

Acupuncture: its use in medicine

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A story is told in China about a peasant who had worked as a maintenance man in a newly established Western missionary hospital. When he retired to his remote home village, he took with him some hypodermic needles and lots of antibiotics. He put up a shingle, and whenever someone came to him with a fever, he injected the patient with the wonder drugs. A remarkable percentage of these people got well, despite the fact that this practitioner of Western medicine knew next to nothing about what he was doing. In the West today, much of what passes for Chinese medicine is not very different from the so-called Western medicine practiced by this Chinese peasant. Out of a complex medical system, only the bare essentials of acupuncture technique have reached the West. Patients often get well from such treatment because acupuncture, like Western antibiotics, is strong medicine. But the theoretical depth and full clinical potential of Chinese medicine remain virtually unknown.¹

The history

Acupuncture has recently become the subject of scientific investigation, most notably as a treatment of pain, nausea and vomiting, neurologic rehabilitation, asthma, and addiction. It encompasses a range of techniques, most of which involve penetration of the skin by fine needles at defined acupuncture points. Stimulation of these areas is also accomplished and augmented by hot herbs (moxibustion), pressure (acupressure), heat, and lasers. The therapeutic modalities and traditions considered to fall under the rubric of acupuncture include acupressure, laser acupuncture, auriculotherapy, Korean hand acupuncture, moxibustion, electroacupuncture, French energetics, and myofascially based acupuncture.

Whereas acupuncture has been practiced in Asia for at least 2500 years, it did not catch America's attention

until 28 years ago. James Reston, a New York Times reporter, was in China covering President Nixon's trip when he developed acute appendicitis. He brought back poignant descriptions of how acupuncture therapy helped relieve his postoperative pain.² The intervening years have seen an exponential growth in the practice of acupuncture in the West, as is reflected by the number of articles appearing in the popular press (Figure 1). In the 1990s, acupuncture is a complementary form of medicine used by more than a million people each year in the United States. In 1993 the Food and Drug Administration (FDA) estimated that Americans spent up to \$500 million for their nine million to 12 million treatments per year.³

Commensurate with its upsurge in popularity, acupuncture has attracted mainstream medical attention. The FDA removed acupuncture needles from the category of "experimental medical devices" and now regulates them as common medical tools, such as scalpels and syringes, under good manufacturing practices and single-use standards of sterility.⁴ In a survey of almost 4000 physicians from the United States and eight other nations practicing predominantly Western medicine, Astin found that 43% of physicians said they had referred at least one patient to an acupuncturist, and more than half believed in its efficacy.⁵ The National Institutes of Health (NIH) estimated that 70% to 80% of insurers in 1996 covered some acupuncture under their policies. The following year the NIH sponsored a Consensus Development Conference on Acupuncture where clinical trials were reviewed and evidence for mechanisms of action was addressed.⁶

Acupuncture according to Eastern medicine

The Yellow Emperor's Classic of Internal Medicine, Huang Ti Nei Ching,⁷ written about 2300 years ago, represents the first known documentation of Chinese medicine, although it is known to have existed even before that time and to have developed over a long period. In his overview of medical acupuncture, Helms describes the essence of classical Chinese medicine. He writes:

'The language in classical Chinese medicine texts reflects nature and agrarian village metaphors and describes a philosophy of man functioning harmoniously within an orderly universe. The models of health, disease, and treatment are presented in terms of patients' harmony or disharmony within this larger order, and involve their responses to external extremes of wind, heat, damp, dryness, and cold, as well as to internal extremes of anger, excitement, worry, sadness, and fear. Illnesses likewise are

