

A SCIENTIFIC LOOK AT ALTERNATIVE MEDICINE

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Eastern Approaches

TRADITIONAL CHINESE MEDICINE: GENERAL ASPECTS

Principles

"Traditional Chinese medicine defines health as a balance between the opposing forces of *yin* and *yang*. The attraction between them creates an energy known as *qi* (pronounced chee), which is somewhat equivalent to the Western idea of vitality, or life force. *Qi* flows to all parts of body through 14 major meridians, conceptual channels that run along the surface of the body and veer off to the interior. Twelve of the meridians are associated with a specific organ, which in Chinese medicine represents not simply a part of the body but the functions of the organ and its relationship to other substances and parts of the body.

"In Chinese medicine, disease is thought to result from an excess or deficiency or *qi* in some part of the body. Six Pernicious Influences - Wind, Cold, Fire, Dampness, Dryness, and Summer Heat - may play a role in the imbalance. Emotional factors, diet, and sexual and physical activity are also thought to affect the balance, and thus affect health." (*Consumer Reports*, Jan. 1994, 54-9).

The idea that *qi* is related to "energy" appears to be a relatively recent invention. The classical usage appears to relate more to concepts of "wind" or "vapor."

"At the time of birth, an infant inherits *Qi* from his or her parents. This *Qi* is called preheaven *Qi*, or original *Qi* (*Yuan Qi*). When the infant grows up, it requires foods to produce energy. The *Qi* that comes from foods is called food *Qi* (*Gu Qi*). The *Gu Qi* ascends up to the lung and is associated with air to become gathering *Qi* (*Zhong Qi*). The *Zhong Qi* is transformed to true *Qi* (*Zhen Qi*), which spreads out over the body to nourish each organ and channel." (Chu (2004) *Phys. Med. Rehabil. Clin. N. Am.* 15, 773-781)

In addition to *qi*, the body is held to be made of "moisture" and blood. "Moisture is the liquid medium which protects, nurtures, and lubricates tissue. Blood is the material foundation out of which we create bones, nerves, skins, muscles, and organs...The Chinese believe all illness is a consequence of either a depletion or congestion of *Qi*, Moisture, and Blood. Depletion leads to weakness, lethargy, frequent illness, poor digestion, and sluggish circulation. Congestion results in aches, tension, tenderness, irritability, and swelling...*Qi*, Moisture, and Blood are regulated by five organ networks which in return are ruled by the five elements of Nature. For instance, the power of Wood rules the liver, Fire manifests the heart, Earth governs the spleen, Metal controls the lung, and Water commands the kidney. Each organ network governs particular tissues and faculties." (promotional material for Heaven & Earth™ Chinese Formulas)

"In Chinese medicine, each of the Five Elements symbolizes a group of physiologic functions. For example, Metal represents decay, and wood represents a growth phase." Furthermore, the "Five Elements' planetary counterparts are Jupiter, Mars, Saturn, Venus, and Mercury..." (Raso, "From Acu-Powder to Zhenjui: A Typology of 'Chinese Medicine'.")

"The premise of five phases holds that nature is in constant motion, following cyclic patterns that describe the process of transformation, and the phases provide a system of correspondences and patterns within which numerous phenomena are arranged in ways that relate to the process of change. More specifically, each phase represents a category of related functions and qualities. For example, wood is associated with active functions that are in a phase of growing or increasing, while fire represents functions that have reached a maximal state, and are about to begin a decline. The theory of correspondence describes the parallelisms and synchronicity of events in the inner and outer world of human organisms. When the elements of nature are in balance, life is harmonious and flourishes. When the balance of polar forces is disturbed, illness and disaster occur." (Bernstein (2000) *J. Nursing Scholarship* 32(3), 267-272)

Practice and scope

Techniques include acupuncture, acupressure, qi gong, tai ch, herbal remedies, and oils and ointments for topical use. However, acupuncture for analgesia is not an ancient technique, but rather arose in the late 1950's. Other recent additions include scalp acupuncture and ideas taken from reflexology. "Many aspects of what is currently described as *traditional* Chinese medicine are actually mid- to late-20th-century inventions owing little or nothing to ancient practice or philosophy. Elements of science and rationality have been added to this system to lend it plausibility." (Imrie et al., *Sci. Rev. Altern. Med.* 7, 61-68 (2003/4))

All of the patient's symptoms, as well as other aspects of life, are considered (compare homeopathy). Thus, two patients with similar medical problems may receive different diagnoses and treatments.

