Meta-analysis: acupuncture for low back pain

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CRD summary
This review assessed the effectiveness of acupuncture in the treatment of low back pain. The authors concluded that acupuncture was more effective in relieving chronic pain than sham acupuncture or no additional treatment, but not other active therapies. The review was reasonably well conducted regarding the review methodology. However, the results and conclusions were based only on a subset of studies that met the inclusion criteria and, therefore, may not be reliable.

Authors' objectives
To assess the effectiveness of acupuncture in the treatment of low back pain.

Searching
MEDLINE, the Cochrane CENTRAL Register, EMBASE, AMED, CINAHL, CISCOM and GERA were searched from inception to August 2004; the search terms were reported. The authors also handsearched the Journal of the Japan Society of Acupuncture, checked the reference lists of retrieved articles, and contacted experts. Unpublished reports were excluded. Studies published in English, Japanese, Korean, Chinese, and Germanic and Romance languages were included in the review.

Study selection
Study designs of evaluations included in the review
Randomised controlled trials (RCTs) were eligible for inclusion. Studies comparing two acupuncture techniques only were excluded.

Specific interventions included in the review
Studies of Chinese, Japanese and Western style acupuncture were eligible for inclusion. The authors defined acupuncture as the insertion of needles into the skin, but not for the purpose of injection. Studies of therapies that did not involve needle insertion were excluded. The studies evaluated Chinese or Western style acupuncture. The comparators included sham acupuncture, sham transcutaneous electrical nerve stimulation (TENS), non-steroidal anti-inflammatory drugs, moxibustion, physical therapy, trigger point injection, spray and acupressure, no treatment, or usual care. Details of the interventions and comparators are provided on the Annals of Internal Medicine website (accessed 08/11/2005), but a subscription may be required to access these additional data.

Participants included in the review
Studies of patients with low back pain were eligible for inclusion. Studies of patients with neck and low back pain were only included if the results for low back pain were available separately. The studies included patients with chronic or acute pain, in either primary or secondary health care settings. Where reported, the mean age ranged from 26 to 73.5 years. Details of the participants and settings are provided on the Annals of Internal Medicine website (accessed 08/11/2005), but a subscription may be required to access these additional data.

Outcomes assessed in the review
Studies providing data on pain, measures of functional status, overall improvement, return to work and analgesic consumption were eligible for inclusion. Studies reporting pain relief after a single acupuncture treatment were excluded. Short-term outcomes were those experienced within 6 weeks of treatment; those experienced closest to 3 weeks were used in the meta-analysis. Long-term outcomes were those reported after 6 weeks post-treatment; the measurement closest to 6 months was used in the meta-analysis. Owing to the risk of carryover effects, only the results of the first group were used from crossover trials. The primary outcome assessed in the review was the short-term effect on pain levels.
How were decisions on the relevance of primary studies made?
Two reviewers independently assessed studies for inclusion in the review.

Assessment of study quality
Study quality was assessed using two methods. First, using the Jadad scale, with a score out of five allocated on the basis of randomisation, blinding, withdrawals and drop-outs. A score of two or less was deemed to indicate a poor quality study. Second, using a 10-point assessment from the Cochrane Back Review Group that was based on the following criteria: randomisation; allocation concealment; blinding; use of a control; results for cointerventions reported separately for each group; withdrawals and drop-outs; timing of the outcome assessment; and the use of an intention-to-treat analysis. A score of four or less was deemed to indicate a poor quality study. Details of the quality assessment are provided on the Annals of Internal Medicine website (accessed 08/11/2005), but a subscription may be required to access these additional data. One reviewer assessed study quality, with a second reviewer performing random checks.

Data extraction
Two reviewers independently extracted the data into a piloted spreadsheet. Any differences were resolved by consensus, or by a third independent reviewer. Where available, data on pain, functional status, overall improvement, return to work and analgesic consumption were extracted. For each study, standardised mean differences (SMDs) and 95% confidence intervals (CIs) were calculated for pain and functioning measurements, and odds ratios (ORs) for other outcome measures.

Methods of synthesis
How were the studies combined?
Twenty-two studies (n=1,805) were included in a random-effects meta-analysis. Separate analyses were carried out for short- and long-term outcomes. The data were stratified according to the comparator used. Pooled SMDs and 95% CIs were calculated for point differences on the scales measuring pain and functioning, while pooled ORs were calculated for other outcome measures. Where the results from a particular subgroup were insufficient for pooling or were heterogeneous, the authors stated that a narrative synthesis was carried out. Eleven studies (n=495) were excluded from the meta-analysis, owing to heterogeneity. Publication bias was investigated using funnel plots.

