A systematic review of evidence for the effectiveness of practitioner-based complementary and alternative therapies in the management of rheumatic diseases: osteoarthritis

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Abstract

Objective. To critically review the evidence on the efficacy and effectiveness of practitioner-based complementary therapies for patients with osteoarthritis. We excluded t’ai chi and acupuncture, which have been the subject of recent reviews.

Methods. Randomized controlled trials, published in English up to May 2011, were identified using systematic searches of bibliographic databases and searching of reference lists. Information was extracted on outcomes, statistical significance in comparison with alternative treatments and reported side effects. The methodological quality of the identified studies was determined using the Jadad scoring system. Outcomes considered were pain and patient global assessment.

Results. In all, 16 eligible trials were identified covering 12 therapies. Overall, there was no good evidence of the effectiveness of any of the therapies in relation to pain or global health improvement/quality of life because most therapies only had a single randomized controlled trial. Where positive results were reported, they were often comparing an active intervention with no intervention. Therapies with multiple trials either provided null (biofeedback) or inconsistent results (magnet therapy), or the trials available scored poorly for quality (chiropractic). There were few adverse events reported in the trials.

Conclusion. There is not sufficient evidence to recommend any of the practitioner-based complementary therapies considered here for the management of OA, but neither is there sufficient evidence to conclude that they are not effective or efficacious.

Key words: complementary medicine, practitioners, randomized controlled trials, osteoarthritis, pain, global health, musculoskeletal.

Introduction

OA is the most common form of arthritis and the leading musculoskeletal cause of pain and reduced function [1]. The evidence on management of OA has been recently reviewed by the National Institute of Health and Clinical Excellence in the United Kingdom, and the key elements of the recommendations were as follows: patient information, exercise (both muscle strengthening and general aerobic fitness training) and weight loss (if overweight) as core components of therapy and paracetamol or topical NSAIDs as adjunctive first-line pharmacological therapy for pain relief [2].
Many people with OA also use complementary therapies. In a previous systematic review of complementary therapies taken orally or applied topically for RA, OA and fibromyalgia (www.arthritisresearchuk.org), OA provided some of the most promising evidence among the rheumatic diseases for such therapies [3]. There was consistent evidence that capsaicin gel and S-adenosyl methionine were effective in the management of OA, and there was also some consistency in the evidence that Indian frankincense, methyl-sulphonyl-methane and rose hip may be effective.

This study reviews randomized controlled trials (RCTs) of practitioner-based complementary therapies for OA to determine which of these provide good evidence of effectiveness or efficacy. Acupuncture and t’ai chi were excluded on the basis that high-quality systematic reviews on these therapies have recently been published [4, 5].

Methods
In reporting the results from this work, we have followed the preferred reporting items for systematic reviews and meta-analyses guidelines (http://www.prisma-statement.org).

Eligibility criteria
Studies were included if (i) they were an RCT involving a practitioner-based complementary medicine (i.e. not taken orally or applied topically); (ii) comparison was made with sham therapy or any other therapy as a form of established therapeutic treatment, or with waiting-list control or usual care; (iii) the therapy is practised in the United Kingdom; (iv) the study involved human participants with OA; and (v) the study was published in English. Studies that were only evaluating t’ai chi or acupuncture were excluded.

Information sources
Between March 2011 and 23 May 2011 we searched Allied and Complementary Medicine (1985 to present), EMBASE (1980 to present), Ovid MEDLINE (1950 to present), EBM Reviews—ACP Journal Club (1991 to present), EBM Reviews—Cochrane Central Register of Controlled Trials (2nd Quarter 2011), EBM Reviews—Cochrane Database of Systematic Reviews (2nd Quarter 2011) and EBM Reviews—Database of Abstracts of Reviews of Effects (2nd quarter 2011). References in each of the identified articles were further screened for relevant articles.

Search
Three comprehensive search themes were used while carrying out the search in the electronic databases: (i) identification of relevant therapies using 67 names of complementary medicines that are commonly used in rheumatic diseases, (ii) identification of the relevant disease of interest, i.e. OA, and (iii) identification of relevant study design, i.e. RCTs. The results of the searches were then combined using the Boolean operator AND.

