

Special Article

Acupuncture: What Does the Most Reliable Evidence Tell Us?

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Abstract

Many trials of acupuncture and numerous systematic reviews have recently become available. Their conclusions are far from uniform. In an attempt to find the most reliable type of evidence, this article provides an overview of Cochrane reviews of acupuncture. Such reviews were studied, their details extracted, and they were categorized as: reviews with a negative conclusion (no evidence that acupuncture is effective); reviews that were inconclusive; and reviews with a positive or tentatively positive conclusion. Thirty-two reviews were found, covering a wide range of conditions. Twenty-five of them failed to demonstrate the effectiveness of acupuncture. Five reviews arrived at positive or tentatively positive conclusions and two were inconclusive. The conditions that are most solidly backed up by evidence are chemotherapy-induced nausea/vomiting, postoperative nausea/vomiting, and idiopathic headache. It is concluded that Cochrane reviews of acupuncture do not suggest that this treatment is effective for a wide range of conditions. *J Pain Symptom Manage* 2009;37:709–714. © 2009 U.S. Cancer Pain Relief Committee. Published by Elsevier Inc. All rights reserved.

Key Words

Acupuncture, alternative medicine, Cochrane, systematic review, effectiveness

Introduction

Merely a few decades ago, acupuncture was generally seen as irrational and not based on evidence.¹ Our attitude began to change when, during Nixon's visit to China, a member of his press corps reported receiving relief from postoperative discomfort through acupuncture. This started a flurry of interest and research into the possible mode of action of this therapy. Eventually, it also triggered

a plethora of clinical trials. As a consequence, hundreds of clinical studies are currently available, many of which demonstrate positive clinical effects in a wide range of conditions. Many health care professionals, therefore, now consider acupuncture a rational and effective therapy, and most acupuncturists tout it as a panacea.

However, most of the clinical trials are methodologically weak. Common flaws include an insufficient control of nonspecific effects, inadequate control interventions, and small sample sizes. Another problem is, as Skrabanek noted more than 20 years ago, "selective inattention" to results that fail to fulfill the hopes of acupuncturists.¹ The trial data are by no means all positive, and the negative studies

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are often ignored by the vociferous enthusiasts of alternative medicine.²

Whenever the evidence is contradictory, it is wise to rely not on single studies but on the totality of the available evidence, and whenever the quality of the data is mixed, it is advisable to critically appraise the primary studies. This concept is realized in systematic reviews. Currently, several hundred systematic reviews of acupuncture exist, and some are more reliable than others. The ones that are among the most rigorous, most transparent, least biased, and most up-to-date are Cochrane reviews.³ This article provides a brief overview of Cochrane reviews of acupuncture in an effort to determine those conditions for which it is demonstrably effective.

Methods

The Cochrane database was searched in November 2007 for all systematic reviews of acupuncture. Reviews were included that assessed acupuncture either as a single modality or as one of several treatments for a given condition. All forms of acupuncture (e.g., needle, electro, laser, ear, body acupuncture, and others) were included. Those excluded were systematic reviews of transcutaneous electrical nerve stimulation (TENS) and laser treatment at non-acupuncture points. Key data from all included reviews were extracted and are summarized in Table 1.

Results

The search located 32 systematic reviews of two different types^{4–35} (Table 1): reviews of acupuncture for a certain condition, such as back pain, and reviews of all treatment options, including acupuncture, for a certain condition, such as back pain. For at least 35 further conditions, the Cochrane database lists reviews in progress (registered titles or protocols). The central database of the Cochrane library lists 2250 primary studies of acupuncture.

The range of conditions for which acupuncture has been tested is considerable. Many, but by no means all of them, are related to pain. The reviews are usually based on only a few primary studies, but the variation is large (range

0–35). The conclusions of these systematic reviews are negative in 25 instances and positive or tentatively positive in five (Table 2);^{9,12,19,22,25} for two reviews, they are inconclusive.^{10,30} The conditions backed by positive or tentatively positive conclusions are chemotherapy-induced nausea/vomiting,⁹ enuresis in children,¹² postoperative nausea/vomiting,¹⁹ idiopathic headache,²² and pelvic and back pain in pregnancy.²⁵ Two of the positive or tentatively positive reviews are based on three or less primary studies,^{12,25} whereas the other reviews are based on more than 10 randomized controlled trials (RCTs), including over 1000 patients each.^{9,19,22}

Discussion

Despite the existence of numerous Cochrane reviews, only two conditions are currently supported by sound evidence from Cochrane reviews: nausea/vomiting^{9,19} and headache.²² Even for these indications, we must consider certain caveats, only some of which are mentioned in Table 2.

