JAMA Clinical Evidence Synopsis

Acupuncture for Chronic Pain

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CLINICAL QUESTION Is acupuncture associated with reduced pain outcomes for patients with chronic pain compared with sham-acupuncture (placebo) or no-acupuncture control?

BOTTOM LINE Acupuncture is associated with improved pain outcomes compared with sham-acupuncture and no-acupuncture control, with response rates of approximately 30% for no acupuncture, 42.5% for sham acupuncture, and 50% for acupuncture.

Although acupuncture is widely used to manage chronic pain, it remains highly controversial, largely due to the lack of a clear mechanism of benefit. Several systematic reviews of acupuncture for chronic pain have included trials of variable quality, typically leading to a finding that limitations in the data do not allow definitive conclusions to be drawn.[1] Meta-analyses have been limited due to variation in study end points used in randomized trials.[2] We conducted an individual patient data meta-analysis of acupuncture for chronic pain, restricted to high-quality trials from 29 of 31 eligible trials.[3]

Summary of Findings

The 29 trials included 18 comparisons of acupuncture vs no-acupuncture control (typically routine care; n = 14 597) and 20 comparisons of acupuncture with sham-acupuncture control (n = 5230). Four sham-acupuncture–controlled trials were determined to have an intermediate likelihood of bias from unblinding. The 16 remaining sham-acupuncture–controlled trials were graded as having a low risk of bias from unblinding.

Analyses were conducted separately according to the control group (no acupuncture or sham acupuncture) and pain condition (nonspecific musculoskeletal pain, osteoarthritis, chronic headache, or shoulder pain). Acupuncture was associated with greater reductions in pain than the control in all comparisons ($P < .001$). Pain scores were better for acupuncture by 0.23 SDs for back and neck pain, 0.16 SDs for osteoarthritis, and 0.15 SDs for chronic headache compared with sham acupuncture, and better for acupuncture by 0.55 SDs for back and neck pain, 0.57 SDs for osteoarthritis, and 0.42 SDs for chronic headache vs no acupuncture (**Figure**).

To translate these results into clinical terms, we defined a good response as a pain reduction of 50% or more and applied the differences between groups from the meta-analysis to a hypothetical trial with a typical mean and standard deviation for pain score. Response rates of approximately 30% for no acupuncture, 42.5% for sham acupuncture, and 50% for acupuncture were calculated by dividing means by standard deviation and then applying to a normal distribution. These results were robust to a number of sensitivity analyses, including those for missing data, publication bias, inclusion of trials for which individual patient data were not available (including all eligible trials published to 2010), exclusion of 4 trials for which blinding was unclear (effect size for back and neck pain was 0.01 SD lower at 0.36 [95% CI, 0.25-0.46], $P < .001$; for chronic headache, 0.01 SD lower at 0.14 [95% CI, 0.03-0.25], $P = .01$), and restricting end points to pain scales measured within 2 to 3 months of randomization.

Discussion

Acupuncture is associated with reductions in chronic pain compared with sham acupuncture and no acupuncture. Differences between acupuncture and sham acupuncture are smaller than those between acupuncture and no acupuncture. The search for eligible trials was repeated in October 2013. An eTable of eligible papers published 2011–2013 is included in the Supplement. There is no reason to believe that recently published data would change the results of the meta-analysis because either the results are very similar to the meta-analytic estimates or the trials are very small.

Limitations

Participants were not blinded to the comparison between acupuncture and no acupuncture and therefore may be subject to bias. The number of trials on shoulder pain was limited, and the effect size of acupuncture for this indication may not have been well characterized by our data.

Comparison of Findings With Current Guidelines

Many current guidelines recommend acupuncture in specific circumstances for back pain or headache. For instance, the American Col-

Evidence Profile

No. of randomized clinical trials: 31 (29 had individual patient data available for inclusion in the primary analysis, 11 had a sham-acupuncture control, 10 had a no-acupuncture control, and 10 were studies of 3 groups including both sham-acupuncture and no-acupuncture control.)