Diagnostic methods:

- *Pulse diagnosis*: "Pulse-taking requires several minutes, but it can take much longer because it is believed that each wrist has six pulses, corresponding to twelve different organs, and that each pulse has about twenty-five qualities. So some three hundred distinct characteristics in a patient's pulse must be evaluated to make a diagnosis and commence treatment. Expert pulse-readers supposedly can detect illnesses long before there are any symptoms and cure them with acupuncture treatments." (Butler, *A Consumer's Guide to "Alternative Medicine,"* p. 96)
- The *tongue* may be examined. "TCM theory assigns areas of the tongue to internal organs, and various lingual conditions to visceral conditions. For example, lateral tooth marks allegedly signify a 'Spleen Qi deficiency'." (Raso)
- *Physiognomy* - areas of the face correspond to internal organs.

Regarded primarily as a preventative rather than a curative tradition

Social, political, and economic factors contribute to maintaining its role in China.

The Chinese government is now promoting Chinese medicine in the West in order to bring economic benefits (e.g., export of herbal and other remedies).

Critique

Origin in *pre-scientific thinking concerning body and how it functions*. Organs were arranged into a symmetrical table of six yin and six yang organs; however, the pancreas was not recognized, and an undefined "triple warmer" organ was made up to complete the table. Organs were compared to the "basic elements" of water, metal, earth, fire, and wood. "They say, for example, that the spleen is the center of thought, the liver produces tears, and the kidneys are the seat of willpower and fear" (Butler, p. 100). The brain was of minimal importance (regarded as the reservoir of the marrow). The ancient Chinese did not understand the role of the heart as a pump, and in general showed little interest in how the organs functioned.

Different schools have mutually contradictory theories. No agreement on number of meridians.

Early texts described qi as flowing through blood vessels; shift to a distinct set of channels came later.

Pulse and tongue diagnoses are invalid. "Today we know that there is only one pulse, which corresponds to the pumping action of the heart, and that the appearance of the tongue is seldom a clue to the diagnosis of disease in other parts of the body." (NCAHF Position Paper on Acupuncture)

Zhang et al. (*Altern. Ther. Health Med.* 10, 568-570 (2004); *J. Altern. Complement. Med.* 11, 415-421 (2005)) found that for a given patient, different practitioners gave inconsistent diagnoses.

Preclinical diagnosis (before the appearance of disease) can result in nonfalsifiable hypotheses.

Idea that a single cause, imbalance in *qi*, is responsible for all diseases is inconsistent with scientific knowledge.

Employs elements of sympathetic magic (e.g., animal parts used to impart their powers to humans; use of ginseng based on resemblance of roots to human body)

Nearly all papers in Chinese journals report positive results, indicating publication bias. A review of randomized controlled trials (Tang et al. (1999) *BMJ* 319, 160-161) found that methodological and reporting problems were widespread and that "publication bias may be common."

Some traditional Chinese remedies contain mercury.

ACUPUNCTURE

Background

Estimated to be used by 1 million Americans, at a cost of \$500 million, per year

Increasingly being covered by health insurance (including about half of covered workers); several states mandate coverage. Costs: \$30-100/visit to non-physicians, higher with physicians.

42 states license or certify practice by non-physicians. For physicians, 31 states include acupuncture with MD or DO licensure; 11 require additional training or examination; 2 states do not permit (data as of July 2001). Some states permit other licensed practitioners such as chiropractors to perform.

