Acupuncture as an intervention against chronic low back pain

Literature Review

Valentin Thoben, Joanna Tomkiewicz

European School of Physiotherapy, Hogeschool van Amsterdam, Tafelbergweg 51, Amsterdam, The Netherlands

Abstract

**Background:** Acupuncture is one of the most frequently used alternative interventions in the course of treatment for chronic low back pain (cLBP).

**Design:** Literature Review

**Search Strategy:** The research team conducted a search of the computerized bibliographic databases available (Cochrane, Cinahl, GoogleScholar, Pubmed, PiCarta) to find a sufficient amount of relevant articles.

**Selection Criteria:** All articles first had to pass the inclusion and exclusion criteria to show a relevance with our research topic. The researchers ended up with a list of 35 articles, meeting the inclusion criteria. These were read and graded by the criteria list designed by the research team. After this, 15 articles with good rankings were selected to be included.

**Data Selection and analysis:** The 15 articles are published between 1986 and 2008 (Mean 2002, 53). All of them focused on various forms of acupuncture as an alternative intervention for cLBP. 5 of them also compared the intervention to conservative treatments (physiotherapy, exercise etc.) as a control.

**Results:** 12 articles have according to our criteria list good quality and 3 are of moderate quality. 9 of these studies showed significant changes in pain intensity by for e.g. VAS scale, 5 showed the best improvement with Acupuncture as an adjunctive to conventional therapies. 1 of the studies had no, inconclusive or neglectable outcome.

**Discussion:** Our research, as well as the articles reviewed, showed confounding factors which mostly were seen in too small sample sizes, interferences in the study protocols due to high drop-out or low follow up, what respectively causes problems in drawing conclusions about long-term effect.

**Conclusion:** This study makes visible that acupuncture in general has an effect as an adjunctive tool in the course of treatment for chronic LBP patients, but there is only low evidence that it exceeds placebo in general, although it seems to be superior to other available alternative interventions, for e.g. TENS. Recommendation for the future could be that more RCT’s with a strict, but pragmatic study protocol and bigger sample sizes need to be conducted.

© 2009 European School of Physiotherapy

**Keywords:** Chronic, LBP, low back pain, Acupuncture, Exercise, Physiotherapy
Introduction
The lifetime prevalence of low back pain goes above 70% in the population of western society, and as a chronic condition it often shows only minor improvement in the course of conventional therapy treatment. It represents a high economic burden regarding the therapeutic treatment as well as the time till return to work. Normally 90% of the acute periods disappear within 6 weeks, but up to 7% of these patients develop a condition with chronic pain (Speed, 2004). There is a steady, ongoing research about alternative therapies and therapies that can be used as a conjunctive treatment with the already existing therapies. The management of chronic low back pain varies on a wide base, and also a number of the standardized conventional treatments have still to be evaluated regarding their effectiveness (Deyo & Weinstein, 2001).

The number of patients that could not be helped with one of the standardized courses of treatment, as it for example is conducted in guidelines for the treatment of low back pain, is growing, and lots of them make use of complementary and alternative medicine. As a treatment especially for chronic low back pain, acupuncture is widely used, and back pain is one of the most common reasons to visit an acupuncturist (Eisenberg et al. 1997, p. 1569 & Cherkin et al. 2002, p. 463).

Some researches suggest that there is an analgesic treatment effect of acupuncture and there has also been research, looking for a possible contribution of acupuncture to the standard treatment modalities that often are related to exercise (Han & Terenius, 1982; Stux & Pomeranz, 1998).

The KNGF guidelines 2006 for the treatment of low back pain define a chronic condition of low back pain after a stable or deteriorating condition for longer than 12 weeks. One of its main recommendations is the activation of the patient, to overcome the fear of movement and the possibly related pain to these movements with for e.g. exercise treatment.

Aim of the Study
With this literature review the researchers want to determine whether acupuncture as a conjunctive treatment can be used in the course of chronic low back pain treatment. This was done by comparing the outcomes of articles, researching on the overall effect of acupuncture or the effect of acupuncture as an adjunctive treatment, visualized by test results on the Visual Analogue Scale (VAS) or tests for the passive and active range of motion (SLR, Schober Tests).

Methods and Materials

Databases
In order to properly use the databases, the following sources were used: Medline, Pubmed, Embase, Cochrane, Picarta.

Keywords
While the researchers were performing the database search, the following keywords were used either alone or in combinations.

