Efficacy of Acupuncture in Chronic Low Back Pain Treatment: a literature review

ABSTRACT

Aims: To evaluate the effects of the use of acupuncture as a treatment of chronic low back pain.
Methodology: This study follows the integrative methodology of literature review, seeking articles published on PubMed, using keywords fromMedical Subject Headings (MeSH) to form the search formula: Acupuncture AND "low back pain". Inclusion criteria were randomized controlled trials published between 2018 and 2023, with free full text available in english or portuguese. The exclusion criteria was not answering this review's orienting question.
Results: Several studies analyzed the efficacy of different acupuncture and electroacupuncture approaches in the treatment of chronic low back pain. One study highlighted invasive laser acupuncture with different wavelengths, revealing improvements in pain and disability scales after 4 weeks. Another research compared electroacupuncture at various frequencies, observing similar reductions in pain between the groups. Combined acupuncture (hands and ear) was more effective than usual medical treatment, showing greater reduction in pain and cure rate. Both electroacupuncture and manual acupuncture also demonstrated efficacy in reducing pain intensity and quality. Acupuncture with embedded wires stood out, showing positive and rapid results in chronic low back pain. Another study revealed that both electroacupuncture and a placebo had positive impacts on pain intensity.
Conclusion: Even though there are multiple forms of acupuncture used throughout the studies, and even those that appear on multiple studies are done differently on those appearances, all are used as a way to reduce CLBP. In that sense, the positive effects from using traditional acupuncture or some different form of acupuncture as a treatment for CLBP is highlighted by the results from the studies that were a part of this review.

Keywords: Acupuncture, Low Back Pain, Complementary Therapies, Therapeutics, Chronic Pain.

1. INTRODUCTION

Chronic low back pain (CLBP) is characterized by dysfunction in lumbar biomechanics, manifesting as painful episodes lasting more than 12 weeks [1]. It can be classified as specific when the etiology is known, such as hernias or fractures, or nonspecific when the cause is unknown [2]. Furthermore, CLBP is considered a public health issue, being one of the primary causes of work absenteeism worldwide [3]. CLBP has a global prevalence of 25.4% in the elderly population (≧60 years) and 3-20% in adults (<60 years) [4,5].

Various therapeutic interventions have been proposed as alternatives for CLBP treatment, given that this condition affects approximately 80% of the population at some stage in life, primarily impacting the elderly population, which is more susceptible to the side effects of analgesics and anti-inflammatories. Additionally, certain factors are associated with the presence of CLBP, such as male gender, age over 30 years, smoking, alcohol consumption, obesity, and improper posture [6].

Some of the non-traditional curative and preventive measures for CLBP include pilates, kinesiotherapy, heat therapy, hydrotherapeutic treatment, and acupuncture [7]. Currently, acupuncture is part of Integrative and Complementary Practices (PICS) offered by the Unified Health System (SUS) and is used as an alternative treatment for CLBP, potentially effective in reducing symptoms and consequently improving the patient's quality of life by alleviating pain [8,9].

Acupuncture is an ancient therapeutic practice that involves the insertion of needles into specific points on the body for pain relief [10]. There are variations of the technique that incorporate technological advancements, such as electrical stimulation, the use of lasers in conjunction with needles, and the insertion of biodegradable threads to enhance the effectiveness of acupuncture [11]. As an intervention that avoids the use of pharmaceuticals, acupuncture is an important alternative for patients affected by CLBP [12,13].

Therefore, this mini review aims to evaluate the effects fromthe use of acupuncture as a treatment of chronic low back pain.

2. METHODOLOGY

This study consists of a review following the integrative methodology for bibliographical research [14]. In order to clarify the purpose of this review, the following question was determined: “Does the practice of different forms of acupuncture have any effects in treating chronic low back pain?”. The search for articles was conducted on the PubMed database during July and August of 2023, utilizing keywordsfrom the Medical Subject Headings (MeSH) in order to form the following search formula : Acupuncture AND "low back pain.". The selection criteria were randomized controlled trials published in English or Portuguese between 2018 and 2023. Two different researchers reviewed the reference list, excluding those not related to the theme of this review by first reading the title and abstract of the study, then analyzing the remaining studies’ full text. Studies whose full text could not be found were excluded.

3. RESULTS

A total of 30 articles were found on PubMed using the search strategy described above. Upon reviewing the titles and abstracts, 21 articles were excluded, leaving 9 for full-article reading. Of these, 3 articles were excluded as they did not meet the objective of this review. Therefore, a total of 6 articles were included in this review, with the main findings described below.

Table 1. Articles included as results from this review’s search.