The problem of adequately blinding patients and therapists in RCTs of acupuncture is not fully resolved. It is, therefore, notoriously difficult to control for nonspecific effects, and we can rarely be sure whether the therapeutic benefit is caused by acupuncture per se or by a placebo effect that might be sizable.³⁶ The two reviews on nausea/vomiting^{9,19} included seven and 11 sham-controlled RCTs, and the headache review²² included 11 sham-controlled trials. However, the types of sham procedures employed in these studies cannot adequately control for placebo effects. In recent years, several non-penetrating sham-acupuncture devices have been developed, which allow investigators to control more rigorously for nonspecific effects. Trials using this methodology are now emerging. The majority of these studies fail to demonstrate that acupuncture has any specific therapeutic effects.³⁷ In particular, RCTs employing such devices fail to show that acupuncture is superior to sham-acupuncture for headache^{38,39} or nausea/vomiting.^{40,41} Only one of these recent RCTs⁴⁰ was included in the respective Cochrane reviews.

Table 1
List of All 32 Cochrane Reviews of Acupuncture

First Author	Condition	Included Studies	Conclusions (Verbatim)	Direction of Evidence
Cassimiro ⁴	Rheumatoid arthritis	2 RCTs	... poor quality ... precludes ... recommendation	Negative
Cheuk ⁵	Epilepsy	3 RCTs	Current evidence does not support acupuncture	Negative
Cheuk ⁶	Insomnia	7 RCTs	... current evidence is not sufficiently extensive or rigorous ...	Negative
Coyle ⁷	Breech presentation	3 RCTs	There is insufficient evidence	Negative
Ejnisman ^{8,a}	Tear of rotator cuff	1 RCT	There is little evidence ...	Negative
Ezzo ⁹	Chemotherapy-induced nausea or vomiting	11 RCTs	This review ... [shows] a biologic effect of acupuncture-point stimulation	Positive
Furlan ¹⁰	Nonspecific back pain	35 RCTs	The data do not allow firm conclusions	Inconclusive
Gates ¹¹	Cocaine dependence	11 RCTs	There is currently no evidence ...	Negative
Glazener ^{12,a}	Enuresis in children	3 RCTs	... weak evidence to support the use of ... acupuncture...	Tentatively positive
Green ¹³	Lateral elbow pain	4 RCTs	... there is insufficient evidence	Negative
Green ¹⁴	Shoulder pain	9 RCTs	There is little evidence ...	Negative
He ¹⁵	Bell's palsy	6 RCTs	The quality ... was inadequate to allow any conclusion	Negative
Jewell ^{16,a}	Nausea and vomiting in early pregnancy	6 RCTs	The results ... are equivocal.	Negative
Kwan ^{17,a}	Oocyte retrieval	1 RCT	... insufficient evidence ...	Negative
Law ¹⁸	Glaucoma	No RCT	... it is impossible to draw reliable conclusions	Negative
Lee ¹⁹	Postoperative nausea and vomiting	26 RCTs	This systematic review supports the use of P6 acupoint stimulation ...	Positive
Lim ²⁰	Irritable bowel syndrome	6 RCTs	... it is still inconclusive whether acupuncture is more effective than sham acupuncture or other interventions	Negative
McCarney ²¹	Chronic asthma	11 RCTs	There is not enough evidence to make recommendations ...	Negative
Melchart ²²	Idiopathic headache	26 RCTs	... evidence supports the value of acupuncture ...	Positive
O'Connor ^{23,a}	Carpal tunnel syndrome	1 RCT	... did not demonstrate symptom benefit	Negative
Peng ²⁴	Vascular dementia	No RCT	... effectiveness ... is uncertain ...	Negative
Pennick ^{25,a}	Pelvic and back pain in pregnancy	3 RCTs	Adding ... acupuncture to usual care appears to relieve back or pelvic pain... although effects are small ...	Tentatively positive
Proctor ²⁶	Primary dysmenorrhea	1 RCT	... insufficient evidence to determine the effectiveness of acupuncture	Negative
Rathbone ²⁷	Schizophrenia	5 RCTs	We found insufficient evidence to recommend the use of acupuncture	Negative
Smith ²⁸	Depression	7 RCTs	There is insufficient evidence to determine the efficacy of acupuncture	Negative
Smith ^{29,a}	Induction of labor	1 RCT	... there is insufficient evidence	Negative
Smith ^{30,a}	Labor pain	3 RCTs	Acupuncture may be beneficial ...	Inconclusive
Trinh ³¹	Neck disorders	10 RCTs	... there is moderate evidence that acupuncture relieves pain...	Negative
Verhagen ^{32,a}	Whiplash injury	1 RCT	...the evidence neither supports nor refutes the effectiveness ...	Negative
White ³³	Smoking cessation	24 RCTs	There is no consistent evidence...	Negative
Wu ³⁴	Stroke rehabilitation	5 RCTs	Currently there is no clear evidence ...	Negative
Zhang ³⁵	Acute stroke	14 RCTs	Acupuncture appeared to be... without clear evidence of benefit	Negative