Pubmed:
- "Acupuncture"[Mesh] AND "therapy"[Subheading] AND "low back pain"[Mesh] with 421 Results

Embase:
- Acupuncture AND low back pain AND standard intervention
- Acupuncture AND low back pain AND Physiotherapy
- Dry-needling AND low back pain
- Physiotherapy AND Acupuncture

Picarta:
- Acupuncture AND chronic low back pain AND Physiotherapy

Cochrane:
- Acupuncture AND non-specific low back pain

Medline:
• Acupuncture AND Physiotherapy AND non-specific (chronic) low back pain

**Inclusion and Exclusion Criteria**

In order to determine the relevance of the articles, all first had to pass the inclusion and exclusion criteria listed in **Table 1**. A total of 40 articles met the requirements and were proceeded into further analyzes.

**Table 1: Inclusion and Exclusion Criteria**

<table>
<thead>
<tr>
<th>Inclusion</th>
<th>Exclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject population between 18 and 80 years of age.</td>
<td>Articles older than 25 years.</td>
</tr>
<tr>
<td>Studies, which are studying the effect of acupuncture on low back pain.</td>
<td>Articles not distinguishing clearly between acute and chronic LBP in the outcome.</td>
</tr>
<tr>
<td>Subjects that are suffering from chronic, non-specific low back pain.</td>
<td>Articles written in foreign languages, other than English, German or Dutch.</td>
</tr>
<tr>
<td>Articles, coming from reliable journals from one of the following databases: Pubmed, Embase, Medline, PiCarta, Cochrane.</td>
<td>Studies on patients with identified origin of LBP, even when it is concerning chronic.</td>
</tr>
<tr>
<td>The Articles should be written in the last 15 years.</td>
<td>Studies that investigate effects of medication or combined medication and Interventions.</td>
</tr>
<tr>
<td>All literature must be relevant for the research topic and direct applicable to the target population</td>
<td>Studies that compare to or work with surgical interventions of LBP.</td>
</tr>
<tr>
<td>All studies which are entirely tested on a human population</td>
<td>Studies which are done on other subjects than humans</td>
</tr>
</tbody>
</table>

**Table 2: Quality of the Articles**

<table>
<thead>
<tr>
<th>Name</th>
<th>Score</th>
<th>Use/Quality</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent</td>
<td>66-60</td>
<td>High</td>
<td>Large, Specific RCT’s</td>
</tr>
<tr>
<td>Good</td>
<td>59-50</td>
<td>Good</td>
<td>Smaller, unspecific RCT’s</td>
</tr>
<tr>
<td>Moderate</td>
<td>49-35</td>
<td>Moderate</td>
<td>Case studies</td>
</tr>
<tr>
<td>Insufficient</td>
<td>34-0</td>
<td>Exclusion</td>
<td>Poor</td>
</tr>
</tbody>
</table>

After inclusion and exclusion criteria were met, the team started to grade the articles according to the criteria list designed by the researchers. The total score of 66 was the maximum score that could be achieved per article. The criteria list contained the idea of Pedro, as well as few other items that the researchers considered to be crucial for the research. Each criterion has had a maximum and a minimum score on an ordinal scale, relating to the importance of the criterion. The maximum score for very important items was a 4. The scores were calculated and categorized according to its worth for our review. Four categories have been established (**Table 2**). The whole selection and grading process, including the number of articles that passed the selection, can be seen below in **Figure 1**.

**Figure 1**

1. Topic finding
   2. Computerized Research for Articles
      3. Selection of relevant Articles by the topic and Abstract
         4. Inclusion and Exclusion via Criteria (n=40)
            5. Include (n=15), Exclude (n=25)
               6. Quality grading via the Criteria Grading List
                  7. Exclusion (n=0)
                     8. High Quality (n=0)
                        9. Good Quality (n=12)
                           10. Moderate Quality (n=3)
Figure 1: The Grading process
The Criteria List for the selection process of the articles can be seen in Appendix 1, and is divided into the following 25 categories: Abstract (1), Introduction (2), Methods (12), Results (3), Discussion & Conclusion (3), and Clinical Relevance (4). Pint distribution in detail can be seen in the Appendix 1.

Outcome Measurements
Most common measurement tool used was the Visual Analogue Scale, simply known as VAS-scale. A measurement instrument that tries to measure a characteristic or attitude that is believed to range across a continuum of values and cannot easily be directly measured. VAS is usually a horizontal line, 100 mm in length, anchored by word descriptors at each end. The patient marks on the line the point that they feel is representing their perception of their current state (D. Gould et al, 1990).

Results
The comparison was made between acupuncture and physiotherapeutic interventions in compare with each other, investigating the benefits of non-specific, chronic low back pain patients. Acupuncture included: Sham-, Minimal-, Dry-needle-, Electro- & Electrical Heat Acupuncture. Physiotherapy included: exercise programs, massage, and electrotherapy (TENS). The quality of the articles breaks down into the following results: According to researchers (T.V, T.J), there are three articles graded as having moderate quality and twelve articles graded being of good quality. (Table 3) Cherkin et al. (2001) has shown that massage, in direct comparison with acupuncture and self-care is superior to acupuncture only. Motohiro et al. (2006) found that Acupuncture and Sham-acupuncture both have a significantly better outcome in the Acupuncture group. Kozunori et al. (2008) proved that the most successful reduction in chronic low back pain is when using a combination of TENS and acupuncture.

