A Call for More Comparative and Basic Science Acupuncture Research

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ABSTRACT

Background: The acupuncture profession is stymied by a dearth of comparative research. A review of the literature for acupuncture research reveals no meta-analyses comparing the effectiveness of different clinically popular methods/systems of acupuncture. Rather than comparing different methods/systems, acupuncture research seems more focused on determining if acupuncture, in general, works.

Objectives: The aim of this Perspective is to examine the current state of acupuncture research and determine what, if any, problems or gaps in this research exist.

Materials and Methods: A number of studies are discussed and analyzed to determine the current state of acupuncture research.

Results: There is a lack of focus on details related to clinical practice in much of acupuncture research, and there is lack of diversity of point selection and a subsequent lack of comparison of different acupuncture methods in most acupuncture studies. There are, however, some good exceptions.

Conclusions: There is a need for more comparative and basic science research—not only to demonstrate the efficacy and mechanisms of acupuncture to policymakers and insurers, or to help us know the most potent protocols for certain conditions, but also to instill greater confidence in inexperienced practitioners.

Keywords: acupuncture research, comparative acupuncture research, acupuncture efficacy research, basic science acupuncture research, acupuncture mechanism research, specific effects

INTRODUCTION

DESPITE INCREASED ACCEPTANCE for acupuncture among some members of the medical establishment, the acupuncture profession remains stymied by a dearth of comparative research. In fact, a review of the literature for acupuncture research reveals no meta-analyses that compare the effectiveness of different clinically popular methods/systems of acupuncture. Rather than comparing different methods/systems, acupuncture research seems more focused on determining if acupuncture in general works. The poor representation of clinically popular methods in much of acupuncture research could be the reason for the often rather

modest—if statistically significant—differences in effectiveness between verum and sham acupuncture.

Yet, certain recent studies that go beyond short-term measurement of pain relief and that compare the differing physiologic and long-term effects of different acupuncture points (distal versus local, along with verum versus sham acupuncture) could serve as models for more fruitful future clinical and basic science research. These studies could help identify not just the effectiveness of acupuncture, but its efficacy (specific effects) and possible mechanisms as well. The acupuncture profession needs more comparative and basic science research—not only to demonstrate the efficacy and mechanisms of acupuncture to policymakers and insurers, or to help us know

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the most potent protocols for certain conditions—but also to instill greater confidence in inexperienced practitioners.

One of the first activities in my Evidence Based Medicine class in the Pacific College of Oriental Medicine, San Diego, CA, doctoral program was a discussion on appeals to Traditional Chinese Medicine (TCM) authorities (i.e., to obtain “clinical pearls” by certain figures widely considered to be clinical experts). While many of us agreed that clinical experience matters and that our profession desperately needs more clinicians in charge of provider training, most of us also agreed that it is not right to simply trust and obey what the “masters” have to say. There was consensus that our field needs to rely more on research evidence if we intend to be a successful component of any healthcare system.

Looking at the relatively recent and current state of acupuncture research, there is much to be excited about. A large variety of meta-analyses have shown acupuncture to be effective. A sentinel meta-analysis from 2012 found acupuncture to be superior to usual care for several chronic pain conditions. Using effect size to compare the effects of verum acupuncture (also known as real acupuncture) and sham acupuncture with the effects of usual care, this important meta-analysis showed that, for chronic back and neck pain, the pain level (at the end of the study) of the average person in the verum acupuncture treatment group was lower than 54% of all people in the usual care treatment group.¹ A follow-up study of the data showed that the benefits of the verum acupuncture treatments “persisted 12 months after treatment ended.”²

Recently, the American College of Physicians included acupuncture in its recommendations of nonpharmacologic treatments for acute and chronic pain.³ In 2017, a group of acupuncture organizations issued a White Paper listing and reviewing 16 meta-analyses that showed acupuncture to be effective for various chronic pain conditions, and thus a potential boon to patients who could be part of the current opioid addiction epidemic.⁴ These studies and recommendations should help our profession gain greater acceptance in healthcare systems across the world, especially given the recent attention placed on the opioid addiction crisis.

