

The Current State of Acupuncture Use in the United States

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Citation

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Abstract

A review of the literature evaluating the efficacy of acupuncture was undertaken. This was accomplished by performing a literature search and evaluating selected journal articles, clinical trials, and systematic reviews of clinical trials. One finds that in China and Japan acupuncture enjoys broad application as primary and adjunctive therapy for a wide variety of medical conditions. In the United States, acupuncture is largely employed in the control of painful conditions. Limitations to broader application of acupuncture as a therapeutic modality in the United States seem to be multifactorial and reflect a fundamental difference in the manner in which medical care is conceptualized and practiced in the United States. We are attempting to fit a broadly variable treatment modality based on an alternative concept of healing, into research based on a rigid view of scientific methodology.

BACKGROUND

Acupuncture is an ancient medical art. It is first recorded in the 4,700-year-old Yellow Emperor's Classic of Internal Medicine, and is said to have existed much earlier than this¹. Acupuncture is based on the belief that a life force called "Qi" (roughly pronounced chee) flows through every part of the human body. The Qi incorporates all of the essential spiritual, emotional, mental, and physical aspects of one's life. Flow of Qi controls one's health and can be manipulated by the precise placement of needles along meridians, through which the Qi flows. There are fourteen main pairs of meridians on each side of the body running vertically. Twelve pairs are organ meridians and there are two unpaired midline meridians. Qi energy constantly flows through these meridians. When the meridians become unbalanced in some way, then Qi becomes unbalanced. Qi is comprised of two parts, Yin and Yang. They are opposing forces, that when balanced, work together. When they become unbalanced in the body, disease results¹.

There are six common types of needles that may be used to perform acupuncture. They vary in length, caliber, and shape of the head. All needles in use today are supplied in individual sterile packets. They are used once and then discarded according to standard medical waste guidelines. The desired effect of the needle may be altered or enhanced by the angle of insertion, or manipulation of the needle, i.e. thrusting, rotating, or vibrating the needle. In addition, the

effect of needling may be enhanced by the application of heat (moxibustion), a vibratory stimulus (tuning fork), or electrical stimulation of the needle. On insertion of the needles, most patients will feel a sensation of numbness, fullness, or tingling, called deqi (dah-chee). This sensation is desired, and may be related to efficacy, as we will see later. Needle location and any associated manipulations are carefully selected based on the problem being treated and the desired effect.

There are several prevailing theories to explain why acupuncture appears to work. The "augmentation of immunity theory", suggests that acupuncture exerts an effect on hormone levels, triglycerides, prostaglandins, white blood counts, gamma globulins, opsonins, and general antibody levels. The "endorphin theory" suggests that acupuncture stimulates the release of endorphins, neurotransmitters found in the brain with morphine-like properties. The "neurotransmitter theory" suggests that specific neurotransmitters (like serotonin or noradrenaline) are stimulated by acupuncture. The "circulatory theory" states that acupuncture constricts or dilates blood vessels by causing the release of vasoactive substances. One of the more popular theories is the "gate control theory". This theory suggests that the nervous system regulates pain via the transmission of pain impulses along nerve fibers. Small nerve fibers transmit pain signals, but can become overwhelmed when too many impulses are generated. This effectively closes the "gate" and pain impulses do not get

transmitted to the brain. It is believed that acupuncture stimulates and overwhelms these gates, effectively blocking pain impulses¹.

The mechanism of action for analgesia seems to be stimulation of the muscle's small diameter nerve fibers that eventually enter the dorsal horn of the spinal cord. An impulse is delivered to other levels in the spinal cord, the midbrain, and the hypothalamic-pituitary system, where neurotransmitters are released that limit pain. When needling occurs in the region of pain, all three centers are activated to relieve pain. When needles are placed distant from the pain site, the midbrain and hypothalamic-pituitary system are still activated but are much less effective at relieving pain.² Needles placed at alternative sites remains the basis for so-called "sham" acupuncture, used in many studies as a control. The activation of the midbrain and hypothalamic-pituitary system, as mentioned above, may make this practice an ineffective control or placebo mechanism.

Acupuncture has traditionally been used to maintain health as well as treating disease. It is generally used in concert with traditional Chinese medicine, incorporating the "whole person" concept of health and wellness. In recent years, Western medical practitioners have slowly embraced it as a complementary medicine therapy. However, it appears to have a more narrow range of uses in the United States. Also, as with other western medical therapies, it tends to be used to treat specific complaints, rather than being utilized to maintain balance in mind, body, and spirit. Perhaps this complex array of therapies, collectively called acupuncture, cannot be tested in the same way as an antibiotic or cardiac stent.

