A systematic review of randomized controlled trials of acupuncture for neck pain

A. R. White and E. Ernst

Department of Complementary Medicine, School of Postgraduate Medicine and Health Sciences, University of Exeter, 25 Victoria Park Road, Exeter EX2 4NT, UK

Abstract

Objective. To establish whether there is evidence for or against the efficacy of acupuncture in the treatment of neck pain.

Methods. A systematic literature review was undertaken of studies that compared needle or laser acupuncture with a control procedure for the treatment of neck pain. Two reviewers independently extracted data concerning study methods, quality and outcome.

Results. Overall, the outcomes of 14 randomized controlled trials were equally balanced between positive and negative. Acupuncture was superior to waiting-list in one study, and either equal or superior to physiotherapy in three studies. Needle acupuncture was not superior to indistinguishable sham control in four out of five studies. Of the eight high-quality trials, five were negative.

Conclusions. In conclusion, the hypothesis that acupuncture is efficacious in the treatment of neck pain is not based on the available evidence from sound clinical trials. Further studies are justified.

Keywords: Acupuncture, Lasers, Neck pain, Spinal diseases, Randomized controlled trial, Systematic review.

Neck pain is a common condition. Bovim et al. [1] found that 34% of a sample of 10 000 adults had experienced neck pain in the previous year. The prevalence increases with age and is higher in women than in men. Neck pain may be responsible for as many days lost from work as back pain, depending on the setting; for example, Kvarnstrom [2] reported that back and neck pain in a Swedish manufacturing industry were each responsible for sickness absence of 1.5% of the total work time available. Neck pain frequently becomes chronic: troublesome neck pain of more than 6 months duration was reported by 10% of males and 17% of females [1].

Neck pain is frequently treated by physical therapies such as exercise, traction, acupuncture, heat and cold therapies, and electrotherapies. The effectiveness of physical treatments of neck pain is controversial. One review of physical treatments concluded that ‘there is little information available from clinical trials to support many of the treatments for mechanical neck pain’ [3]. However, this review was limited to reports published between 1985 and 1993.

Acupuncture is commonly used for neck pain. A survey of acupuncturists in the UK [4] found that 26% of their patients presented with musculoskeletal disorders other than back pain, a substantial number of whom would have suffered from neck pain. Acupuncture may be an effective treatment for neck pain; one uncontrolled cohort study found that 68% of 60 patients suffering from ‘cervicobrahial’ syndrome displayed a good response to a course of acupuncture and 33% still rated themselves as ‘improved’ at follow-up 6 months later [5]. Two meta-analyses of acupuncture treatment for pain have not considered neck pain separately from other painful conditions [6, 7]. Patel et al. [6] found that the combined outcome of six studies of head and neck pain showed acupuncture to be superior to various control interventions; Ter Riet et al. [7] concluded that the efficacy of acupuncture in the treatment of chronic pain remains doubtful.

In view of the importance of the subject matter and the absence of a comprehensive review of acupuncture for neck pain, we undertook a review with the aim of summarizing the existing evidence for or against the hypothesis that acupuncture is an efficacious therapy for neck pain.

Method

Data sources

Searches were performed in January 1998 for controlled trials of acupuncture for neck pain, using Medline (1966–97), Embase (1974–97), The Cochrane Library...
A. R. White and E. Ernst

Table 1. Reports of studies of acupuncture therapy for neck pain which were retrieved by literature searches, but excluded from the systematic review, and reasons for their exclusion