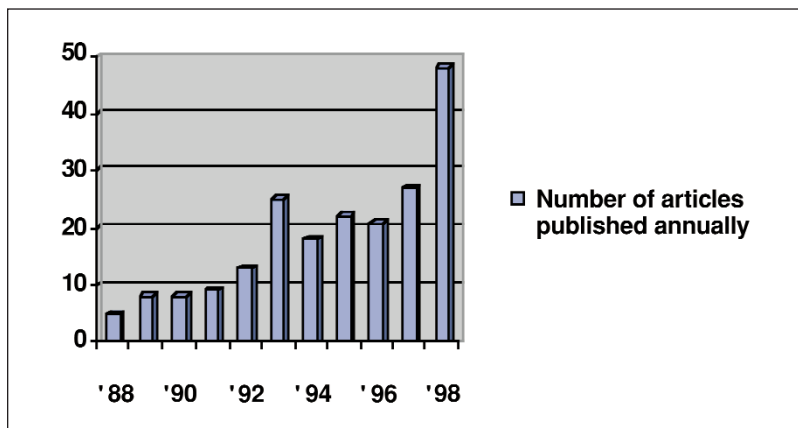


Figure 1 Number of acupuncture articles published annually in the US popular press in the last decade. From Magazine and Journals Database of over 1000 journals and magazines, 1988 to present.

described and defined poetically, by divisions of the yin and yang polar opposites (interior or exterior, cold or hot, deficient or excessive), by descriptors attached to elemental qualities (wood, fire, earth, metal, and water), and by the functional influences traditionally associated with each of the internal organs.⁸

Qi (pronounced “chee”) is the energy that flows through the body in predictable patterns, along meridians. It is determined in part by the balancing forces of yin and yang. Disruption of this flow is thought to cause disease; manipulation of the flow of *qi* with acupuncture reestablishes the balance of yin and yang and, therefore, a healthy state. Acupuncture is fundamentally different from allopathic medicine in that organs are considered energetic, not anatomic, concepts. Both diagnosis and treatment are based on measuring and adjusting the flow of energy.

Acupuncture according to Western medicine

These theories and approaches are difficult to reconcile with Western biomedical concepts of anatomy and physiology. There are no known circulatory or neuroanatomic correlates to meridians. The neural mechanism of acupuncture analgesia has been partially explained, however, through animal experiments over the past twenty years which implicate sensory nerves and endorphin release.⁹ Acupuncture analgesia is initiated by stimulation of sensory nerves in muscle. These stimuli activate three centers (spinal cord, midbrain, and pituitary) to release neurochemicals (endorphins, serotonin, and norepinephrine) that block pain messages (Figure 2). The most powerful evidence for the essential role of endorphins comes from experiments showing that the opioid antagonist naloxone blocks acupuncture analgesia. Procaine infiltration of acupuncture points also blocks acupuncture analgesia, showing that afferent transmission via sensory nerves is also essential for effect.

In addition to endorphin release, acupuncture triggers the release of adrenocorticotropic hormone (ACTH) from the pituitary. ACTH stimulates the adrenal to produce cortisol. Since cortisol is known to have anti-inflammatory properties, acupuncture’s efficacy in treating inflammatory conditions may also be explained by this mechanism.

Adverse reactions from acupuncture

Adverse reactions are rare, but acupuncture is not without risk. During the period encompassed by Ernst and White’s review, 1969-1996, 56 articles reporting adverse effects of acupuncture were published.¹⁰ The most common deleterious effects were infection and trauma. A total of 126 cases of hepatitis transmitted by acupuncture nee-