However, there are two major problems with current and past acupuncture research that I argue have stymied and will continue to hurt our profession if not corrected. The first problem is the serious paucity of comparative research in past and current acupuncture research. The second problem is the lack of evidence for strong specific effects of verum relative to sham acupuncture. I argue that addressing the first problem, along with greater basic science research, could resolve the second.

THE DESPERATE NEED FOR COMPARATIVE RESEARCH

The first major problem with acupuncture research is that it has not been grounded in a comparative focus. This might

have been due to difficulties obtaining funding for new ways of researching acupuncture as much as to path dependence. Nevertheless, this author’s survey of current and past acupuncture systematic reviews and meta-analyses revealed a focus on testing if acupuncture in general works, rather than to identifying the most potent and cost-effective clinical acupuncture protocols for treating certain conditions. This section briefly reviews examples of the lack of focus on details related to clinical practice in much of acupuncture research, and the lack of diversity of point selection and the subsequent lack of comparison of different acupuncture methods in most acupuncture studies. Giving more attention to these factors is necessary if our profession is to implement more comparative research. I also present exceptions which can offer inspiration for researchers looking to adopt a more comparative approach.

Since the adoption of the Standards for Reporting Interventions in Clinical Trials of Acupuncture (STRICTA) guidelines in 2001,⁵ there have been several important meta-analyses that, for whatever reason, either did not or were not able to list acupuncture points used in included studies, nor was there information about treatment frequency or needle retention time in the studies selected for analysis.^{1,6–8} This article is certainly not the first to identify this problem. For example, White et al. focused on the lack of attention in the literature to acupuncture dosage, which includes not only treatment frequency but also level of stimulus from needling.⁹ Their review of the literature found that only 6 of 47 systematic reviews of acupuncture had some requirement for adequacy of acupuncture dosage for inclusion. As White, et al. argued, how can researchers make conclusions about the efficacy of acupuncture (specific effects beyond placebo) without making sure that the intervention is supplying an adequate dosage of acupuncture? Furthermore, how can we know the true importance of acupuncture dosage without comparative research to answer that question?

Another problem with acupuncture research is the seemingly narrow range of point selection in most studies. Even many reviews that provided detailed information about their included studies’ acupuncture interventions,^{10–14} did not include—or were not able to find—higher-quality studies whose researchers have ventured outside of TCM theory for point selection. An important exception is Li et al., 2017, who included in their meta-analysis of acupuncture for myofascial pain syndrome a sizeable number of studies of varying methodological quality and whose researchers’ point selection included trigger points.¹⁵ In addition, a PubMed search revealed no meta-analyses nor systematic reviews of comparisons in the literature between different acupuncture systems, as in Balance Method versus TCM, Tung versus TCM, Motor Point versus TCM, not to mention any information on what combinations of styles or systems might be most effective. As with acupuncture dosage, how can we know which acupuncture methods are

most powerful, without comparing their effects, as Western pharmaceutical research compares drug regimens?

If we look in the literature for comparison of results from different forms of needling of the same points, again, Li et al., 2017¹⁵ is an encouraging new study. This meta-analysis used network analysis to compare results directly and indirectly for treatment of myofascial pain syndrome with various forms of needling. Methodological limitations of the included studies made conclusions difficult, but the researchers' future efforts to correct for these limitations could offer breakthrough comparative data for our profession.

Another sign of more comparative research is the 2017 study of acupuncture for carpal tunnel syndrome by Maeda et al.¹⁶ Their research showed that needling *Daling* P-7 led to an even stronger physiologic reaction than needling of a distal point.¹⁶ Surely practitioners who primarily use distal approaches would like to see more research to determine if a patient with carpal tunnel syndrome is really benefited more by local than distal needling. Even many people who do local needling for that condition might want to see if it is more efficacious to needle motor points in the forearm than it is to needle *Daling* P-7, or if it is more effective to needle both and whether it is even more effective to add distal to the mix. This is just one example of a condition ripe for more comparative research.