<table>
<thead>
<tr>
<th>Author (date)</th>
<th>Reason for exclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teng (1973) [34]</td>
<td>Abstract only, no data or statistics</td>
</tr>
<tr>
<td>Matsumoto et al. (1974) [27]</td>
<td>Not randomized</td>
</tr>
<tr>
<td>Gaw et al. (1975) [16]</td>
<td>Pain in multiple sites</td>
</tr>
<tr>
<td>Laitinen (1975) [5]</td>
<td>Uncontrolled</td>
</tr>
<tr>
<td>Boas and Hatangdi (1976) [9]</td>
<td>Not randomized, no data or statistics</td>
</tr>
<tr>
<td>Yue (1978) [37]</td>
<td>Brief report, no data or statistics</td>
</tr>
<tr>
<td>Hertz et al. (1983) [18]</td>
<td>Uncontrolled</td>
</tr>
<tr>
<td>Rabl et al. (1983) [31]</td>
<td>Uncontrolled</td>
</tr>
<tr>
<td>von Koenig (1985) [22]</td>
<td>Uncontrolled</td>
</tr>
<tr>
<td>Peng et al. (1987) [26]</td>
<td>Uncontrolled</td>
</tr>
<tr>
<td>Zhang et al. (1987) [39]</td>
<td>Uncontrolled</td>
</tr>
<tr>
<td>Goidenko et al. (1989) [17]</td>
<td>Pain in multiple sites</td>
</tr>
<tr>
<td>Fattori et al. (1996) [14]</td>
<td>Not randomized</td>
</tr>
<tr>
<td>Xia (1996) [36]</td>
<td>Acupuncture vs acupuncture</td>
</tr>
<tr>
<td>Zhang (1996) [38]</td>
<td>Acupuncture vs acupuncture</td>
</tr>
<tr>
<td>Stone and Wharton (1997) [33]</td>
<td>Uncontrolled</td>
</tr>
</tbody>
</table>

A database specializing in complementary medicine including much of the ‘grey literature’. Search terms used were neck pain, cervical, cervicogenic, osteoarthritis, acupuncture and controlled trial. In addition, our own extensive files were searched, including all reviews of acupuncture treatment for pain. Original articles were obtained, and all reference lists were scanned for further relevant articles.

Study selection

All articles were included which reported a randomized controlled trial in which subjects with neck pain were allocated at random to receive either acupuncture or any control procedure. Either needle acupuncture, electroacupuncture or laser acupuncture was permissible. No language restrictions were applied. Studies in which two different forms of acupuncture were compared were excluded, as were those in which no data or statistical comparison were reported. Studies of subjects with headache, even if possibly of nuchal origin, were excluded. Studies which included subjects with either neck or back pain were included, but not those with pain in multiple sites.

Data extraction

Data were extracted independently by both authors using a specially prepared form. All differences were settled by discussion. For each study, trial design, randomization, blinding and handling of drop-outs were recorded, in addition to inclusion and exclusion criteria, details of treatment and control procedures, main outcome measure and study result. The initial protocol for this review anticipated that results from several studies could be combined in a meta-analysis, but this was precluded by the heterogeneity of the studies.

Quality assessment

The quality of studies was assessed by the system of Jadad et al. [8], modified to take account of the fact that it is virtually impossible for an acupuncturist to be blinded to the treatment. Points were awarded as follows: study described as randomized, 1 point; additional point for appropriate method, 1 point; inappropriate randomization method, deduct 1 point; subject blinded to intervention (i.e. control procedure was indistinguishable from acupuncture), 1 point; evaluator blinded to therapy, 1 point; description of withdrawals and drop-outs, 1 point. The maximum points available were 5. Subject blinding was assumed where the control intervention was indistinguishable from acupuncture, even if the word ‘blinding’ did not occur in the report. Observer blinding was only scored if specified in the text.

Results

Description of studies

The searches revealed 32 possibly relevant studies [5, 9–39], of which 18 were excluded for the reasons given in Table 1. Of the 14 studies included, needle acupuncture was employed in all except those by Kreczi and Klinger [23] and Ceccherelli et al. [10] in which acupuncture points were stimulated by low-energy laser. Gallacchi et al. [15] reported two parallel studies with laser and needle acupuncture, each with respective control procedures.

Subjects were recruited from various sources: media advertisements [11], primary care [20], hospital in-patients [29, 23]; in all remaining studies, subjects had been referred for physiotherapy or specialist opinion. Treatment was given in a hospital or university outpatient department in all studies except: Gallacchi et al. [15]—Chinese Medical Institute; Junnila [20]—primary care; Petrie and Langley [29] and Kreczi and Klinger [23]—hospital ward; Kisiel and Lindh [21]—physiotherapy department.