Study years: Conducted, 1996-2008

No. of participants: 14 597 for studies in which a no-acupuncture control was used; 5230 for studies in which a sham-acupuncture control was used

Men: 5624 (30.5%) **Women:** 12 535 (68%)

Missing data on 275 participants (1.5%)

Race/ethnicity: Unavailable

Age, median (interquartile range)[range], y: 51 (39-63)[17-95]

Settings: Community- and hospital-based

Countries: United States, United Kingdom, Germany, Spain, Sweden

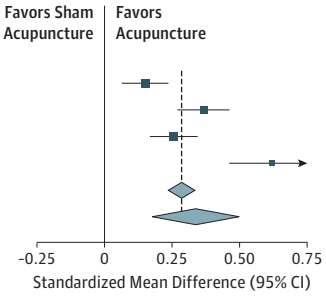
Comparisons: Acupuncture vs no-acupuncture control and acupuncture vs sham-acupuncture control

Primary outcome: A variety of different pain and function scores were used in the original trials; these were converted to standardized differences in the meta-analysis

Figure. Results of the Individual Patient Data Meta-analysis

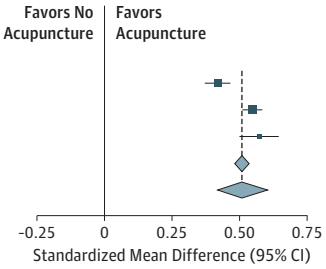
A Acupuncture vs sham acupuncture

Pain Type	Trials	Total No. of Participants: Sham Acupuncture	Total No. of Participants: Acupuncture	Standardized Mean Difference (95% CI)
Headache	4	683	799	0.15 (0.07-0.24)
Musculoskeletal	8	708	804	0.37 (0.27-0.46)
Osteoarthritis	5	799	830	0.26 (0.17-0.34)
Shoulder	3	312	295	0.62 (0.46-0.77)
Overall (fixed-effects estimate)				0.29 (0.24-0.33)
Overall (random-effects estimate)				0.34 (0.18-0.50)



B Acupuncture vs no acupuncture

Pain Type	Trials	Total No. of Participants: No Acupuncture	Total No. of Participants: Acupuncture	Standardized Mean Difference (95% CI)
Headache	5	2224	2408	0.42 (0.37-0.46)
Musculoskeletal	7	3739	4000	0.55 (0.51-0.58)
Osteoarthritis	6	1062	1164	0.57 (0.50-0.64)
Overall (fixed-effects estimate)				0.51 (0.48-0.53)
Overall (random-effects estimate)				0.51 (0.42-0.60)



Source: Vickers et al.[3] A standardized mean difference of 0.42, for instance, means that pain scores were 0.42 SDs lower in patients undergoing acupuncture compared with controls. These differences are converted to clinically meaningful statistics in the text.

lege of Physicians' guidelines recommend acupuncture as one of several options, such as manual therapy or exercise, for patients with back pain[4]; the UK National Institute for Health and Care Excellence (NICE) guidelines recommend acupuncture for chronic headache or migraine[5] that does not respond to pharmacologic treatment. However, the evidence in favor of these guidelines has been reported as fair. There have been recommendations against using acupuncture for osteoarthritis in several guidelines including those from NICE[6] and the American Academy of Orthopaedic Surgeons.[7] No current guidelines recommend acupuncture for neck or shoulder pain.

Areas in Need of Future Study

The sham acupuncture techniques varied and included several control conditions that involved skin penetration. It remains to be established whether this type of sham acupuncture is indeed physiologically inactive; if not, trials that include sham acupuncture as a comparison may underestimate the effects of acupuncture on pain reduction. Research is also needed to better identify which patients will benefit most from acupuncture and where in the normal stepped-care approaches for chronic pain acupuncture is best positioned.

ARTICLE INFORMATION

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Section Editor: Mary McGrae McDermott, MD, Senior Editor.

Conflict of Interest Disclosures: Both authors have completed and submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest. Dr Vickers reports receiving grant funding from the National Institutes of Health (NIH). No other disclosures were reported.

Funding/Support: This study was funded by R21 and R01 (AT004189I and R01 AT006794) grants from the National Center for Complementary and Alternative Medicine at the NIH to Dr Vickers and by a grant from the Samueli Institute.

Role of the Sponsor: The sponsors had no role in the design and conduct of the study; collection, management, analysis, and interpretation of the data; preparation, review, or approval of the manuscript; and decision to submit the manuscript for publication.

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