The deficiencies of acupuncture research that have been highlighted above compound the already lower external validity* of randomized clinical trials and hurt our profession by making it harder for practitioners, especially those without extensive clinical experience, to know which acupuncture protocols are most effective. It is also likely that the published acupuncture research results do not fairly represent clinical outcomes of the many acupuncturists who use methods or protocols of acupuncture not tested in most of acupuncture research.

THE STATISTICALLY SIGNIFICANT, IF SMALL, DIFFERENCE BETWEEN RESULTS FOR VERUM AND "SHAM" ACUPUNCTURE

The second problem with acupuncture research is that, although both verum and sham acupuncture typically outperform a third arm of usual care in research, the effects of

the verum acupuncture relative to sham acupuncture are usually not large¹⁷ and certainly not large enough to impress many medical establishment skeptics whose support we may need to gain further acceptance for our medicine. This problem is especially significant given the fact that some mainstream medical authorities hold acupuncture to a higher standard than more conventional medical therapies. Acupuncture researchers, such as Birch and MacPherson, discussed this hurdle that was apparent in a recent decision by the National Institute for Health and Clinical Excellence (NICE) of Great Britain.^{18,19} With not a single acupuncture or alternative medicine expert on its panel, NICE refused to include acupuncture as a recommended treatment, citing the lack of evidence of a more-significant specific effect of verum acupuncture as a reason.¹⁷

Looking at the first meta-analysis I referenced in the second paragraph of this article, one can see that acupuncture outperformed both the nonacupuncture and sham acupuncture groups to a statistically significant degree. However, looking at the respective effect sizes of verum and sham acupuncture, we see that the difference in the performance of verum acupuncture versus sham acupuncture was not very large. For example, the pain level of the average person in the acupuncture treatment group for chronic headaches was lower than the pain level of only 14% of the sham acupuncture group.¹ The evidence of only a small specific effect of real acupuncture in many studies hurts our profession by delaying acceptance among third-party payers, and among politicians who must decide if acupuncture is to be a covered benefit under insurance programs, and government programs such as Medicaid, respectively.

Part of this second problem of a lack of evidence for specific effects of verum acupuncture rests in the inherent difficulties in using sham acupuncture points in any test of verum acupuncture effects.²⁰ Put simply, there is actually no such thing as *sham acupuncture*. Sham acupuncture, unlike a drug placebo, is not inert. Needles placed superficially, or in nonacupuncture points, or on points not supposedly effective for a certain condition, are still providing a stimulus. How often do the sham acupuncture arms of studies involve the needling of areas that in certain acupuncture imaging[†] systems, have a therapeutic effect? Even retractable needles provide a stimulus that could have a therapeutic effect.

Furthermore, there is evidence that people with lower pain threshold levels benefit more from sham (which often involves much shallower needle insertion) than verum acupuncture.²¹ The inherent problems in using sham acupuncture, along with the consistent performance of verum acupuncture relative to usual care, in a variety of studies are two of the reasons many researchers are now arguing that we no longer need to include sham arms in acupuncture

*External validity is "the degree to which the conclusions in [a] study would hold for other persons in other places and at other times." Source: Web Center for Social Research Methods, 2017. External validity is a concern for randomized clinical trials, given the differences that could exist between clinical trials and real-world settings. The external validity of acupuncture research is particularly suspect, given that study protocols tend to be standardized and inspired by Traditional Chinese Medicine (TCM) academic theory, whereas treatment protocols in acupuncture clinics are more likely to be individualized and based in non-TCM protocols.

†Certain acupuncture systems utilize "images" of the area or body part in need of care by needling homologous structures.

studies.²² Nevertheless, identifying the most potent acupuncture methods/systems for specific conditions could lead to stronger evidence of specific effects of verum acupuncture, relative to sham acupuncture, in future studies, thus eliminating one of the main obstacles to mainstream acceptance for acupuncture.