Quality of studies

No study gained the maximum score: one study scored 4 points [13]; six studies scored 3 points [10, 11, 15, 23, 26, 35]. The randomization procedure was reported in sufficient detail to be sure that it was appropriate in only two studies [11, 15]; subjects were allocated by alternation instead of randomization in two studies [20, 25]. Subject blinding was judged to have been achieved in eight studies [10, 13, 15, 19, 20, 23, 26, 35]. The assessor was reported as blinded in only one study [13].

Outcomes

Overall, the results of the 14 studies were balanced between positive and negative. Of the eight better quality studies with three or more points on the quality assessment, five were negative [13, 15 (two studies), 26, 35] and three were positive [10, 11, 23].

Acupuncture was superior to waiting-list in one study [11]. Three studies compared acupuncture with an existing treatment, i.e. physiotherapy. Acupuncture was
Table 2. Randomized controlled trials of acupuncture for treatment of neck pain: study characteristics and results

<table>
<thead>
<tr>
<th>Author (date)</th>
<th>Design</th>
<th>Study quality*</th>
<th>Diagnosis, treatment</th>
<th>Control</th>
<th>Endpoint</th>
<th>Follow-up</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Galadur et al. (1991) [13]</td>
<td>parallel</td>
<td>3</td>
<td>neck and back pain, chronic</td>
<td>formula (8)</td>
<td>a) sham needle, b) non-point needling</td>
<td>pain (VAS)</td>
<td>6 months</td>
</tr>
<tr>
<td>Coon et al. (1982) [11]</td>
<td>parallel</td>
<td>3</td>
<td>neck and back pain, chronic</td>
<td>laser (1)</td>
<td>b) sham needle</td>
<td>pain (VAS)</td>
<td>3 months</td>
</tr>
<tr>
<td>Gomez et al. (1980) [20]</td>
<td>parallel</td>
<td>2</td>
<td>neck and shoulder pain, &gt;1 month</td>
<td>classical individual (3-4)</td>
<td>waiting list</td>
<td>pain (VAS)</td>
<td>1 month</td>
</tr>
<tr>
<td>Leit (1983) [23]</td>
<td>parallel</td>
<td>1</td>
<td>cervical spondylosis</td>
<td>formula (4)</td>
<td>sham prick with colleague</td>
<td>pain (VAS)</td>
<td>6 weeks</td>
</tr>
<tr>
<td>Petrie and Loughery (1983) [29]</td>
<td>parallel</td>
<td>2</td>
<td>neck pain, &gt;2 yr</td>
<td>formula (8)</td>
<td>sham TENS</td>
<td>pain (VAS)</td>
<td>24 h</td>
</tr>
<tr>
<td>Emery and Lythgoe (1986) [33]</td>
<td>cross-over</td>
<td>3</td>
<td>neck and back pain, &gt;1 month</td>
<td>formula (5a) with EA (3)</td>
<td>sham needle-prick only</td>
<td>pain (VAS)</td>
<td>24 h</td>
</tr>
<tr>
<td>Kocie and Klinger (1986) [26]</td>
<td>parallel</td>
<td>2</td>
<td>neck pain, &gt;6 months</td>
<td>formula (8)</td>
<td>sham TENS</td>
<td>pain (VAS)</td>
<td>1 week</td>
</tr>
<tr>
<td>Catuccelli et al. (1989) [10]</td>
<td>parallel</td>
<td>3</td>
<td>myofascial neck pain, mean 7 months</td>
<td>laser to tender + ac points (12)</td>
<td>sham laser</td>
<td>pain (McGill)</td>
<td>3 months</td>
</tr>
<tr>
<td>Lundeberg (1981) [26]</td>
<td>parallel</td>
<td>3</td>
<td>OA neck, &gt;6 months</td>
<td>a) formula, manual (1)</td>
<td>superficial needling</td>
<td>short-term pain (VAS)</td>
<td>140 min</td>
</tr>
<tr>
<td>Thomas et al. (1991) [35]</td>
<td>cross-over</td>
<td>3</td>
<td>OA neck, &gt;6 months</td>
<td>formula (1)</td>
<td>a) superficial sensory, b) placebo diazepam, c) placebo diazepam, d) affective pain</td>
<td>short-term pain (VAS)</td>
<td>2 h</td>
</tr>
<tr>
<td>Kosel and Lindh (1990) [24]</td>
<td>parallel</td>
<td>2</td>
<td>OA neck and shoulder pain, &gt;2 months</td>
<td>flexible formula</td>
<td>physiotherapy (massage, stretch, exercise)</td>
<td>pain (VAS)</td>
<td>6 months</td>
</tr>
<tr>
<td>David et al. (1990) [22]</td>
<td>parallel</td>
<td>2</td>
<td>non-inflammatory neck pain, &gt;6 weeks</td>
<td>formula + tender points (6)</td>
<td>mobilization</td>
<td>pain (VAS)</td>
<td>6 months</td>
</tr>
<tr>
<td>Irnich et al. (submitted) [19]</td>
<td>cross-over</td>
<td>2</td>
<td>limited ROM of neck, &gt;2 months</td>
<td>local and distant points from list (1)</td>
<td>sham laser</td>
<td>ROM, short-term pain (VAS)</td>
<td>5 min</td>
</tr>
</tbody>
</table>