Scopes of practice vary among the states. "Definitions may include, in addition to needling, the following: magnets, laser biostimulation, cupping, Oriental bodywork (such as Shiatsu or acupressure), dietary counseling, reflexology, and other treatments" (Eisenberg et al. (2002) *Ann. Intern. Med.* 137, 965-973).

14,000 licensed practitioners in U.S.; an additional 3000 doctors include it in their practice.

Non-physicians trained as acupuncturists may claim various degrees and titles such as Certified Acupuncturist (CA), Master Acupuncturist (MA), Diplomate of Acupuncture (Dipl.Ac.), or Oriental Medical Doctor (OMD or MOD). More than 70 acupuncture schools in U.S. Most state licenses require passing national written examinations by the National Certification Commission for Acupuncture and Oriental Medicine (NCCAOM).

Training of MD's by American Academy of Medical Acupuncture (has 2000 physician members), offered through some colleges and universities.

In 1996 the FDA reclassified acupuncture needles from Class III (investigational devices) to Class II (for general use by "licensed, registered or certified acupuncture practitioners").

Principles

Needles may be inserted at certain points on the meridians to adjust opposing yin and yang forces. Hundreds or even thousands of acupuncture points.

"Modern medical acupuncturists use fewer points and believe these are nerve-muscle junctions rather than mystical windows to vital energy flow." (Butler, p. 103)

Sims (*Complementary Therapies in Medicine* 5, 102-111 (1997)) reviewed five proposed theories for the mechanism of acupuncture anesthesia:

- *Neural* - stimulation of sensory nerves by acupuncture activates pathways leading to reduced pain sensation; some of these are tied to release of hormones and neurotransmitters (humoral mechanisms, next section). "Higher centres may exert a descending inhibitory gating effect." "Diffuse noxious inhibitory control (DNIC) theory proposes a counter-irritant stimulation which acts to inhibit pain messages."
- *Humoral* - acupuncture causes release of endorphins, enkephalins, and various neurotransmitters.
- *"Bioelectric and biomagnetic"* - "proposes that the meridians are electrically distinct entities."
- *Generalized stress response*
- *Hypnotic-type suggestibility*

"Acupuncture is hypothesized to work at both segmental and nonsegmental levels. The postulated segmental effects arise at the spinal cord level; acupuncture is believed to stimulate the A beta nerve fibers, which in turn block the transmission of pain to higher centers - the gate theory of pain. Nonsegmental effects, in general, occur at supraspinal levels. Acupuncture is believed to stimulate A delta and C fibers in addition to A beta and these activate 3 centers: the spinal cord, the midbrain (periaqueductal gray and nucleus magnum raphe), and the hypothalamic pituitary complex. These centers release various endogenous pain modulators (eg, β endorphins), and there are corresponding receptors distributed throughout the body. Additionally, the stimulation of supraspinal structures brings about diffuse, noxious inhibitory control, whereby a noxious stimulant (acupuncture) in 1 area of the body can reduce the perceived intensity of pain produced by a noxious stimulant (tissue damage) in another area of the body." (Downs et al. (2005) *Arch. Phys. Med. Rehabil.* 86, 1252-1257)

Han (*Neurosci. Lett.* 361, 258-261 (2004)) reported that different frequencies of electroacupuncture released different types of endorphins.

"Less popular theories on how acupuncture works are based on acupuncture's effects on the various weak electromagnetic fields in the body, which signal biologic and circadian rhythms and endocrine and immune function." (Kemper and Highfield (2002) *Contemporary Pediatrics* 19(12), 31-41, 46)

Practice and Scope

Major use for *treatment of pain* and *anesthesia*, but also employed for a variety of conditions such as drug addiction, arthritis, high blood pressure, respiratory diseases, eye diseases, hepatitis, malaria, schizophrenia, cancer, AIDS, diabetes, heart disease, obesity, appendicitis, and others. Hundreds of clinics in U.S. and Europe use for treatment of addiction. Has been used in Jefferson County Drug Court, with the involvement of Dr. R. P. Steiner. A new trend is acupuncture for face-lifts.