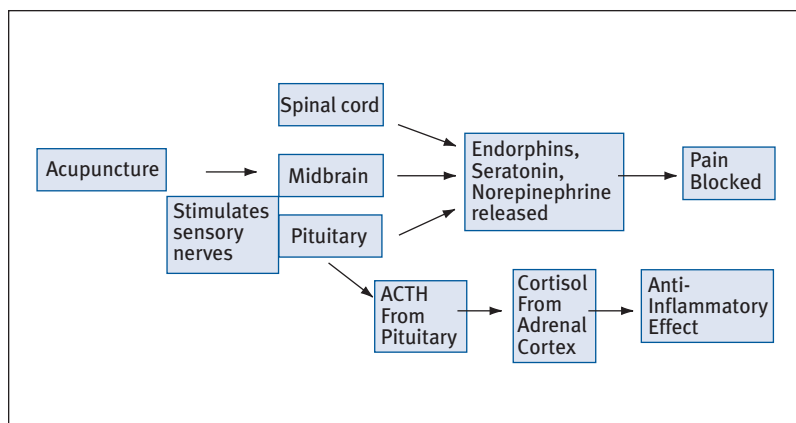


Figure 2 Acupuncture according to Western medicine. Adapted from Pomeranz, 1996.

dles was reported. One practitioner was noted to have infected 36 patients by reusing needles. In addition, in an epidemiologic study in Japan, of 262 carriers of hepatitis C, acupuncture was identified as the likely route of infection in 20% of cases. Three case reports of HIV were found, as were individual case reports of subacute bacterial endocarditis and *Staphylococcus* sepsis.

Trauma is the second most prevalent adverse event resulting from acupuncture. Sixty-five case reports of pneumothorax and several reports of cardiac tamponade are noted, one occurring as a result of needle placement through a foramen in the sternum. There is also one case of pacemaker suppression by electroacupuncture. Another report implicated acupuncture in the death of a patient from asthma; in that case, in the pursuit of acupuncture treatment, conventional therapy was delayed. In a separate report, nine cases of spinal injury have been noted as well.¹¹ During the period studied, a total of five deaths were reported. These case reports highlight the paramount importance of the regulation of acupuncture, with particular attention paid to sterility, universal precautions, and appropriate referral for medical consultation.

Why this review

Of the million or so people in the United States undergoing acupuncture treatment, up to 70% seek this care without the knowledge of their primary care physician.¹² Eisenberg et al. suggest that this failure of communication may be due to physicians’ lack of information about nonallopathic treatment modalities.¹² In this review, a summary of the research in the field of acupuncture is presented, including a discussion of the shortcomings of much of the research.

The data in context

The 1997 NIH Office of Alternative Medicine Consensus panel reviewed the scientific acupuncture litera-

ture and concluded that acupuncture is effective treatment for postoperative and chemotherapy-induced nausea and vomiting, postoperative dental pain, and acupressure for the nausea of pregnancy. They also found that acupuncture may be useful either alone or in combination with other therapy for addiction, headache, dysmenorrhea, lateral epicondylitis, stroke rehabilitation, fibromyalgia, low back pain, carpal tunnel syndrome, and asthma (see box).

Conclusions of the NIH Office of Alternative Medicine regarding acupuncture

Acupuncture is effective treatment for

- Nausea and vomiting (secondary to surgery, chemotherapy, or pregnancy)
- Pain (secondary to dental procedures)

Acupuncture may be helpful either alone or as adjunctive therapy for

- Addiction
- Asthma
- Carpal tunnel syndrome
- Dysmenorrhea
- Fibromyalgia
- Headache
- Lateral epicondylitis
- Low back pain
- Stroke rehabilitation

We conducted our own review of published meta-analyses and systematic reviews of the effect of acupuncture on a variety of conditions. Several of the reviews were published after the NIH panel met. These studies are shown in Table 1. They suggest that there is evidence for a beneficial effect of acupuncture in the treatment of low back pain, headache, neck pain, and other musculoskeletal pain; acute postoperative dental pain; nausea and vomiting of pregnancy; dilation and curettage; and cancer chemotherapy. There is also evidence of efficacy in the treatment of acute stroke. It was found that many studies have considered acupuncture for asthma and addiction, but these studies have produced either negative or inconclusive results (see Table 1).

There is a notable lack of published data for many conditions for which people seek acupuncture. Even with numerous available studies to consider, the evidence is inconsistent. In the case of back pain, for example, two of the meta-analyses included in this review demonstrated overall positive results. The other two analyses determined that the trials were of insufficient quality to conclude one way or the other. Between those with inconclusive results and those finding acupuncture to be of benefit, the essential difference was to be found in study design. The two positive meta-analyses had less stringent inclusion criteria and may therefore have included studies of lower quality.