Christer et al. (2001) have shown a positive outcome when acupuncture was used as a treatment for chronic low back pain Cecilia et al. (2003) also found in comparison the combination of electro-acupuncture and exercise to be superior.

Meng et al. (2003) used acupuncture only, to treat low back pain and have found it as an effective adjunctive treatment. Witt et al. (2006) similar findings are in this study, when acupuncture was used in combination with routines care, to be superior. Tsui et al. (2004) have shown with their study that electrical heat acupuncture had the greatest improvement in VAS scale in pain reduction. Lehmann Et al. (1986) showed electro-acupuncture to rank the highest numbers on VAS and disability scales. Molsberger et al. (2002) showed Acupuncture as an adjunctive treatment to standard care to be most efficient. Katzenschlager et al. (2004) found that electro-acupuncture significantly improved the treatment of low back pain. Leibling et al. (2002) have discovered that acupuncture had better results when compared with exercise treatment only. Kazunori et al. (2006) proved that acupuncture has a significant greater effect than sham in short-term treatment. Kazunori et al. (2004) compared types of acupunctures with each other and his findings were that acupuncture with deep needling on trigger points, were found to be better than sham or conventional acupuncture only. Tsukayama et al. (2002) have discovered that in short- term use, electro-acupuncture appeared more useful than TENS. The articles in detail can be seen in Table 3.

The Articles
Two articles are published in 2001, three articles are published in 2002, and two articles are published in 2003, three in 2004, three in 2006, one in 2008 and one article in 1986 (Mean 2002,53)

Table 3: The detailed Articles
<table>
<thead>
<tr>
<th>Article</th>
<th>Quality</th>
<th>Subjects number</th>
<th>Type of Subjects</th>
<th>Intervention</th>
<th>Study length</th>
<th>Outcome measurements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cecilia et al. (2003)</td>
<td>Good</td>
<td>52</td>
<td>Mean 53 years,</td>
<td>Electro acupuncture, Exercise</td>
<td>4 weeks</td>
<td>VAS, AROM, Aberdeen LBP</td>
</tr>
<tr>
<td>Cherklin et al. (2001)</td>
<td>Good</td>
<td>262</td>
<td>Mean 45 years,</td>
<td>Acupuncture, Massage, self-care education</td>
<td>10 weeks</td>
<td>VAS, SF-12</td>
</tr>
<tr>
<td>Christer et al. (2001)</td>
<td>Good</td>
<td>50</td>
<td>Mean 49 years,</td>
<td>Acupuncture, Electro acupuncture</td>
<td>8 weeks</td>
<td>VAS, ADL's</td>
</tr>
<tr>
<td>Kazunori et al. (2004)</td>
<td>Good</td>
<td>35</td>
<td>Mean 72 years,</td>
<td>Acupuncture, Trigger point acupuncture</td>
<td>12 weeks</td>
<td>VAS, RMDQ</td>
</tr>
<tr>
<td>Kazunori et al. (2006)</td>
<td>Good</td>
<td>26</td>
<td>Mean 76 years,</td>
<td>Acupuncture, Sham-acupuncture</td>
<td>12 weeks</td>
<td>VAS, RMDQ</td>
</tr>
<tr>
<td>Kazunori et al. (2008)</td>
<td>Moderate</td>
<td>32</td>
<td>Age 60 + years,</td>
<td>Acupuncture, TENS</td>
<td>10 weeks</td>
<td>VAS, RMDQ</td>
</tr>
<tr>
<td>Katzenschläger et al. (2004)</td>
<td>Moderate</td>
<td>87</td>
<td>Mean 54 years,</td>
<td>Electro acupuncture, Sham Electro acupuncture</td>
<td>6 weeks</td>
<td>VAS in different ADL’s</td>
</tr>
<tr>
<td>Lehmann et al. (1986)</td>
<td>Good</td>
<td>54</td>
<td>Mean 40 years,</td>
<td>Electro acupuncture, TENS, Exercise</td>
<td>3 weeks</td>
<td>VAS, disability scale</td>
</tr>
<tr>
<td>Leibling et al. (2002)</td>
<td>Good</td>
<td>131</td>
<td>Mean 48 years,</td>
<td>Acupuncture, Sham-acupuncture, Exercise</td>
<td>12 weeks</td>
<td>VAS in pain and disability</td>
</tr>
<tr>
<td>Motohiro et al. (2006)</td>
<td>Good</td>
<td>31</td>
<td>Mean 69 years,</td>
<td>Acupuncture, Sham-acupuncture</td>
<td>1 treatment</td>
<td>VAS, Schober Test</td>
</tr>
<tr>
<td>Meng et al. (2003)</td>
<td>Good</td>
<td>55</td>
<td>Mean 72 years,</td>
<td>Acupuncture, Exercise</td>
<td>5 weeks</td>
<td>Modified RMDQ</td>
</tr>
<tr>
<td>Molischberger et al. (2002)</td>
<td>Good</td>
<td>186</td>
<td>Mean 40 - 60 years,</td>
<td>Acupuncture, Sham-acupuncture, Exercise</td>
<td>4 weeks</td>
<td>VAS, pain diary</td>
</tr>
<tr>
<td>Tsui et al. (2004)</td>
<td>Good</td>
<td>42</td>
<td>Mean 40 years,</td>
<td>Electro acupuncture, Heat acupuncture, Exercise</td>
<td>4 weeks</td>
<td>VAS, SLR, RMDQ</td>
</tr>
<tr>
<td>Tsukayama et al. (2002)</td>
<td>Good</td>
<td>20</td>
<td>Mean 45 years,</td>
<td>Electro acupuncture, TENS</td>
<td>2 weeks</td>
<td>VAS, JOA score</td>
</tr>
<tr>
<td>Witt et al. (2001)</td>
<td>Moderate</td>
<td>11630</td>
<td>Mean 53 years,</td>
<td>Acupuncture, Exercise</td>
<td>3 month</td>
<td>SF-36, Questionnaire</td>
</tr>
</tbody>
</table>
Discussion