REVIEW OF THE LITERATURE OVERVIEW

In China and Japan, acupuncture has been used for thousands of years, for a whole range of health maintenance and disease states. It should be noted that it is generally used within an entire system of Traditional Chinese Medicine (TCM) that believes in the integration of a universal life force (Qi) in the environment, the body, mind, and spirit. Based on this, it is difficult to sort out the solitary role of acupuncture in the traditional use of this therapy. The World Health Organization has published a review and analysis of controlled clinical trials in acupuncture treatment.³ They tend to reflect a broader view of conditions that may be treated with acupuncture. They include a list of twenty-eight conditions "for which acupuncture has been proved –

through controlled trials – to be an effective treatment". This list includes: adverse reactions to chemotherapy, depression, dysentery, hypertension, induction of labor, leukopenia, correction of malposition of fetus, and stroke, to name a few. They further list sixty-three conditions "for which the therapeutic effect of acupuncture has been shown, but for which further proof is needed". This group of conditions includes such diverse conditions as: acne, alcohol dependence, asthma, cardiac neurosis, diabetes, female infertility, hyperlipidemia, drug and tobacco dependence, nosebleed, and obesity.

The National Institutes of Health⁴ convened a consensus conference to address the efficacy of acupuncture. Their conclusions provided a more modest list, citing "promising results" in the efficacy of acupuncture in the treatment of adult post-operative and chemotherapy nausea and vomiting, as well as the treatment of postoperative dental pain. They further cite that acupuncture may be a "useful adjunctive treatment or an acceptable alternative" in the treatment of addictions, headache, menstrual cramps, tennis elbow, fibromyalgia, myofascial pain, osteoarthritis, low back pain, and carpal tunnel syndrome. Well over a million patients a year in the United States utilize acupuncture treatment.⁵ It is clear that in the United States, while acupuncture has been embraced as a viable treatment modality, its role has largely been limited to the treatment of painful conditions.

REVIEW OF RESEARCH

Smith, L.A., et. al.⁶ reported in the journal *Pain*, a systematic review of thirteen randomized clinical trials of acupuncture in the control of chronic neck and back pain. They reported that five trials concluded that acupuncture was effective and eight concluded that it was not effective for relieving neck or back pain. They also felt that the author's conclusions did not always agree with their data. On re-evaluation of the data contained in these trials, they concluded that there was "no convincing evidence" that acupuncture was responsible for relieving back and neck pain. They used the Oxford Pain validity Scale (OPVS) in analyzing the study data and found that the most valid trials tended to be negative.

White, A. R., & Ernst, E.⁷ reported in the *Journal of Rheumatology*, a systematic review of fourteen randomized controlled trials of acupuncture for neck pain. These studies compared needle or laser acupuncture with a control procedure. They reported that seven studies showed positive results and seven were negative. They further reported that of eight "high quality" studies, five were negative. Their

conclusion was that “the hypothesis that acupuncture is efficacious in the treatment of neck pain is not based on the available evidence from sound clinical trials”.

Ezzo, J. et. al.⁸ reported in the journal *Arthritis and Rheumatism*, a systematic review of seven controlled clinical trials, representing 393 patients who received acupuncture for osteoarthritis (OA) of the knee. They felt that the studies, overall, suggested that acupuncture may play a role in the treatment of OA of the knee. They further concluded that “for pain there was strong evidence that real acupuncture is more effective than sham acupuncture”. However, when pain and function were considered together, the results were inconclusive.

Melchart, D. et. al.⁹ performed a systematic review of trials using acupuncture for recurrent headaches with the results being published in the journal *Cephalalgia*. They included trials that were randomized or quasi-randomized. Their evaluation included twenty-two headache trials, fifteen for migraine, six for tension-type, and one for various types of headaches. The majority of the fourteen trials comparing true and sham acupuncture showed “at least a trend in favor of true acupuncture”. The remaining eight trials compared acupuncture to other treatment modalities and had conflicting results. They concluded that “overall, the existing evidence suggests that acupuncture has a role in the treatment of recurrent headaches”.

Another review of acupuncture in headache was conducted by Manias, P et. al.¹⁰ and reported in *The Clinical Journal of Pain*. They evaluated twenty-seven clinical trials using acupuncture in the treatment of “primary headaches”, which included migraine, tension-type, and mixed forms. In twenty-three of the twenty-seven studies, they concluded that acupuncture “offers benefits in the treatment of headaches”.