Title	Authors	Year	Country
Efficacy of invasive laser acupuncture in treating chronic non-specific low back pain: A randomized controlled trial	Kim *et al.*	2022	South Korea
Effect of Different Frequencies of Electroacupuncture on Chronic Low Back Pain in Older Adults: A Triple-blind, Placebo-controlled, Randomized Clinical Trial	Torres *et al.*	2023	Brazil
Effect of hand-ear acupuncture on chronic low-back pain: a randomized controlled trial	Luo *et al.*	2019	China
Effectiveness of Manual and Electrical Acupuncture for Chronic Non-specific Low Back Pain: A Randomized Controlled Trial	Comachio*et al.*	2020	Brazil
Efficacy of Electronic Acupuncture Shoes for Chronic Low Back Pain: Double-Blinded Randomized Controlled Trial	Yeh *et al.*	2020	Taiwan
Efficacy and safety of thread embedding acupuncture combined with acupuncture for chronic low back pain: A randomized, controlled, assessor-blinded, multicenter clinical trial	Sung *et al.*	2020	South Korea

Kim *et al.* examined the efficacy of Invasive Laser Acupuncture (ILA) with lasers of different wavelengths for treatingCLBP. Participants were allocated into 3 groups: control, which received acupuncture without laser activation; a group with laser activation at a wavelength of 650 nanometers (nm); and a group with laser activation at a wavelength of 830 nm. Following a bilateral acupuncture treatment lasting 10 minutes with ILA and subsequent electroacupuncture, also

for 10 minutes, over 4 weeks, different patient responses regarding pain scales were observed. In terms of the Visual Analog Scale for pain (VAS), there was an average drop from 50.47 mm to 36.20 mm in the control group; from 55.07 mm to 23.13 mm in the 650 nm group; and from 49.60 mm to 28.60 mm in the 830 nm group after the 4 weeks of treatment. Regarding the Oswestry Disability Index (ODI), there was a decrease from 9 to 8 points in the control group, from 11 to 7 points in the 650 nm group, and from 11 to 5 points in the 830 nm group [15].

Over a 5-week period, Torres *et al.*conducted electroacupuncture (EA) therapy at different frequencies: high (100 Hz), low (2 Hz), alternate (2 and 100 Hz), control (without electrical stimulation), and placebo (with an adhesive moxa, mimicking needle penetration). EA sessions were held for 30 minutes, twice a week for 5 weeks. A significant difference between all groups from pre-treatment to post-treatment was observed, with an average decrease from 6.8 to 1.9 on the Numeric Pain Rating Scale (NPRS). No significant differences were found between the three groups with electrical stimulation at different frequencies. The study also showed that manual (control) and electrical (intervention) stimulation did not differ statistically and that a placebo effect occurred, with the placebo group achieving the greatest reduction in NPRS (from 7.5 to 0.9) [16].

Luo and colleagues investigated, after 7 weeks of treatment, the superiority of acupuncture, whether hand acupuncture combined with auriculotherapy or standard acupuncture, compared to usual medical treatment for CLBP. Three groups were used for comparison of therapy results with VAS. After 6 months of treatment, a decrease from 6.7 to 3.02 on the VAS (0 to 10) was observed in the combined hand acupuncture and auriculotherapy group, from 6.92 to 4.16 in the standard acupuncture group, and 1.42 points in the usual medical treatment group. The research found that after 6 months of treatment, there was a cure rate of 70.4% and a pain reduction of 18.5% in the combined acupuncture group. In contrast, a cure rate of 46% and a 22% pain reduction were observed in the standard acupuncture group, and a 22.9% cure rate and a 22.9% pain reduction in the usual medical treatment group [17].

Comachio*et al.* examined the effectiveness of EA and manual acupuncture (MA) in treating patients with CLBP over 6-week, with a frequency of 2 sessions per week and 40 minutes per session. EA received 30 minutes of manual acupuncture, followed by 10 minutes of electroacupuncture at a frequency of 10 Hz. Pain intensity was quantified using the Numeric Rating Scale (NRS), and pain quality was assessed using the McGill Pain Questionnaire (MPQ). The treatment results indicated a reduction from 7.9 to 3.8 and from 7.8 to 4.2 in the NRS for the MA and EA groups, respectively, between the pre-treatment and post-treatment periods. In the sensory component of the MPQ, there was a decrease from 17.3 to 8 for MA and from 20.1 to 9.4 for EA during the same period [18].

In the study led by Yeh and colleagues, 60 participants were divided into a group receiving nonsteroidal anti-inflammatory drugs (NSAIDs) and fake electronic acupuncture shoes and another group with electronic acupuncture shoes (EAS) and a placebo for NSAIDs to compare the effectiveness of both over 6 weeks. The Visual Analog Scale (VAS) was used to analyze pain intensity during this period. The study found, after 2 weeks of treatment, an effectiveness of 68% in the EAS group and 59% in the NSAIDs group, based on a decrease in VAS. In contrast, after 1 week of treatment, there was 78% effectiveness in EAS and 59% in NSAIDs, while after the last treatment session, these numbers were 73% and 62%, respectively. The average VAS score before starting treatment was 4.4, and at the last visit, it was 3.1 [19].