Study selection
Two researchers reviewed the titles of the articles, and irrelevant and duplicate articles were removed. Abstracts of the remaining articles were assessed applying the selection criteria. If the information in the abstract was not sufficiently clear to make a decision, the full article was retrieved. Bibliographies of all selected relevant articles, including systematic reviews and meta-analyses, were manually searched to obtain additional relevant publications. Any disagreements in selections were discussed and resolved during a consensus meeting. The identification of relevant studies is presented in Figure 1.

Data extraction and items
Two reviewers extracted the relevant information from the selected studies: the country, number of persons recruited to the trial, complementary therapy under investigation, duration of treatment and length of follow-up, outcome measures studied, data on the statistical significance of change of outcome measure in the complementary therapy group in relation to the comparator and any side effects reported. The quality of the study was assessed using the 5-point Jadad scale, with higher scores indicating higher quality [6]. The results are summarized in Tables 1–3.

The principal measures considered in this review were pain and patient global assessment of change. If these (or a closely related domain) were measured, they are reported in the results. The other outcomes measured and results obtained in individual studies are included in the accompanying tables.

Results
Overall, 504 references were initially identified from the computerized search but 396 were excluded by screening titles. The abstracts of the remaining 108 articles were assessed and, from these and the full manuscript, 12 RCTs were found to be eligible. Four additional studies were identified from the references, providing 16 in total. Two articles appear twice, as both the intervention and the control therapies were under consideration in this review.

Therapies tested in single trials
Copper bracelets
A trial of 45 patients with OA of the hips, knees, wrists or hands randomized participants to wear one of four different devices—(i) a magnetic wrist strap, (ii) a weak magnetic wrist strap, (iii) a demagnetized wrist strap or (iv) a copper bracelet—in random order for 16 weeks (Jadad = 5) [7]. At the end of the treatment, no differences were found between the four groups in terms of pain reduction using pain items of the Western Ontario and McMaster Universities Osteoarthritis Index.
(WOMAC) [23], the McGill Pain Questionnaire Pain Rating Index [24] and a visual analogue scale (VAS) or pain medication intake. The change in pain (VAS) at the end of the period using copper bracelets was +3.25 mm, whereas the mean change in the other interventions ranged from −2.70 to +1.48 mm (P = 0.51 for the difference across groups). Adverse events included minor complaints of a rash or swelling while wearing the copper bracelet.

Healing therapy
The effectiveness of healing therapy [25] was tested in a trial of 31 participants, 25 of whom completed the study (Jadad = 3) [8]. Participants with knee OA received either (i) weekly sessions of therapeutic touch for 6 weeks, (ii) weekly sessions of sham therapeutic touch for 6 weeks or (iii) standard care. The sham treatment used people not trained in therapeutic touch, performing similar hand movements a few inches away from the patient’s body, but focusing on cognitive tasks rather than on the patient. The therapeutic touch group had significantly decreased pain as compared with both the sham group and the standard care group on analysis, considering scores throughout the 13 weeks after commencing treatment. This was demonstrated by an improved outcome in 10 of 13 scales on the Multidimensional Pain Inventory [26]. For example, pain severity (on a 0–6 numerical rating scale) was scored an average of 3.06 in the standard care group, 3.27 in the sham therapeutic touch group and 2.14 in the active intervention group. However, when pain was measured using a VAS, no significant differences between the groups were noted. The treatment group also reported significant improvement in general health compared with the other two groups, using the general health status questions of the HAQ [27]. No adverse events were reported in the study.

Hypnotherapy
The effectiveness of hypnotherapy was tested in a trial of 41 participants (36 of whom completed the study) for a period of 8 weeks (Jadad = 2) [9]. Participants with a clinical diagnosis of hip or knee OA were recruited from senior citizen groups and randomized to one of the following three groups: hypnosis, relaxation or an observation control group. The intervention groups received eight sessions of treatment, whereas the control group received no treatment. In an analysis across the follow-up points from 4 weeks (during treatment) to 6 months, the hypnosis and relaxation groups reported greater improvements in pain (VAS) than the control group. After 8 weeks treatment, pain had reduced by 56% in the hypnosis group, 31% in the relaxation group and 4% in the control group. Although there was no difference between the former two groups, the beneficial effects occurred more quickly in the hypnotherapy group. However, at 6-month follow-up, no significant difference was observed across groups. No adverse events were reported in the study.