Lee, A., & Done, M. L.¹¹ reported in the journal *Anesthesia and Analgesia*, a meta-analysis of twenty-four studies employing acupuncture, electroacupuncture, TENS, Acupoint stimulation, and acupressure to control postoperative nausea and vomiting. They found a good respond from these nonpharmacologic techniques compared to placebo in the control of nausea in adults. They felt that the studied “nonpharmacologic techniques were equivalent to commonly used antiemetics in preventing vomiting after surgery”. They did not find a similar benefit in children.

In a similar review of the literature for their book chapter,

Jacobs, B., et. al.² report “strong evidence demonstrating effectiveness of acupuncture in the treatment of pregnancy-induced, chemotherapy-induced, and post-operative nausea and vomiting”. One such review involved twenty-nine trials specifically using acupuncture point P6 to control nausea and vomiting postoperatively. Of these, twenty-seven demonstrated real acupuncture to be superior to sham acupuncture or a placebo control. This use of acupuncture was clearly supported by the NIH consensus development panel on acupuncture as well.⁴

In a systematic review evaluating the effectiveness of acupuncture in acute dental pain, Ernst, E., & Pittler, M. H. (1998) cite sixteen controlled clinical trials. They reported in the *British Dental Journal* that the majority of the trials imply that acupuncture is “effective in dental analgesia”. This result in the treatment of dental pain was confirmed by a subsequent study by Lao, L., et. al.¹² published in the *Archives of Otolaryngology-Head and Neck Surgery*. They recruited thirty-nine adult subjects in a randomized, double blind; placebo controlled trial, and concluded that acupuncture is superior to placebo in preventing postoperative dental pain.

In the treatment of chronic pain, a systematic review of the literature was performed by Ezzo, J., et. al.⁵ and reported in the journal *Pain*. They reviewed fifty-one studies, finding positive results in twenty-one, negative results in three, and neutral results in twenty-seven. They also found that the studies with the lowest quality ratings were more likely to be positive. They also noted a correlation between six or more treatments and a positive outcome, and between the recorded achievement of deqi and a positive outcome. These findings could have implications for future study designs.

The incidence of adverse events in acupuncture is quite low. The most frequent problems encountered are vasovagal or sedating reactions. Problems associated with these conditions are easily avoided by having the patient lie flat during treatment and remain in the clinic until sedating effects have resolved. Other literature reviews indicated serious side effects including Hepatitis or HIV infections associated with reuse of needles. This problem should be virtually non-existent today. There have also been case reports of endocarditis in patients with prosthetic valves, cardiac tamponade where needling was performed directly over the heart, pneumothorax in patients with emphysema, and aneurysmal changes with repeated needling over extremity arteries.² Careful patient selection should largely

eliminate these problems.

Most surveys estimate adverse events frequency to be between 1:10,000 and 1:100,000. They cite a review of the literature that identified 300 complications over a 30-year period. With greater than 10 million acupuncture visits in the US annually, the frequency of adverse events is roughly one per million visits.²

SUMMARY

The literature provides a vast amount of information relating to the relative efficacy of acupuncture compared to placebo or other therapies. Unfortunately, much of it is conflicting. The disparity is highlighted by the difference between the WHO and NIH consensus documents. The case of acute dental pain, headache, and nausea/vomiting control seem more clear, but other painful conditions fare less well in the cited studies. Few of the one hundred and seventy-five studies contained in the reviews were considered to be of high quality. There is no question that acceptance of acupuncture therapy is growing among patients and clinicians. However, acceptance is undoubtedly hampered by the quantity and quality of research conducted in this area.

METHODOLOGY

A review of the literature on acupuncture for painful conditions was undertaken employing MEDLINE, OhioLink, and CINAHL. I specifically excluded alternative medicine search resources to attempt to capture a more mainstream medical view of acupuncture. All studies utilized were performed in western countries and published in western medical journals, due to concerns of possible publication bias mentioned earlier.

ASSUMPTIONS

I chose to concentrate on publications that were systematic reviews or meta-analysis of studies on acupuncture. I felt that this would allow a broader review of the existing studies and result in larger numbers overall. Alternative medicine studies tend to involve small numbers of participants, and large numbers of studies would have to be evaluated individually to yield similar results. In this manner, I was able to review 175 studies.