Regardless of the problems with sham acupuncture identified above, acupuncturists might not be able to convince authorities to drop the requirement for sham arms in studies. Indeed, even researchers such as Linde—who has called for mainstream science to accept the substantial evidence for acupuncture effectiveness in various trials and to stop holding acupuncture to a higher standard than that required for pain medication—believes it is necessary to continue the search for more substantial specific effects.¹⁷ Weeks quotes Linde:

“Functional specificity is central to legitimizing a therapy. Believing in functional specificity is crucial for a provider! Explaining and showing this remains important for complementary and alternative medicine therapies! If you fail this is a problem!”¹⁷

Linde is not just focused on impressing people who have the power to bring acupuncture more fully into the mainstream. He sees how important it can be to providers to have the power of evidence-based medicine on their side.

MAKING THE MOST OF THE USE OF SHAM ACUPUNCTURE

More analysis of the mechanics of verum acupuncture effects relative to sham acupuncture and more long-term follow up studies could be a way to identify specific effects of the acupuncture points needed in the clinic. Looking again at Maeda et al.’s, 2017¹⁶ study of acupuncture for carpal tunnel syndrome, we see that, despite verum and sham acupuncture leading to similar pain relief, only verum acupuncture produced measurable improvements in the speed of nerve transmission and in the somatosensory cortex. Importantly, follow-up revealed that only the true acupuncture groups still had reduced pain after 3 months.^{16,23} Looking at a different condition, researchers have found higher levels post treatment, of free opioid receptors[‡] among subjects receiving verum versus sham acupuncture for fibromyalgia.²³ The identification of greater specific effects of acupuncture and possible mechanisms of acupuncture, via more comparative, basic science and follow-up studies, is a great way to make the most out of the use of sham points/needling in acupuncture research.

[‡]Healthy controls in this study had higher levels of free opioid receptors than patients with fibromyalgia prior to the latter receiving acupuncture.

CONCLUSIONS

If we believe that it matters how a patient is needled, where a needle is placed, how often patients come in for care, and how long results last, then we should want to see comparative data about these matters. If there are acupuncture protocols that, in future studies, can point to greater specific effects for verum acupuncture, and thus offer greater support for acupuncture efficacy, the cost will be well worth it. Identifying the most efficacious acupuncture protocols and conducting more follow-up and basic science studies could lead to more findings of impressive specific effects for acupuncture, which should significantly diminish resistance among medical opinion leaders.

AUTHOR DISCLOSURE STATEMENT

No competing financial conflicts exist.

REFERENCES

1. Vickers AJ, Cronin AM, Maschino AC, et al. Acupuncture Trialists Collaboration. Acupuncture for chronic pain: Individual patient data meta-analysis. *Arch Intern Med.* 2012; 172(19):1444–1453.
2. Evidence Based Acupuncture: Acupuncture for Pain. 2017. Online document at: www.evidencebasedacupuncture.org/present-research/pain-2/ Accessed October 26, 2017.
3. Qaseem A, Wilt TJ, McLean RM, Forciea MA; Clinical Guidelines Committee of the American College of Physicians. Noninvasive Treatments for Acute, Subacute, and Chronic Low Back Pain: A Clinical Practice Guideline from the American College of Physicians. *Ann Intern Med.* 2017; 166(7):514–530.
4. Joint Acupuncture Opioid Task Force. Acupuncture’s Role in Solving the Opioid Epidemic: Evidence, Cost-Effectiveness, and Care Availability for Acupuncture as a Primary, Non-Pharmacologic Method for Pain Relief and Management 2017;1–20. Online document at: https://acunow.org/wp-content/uploads/2017/10/Acupunctures-Role-in-Solving-the-Opioid-Epidemic-Final_September_20_2017/pdf Accessed October 26, 2017.
5. MacPherson H, White A, Cummings M, et al. Standards for reporting interventions in controlled trials of acupuncture: The STRICTA recommendations. *Complement Ther Med.* 2001;9(4):246–249.
6. Cho YH, Kim CK, Heo KH, et al. Acupuncture for acute postoperative pain after back surgery: A systematic review and meta-analysis of randomized controlled trials. *Pain Pract.* 2015;15(3):279–291.
7. Corbett MS, Rice SJ, Madurasinghe V, et al. Acupuncture and other physical treatments for the relief of pain due to osteoarthritis of the knee: Network meta-analysis. *Osteoarthritis Cartilage.* 2013;21(9):1290–1298.
8. Lewis RA, Williams NH, Sutton AJ, et al. Comparative clinical effectiveness of management strategies for sciatica:

