The effectiveness of acupuncture for osteoarthritis of the knee: a systematic review

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CRD summary
This review concluded that acupuncture proved to be more effective for pain reduction and improvement of function than sham acupuncture and no additional treatment (usual care) for patients with osteoarthritis of the knee. Acupuncture should therefore be considered as an alternative to treatment with non-steroidal anti-inflammatory drugs. The authors’ conclusions are appropriate, given the evidence presented, and are likely to be reliable.

Authors' objectives
To evaluate the effectiveness of acupuncture for the treatment of pain and function in patients with osteoarthritis of the knee.

Searching
MEDLINE, EMBASE, the Cochrane CENTRAL Register, AMED, CINAHL and PEDro were searched to June 2006; the search terms were reported (see Other Publication of Related Interest). Authors of primary studies were contacted for additional publications, reference lists were screened, and studies published in English, French, German, Greek, Italian and Spanish were eligible for inclusion (see Other Publications of Related Interest).

Study selection
Randomised controlled trials (RCTs) comparing acupuncture (body as well as auricular) with sham acupuncture, other sham treatments, no other additional treatment (usual care), or another form of care were eligible for inclusion. Studies of post-operative knee pain, comparisons of different forms of active acupuncture, treatment with 'laser acupuncture' or electrical stimulation without needles, or where no data were reported, were excluded. The intervention groups in the included studies used manual acupuncture (MA) with or without physiotherapy and/or electroacupuncture (EA) with or without placebo. The control groups in the included studies used current medication, true sham EA and MA, on-point sham transcutaneous electric nerve stimulation plus placebo, off-point superficial MA or EA, education or waiting list. Some studies allowed concurrent use of diclofenac or non-steroidal anti-inflammatory drugs for all participants.

Studies had to include participants who were adults with a clinical or radiological diagnosis of osteoarthritis of the knee (or chronic knee pain for at least 3 months) and assess pain or function. The mean age of the included participants ranged from 58 to 85 years. The Western Ontario and McMaster Osteoarthritis Index (WOMAC) mean score was the most commonly used outcome measurement scale in the included studies; the baseline scores ranged from 7.8 to 12.4 for pain and from 24.6 to 40.5 for function.

Two reviewers independently selected studies for inclusion.

Assessment of study quality
The validity assessment covered randomisation, blinding, control for cointerventions, drop-outs, timing of measurements and method of analysis. The maximum possible score was 9 points.

It appears that two reviewers independently assessed validity.

Data extraction
Treatment was defined as 'adequate' based on published literature and authors' clinical experience if it consisted of at least 6 treatments, was provided at least once a week, with at least four points needled for each painful knee for a minimum of 20 minutes, and either needle sensation was achieved in manual acupuncture or electrical stimulation used at sufficient intensity to produce more than minimal sensation.

For each individual study, the mean difference (MD) in WOMAC scores for pain and function were calculated together with their 95% confidence intervals (CIs). Additional data were requested from study authors, where required (see Other Publication of Related Interest).
Two reviewers independently extracted the data and any differences were resolved by discussion.

**Methods of synthesis**
The results from individual studies were used to produce a pooled weighted mean difference (WMD) using a random-effects model. Only the results of studies using WOMAC scores for pain and function and in which the treatment was defined as adequate were included in the analysis. Data from studies using a visual analogue scale or other pain scales were excluded from the analysis, although the data were reported in the tables. Multiple comparisons were conducted for pain and function, both in the short term (end of treatment to 6 months) and long term (between 6 months and 1 year). Heterogeneity was assessed using the $\chi^2$ and $I^2$ statistics. Sensitivity analyses were conducted to investigate the effect of low-quality studies (repeating analyses after removing any study with a quality score of less than 50%), and to take account of the effect of heterogeneity between studies (by removing those studies responsible for the heterogeneity). In addition, the results of the meta analysis were compared with the results of studies not included in the meta-analysis to check consistency of the findings.

**Results of the review**
Thirteen RCTs (n=2,596) were included in the review, of which eight (n=2,340) were included in the meta analysis.