Massage
A trial with 68 participants tested the effectiveness of massage in adults satisfying the ACR 1987 criteria for OA of the knee (Jadad = 3) [10]. Participants were assigned either to massage treatment or to waiting list control. Intervention and control groups were compared at 16 weeks and 8 weeks, respectively, from the beginning of the study.
<table>
<thead>
<tr>
<th>Therapy</th>
<th>Intervention group</th>
<th>Control group</th>
<th>Duration of treatment, weeks</th>
<th>Outcome</th>
<th>Jadad score</th>
<th>Reference, country</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copper bracelets</td>
<td>Magnetic wrist strap</td>
<td>A weak magnetic strap A demagnetized wrist strap A copper bracelet</td>
<td>16</td>
<td>Difference (+): none No difference: pain (VAS, WOMAC, PRI); stiffness and function (WOMAC); medication intake</td>
<td>5</td>
<td>Richmond et al. 2009, UK [7]</td>
</tr>
<tr>
<td>Healing therapy</td>
<td>Therapeutic touch</td>
<td>Sham therapeutic touch Usual care</td>
<td>6</td>
<td>Difference (+): pain and function (MPI), general health (HAQ) No difference: pain (VAS); functional disability (HAQ)</td>
<td>3</td>
<td>Gordon et al. 1998, USA [8]</td>
</tr>
<tr>
<td>Hypnotherapy</td>
<td>Hypnotherapy</td>
<td>Waiting list control</td>
<td>8</td>
<td>Difference (+): pain (VAS), analgesic medication intake No difference: none</td>
<td>2</td>
<td>Gay et al. 2001, France [9]</td>
</tr>
<tr>
<td>Massage</td>
<td>Massage</td>
<td>Waiting list control</td>
<td>8</td>
<td>Difference (+): pain (VAS, WOMAC), time to walk 50ft No difference: stiffness (WOMAC), range of motion</td>
<td>3</td>
<td>Perlman et al. 2006, USA [10]</td>
</tr>
<tr>
<td>Music</td>
<td>Music</td>
<td>Sitting quietly</td>
<td>2</td>
<td>Difference (+): pain (PRI, VAS) No difference: pain (WOMAC and MPQ), function (WOMAC), 15 m walk time (for healer 1) No difference: pain (WOMAC and MPQ), function (WOMAC), 15 m walk time (for healer 2)</td>
<td>2</td>
<td>McCaffrey et al. 2003, USA [11]</td>
</tr>
<tr>
<td>Qigong (external)</td>
<td>Qigong</td>
<td>Sham Qigong</td>
<td>3</td>
<td>Difference (+): pain (WOMAC and MPQ), function (WOMAC), 15 m walk time (for healer 1) No difference: pain (WOMAC and MPQ), function (WOMAC), 15 m walk time (for healer 2)</td>
<td>5</td>
<td>Chen et al. 2008, USA [12]</td>
</tr>
<tr>
<td>Qigong (internal)</td>
<td>Qigong</td>
<td>Control group</td>
<td>8</td>
<td>Difference (+): pain, stiffness, physical function (WOMAC), 6 min walk test, isokinetic strength of knee extensor No difference: general health, social function, mental health (SF-36 subscale)</td>
<td>2</td>
<td>An et al. 2008, China [13]</td>
</tr>
<tr>
<td>Relaxation</td>
<td>Hypnotherapy</td>
<td>Waiting list control</td>
<td>8</td>
<td>Difference (+): pain (VAS), analgesic medication intake No difference: pain during activity (VAS), tenderness No difference: pain during rest (VAS), function (HAQ)</td>
<td>2</td>
<td>Gay et al. 2001, France [9]</td>
</tr>
<tr>
<td>Yoga</td>
<td>Yoga</td>
<td>Waiting list control</td>
<td>8</td>
<td>Difference (+): pain (VAS), analgesic medication intake No difference: pain during activity (VAS), tenderness No difference: pain during rest (VAS), function (HAQ)</td>
<td>2</td>
<td>Garfinkel et al. 1994, USA [14]</td>
</tr>
</tbody>
</table>

*Difference significantly greater in intervention group than either of the control groups. "Difference significantly greater in both of the intervention groups than the control group. PRI: patient rating index; MPQ: McGill Pain Questionnaire.*
At this time, pain measured either by 100 mm VAS or by pain items on WOMAC demonstrated a significantly larger improvement in the massage group (18.5 mm) than in the control group (3.1 mm). A case of increased discomfort in the massage group was reported in the study.

