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Acupuncture: Its Evidence-Base is Changing

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Abstract: The effectiveness of acupuncture remains a controversial issue. The aim of this article is to evaluate trends over time in the development of the evidence-base of acupuncture. A comparison of two series of systematic reviews was conducted. The first related to the evidence-base in 2000, the second related to 2005. Both employed virtually the same methodology and criteria for evaluation. The results indicate that the evidence base has increased for 13 of the 26 conditions included in this comparison. For 7 indications it has become more positive (i.e. favoring acupuncture) and for 6 it had changed in the opposite direction. It is concluded, that acupuncture research is active. The emerging clinical evidence seems to imply that acupuncture is effective for some but not all conditions.

Keywords: Acupuncture; Systematic Reviews; Effectiveness.

Introduction

Despite its long history, acupuncture has remained a controversial issue. Opinions range from uncritical approval to outright rejection. For instance, in 2003, a WHO report concluded that "acupuncture has been proved" efficacious for 28 medical conditions (WHO, 2003). Yet critics maintain that its "effectiveness could not be established with confidence for any condition studied" (Ramey and Sampson, 2001) or that "acupuncture alone has not been shown in rigorous, duplicated studies to benefit any defined medical condition" (Anonymous, 2006). Discrepancies of this magnitude require a solution. This is unlikely to come from one study which would generate a degree of contradiction. The solution could, however, be facilitated through systematic reviews of the trial data which summarize and evaluate the totality of the available evidence of a predefined nature and quality.

In 2001, we published a book (*The Desktop Guide to Complementary and Alternative Medicine*) which is essentially a compilation of systematic reviews of the main complementary therapies, including acupuncture (Ernst *et al.*, 2001). These reviews had

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been concluded in 2000. In 2005, we finished our update for a new edition of this book (Ernst *et al.*, 2006). This allows us to compare the evidence base (summarized using virtually the same methodology) for acupuncture as it existed in 2000 with that of 2005. The aim of this article is to define how the evidence base for acupuncture has changed over time and to discuss what the emerging trends may be.

Method

Both versions of our Desktop Guide, are based on systematic reviews employing virtually the same methodology; details are provided elsewhere (Ernst *et al.*, 2001; Ernst *et al.*, 2006). Essentially, we carried out electronic searches in Medline, Embase, Amed and the Cochrane Library to find all controlled clinical trials of acupuncture. Trials were considered for such indications which had dedicated chapters in our book. For the first edition, the search ended in March 2000 while for the second edition the deadline was June 2005.

To evaluate the data, we created a parameter called the "weight of the evidence" a compound variable consisting of the level of evidence (e.g. related to a single trial or a meta-analysis), the quality of the evidence (usually estimated with the Jadad score) (Jadad *et al.*, 1996) and the volume (i.e. total sample size). The weight was graded in three categories: low, moderate and high. In addition, we graded the direction of the evidence in five categories: clearly positive, tentatively positive, uncertain, tentatively negative and clearly negative.

For the purpose of the present analysis, we compared the weight and direction of the evidence for treating those 26 conditions which were included in both editions of our book: AIDS, Alzheimer, asthma, back pain, cancer, chronic heart failure, constipation, depression, drug/alcohol dependence, erectile dysfunction, fibromyalgia, hay fever, headache, insomnia, irritable bowel syndrome, menopause, migraine, nausea, neck pain, osteoarthritis, obesity, rheumatoid, arthritis, smoking cessation, stroke and tinnitus.

Results

Weight of the Evidence

By definition, the weight could only grow between 2000 and 2005. Our comparisons show that it increased by at least one category for the following 13 conditions: asthma, back pain, constipation, erectile dysfunction, fibromyalgia, headache, insomnia, irritable bowel syndrome, migraine, nausea and vomiting induced by chemotherapy, neck pain, osteoarthritis, obesity. For the other 13 conditions, no change in weight of evidence was noted (Table 1).

Direction of Evidence

For a total of 7 conditions, the direction of evidence changed in a "positive" sense, i.e. indicating that new data suggested effectiveness of acupuncture for the condition in