Does *not* relax abdominal muscles or "prevent pain due to the stretching of internal organs" (*Consumer*

Reports), limiting its use in surgery. Typically used for head and neck surgery, and even then is accompanied by conventional drugs.

"The needles are inserted rapidly or slowly, twirled clockwise or counterclockwise, used hot or cold, left in for longer or shorter periods, and removed rapidly or slowly, according to their postulated effects on yin or yang to the liver, lungs, heart, or other organ." (Butler, p. 96)

Usually inserted in such a way as to stimulate a sense of heaviness or numbness (said to be associated with *qi*, and referred to as "de *qi*"). "It is now believed that this sensation is a sign of the activation of group III and IV fibers in skeletal muscle." (Audette et al. (2004) *Phys. Med. Rehabil. Clin. N. Am.* 15, 749-772)

"In the case of pain, the treatment usually consists of needling the points on the meridian where the obstruction of *qi* has occurred, as well as some distal points on meridians that are related to the ailing meridian in a direct fashion. Auricular points also have been used with some degree of success." (Eshkevari (2003) *AANA J.* 71, 361-370) Theory of *Ah Shi* points: "This theory states that whenever there is a local soreness or pressure, there is an active acupuncture point regardless of whether or not the point lies on a classic acupuncture meridian." (Audette et al., *op cit.*)

Variations:

- Needles combined with electrical stimulation (*electroacupuncture*). Zhou et al. (*J. Appl. Physiol.* 98, 872-880 (2005)) described differences between electroacupuncture (EA) and manual acupuncture (MA): "EA causes the release of β -endorphin and ACTH into plasma, whereas MA releases only β -endorphin. EA increases the concentrations of vasoactive intestinal peptide, neuropeptide Y in the hippocampus and occipital cortex, and substance P and neurokinin A in the hippocampus, whereas MA does not influence the concentrations of these neuropeptides." (Because of these differences, research studies indicating benefits of electroacupuncture do not validate manual acupuncture.)
- *Transcutaneous electrical nerve stimulation* (TENS) - surface electrodes rather than needles. (Note: in contrast, in *percutaneous* electrical nerve stimulation (PENS) there is similar stimulation of electrodes, but their placement is around the pain areas rather than at acupuncture points.)
- *Moxibustion* - "small piles of moxa, the leaves of the Chinese wormwood tree, are burned at the ends of the needles or directly on the acupuncture points" (Butler, p. 96). Also referred to as *acumoxa*.
- *Acupressure* - pressure used instead of needles. Japanese version is *shiatsu*.
- *Auriculotherapy* - uses acupuncture points in the ear (see handout on holistic approaches)
- *Electroacupuncture according to Voll* (EAV) (Reinhold Voll, Germany) - galvanometer attached to acupuncture points to diagnose diseases by detecting energy imbalances. Also *electrodiagnosis*, *electrodermal screening* (EDS).
- *Cupping* - heated cups are placed on the skin, and suction is created as the air cools.
- *Homeoacupuncture* - homeopathic solutions are injected at acupoints
- *Homuncular acupuncture* - a miniature person is represented in a small part of the body, and appropriate acupuncture points used (compare *reflexology*)
- *Laserpuncture* - laser beams applied to points

In the Japanese tradition, needles are thinner and not inserted as deeply. Some Korean practitioners use only points on the hand.