In the current era of evidence-based medicine and managed care, we believe that good care should have a

scientifically demonstrated benefit. While many Western medical practices have only recently come under closer scrutiny, a similar standard of evidence-based care should be applied to approaches like acupuncture. In the broader context of low back pain management, just as spinal manipulation has been adopted as a first-line treatment,¹³ so too might acupuncture be considered a reasonable option. Acupuncture compares favorably to a variety of control interventions, and it presents little danger of adverse effects.¹⁴

Classical versus formula acupuncture

There are many challenges in acupuncture research, the most fundamental being the definition of the intervention itself. The Western model has generally demanded that the therapeutic intervention be standardized. This issue presents a philosophical problem, bringing Eastern and Western concepts of disease and therapy head-to-head. Acupuncture in the Eastern context is a fluid art; the treatment for the same problem in two people may be very different. To adequately assess a treatment and its effects on a number of patients compared with controls, the scientific method would seem to require that the treatment be the same for all subjects. This rigid approach may drain therapeutic benefit from the art of acupuncture. The question arises as to whether a customized treatment can be tested with scientific rigor.

Most trials to date have tested protocol or formula acupuncture, in which one problem has one treatment. This simplistic approach may not be appropriate. Acupuncturists generally treat the same problem in a variety of ways, depending on the complex characteristics of the patient. This approach has come to be known as classical acupuncture. There is some evidence from pooled data comparing classical with formula acupuncture that the former approach may be more effective,¹⁵ but there is as yet no explanation for this observed difference in efficacy. Do classical acupuncturists spend more time with their patients, honoring unique qualities in each individual, thereby making them feel truly cared for? Does classical acupuncture involve more touching of patients, and does this promote healing in some way? Or is there something about the unique approach of the classical acupuncturists that has as yet eluded scientific definition and explanation?

Placebo acupuncture

Researchers have struggled to define an adequate placebo as a control intervention for acupuncture research. Some trials compare acupuncture to drugs and others to acupuncture at points thought to be inactive for the problem. The use of sham acupuncture points has proven problematic, however, because even nonspecific

ic needling can lead to neurohormonal responses and clinical effects.²⁷

Lao et al.²⁸ addressed the issues of control intervention and blinding of trials in an elegant study that sets a new standard for placebo acupuncture. In a study of the efficacy of acupuncture on postoperative oral surgery pain, subjects were randomized to receive actual acupuncture or placebo acupuncture. The former was provided by an experienced and registered acupuncturist at four acupuncture points ipsilateral to the tooth extraction site. Placebo acupuncture consisted of tapping empty plastic needle tubes and needles at the skin surface of each of the same points. Both groups received manipulation at the sites in ten-minute intervals. Treatment group had needles twisted, as per usual protocol, and placebo group had palpation of the surface of the skin with a blunt dental instrument. All patients' eyes were covered with gauze so they could not see the procedure. To make the placebo more credible, mock electrical stimulation of patients in both groups was performed. No electrical current was applied, but patients were told that they may or may not feel electrical current because of its very high frequency.

To validate the blinding of patients to group assignment, all patients were asked at follow-up which treatment they believed they had received. More patients guessed wrong in both groups: 6 of 11 in the acupuncture group and 5 of 8 in the control group. In general, if research subjects do not know if they were in the treatment or control group, the placebo in use was adequate and patient blinding was accomplished. This work by Lao's group represents a crucial step forward in validating acupuncture research. With an effective placebo procedure, we can begin to study with far greater scientific rigor the effectiveness of acupuncture for a variety of indications.