Table 1. Summary of Clinical Evidence for Acupuncture

Conditions	Weight of Evidence		Direction of Evidence	
	2000	2005	2000	2005
AIDS/HIV infection (symptomatic)	O	O	⇩	⇘
Alzheimer	O	O	⇨	⇨
Anxiety	no entry	OO	no entry	⇗
Asthma	OO	OOO	⇘	⇨
Back pain	OO	OOO	⇗	⇗
Cancer, palliative (nausea)	OO	OO	⇧	⇗
Cancer, palliative (pain)	no entry	OO	no entry	⇨
Cancer, palliative (xerostomia)		O	no entry	⇗
Chronic heart failure	O	O	⇗	⇗
Constipation	O	OO	⇩	⇨
Crohn's disease	no entry	O	no entry	⇗
Depression	OO	OO	⇨	⇨
Drug/alcohol dependence (alcohol)	OO	OO	⇨	⇨
(cocaine and opiates)		OOO		⇘
Erectile dysfunction	O	OO	⇗	⇗
Fibromyalgia	O	OO	⇧	⇧
Hay fever (prevention)	OO	O	⇨	⇨
Hay fever (treatment)	O	OO	⇨	⇨
Headache	O	OO	⇨	⇨
Hypertension	no entry	O	no entry	⇨
Insomnia	O	OOO	⇧	⇨
Irritable bowel syndrome	O	OO	⇧	⇗
Labor (pain) acupuncture	no entry	OO	no entry	⇗
Labor (induction) acupuncture	no entry	O	no entry	⇨
Labor (pain) acupressure	no entry	OO	no entry	⇗
Labor (induction) acupressure	no entry	OO	no entry	⇨
Menopause	O	O	⇗	⇨
Migraine	OO	OOO	⇗	⇗
Nausea of pregnancy, acupoint stimulation	OOO	OOO	⇧	⇧
Postoperative nausea and vomiting, acupoint stimulation	OOO	OOO	⇧	⇗
Nausea and vomiting induced by chemotherapy, acupoint stimulation	OO	OOO	⇧	⇧
Motion sickness, acupoint stimulation	OO	OO	⇗	⇗
Neck pain	OO	OOO	⇘	⇨
Osteoarthritis	OO	OOO	⇗	⇧
Overweight/obesity	OO	OOO	⇨	⇨
Peripheral arterial occlusive disease	no entry	O	no entry	⇗
Premenstrual syndrome	no entry	OO	no entry	⇗
Rheumatoid arthritis	OO	OO	⇨	⇨
Smoking cessation	OOO	OOO	⇩	⇩
Stroke	OOO	OOO	⇗	⇨
Tinnitus	OO	OO	⇩	⇘
Ulcerative colitis		O	no entry	⇨

OOO high weight of evidence, OO moderate weight of evidence, O low weight of evidence, ⇧ clearly positive evidence, ⇗ tentatively positive evidence, ⇨ uncertain evidence, ⇘ tentatively negative evidence, ⇩ clearly negative evidence.

question: AIDS, asthma, constipation, nausea of pregnancy, neck pain, osteoarthritis and tinnitus. With 6 other conditions, the evidence had changed in the opposite direction: cancer palliation (nausea), insomnia, irritable bowel syndrome, menopause, nausea (postoperative) and stroke. For all other conditions the direction of the evidence remained unaltered (Table 1).

Discussion

These comparisons suggest that, within the observation period (2000–2005), the evidence base of acupuncture has rapidly become more solid: in about half of all indications, the weight of the evidence had increased. Interestingly this change has not always supported the effectiveness of acupuncture. For only 7 of 26 indications have the direction of the evidence changed positively, while for 6 conditions it changed negatively. For the remainder no change was noted at all. For 4 conditions both the weight and the direction of evidence altered positively: asthma, constipation, neck pain, osteoarthritis.

Apart from showing a strong trend for the evidence base becoming stronger, our analysis might inform the future research agenda. For instance, several indications can be identified for which the direction of evidence is "tentatively positive" (e.g. anxiety) but the weight of the evidence is not maximal. This seems to suggest that these are the areas where future research might be fruitful. Conversely there are areas where the direction of the evidence is "tentatively negative" (e.g. drug dependence or tinnitus). This could imply that these topics should not be the priorities for future clinical trials.

Our comparison also suggests that the application of evidence-based medicine (EBM) to acupuncture is both possible and constructive. It has repeatedly been argued that EBM is not applicable to areas of "alternative medicine" e.g. (Barry, 2006; Paterson and Dieppe, 2005). Our analysis seems to disprove this view. It is conceivable that EBM will eventually generate a list of indications for which acupuncture is demonstrably effective. As science is not a good tool for proving a negative, EBM will not easily yield a list of indications for which acupuncture is definitively ineffective beyond doubt. It will however, be possible to provide indications for which effectiveness is less likely. In turn, this knowledge could be applied in clinical practice and for educational purposes (Marcus, 2001).

Of all 26 conditions listed above, only two are associated with the maximum grading for both the weight and the direction of evidence: nausea and vomiting due to chemotherapy, or pregnancy and osteoarthritis. In other words, these two indications are those for which, according to our application of EBM, acupuncture is optimally supported by evidence. Conversely for one indication, smoking cessation, the weight of the evidence is maximal and the direction of the evidence is "clearly negative." This suggests that, for these indications, acupuncture is probably not associated with specific therapeutic effects. Yet acupuncture is highly popular for helping people to stop smoking and smoking cessation continues to be the subject of clinical trials (Chen *et al*., 2006). This seems to imply that, at least for some indications, acupuncture can be clinically beneficial through non-specific (e.g. placebo) effects (Ernst, 2006).

Several limitations of our comparison should be mentioned. Even though our approach in producing the two editions of our Desktop Guide (Ernst *et al.*, 2001; Ernst *et al.*, 2006) was systematic, we cannot exclude a degree of bias in evaluating the published trial data. As the emphasis of the current analysis was on comparing changes over time, one would hope that such bias is minimised: we used the same approach (biased or unbiased) for both editions. Moreover, there was both an internal and an external review process which should have minimized bias (Ernst *et al.*, 2001; Ernst *et al.*, 2006) A further potential drawback is that we only included a limited number of indications (i.e. those conditions for which there was most CAM evidence). Thus our comparisons fail to encompass all conditions for which acupuncture has ever been tested.

In conclusion, this comparison of the current and past evidence, as it existed in 2000 and 2005, suggests that the research activity relating to acupuncture is lively. The emerging new evidence goes some way towards naming those conditions for which acupuncture is demonstrably effective and other indications for which it is less likely to work.

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