The aim of our study was to clarify the recommendable interventions in the course of treatment and rehabilitation of non-specific, chronic low back pain. Furthermore in detail, whether the patients making use of various kinds of acupuncture or of the combination of acupuncture with exercise showed a significant improvement in the reduction non-specific low back pain. There is now reasonable evidence that acupuncture has a clinically relevant analgesic effect on certain forms of chronic pain (Leibling et al. 2002). Some studies showed that acupuncture had better results when compared with exercise treatment only, but the study protocol and design were poor, or the effect was reviewed for acute periods of back pain and/or short-term effects only. Sometimes, the main outcome measurement is not specific to acupuncture only. Other studies show that sham acupuncture, which is most of the time a control to acupuncture interventions, also has a treatment effect. But it is difficult to draw the conclusion that acupuncture does not produce pain relief. A negative finding was reported by Cherkin et al (2001). This study has shown that massage in comparison with acupuncture and self-care was superior to acupuncture only. The outcomes were sometimes unclear, because there was no control group, or the control group receives sham acupuncture that is nowadays believed to also be a form of acupuncture. Moreover, the studies done about acupuncture till now, still highly vary in their use of acupuncture techniques in their patient regimen. There is a lack in follow up to underline their results for long-term outcomes.

Non-specific low back pain is typically known for being intermittent and recurrent, being also associated with high health, and social and economic costs. As an example for this, it limits the patient in nearly all ADL activities, and is because of this often also evaluated by pain questionnaires, like in our studies the Ronald Morris Disability Questionnaire (RMDQ) or modified versions of the SF-12 and SF-36 Questionnaire. The Physiotherapist always aims to improve the patient’s abilities and potentials, in a patient specific and ADL centred way. To be able to help those patients, the PT has to understand the pathology, knowing the specific mechanisms of the impairment and should also be in possession of skills and knowledge of interventions that are known to reduce chronic, non-specific low back pain. Due to this, a PT always has to be open for new intervention techniques, especially when they are evidence based. Acupuncture is a widely known intervention tool for chronic, non-specific low back pain, but it has till now not been directly compared to physiotherapy (for e.g. exercise-related) interventions. There are 13 existing Cochrane reviews, looking into different non-surgical treatments for back pain, including acupuncture, but the outcomes are inconclusive. The “CSP” also states that Physiotherapy is scientifically based, and that it commits to evaluating and reviewing the evidence underlining its practice. Our project will support this idea and will hopefully help to review the evidence about the management of non-specific low back pain patients.

Conclusion

In the question of either physiotherapy or acupuncture use in treatment of chronic non-specific low back pain, there is evidence of acupuncture being a good adjunctive tool to a physiotherapeutic treatment that directed on back exercises, patient education and motivation towards movement. Acupuncture itself showed analgesic effects, but in the patient follow up on the long term it was often behind the standard therapies when it was used for non-specific, chronic low back pain.

Recommendations for future studies

Studies should be bigger in patient seizes, the follow up should be taken more care of and the acupuncture interventions could be more standardized.
Acknowledgements

We would like to thank our coach Joost Zalm for his guidance and support during this research study.

References