- Systematic review and network meta-analyses. *Spine J.* 2015; 15(6):1461–1477.
9. White AM, Cummings M, Barlas P, et al. Defining an adequate dose of acupuncture using a neurophysiological approach—a narrative review of the literature. *Acupunct Med.* 2008;26(2):111–120.
 10. Dimitrova A, Murchison C, Oken B. Acupuncture for the treatment of peripheral neuropathy: A systematic review and meta-analysis. *J Altern Complement Med.* 2017;23(3):164–179.
 11. Gadau M, Yeung WF, Liu H, et al. Acupuncture and moxibustion for lateral elbow pain: A systematic review of randomized controlled trials. *BMC Complement Altern Med.* 2014;14:136.
 12. Cho SH, Hwang EW. Acupuncture for primary dysmenorrhea: A systematic review. *BJOG.* 2010;117(5):509–521.
 13. Cho HK, Park IJ, Jeong YM, Lee YJ, Hwang SH. Can peri-operative acupuncture reduce the pain and vomiting experienced after tonsillectomy? A meta-analysis. *Laryngoscope.* 2015;126(3):608–615.
 14. Ji M, Wang X, Chen M, Shen Y, Zhang X, Yang J. The efficacy of acupuncture for the treatment of sciatica: A systematic review and meta-analysis. *Evid Based Complement Alternat Med* 2015;2015:192808.
 15. Li X, Wang R, Xing X, et al. Acupuncture for myofascial pain syndrome: A network meta-analysis of 33 randomized controlled trials. *Pain Physician.* 2017;20(6):E883–E902.
 16. Maeda Y, Kim H, Kettner N, et al. Rewiring the primary somatosensory cortex in carpal tunnel syndrome with acupuncture. *Brain.* 2017;140(4):914–927.
 17. Weeks J. The march for effectiveness science. *J Altern Complement Med.* 2017;23(6):397–398.
 18. Birch S, Lee MS, Robinson N, Alraek T. The U.K. NICE 2014 guidelines for osteoarthritis of the knee: Lessons learned in a narrative review addressing inadvertent limitations and bias. *J Altern Complement Med.* 2017;23(4):242–246.
 19. MacPherson H. NICE for some interventions, but not so NICE for others: Questionable guidance on acupuncture for osteoarthritis and low-back pain. *J Altern Complement Med.* 2017;23(4):247–248.
 20. Pierre-Louis, K. Why It's So Hard to Figure Out If Acupuncture Works. Pop Science 2017;May 5. Online document at: www.popsoci.com/does-acupuncture-work Accessed October 26, 2017.
 21. Zucker NA, Tsodlikov A, Mist SD, Cina S, Napadow V, Harris RE. Evoked pressure pain sensitivity is associated with differential analgesic response to verum and sham acupuncture in fibromyalgia. *Pain Med.* 2017;18(8):1582–1592.
 22. Smith A. It's a Great Time for Acupuncture in the USA. *Oriental Med Newspaper* 2017;June 26:15&38. Online document at: www.mzines.net/publications/1588/p/omsummer17_finalv2_optimized.pdf Accessed October 26, 2017.
 23. Marchant, J. Pains and Needles: Brain Scans Point to Hidden Effects of Acupuncture. *The Guardian.* 2017;September 7. Online document at: www.theguardian.com/global-development-professionals-network/2017/sep/07/pains-and-needles-brain-scans-point-to-hidden-effects-of-acupuncture Accessed October 26, 2017.

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