Music therapy
A trial of 66 participants tested the efficacy of music therapy [28] in patients with OA (Jadad = 2) [11]. The patients either listened to music (Mozart) for 1 hour or were asked to sit in a quiet comfortable place for 1 hour, every morning for 14 days. Pain was measured, using the pain descriptor scale and 100 m VAS of the McGill Pain Questionnaire after 20 minutes of treatment on the 1st, 7th and 14th days of the trial. Compared with the control group, patients in the music group reported significantly reduced pain on both measures at all three time points. The increased benefit of the intervention was 20 mm on the VAS at each time point. No adverse effects were reported.

Qigong—external
Qigong is an Asian healing art that uses slow graceful movements, controlled breathing and focused intention to promote the circulation of ‘qi’ (life energy). External qigong is performed by a trained practitioner, using the hands and any part of the body to direct qi energy on to (or into) the patient. An RCT randomized 112 participants to receive either qigong therapy [28] or sham qigong (Jadad = 5) [29]. Five to six sessions of qigong were performed by two individual therapists for 3 weeks. The sham intervention was performed by a person without experience in qigong, but who mimicked the movements, for the same number of sessions and duration. At the end of the treatment, only the participants receiving qigong from one of the therapists showed significantly greater improvement in pain than in the sham group, using both the WOMAC and McGill Pain Questionnaire. Those treated by the other healer reported improvements no better than those achieved in the sham qigong group. The noted effects persisted at 3 months. Minor adverse events of increased pain were reported equally from both groups.

Qigong—internal
Internal qigong is self-directed and involves the use of movements and meditation, and it can be practiced with or without the presence of a teacher. The effectiveness of internal (self-directed) qigong [13] was determined in a study of 28 women with knee OA who met ACR criteria, and who were randomized to receive traditional Chinese exercise, known as Baduanjin, whereas the control group received no treatment (Jadad = 2) [30]. The intervention group followed taped commands during 30-minute classes, five times per week for 8 weeks. Compared with the control group, those who received qigong reported a significantly greater percentage reduction in pain measured by WOMAC (62% intervention group vs +45% control group; \( P = 0.006 \)) but no significant difference between the groups was found in overall rating of quality of life as measured by SF-36 [31]. No adverse events were reported in the study.

Progressive muscle relaxation
A trial of 41 participants tested the effectiveness of relaxation and reported significantly greater benefits of relaxation in terms of pain (VAS) reduction than in a waiting list control group, although no such difference was reported when the relaxation group was compared with a hypnosis group (more detail is provided in the hypnotherapy section) (Jadad = 2) [9].

Yoga
A small RCT (\( n = 25 \)) tested the efficacy of yoga [32] in participants with hand OA (Jadad = 2) [14]. Participants were allocated to receive a 10-week yoga programme or to a waiting list control group. One week after the end of treatment, patients in the yoga group reported significant

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**Table 2** Practitioner-based CAMs for OA tested in two trials

<table>
<thead>
<tr>
<th>Therapy</th>
<th>Intervention group</th>
<th>Control group</th>
<th>Duration of treatment, weeks</th>
<th>Outcome</th>
<th>Jadad score</th>
<th>Reference, country</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biofeedback</td>
<td>Biofeedback-assisted exercise</td>
<td>Electrical stimulation</td>
<td>4</td>
<td>Difference (+): none No difference: pain (VAS and WOMAC), physical function (WOMAC), stiffness (WOMAC), 50 m walking time, 10 steps stairs climbing up-down, one repetition maximum (RM), 10 RM time</td>
<td>2</td>
<td>Durmus et al. 2007, Turkey [15]</td>
</tr>
<tr>
<td>Exercise with EMG biofeedback</td>
<td>Strengthening exercise programme only</td>
<td></td>
<td>3</td>
<td>Difference (+): none No difference: pain at rest, walking, ascending and descending stairs (VAS); pain (WOMAC), stiffness (WOMAC), function (WOMAC), 2 of 6 measures in NHP</td>
<td>2</td>
<td>Yilmaz et al. 2010, Turkey [16]</td>
</tr>
</tbody>
</table>