Six studies were described as high quality (scoring between 6 and 8 points) and two were described as low quality (scoring 3 points).

Acupuncture compared with sham acupuncture.

Acupuncture was significantly more effective than sham acupuncture for pain reduction in studies assessing short-term follow-up (5 RCTs, n=1,334; WMD 1.54, 95% CI: 0.49, 2.60, p=0.004). The analysis of combined high-quality only studies made no significant difference to the results. Statistical heterogeneity was high. However, after the removal of one outlying study the result remained statistically significant in favour of acupuncture, but the WMD changed to 0.87 (95% CI: 0.40, 1.34) and heterogeneity was removed. Acupuncture was also found to be more effective for pain reduction in studies assessing long-term follow-up (3 RCTs, n=1,178; WMD 0.54, 95% CI: 0.05, 1.04, p=0.03); there was no evidence of statistical heterogeneity.

Acupuncture was significantly more effective than sham acupuncture for improvement in function at the short-term follow-up (5 RCTs, n=1,333; WMD 4.32, 95% CI: 0.60, 8.05, p=0.02). The analysis of combined high-quality only studies made no significant difference to the results. Statistical heterogeneity was high. However, after the removal of one outlying study the result remained statistically significant in favour of acupuncture, but the WMD changed to 2.41 (95% CI: 0.60, 4.21) and heterogeneity was reduced. Acupuncture was also found to be more effective at the long-term follow-up of function (3 RCTs, n=1,178; WMD 2.01, 95% CI: 0.36, 3.66, p=0.02).

The results were consistent with the other included studies assessing pain and function which were excluded from the meta analysis.

Acupuncture compared with no additional treatment (usual care).

Acupuncture was significantly more effective than no additional treatment for studies assessing pain reduction at the short-term follow-up (4 RCTs, n=927; WMD 3.42, (95% CI: 2.58, 4.25, p<0.00001). There was evidence of moderate heterogeneity. Acupuncture was also found to be more effective in studies assessing function at the short-term follow-up (3 RCTs, n=907; WMD 11.65, 95% CI: 6.48, 16.81, p<0.00001), though evidence of statistical heterogeneity was high. The analysis of combined high-quality only studies made no significant difference to these results. The results were consistent with the one study not included in the meta-analysis.

Acupuncture compared with other interventions.

Acupuncture was significantly more effective than an education programme for reducing pain and improving function in one RCT (n=379)(data not reported).
Authors' conclusions
The review found that acupuncture proved to be more effective for pain reduction and improvement of function than sham acupuncture and no additional treatment (usual care) for patients with osteoarthritis of the knee. Acupuncture should therefore be considered as an alternative to treatment with non-steroidal anti-inflammatory drugs.

CRD commentary
The review question was defined clearly in terms of the intervention, population, outcomes and study design. Several relevant databases were searched, with search terms and language restrictions reported in another publication. The authors acknowledged that omitting searches of Asian databases may have produced conservative results. Methods were used to minimise reviewer error and bias in the study selection, validity assessment and data extraction processes. Validity was assessed, although only the composite score was presented; this makes it difficult to independently comment on the reliability of the evidence presented. The authors only included in the meta-analysis studies using the WOMAC tool for the assessment of pain and function, although the excluded data were presented in a table. Statistical heterogeneity was assessed and the authors explored reasons for variation in the text and analysis. The authors’ conclusions are appropriate, given the evidence presented, and are likely to be reliable.

Implications of the review for practice and research
Practice: The authors stated that acupuncture could be considered as an alternative to non-steroidal anti-inflammatory drugs for patients with symptoms that are not controlled by education, exercise, weight loss and analgesics.

Research: The authors stated that further studies are required to assess whether response rates differ between subgroups of patients (e.g. patients with differing severity of symptoms). In addition, studies should assess acupuncture in conjunction with other treatments (e.g. physiotherapy). Studies should also determine the optimum schedule for acupuncture treatment and be of long-term duration.

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Record Status
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.