Acupuncture's role in Western medicine

Eisenberg discusses strategies for introducing alternative medicine into the allopathic, Western medical setting.²⁹ In a context where the efficacy of some treatments is still unknown, the challenge to allopathic medical professionals is how to advise patients responsibly. Key elements are the importance of maximizing patient and provider communication and satisfaction while minimizing risk, by including a discussion with the patient about expectations and preferences and by scheduling follow-up visits to help monitor for improvement and problems. Eisenberg suggests the following type of question to initiate discussions: "Patients with [chief complaint] frequently use other kinds of therapy to find relief. For example, some patients use chiropractic, massage, herb, or vitamin therapies. Have you used or thought about using any of these or other therapies for your chief symptom, or for other reasons?"

Table 1 A summary of meta-analyses and reviews of acupuncture efficacy

Author (year)	Type of review	Conditions treated	Overall result
Pain			
Patel et al. ¹⁵ (1989)	Meta-analysis of 14 RCTs	Headache, neck pain, low back pain, other musculoskeletal pain	Positive
Ter Riet et al. ¹⁶ (1990)	Meta-analysis of 52 clinical trials	Headache, arthritis, back pain	Inconclusive
Ernst and White ¹⁷ (1998)	Meta-analysis of 9 RCTs	Low back pain	Positive
Tulder et al. ¹⁸ (1999)	Systematic review of 11 RCTs	Low back pain	Inconclusive
Postoperative pain			
Ernst and Pittler ¹⁹ (1998)	Systematic review of 16 clinical trials	Acute postoperative dental pain	Positive
Nausea/ vomiting (N/V)			
Dundee and McMillan ²⁰ (1991)	Review article	N/V with dilation and curettage	Positive
		Nausea of pregnancy	Positive
		Emesis of cancer chemotherapy	Positive
		Motion sickness	Negative
Paralysis			
Naesser ²¹ (1996)	Review article of 8 clinical trials	Acute stroke	Positive
Asthma			
Jobst ²² (1996)	Review of 16 clinical trials	Asthma, bronchoconstriction, breathlessness, bronchitis	Inconclusive
Linde et al. ²³ (1999)	Meta-analysis of 7 RCTs	Chronic asthma	Inconclusive
Addiction			
Ter Reit et al. ²⁴ (1990)	Systematic review of 22 clinical trials	Nicotine, heroin, alcohol addiction	Inconclusive
Culliton and Kiresuk ²⁵ (1996)	Review article	Alcohol, cocaine, nicotine addiction	Inconclusive
White and Ramps ²⁶ (1999)	Systematic review	Smoking cessation	Negative

RCT = randomized controlled trial.

Asking about unconventional therapies or comanaging a patient who is undergoing acupuncture therapy might raise concerns about liability. According to legal scholar D.M. Studdert, no case law directly answers the question of whether a provider can be sued for a bad out-

come related to the alternative therapy.³⁰ Case law does state that “as a general rule, a physician’s mere referral of a patient to another physician, without more, does not expose the referring doctor to liability.” The most prudent referral would be to a licensed practitioner who is generally known to be competent and communicates easily with allopathic medical doctors.³⁰

In 1993 the FDA estimated that there were approximately 9000 acupuncturists, both licensed and unlicensed, practicing in the United States. Acupuncture may be practiced under a specific acupuncture license or as a procedure under a medical license. In 1982 the Council of Colleges of Acupuncture and Oriental Medicine (CCAOM) was formed. They have developed academic standards as well as curriculum requirements for both master’s and doctoral level programs in acupuncture. As of 1996, 25 colleges were members of CCAOM, with membership open to any established 3-year acupuncture program that met the 14 requirements of the National Accreditation Commission of Schools and Colleges of Acupuncture and Oriental Medicine. The American Academy of Medical Acupuncture (AAMA) represents physician acupuncturists. Full membership requires a minimum of 220 hours of formal training and 2 years of clinical experience, as outlined by the WHO. In 1995 there were an estimated 10,000 certified acupuncturists in the United States, approximately one third of whom were medical doctors.³¹

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