7)	61–74	63–100	Placebo (4), standard care (1), TENS (1), muscle-strengthening exercise (1), balneotherapy (1), ice/cooling (1)
Ice/cooling treatment	4 (211)	General (4)	56–61	48–91	TENS (2), acupuncture (1), standard care (1), heat treatment (1), placebo (1), no treatment (1)
Insoles	6 (893)	General (6)	58–68	54–100	Placebo (5), braces (1)
Interferential therapy	5 (240)	General (5)	59–67	67–80	Placebo (3), TENS (1), no treatment (1)
Laser/light therapy	9 (379)	General (6), both knees affected (3)	58–74	68–90	Placebo (8), standard care (1)
Manual therapy	6 (486)	General (6)	56–68	63–78	Standard care (4), placebo (2), muscle-strengthening exercise (1)
NMES	3 (78)	General (3)	60–71	42–79	Standard care (2), muscle-strengthening exercise (2)
PES	8 (392)	General (8)	55–70	46–100	Placebo (7), standard care (1), muscle-strengthening exercise (1), no treatment (1)
PEMFs	6 (521)	General (6)	60–69	28–80	Placebo (6)
Static magnets	3 (131)	General (3)	63–65	60–79	Placebo (3)
Tai Chi	4 (307)	General (4)	65–70	75–93	Standard care (4)
TENS	18 (805)	General (17), awaiting surgery (1)	56–85	48–97	Placebo (12), standard care (3), acupuncture (3), ice/cooling (2), heat treatment (1), interferential (1), no treatment, muscle strengthening exercise (1)
Weight loss (dieting)	5 (870)	Overweight or obese (5)	61–70	26–89	Standard care (5), aerobic exercise (1)

\*Number of patients analysed by the primary studies for end-of-treatment pain – this was not always clearly stated.

†Different doses of the same treatment in a trial were pooled, counting as one arm.

‡Trial reported mean age by treatment group, and contained a group with a mean age of ≥ 55. Some studies compared two or more different interventions. “General” is used as a broad term for studies which did not recruit very specific population types.