NHP: Nottingham Health Profile.
### Table 3 Practitioner-based CAMs for OA tested in more than two trials

<table>
<thead>
<tr>
<th>Therapy</th>
<th>Intervention group</th>
<th>Control group</th>
<th>Duration of treatment, weeks</th>
<th>Outcome</th>
<th>Jadad score</th>
<th>Reference, country</th>
</tr>
</thead>
</table>
| Chiropractic                  | Chiropractic                         | Meloxicam medication     | 3                           | Difference (+): none
No difference: pain (VAS, NRS-101); function (PSFS), range of motion (ROM) | 2           | Tucker et al. 2003, South Africa [17] |
| Chiropractic                  | Sham electrical micro-current        |                          | 2                           | Difference (+): pain (VAS), global health (VAS) patient’s rating of knee function (VAS), mobility and ability to perform general activities (VAS)
No difference: hip mobility (VAS) | 3           | Pollard et al. 2008, Australia [18] |
| Moist heat packs and chiropractic care | Moist heat pack only                |                          | 7                           | Difference (+): pain (VAS), patient’s rating of knee function (VAS), mobility and ability to perform general activities (VAS)
No difference: hip mobility (VAS) | 2           | Beyerman et al. 2005, USA [19] |
| Magnetic therapy (static)     | Magnetic knee sleeves (4–85 mT)      | Magnetic knee sleeves (0.65 mT) | 6                           | Difference (+): none
No difference: pain (VAS); physical function and stiffness (WOMAC); 50 m walk time | 5           | Wolsko et al. 2004, USA [20] |
| Magnetic bracelet (170–200 mT)| Magnetic bracelet (21–30 mT), steel bracelets |                          | 12                          | 4
| Magnetic knee wrap (35 mT)    | Sham knee wrap                       |                          | 12                          | Difference (+): isokinetic quadriceps strength, disability (HAQ)
No difference: pain (HAQ) | 4           | Harlow et al. 2004, UK [21] |
| Magnetic pads (40–56 mT)      | Sham pads                            |                          | 2                           | Difference (+): pain (VAS), physical function (WOMAC); 15 m walk time
Difference (−): none | 3           | Chen et al. 2008, Taiwan [12] |
| Magnetic wrist strap          | Weak magnetic strap Demagnetized wrist strap Copper bracelet |                          | 16                          | Difference (+): none
No difference: pain (VAS, WOMAC, PRI); stiffness and function (WOMAC); medication intake | 5           | Richmond et al. 2009, UK [7] |

*Difference found only between high-strength magnetic bracelet and steel bracelets. NRS-101: Numerical Rating Scale-101.*
improvements in hand pain during activity, but not at rest. No report of any adverse events was made in the study.

Therapies tested in two trials

Biofeedback
In the first study ($n = 50$), women with knee OA were randomized to receive either electrical stimulation or biofeedback-assisted isometric exercise (Jadad = 2) [15]. Both of these treatment programmes were conducted 5 days a week for 4 weeks. At the end of the treatment, there were no differences between the groups in terms of pain measured either using VAS or by WOMAC. In the second trial ($n = 40$), participants with knee OA meeting ACR criteria received a strengthening exercise programme with or without biofeedback (Jadad = 2) [16]. At the end of the 3-week treatment period, no significant differences between the groups were found in relation to pain (measured by WOMAC and by a VAS) or quality of life (measured by the Nottingham Health Profile) [33]. No adverse events were reported in either of the trials.