*Quality assessed by randomization, blinding and drop-outs: see the text for full details.

either equal [12, 21] or superior [25] to physiotherapy. Needle acupuncture was compared with indistinguishable control in five studies [13, 15, 20, 26, 35]: all but one [20] produced negative results. Laser stimulation of acupuncture points was better than sham laser in two studies [10, 23] and no different in one study [15]. Three studies examined the effectiveness of acupuncture for short-term pain relief only; acupuncture was superior to sham laser [19], but not superior to indistinguishable sham acupuncture [26, 35].

Discussion

There are equal numbers of positive and negative randomized controlled trials of acupuncture for neck pain. For the better quality studies, the majority are negative.

In general, the methodological quality of the studies, as assessed by the three criteria of the modified Jadad score for clinical trials [8], was disappointing. Good quality in acupuncture studies requires additional design features, including standardization of the interaction between the acupuncturist and the patients (which was not mentioned in any of the reports), and adequate acupuncture treatment. The adequacy of the acupuncture treatment was not formally tested, but appeared to be satisfactory in most cases. One exception was the course of only three sessions used in the study of Emery and Lythgoe [13]; most acupuncturists would consider this an inadequate treatment for the pain of ankylosing spondylitis. As it happens, this study had the highest quality in acupuncture studies requires additional design features.
effect of acupuncture is point specific and technique specific. Four of these studies were negative. This suggests that acupuncture performed at carefully selected points with precise techniques produces no better results than the generalized physiological response that may occur after random needling of the skin [42, 43]. However, this conclusion is far from definite; the inadequacy of the acupuncture in one negative study [13] has already been referred to above, and the results of the other negative studies [15, 26, 35] may not have been conclusive because they all showed positive trends with small sample sizes.

One reason for using acupuncture in the management of painful musculoskeletal conditions of the neck is that it is perceived to be much safer than orthodox treatment with drugs. It has been estimated that non-steroidal anti-inflammatory drugs are responsible for about 12 000 emergency admissions for gastrointestinal disturbances in the UK each year, and 2500 deaths [44]. Acupuncture is by no means free from life-threatening adverse events [45], although it has not been established how frequently they occur. One estimate, from data provided by a survey of doctors and acupuncture practitioners, suggested that pneumothorax may occur once in every 120 years of an acupuncture practitioner’s work [46]. Assuming that acupuncture can be demonstrated to be safe, we believe that there is sufficient equipoise in the results of this review to justify further studies.

In conclusion, the hypothesis that acupuncture is efficacious in the treatment of neck pain is not supported by current evidence from controlled trials. More, better designed trials of acupuncture are required before its place in the management of neck pain can be defined.

Acknowledgement

Funding was provided by Exeter University Departmental Funds (Laing Foundation).

References

Review of acupuncture for neck pain

147


A systematic review of randomized controlled trials of acupuncture for neck pain
A. R. White and E. Ernst