G. Ulett maintains that the benefits of acupuncture can be provided by electrical stimulation, not necessarily involving needles. "Evidence-based neuroelectric acupuncture requires no metaphysical rituals. It is a simple, useful clinical tool for pain modulation and other conditions and can be easily taught to physicians." (*Southern Med. J.* 91, 1115-1120 (1998))

Arguments in support:

Some individual research studies with positive findings (2000-present only):

- Vas et al. (*BMJ* 326, 1216 (2004)) - osteoarthritis of knee (electroacupuncture)
- Berman et al. (*Arch. Intern. Med.* 141, 901-910 (2004)) - osteoarthritis of knee (electroacupuncture)
- Vickers et al. (*BMJ* 328, 744 (2004)) - chronic headache
- Giles and Muller (*Spine* 28, 1490-1503 (2003)) - neck pain (although for spinal pain in general was less effective than manipulation)
- White et al. (*Ann. Intern. Med.* 141, 911-919 (2004)) - neck pain (although effects were not clinically significant compared to placebo)
- He et al. (*Pain* 109, 299-307 (2004)) - chronic neck and shoulder pain
- Thomas et al. (*Health Technol. Assessment* 9(32), 1-126 (2005)) - low back pain
- Alimi et al. (*J. Clin. Oncol.* 21, 4120-4126 (2003)) - cancer pain
- Elden et al. (*BMJ* 330, 761-764 (2005)) - pelvic girdle pain
- Kotani et al. (*Anesthesiology* 95, 349-356 (2001)) - postoperative pain and nausea
- Boehler et al. (*Anesth. Analg.* 94, 872-875 (2002)) - Korean hand acupressure for nausea
- Gan et al. (*Anesth. Analg.* 99, 1070-1075 (2004)) - postoperative nausea (electroacupuncture)
- Avants et al. (*Arch. Int. Med.* 160, 2305-2312 (2000)) - cocaine dependence (but a larger study from the same group found no benefit - see Margolin et al. below)
- Bier et al. (*Am. J. Pub. Health* 92, 1642-1647 (2002)) - smoking cessation

Reviews supporting effectiveness (1998-present):

- Ernst and White (*Arch. Intern. Med.* 158, 2235-2241 (1998)) - back pain (though couldn't conclude better than placebo)
- Cochrane Collaboration review (2005) - chronic low back pain (but not more effective than other methods)
- Agency for Healthcare Research and Quality (2003) - arthritis
- Melchart et al. (*Cephalalgia* 19, 779-786 (1999)) - headaches (but evidence not fully convincing)
- Cochrane review (2002) - idiopathic headache (but evidence not fully convincing)
- Ernst and Pittler (*Br. Dent. J.* 184, 443-447 (1998)) - dental pain
- Trinh et al. (*Rheumatology* 43, 1085-1090 (2004)) - lateral epicondyle pain (tennis elbow)
- Lee and Ernst (*Am. J. Obstet. Gynecol.* 191, 1573-1579 (2004)) - labor pain (evidence is "promising" but "not convincing")
- Lee and Done (*Anesth. Analg.* 88, 1362-9 (1999)) - nausea (but see below)

Association of traditional acupuncture points with surface points of low electrical resistance; with points where peripheral nerves become cutaneous; with "motor points, i.e. where the nerve passes through the fascia into the muscle" (Sims). (However, Ramey (*Sci. Rev. Altern. Med.* 5, 140-145 (2001)) argues that none of these correlations is valid.)

Animal and human studies indicating release of endorphins and other pain-relieving chemicals in acupuncture

In some cases needling may affect relief by interacting with *trigger points* ("thought to be little knots of damaged and degenerating nerve and muscle fibers that are tender to pressure" - Butler, p. 103). (But the correspondence is not exact, and the existence of trigger points is controversial.)