Therapies tested in more than two trials

Chiropractic
Three RCTs tested the effectiveness or efficacy of chiropractic in the treatment of knee OA and OA of the spine. In the first trial ($n = 60$), participants were randomized to receive either eight chiropractic consultations/treatments for a 3-week period or treatment with an NSAID for 3 weeks (Jadad = 2) [17]. At the end of treatment there was no significant difference in pain (reported by VAS) between the groups. No adverse reaction to knee manipulation was reported but 10% of participants experienced an adverse reaction to NSAIDs. The second trial ($n = 43$) randomly allocated participants to either (i) chiropractic mobilization and manipulation or (ii) control treatment where participants were told they were receiving a micro-current application they would not be able to feel (though they received no such current). The treatments were provided three times a week for 2 weeks (Jadad = 3) [18]. At the end of the trial, greater improvements were reported in the group that received chiropractic treatment with regard to self-reported global measures, such as ‘Do you feel the treatment has helped you?’ (treatment—control VAS 2.9; 95% CI 1.1, 4.8), ‘How would you rate this treatment programme in terms of…pain and function?’ (3.1; 1.3, 5.0) and ‘How would you rate your pain?’ (~1.1; ~2.2, ~0.1). The third trial ($n = 252$) randomized participants with back pain ‘secondary to OA’ to either (i) moist heat packs for 15 minutes and chiropractic care or (ii) moist heat packs for 15 minutes only, with 20 sessions provided for a 3-week period (Jadad = 2) [19]. Both groups reported an improvement across all measures of pain ($P < 0.05$) but those who received moist heat packs and chiropractic care reported a greater and faster improvement (current pain, average pain, pain during past week and pain intensity; all $P < 0.05$). There were no adverse events or side effects reported in the study.

Magnet therapy (static)
Five RCTs report on magnet therapy [28] in the treatment of OA (Table 3). Two high-quality trials ($n = 29$, Jadad = 5 and $n = 194$, Jadad = 5) compared the effect of high-strength versus low-strength magnets [20, 21]. The former trial found, after 4 hours of treatment, significantly greater improvement in pain, global assessment of change and overall helpfulness for the high-strength magnets than for the low-strength magnets (VAS $-79$ mm vs $-10$ mm; $P = 0.03$). However, there was no difference at 6 weeks. A few cases of mild discomfort, dizziness, increased pain and stiffness were reported from both groups. In the latter trial, there was a significantly greater improvement in pain, measured by VAS, for standard magnet versus a steel washer group, but not when compared with a weak magnet. Two further trials ($n = 50$, Jadad = 4 and $n = 43$, Jadad = 3) tested the efficacy of magnets against a sham magnet. In the first, after the 12-week treatment period, no significant difference was found for pain [12]. One case of skin irritation as a result of wearing the knee wrap was noted. The second trial reported significantly greater reductions in pain after the 2-week treatment period in the magnet group than in the sham group [22]. Using the sum of five pain-related VASs, the change in the magnet and sham groups was $-12$ mm and $-3.5$ mm, respectively. The final trial ($n = 45$), reported earlier in the copper bracelet section, did not find any significant benefits of a magnetic wrist strap when compared with a weak magnetic or non-magnetic strap in terms of pain (using WOMAC, the McGill Pain Questionnaire and VAS) (Jadad = 5) [7].

Discussion
This review of evidence for practitioner-based complementary therapies in the management of OA (excluding acupuncture and t’ai chi) found 16 studies providing evidence in relation to 12 therapies. Overall, there was no good evidence of the effectiveness of any of the therapies in relation to pain or global health improvement; where positive results were reported, they were generally of modest magnitude. For nine of the therapies, there was only a single trial available, and positive results were mainly reported in comparison with no-treatment control groups. Chiropractic and magnet therapy had evidence available from three and five trials, respectively. Two of three trials in chiropractic therapy reported significantly greater improvements in pain compared with control interventions, the trial reporting a null result being compared with NSAID therapy. However, all chiropractic trials were evaluated as poor quality.