LIMITATIONS

Studies tended to be small in numbers of participants. Studies were seldom deemed to be of high quality or highly reproducible. The literature outside western countries was quite plentiful, but it has been suggested that these studies

have a likely publication bias¹⁴, meaning that some countries tended to only publish studies with favorable results. This may, in part, explain the differences in the WHO and NIH consensus documents on acupuncture. In addition, I cannot be certain whether individual studies are evaluated more than once in the systematic reviews of the same or inclusive disease entities.

One of the significant limitations of acupuncture research has been the lack of a convincing placebo control. In many studies, so-called “sham” needling is performed. Needles are inserted in control group patients, but not at sites appropriate for the condition being treated. Even with this needling, it is suspected that some physiologic changes may occur that could affect the results. So researchers in Germany developed acupuncture needles with a plastic hub that covers the site of penetration into the skin.¹⁵ The placebo needles are blunt and touch the skin, causing a slight pinprick sensation, but they do not penetrate the skin. They had a group of sixty patients who underwent actual acupuncture with the study needles followed by a second treatment with the blunt placebo needles. More of the volunteers felt penetration and deqi with the acupuncture needles. But, they report that none of the volunteers suspected that the placebo needles had not penetrated the skin. This additional tool may improve the quality of future studies.

DISCUSSION

The current state of western medicine as practiced in the United States is not particularly conducive to the use of acupuncture. Use of acupuncture as adjunctive therapy is difficult to sell in many settings. Spending considerable time and effort to decrease the use of perioperative pain medications with acupuncture when increasing the dose is easier, for example. It may be pursued only when the risk of sedation, respiratory depression, or renal difficulties from the pain medication is a significant factor.

Acupuncture requires additional training for a provider, which is outside their customary training. It requires much more time than writing a prescription. There will also be variability in patient acceptance. And, it is likely to be variably reimbursed, depending on the setting in which one practices. In spite of this, I think that the key to greater use and acceptance is improved and expanded research.

The National Center for Complimentary and Alternative Medicine sponsored at least fifteen new studies involving acupuncture in 2002.¹⁶ Perhaps the new studies will be seen as more elegant than previous studies have been. Also, larger

studies may be needed to separate out the beneficial effect of true acupuncture when sham acupuncture is used as the control. The partial effect caused by the sham acupuncture may cause a different result than a true placebo.

The difficulties with study quality are based on several factors, not the least of which is the concept of acupuncture as a single therapy. TCM trained practitioners in the United States tend to examine patients differently and to provide treatments using the “classic acupuncture method”. This therapy is based on the belief that each patient presents with a unique set of symptoms and signs. This results in unique treatments for each patient. “What this means is that ten patients presenting with migraine headaches will receive ten different treatments”.² Western practitioners who employ acupuncture tend to treat patients based on the “formula acupuncture method”. This involves needling of a fixed combination of acupuncture points for a given diagnosis, such that, all migraine patients would be treated in precisely the same way.²

The efficacy of acupuncture in the treatment of medical conditions is likely under-reported in the available literature. Development of believable placebo controls may facilitate research for painful conditions as pain is either present to some degree or absent. Other conditions may be more difficult to study. It may well be that our western approach to medicine has something to do with our inability to prove the relative effectiveness of acupuncture as a treatment modality. In TCM, acupuncture exists as one aspect of a system of healing that incorporates the environment, the body, the mind, and the spiritual realm with herbal treatments, exercise, meditation, diet, and so on. Perhaps there is a synergistic effect at work in TCM. In the west, we tend to isolate treatments, find the right pill for the condition, and move on. In that context, we may only be able to demonstrate efficacy in a few painful conditions or perhaps as an adjunct to our usual pills and injections. The disease model in western medicine has allowed phenomenal progress in the treatment of acute and chronic conditions and dramatically extended the life expectancy of Americans in the past century. But, our greatest failure may be that in pursuit of the disease, we have lost site of the person.

CONCLUSIONS

It is apparent that the improvement of study design is crucial to ongoing acceptance of this therapy by patients and clinicians. Studies must standardize treatments in terms of the techniques employed, i.e. electroacupuncture,

moxibustion, locations of treatments, angle of insertion, controls used, and the like. One should also only compare classic techniques or formula techniques in a single study, or at least separate results in that manner. It is likely that one technique will not be equally effective on different patients.

The number of acupuncture sessions and duration of sessions should be evaluated as well to determine a “dose response”. The intensity and duration of deqi could similarly be evaluated for a dose response.

The alternative is to acknowledge that acupuncture is a complex therapy with widely variable techniques to tailor therapy to the individual patient. In the latter case, perhaps it is pointless to attempt to fit acupuncture into a western medical milieu with rigid research constraints.

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