RCTs= randomized controlled trials.

^aSystematic review of a range of interventions for one condition.

Another common problem is that acupuncture trials are often conducted by acupuncture enthusiasts with inadequate research expertise. As a result, trials are often poorly designed and badly reported. This is particularly true for older studies that were conducted before guidelines on trial reporting were published. A further caveat is the fact that not all of the

positive Cochrane reviews are being regularly updated (Table 2). Consequently, some fail to include the latest data.

One could, of course, argue that Cochrane reviews do not represent the full picture of the evidence related to acupuncture. However, non-Cochrane reviews tend to be not more but less reliable³ and those (non-Cochrane)

Table 2
Further Methodological Details of the Five Cochrane Reviews Arriving at Positive or Tentatively Positive Conclusions

First Author (Most Recent Update)	Condition	Total Sample Size	Forms of Acupuncture	Control Intervention	Outcome Measures	Quality of Primary Study	Pitfalls (as stated by authors of primary studies)
Ezzo ⁹ (February 2006)	Chemotherapy-induced nausea/vomiting	1247	Acupuncture point stimulation by any method	Any	Acute or delayed nausea/vomiting	Generally high	Lack of sham controls, lack of concurrent antiemetics
Glazener ¹² (February 2005)	Nocturnal enuresis in children	251	Needle and laser acupuncture points	Sham, medication	Incidence of bed wetting	Variable	Only three primary studies; allocation concealment unclear; lack of blinding
Lee ¹⁹ (April 2004)	Postoperative nausea/vomiting	3347	P6 point stimulation by any method	Sham, medication	Incidence and severity of nausea/vomiting; need for emetics	Moderate	No trial reported adequate allocation concealment; questionable blinding
Melchart ²² (November 2000)	Idiopathic headache	1151	Acupuncture point stimulation by any method	Any	Headache frequency and severity	Generally low	Heterogeneity of primary studies, insufficient reporting
Pennick ²⁵ (February 2007)	Pelvic and back pain in pregnancy	813	Needle acupuncture	Exercise, standard treatment	Pain severity, disability	Adequate	Only three primary studies; poor reporting

systematic reviews and metaanalyses that are rigorous are, generally speaking, not more encouraging. For instance, until recently, osteoarthritis of the knee was seen as a well-supported indication for acupuncture. However, the most up-to-date and most rigorous systematic review concluded that “sham controlled trials show clinically irrelevant short-term benefits of acupuncture for treating knee osteoarthritis,”⁴² and recent guidelines from the UK National Institute of Clinical Excellence recommend not using acupuncture for knee osteoarthritis,⁴³ because “not enough consistent evidence” exists.

Opinions may differ regarding whether further trials of acupuncture are warranted. In my view, we should clarify whether or not the clinical effects of acupuncture are specific or nonspecific. This means that we should consider conducting trials comparing real acupuncture with placebo acupuncture using the non-penetrating devices that recently became available. Such comparisons should be conducted in those clinical areas where the current evidence is most convincing (Table 2). If these studies fail to show significant intergroup differences, the most likely conclusion would be that acupuncture is a (powerful) placebo, and we could then discuss whether this is sufficient justification for using acupuncture in clinical routine. In my personal view, it is not.⁴⁴

In conclusion, Cochrane reviews of acupuncture fail to demonstrate that this therapy is effective for a wide range of conditions. They suggest effectiveness merely for two conditions, and even there, important caveats apply.

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