How were differences between studies investigated?
Heterogeneity was investigated statistically using the I² statistic. A sensitivity analysis was carried out on the short-term pain outcome, by substituting imputed mean values one standard deviation (SD) higher and lower than the imputed values and then substituting an SD equivalent to the maximum of any study. Forest plots enabled a visual inspection of heterogeneity.

Results of the review
Thirty-three RCTs (n=2,300) were included in the review.

The quality score ranged from 1 to 5 on the 5-point scale, and from 0 to 7 on the 10-point scale. Fifteen studies were rated as poor quality on both scales, 6 studies were rated as poor quality on one of the scales, and 12 studies achieved a ‘not poor’ rating on both scales. The quality scores for individual criteria for each study are provided on the Annals of Internal Medicine website (accessed 08/11/2005), but a subscription may be required to access these additional data.

Short-term effect on pain.
There was a statistically significant improvement in short-term pain relief with acupuncture in comparison with sham acupuncture (4 studies; SMD 0.58, 95% CI: 0.36, 0.80), sham TENS (3 studies; SMD 0.42, 95% CI: 0.05, 0.79) and no additional treatment (8 studies; SMD 0.69, 95% CI: 0.40, 0.98). Spinal manipulation gave a statistically significant improvement in short-term pain relief in comparison with acupuncture (2 studies; SMD -1.32, 95% CI: -1.87, -0.77).
Long-term effect on pain.

There was a statistically significant improvement in long-term pain relief with acupuncture in comparison with sham TENS (2 studies; SMD 0.62, 95% CI: 0.03, 1.22) and no additional treatment (5 studies; SMD 0.74, 95% CI: 0.02, 1.47). Compared with acupuncture, massage gave a statistically significant improvement in short-term pain relief (1 study; SMD -0.40, 95% CI: -0.71, -0.09).

Functioning.

There was a statistically significant improvement in short-term functioning effects with acupuncture in comparison with no additional treatment (6 studies; SMD 0.62, 95% CI: 0.30, 0.95).

Overall improvement.

There was a statistically significant improvement in overall improvement with acupuncture when compared with sham acupuncture/TENS and no additional treatment in the short term (5 studies for each comparison) and long term (2 studies for each comparison). The results were presented in a forest plot, but the actual values for the OR and 95% CI were not reported.

Return to work (2 studies) and analgesic use (3 studies).

The forest plots for these outcomes are provided on the Annals of Internal Medicine website (accessed 08/11/2005), but a subscription may be required to access these data. The actual values for the OR (return to work) or SMD (analgesic use) and 95% CIs were not reported, and the authors stated that no conclusions could be drawn from these results.

The authors stated that there were too few trials overall, and too few large trials to draw conclusions from the funnel plots. The results of the funnel plots are provided on the Annals of Internal Medicine website (accessed 08/11/2005), but a subscription may be required to access these data.

**Authors' conclusions**

Acupuncture is more effective than sham acupuncture or no additional treatment for relieving chronic lower back pain. The evidence for patients with acute pain was sparse and inconclusive. There was no evidence that acupuncture is more effective than other active therapies.

**CRD commentary**

The study question was clear in terms of the intervention, participants, outcomes and study design. A range of databases was searched and attempts were made to locate unpublished data via two databases that indexed grey literature. However, the authors stated that unpublished reports were excluded from the review, although unpublished data retrieved from the authors were included. The authors investigated publication bias, but failed to draw conclusions from the funnel plots. Each stage of the review was carried out in duplicate, thus reducing the potential for introducing error or bias, although only a random sample of the quality assessments were checked by a second reviewer.

Two outcomes, for which no conclusions were drawn from the meta-analysis, were not reported clearly. There was also no narrative synthesis of the results of these studies. Some details of 11 studies that were deemed to be heterogeneous and excluded from the meta-analysis were tabulated, but these studies were not analysed in a narrative synthesis. The review was reasonably well conducted in terms of the study selection and data extraction processes, but it lacked a synthesis of data from a large proportion of the included studies; this meant that the results and conclusions were based on a subset of the studies that met the inclusion criteria. This may have had a substantial impact on the results of the review and, therefore, the conclusions drawn may not be reliable.

**Implications of the review for practice and research**
Practice: The authors did not state any implications for practice.

Research: The authors suggested that further research is required to evaluate the effect of acupuncture on low back pain and its efficacy in comparison with other active treatments.

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