Some studies on *possible mechanisms*:

- Using PET imaging, Biella et al. concluded that acupuncture activates brain structures involved in pain (*NeuroImage* 14, 60-66 (2001)).
- Langevin et al. (*FASEB J.* 15, 2275-2282 (2001); *FASEB J.* 16, 872-874 (2002)) investigated anatomical changes associated with needle insertion and rotation (which produce the sensation of "de qi"). They propose that mechanical changes in connective tissue could trigger signaling pathways.
- Middlekauff et al. (*Am. J. Physiol.* 280, R1462-8 (2001)) found that changes in blood pressure during

mental stress were reduced by acupuncture (though almost as well at non-acupoints as at "real" points), and proposed that acupuncture "attenuates sympathetic nerve activation to nonmuscular vascular beds" and "augments vasodilatation during mental stress, countering sympathetic vasoconstrictor influences."

- Li et al. (*Autonomic Neuroscience* 89, 38-47 (2001)) also examined effects on blood pressure, with results indicating opioid receptors in rostral ventrolateral medulla.

Arguments against:

No precise guide to location of acupuncture points. Different systems have conflicting locations. Points identified in various texts cover almost all of the skin! A study by Aird et al. (*J. Altern. Complement. Med.* 8, 635-642 (2002)) found that the most widely used methods of locating acupuncture points "are grossly imprecise," yielding possible target areas of about 10 cm². "These areas would rule out any specificity of function for acupoints because of the resulting overlap of points."

Chinese research supporting acupuncture is questionable because of political and other factors. Papers cite fantastic cure rates of diverse diseases. Supposed successful use in anesthesia for surgery was actually accompanied by substantial use of other anesthetics and was done on carefully selected patients. Moreover, some claimed "successes" included patients who were moaning, struggling, and interfering with the operations. Procedures for rapid incisions were developed to minimize the associated pain. Also, some people can tolerate the pain of certain operations without anesthesia or acupuncture. Others may feel intense pain but not report it or show it visibly.

"Even at the peak of its popularity in China, acupuncture anesthesia was used in no more than 5 percent of the operations because it usually doesn't work." (Butler, p. 95). "It is not used routinely, but only on the 10% to 15% of people who are suggestible and perhaps easily hypnotizable" (NCAHF Position Paper). A 2002 report indicated usage at 0 to 10% in large Chinese hospitals.

Some individual studies in which acupuncture was ineffective or no more effective than placebo or sham acupuncture (2000-present only):

- Cherkin et al. (*Arch. Intern. Med.* 161, 1081-1088 (2001)) - chronic low back pain
- Leibing et al. (*Pain* 96, 189-196 (2002)) - chronic low back pain
- Kerr et al. (*Clin. J. Pain* 19, 364-370 (2003)) - chronic low back pain
- Irnich et al. (*BMJ* 322, 1574-1577 (2001)) - chronic neck pain (better than massage, but no better than sham laser acupuncture)
- Näslund et al. (*J. Rehab. Med.* 34, 231-238 (2002)) - knee pain
- Goddard et al. (*J. Orofac. Pain* 16, 71-76 (2002)) - myofascial pain
- Assefi et al. (*Ann. Intern. Med.* 143, 10-19 (2005)) - fibromyalgia
- Linde et al. (*JAMA* 293, 2118-2125 (2005)) - migraine
- Bausell et al. (*Eval. Health Prof.* 28, 9-26 (2005)) - pain after dental surgery
- Bullock et al. (*J. Substance Abuse Treatment* 22, 71-77 (2002)) - alcohol dependence
- Margolin et al. (*JAMA* 287, 55-63 (2002)) - cocaine addiction
- Knight et al. (*Obstet. Gynecol.* 97, 184-188 (2001)) - nausea of pregnancy
- Streitberger et al. (*Clin. Cancer Res.* 9, 2538-2544 (2003)) - nausea in chemotherapy
- Streitberger et al. (*Anaesthesia* 59, 142-149 (2004)) - postoperative nausea
- Tarçin et al. (*Turk. J. Gastroenterol.* 15, 258-262 (2004)) - nausea during gastroscopy (electrical stimulation of P6 point)
- Shapira et al. (*Chest* 121, 1396-1400 (2002)) - asthma
- Stavem et al. (*Seizure* 9, 422-426 (2000)) - epilepsy
- Johansson et al. (*Stroke* 32, 707-713 (2001)) - stroke rehabilitation
- Park et al. (*Arch. Intern. Med.* 165, 2026-2031 (2005)) - stroke rehabilitation
- Kvist et al. (*Int. Nurs. Rev.* 51, 56-64 (2004)) - inflammatory symptoms in lactation
- Fireman et al. (*Digestion* 64, 100-103 (2001)) - irritable bowel syndrome