The Korean study conducted by Sung and others evaluated the effects of acupuncture and Thread Embedding Acupuncture (TEA) as a treatment for CLBP. Both treatments resulted in a clinically relevant reduction in VAS after 8 weeks of the study. However, the TEA group showed a higher average reduction of 33.7, compared to the traditional acupuncture group, which had an average reduction of 15.6. The reduction in pain was observed in the long term for both treatments, increasing over time and with more sessions. The reduction in the TEA-treated group occurred more rapidly, within the first month of the study, while the acupuncture group experienced it from one and a half months onwards [20].

4. DISCUSSION

The use of ILA was shown by Kim *et al.* and Lin *et al.* to reduce pain levels in patients with CLBP. Kim *et al.* evaluated different frequencies of ILA, with 650 nm having the most improvements on the pain scale. Lin *et al.* combined ILA with Chinese Cupping and had better results on the ILA group when compared to sham ILA group [15, 21]. Similar effects of ILA were demonstrated by Huang *et al.*, as a treatment for temporomandibular joint disorder, and by Manente *et al.*, as a way to neuralgia on facial neuropathies [22, 23]. These findings suggest that ILA is an effective way to reduce pain in multiple conditions and has further potential to be yet explored, with studies to compare its efficacy with regular forms of acupuncture and the best therapeutic protocols for its frequency being needed.

Comachio*et al.* and Torres *et al.* both found the use of EA to be effective as a treatment for CLBP, even with different charges being used (2 Hz, 10 Hz, 100 Hz). While Torres *et al.* focused on elders and only EA was utilized as a

form of treatment, Comachio*et al.* had a mean patient age of 46 years in the EA group and tested a combination of manual acupuncture and EA [16,18]. Both studies, although they did not show any superiority of EA when compared to normal, manual acupuncture, presented with improvement on the pain scale. EA may not be more effective than manual acupuncture, but it is shown to be as effective regarding pain relief.

Yeh *et al.* also studied the effect EA has on CLBP, implementing it on therapeutic shoes, which resulted in analgesic effects and improvements in range of motion [19]. As elucidated by Zheng *et al.* and Wan *et al.*, EA also has an analgesic role on knee osteoarthritis and dry eye pain, reducing the expression of pain receptors and inflammation on rat models [24,25] and was shown to help during the rehabilitation of meniscal injuries on athletes [26]. Thus, EA could be an effective alternative treatment for many forms of not only CLBP but several chronic pain illnesses. Further studies exploring EA's effects on pain signaling in humans and anti-inflammatory effects may lead to discoveries regarding its benefits to a variety of diseases.

Auriculotherapy (AT) is a variation from traditional acupuncture, specifically performed on the patient's outer ear. Luo *et al.* combined it with acupuncture performed on specific points of the hand to analyze the treatment of CLBP with hand-ear acupuncture, finding better long-term results on patients treated with hand-ear than those treated by regular acupuncture [17]. Ushinohama*et al.* only evaluated the use of AT in a single session of treatment, but even with the methodological differences both found AT to have a great effect on reducing CLBP [27]. AT was also effective as a complementary treatment for chronic spinal pain, temporomandibular joint disorder pain, premenstrual syndrome symptoms and orthodontic pain [28, 29, 30, 31]. AT is another form of acupuncture with many helpful effects that should keep being studied and explored to keep evolving it as a complementary to pain management.

Sung *et al.* combined TEA with acupuncture as a treatment for CLBP, with positive results on pain relief, but did not find any statistically significant difference between the use of TEA and the use of acupuncture [20].Lee *et al.* found similar results, showing that TEA can be effective against CLBP, but without any superiority when compared to normal acupuncture [32]. Even though TEA isn't superior to regular acupuncture and may even have more risks attached as it consists of a more invasive treatment than AC, different studies have shown TEA to have as broad of a range as other acupuncture variations. Woo *et al.*, Li *et al.,* and Goo *et al.* studied TEA concerning knee osteoarthritis, anorectal pain, and herniated lumbar intervertebral disc, respectively, all with improvements in pain levels. Goo *et al.* also showed that TEA can have a greater long-term effect, even after treatment was already been done [33,34,35].

All five forms of acupuncture, traditional, ILA, EA, AT, and TEA were all found to be effective in relieving pain, not only CLBP but also knee osteoarthritis, temporomandibular joint disorder, etc. Some studies even show acupuncture and some variations to have psychological effects, being complementary to medications when treating depression and anxiety [30, 36, 37]. And, as elucidated by Kong *et al.*, the psychological effect of acupuncture may also be an effective way to help relieve pain in patients with CLBP [38]. This comes to show that acupuncture, in its many forms, has a wide range of beneficial effects that should be further explored. It is not an ancient technique without reason, and the combination with more recent developments shown in EA and ILA for example, may be the key to unlocking its full potential. More research with a bigger number of participants should help establish the most efficient and safe protocols for acupuncture and its varieties to follow when treating CLBP.

5. Conclusion

Even though there are multiple forms of acupuncture used throughout the studies, and even those that appear in multiple studies are done differently in those appearances, all are used as a way to reduce CLBP. In that sense, the positive effects of using traditional acupuncture or some different form of acupuncture as a treatment for CLBP are highlighted by the results from the studies that were a part of this review.

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