There are a number of methodological issues to consider. The search was conducted only in English, and we therefore missed trials published only in another language. Of note, however, there were no studies whose abstract was published in English that were excluded from further consideration because the main article was not published in English. There are some practitioner-based therapies, such as acupuncture, t’ai chi, qigong and yoga, for which...
a body of literature is likely to exist in other languages (e.g. Chinese). The first two of these therapies were excluded from this study on the basis that they have been the subject of recent reviews. Almost all studies reported multiple outcomes, and most did not state which was, a priori, the principal outcome that their intervention was designed to change. We focused, for consistency, on two principal outcomes. We chose pain because patients rate it as one of their most important symptoms, and all eligible trials reported pain as an outcome, often using more than one method of measurement. We also used global impression of change to capture overall whether participants thought the intervention beneficial. Both of these measures are part of the recommended set of criteria for assessing response in OA trials [34]. The latter measure (or one closely related) was only used in a few trials, in contrast to a similar recent review [35] where we reported that this was a measure consistently used in complementary medicine trials of rheumatoid arthritis. The only other outcome measured across several trials was function, and it is of note that the results obtained were very similar to those reported for pain. Finally, the quality measure used (Jadad) is a relatively crude measure to assess RCTs. In addition, it assigns lower scores to trials where the recipient is not blinded to the treatment received, and for some of the therapies reviewed here, it is challenging to design a sham intervention. Most of the trials that received low scores did so as a result of lack of blinding or inadequate description of withdrawals or loss to follow-up.

Systematic reviews of disease management commonly conclude that there is not enough evidence on which to reach a definite conclusion—and this is certainly the case here. Most of the practitioner-based therapies reviewed have a single trial available on which to base a judgment of efficacy or effectiveness. Only the trial on copper bracelets did not report any positive outcomes; the remainder reported some or all of their outcome measures to be superior in the intervention group. Two considerations are relevant here. First, there is likely to be publication bias involved. Many of these trials were small, and if similar trials produced null results, these would have been more difficult to publish. We do not know how many trials have been conducted on these therapies but not published; nor whether the outcomes reported in the published trials include all of the outcomes originally measured. Second, many of the therapies assessed in a single RCT demonstrate a positive effect on outcomes using the design of an intervention compared with no intervention (e.g. massage, hypnotherapy, relaxation and yoga). In such designs, we cannot conclude whether the positive results obtained are due to specific effects of the therapy or non-specific effects. Kaptchuck et al. [36] demonstrated in a trial conducted in patients with irritable bowel syndrome that non-specific aspects of therapy can produce clinically meaningful improvements in outcome, and that the practitioner–patient relationship was an important component of such effects. Even where efficacy trials are designed (i.e. therapy vs sham therapy), there can be difficulties in blinding subjects to the intervention received. The studies conducted on magnet therapy, for reasons of blinding, often used high-strength versus low-strength magnets, and in one study, more than half the participants reported that they had tried to test the magnets to determine to which arm they had been assigned [30].

It is of note that few adverse effects were noted in the eligible trials, and this is an important consideration for patients considering such therapies. Relying on information of adverse events from trials is, however, problematic. The individual trials are small, and thus, unless an adverse event was common, it might not be detected. Trials often have eligibility criteria that are more restrictive than the patient population to which the therapy may be applied in clinical practice—thus adverse events may not be evident from trials because of the narrowly defined participant population. Most of the therapies included here are considered generally safe. However, there have been concerns noted around the safety of chiropractic treatment involving manipulation of the neck, an observation that has given rise to considerable debate [37–39].

In this review, chiropractic treatment provided the most positive evidence. For knee OA, chiropractic treatment was reported to be similar to NSAID therapy (although no power calculations were provided on the ability to detect a difference) and superior to sham electrical micro-current, and for back pain secondary to OA, it was reported that chiropractic and moist heat was superior to moist heat alone. However, all the available trials were scored as modest or poor quality. Even for chiropractic treatment, therefore, it is not possible to draw conclusions based on this limited evidence.

In summary, this review has clearly demonstrated that there is not sufficient evidence to recommend any of the practitioner-based complementary therapies considered here for the management of OA but there is also not sufficient evidence to be sure that they are not effective or efficacious.

**Rheumatology key messages**

- Very few practitioner-based complementary therapies for OA have been the subject of more than one trial.
- There is no good evidence that any of the therapies reviewed in this study are effective in the treatment of OA.

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