- Ng et al. (*Pediatrics* 114, 1242-1247 (2004)) - allergic rhinitis

In preliminary results released from a large German study of knee or groin pain, acupuncture produced greater improvement than standard therapy but no greater than sham acupuncture.

Reviews and meta-analyses with generally negative conclusions (acupuncture ineffective, or insufficient evidence to conclude that it is effective) (1998-present):

- Ezzo et al. (*Pain* 86, 217-225 (2000)) - chronic pain
- Cherkin et al. (*Ann. Intern. Med.* 138, 896-906 (2003)) - back pain (effectiveness "remains unclear")
- Agency for Healthcare Research and Quality (2003) - fibromyalgia
- Mayer (*Annu. Rev. Med.* 51, 49-63 (2000)) - addiction
- D'alberto (*J. Altern. Complement. Med.* 10, 985-1000 (2004)) - drug abuse
- Medici et al. (*J. Altern. Complement. Med.* 8, 737-750 (2002)) - asthma (but see critique, 751-754)
- Martin et al. (*Eur. Resp. J.* 20, 846-852 (2002)) - asthma
- Park et al. (*Arch. Otolaryngol. Head Neck Surg.* 126, 489-492 (2000)) - tinnitus
- Park et al. (*J. Neurol.* 248, 558-563 (2001)) - stroke rehabilitation
- Sze et al. (*Stroke* 33, 2604-2619 (2002)) - stroke rehabilitation
- Cochrane Collaboration reviews: elbow pain (2002); smoking cessation (2002); menstrual pain (2002); rheumatoid arthritis (2002); asthma (2004); induction of labor (2004) (only one trial, data unsuitable for analysis); Ball's palsy (2004) (quality of trials inadequate to allow conclusions); depression (2005) (insufficient evidence to determine efficacy; study design poor); shoulder pain (2005) (little evidence to support or refute); acute stroke (2005) (number of patients too small); moxibustion for breech presentation (2005)

Ramey and Sampson (*Sci. Rev. Altern. Med.* 5, 195-201 (2001)) reviewed 33 reviews and meta-analyses, 1990 or later, and concluded that "effectiveness could not be established with confidence for any condition studied."

Atwood (*Sci. Rev. Altern. Med.* 8, 29-31 (2004/5)) re-analyzed the data for P6 acupuncture and nausea (considered by Lee and Done, *Anesth. Analg.* 88, 1362-9 (1999)), as well as subsequent studies, and concluded that the evidence did not support effectiveness.

In general, the better designed the study, the smaller have been the beneficial effects.

Role of endorphins controversial. "Even if endorphin release were a real mechanism for acupuncture action, there are simpler and noninvasive ways to cause endorphin release." (NCAHF Position Paper) Moreover, endorphins can be released in response to painful stimuli in general, and, with a limited lifetime in the circulation, it is difficult to see how they could be involved in long-term pain relief (although increased gene expression has been proposed as a mechanism).

"The argument that acupuncture's effectiveness in animals eliminates the placebo explanation ignores the fact that the immobilization necessary to insert the needles in animal subjects has been shown to produce a sort of catatonia/analgesia by itself." (Beyerstein & Sampson (1996) *Skeptical Inquirer*, July/Aug., 18-26)

Has been rejected repeatedly (even in China) on the basis of experience. It "...is not highly regarded within China's scientific community." (Taub in *The Health Robbers*) "None of the approximately 46 major medical journals the Chinese Medical Association publishes is devoted to acupuncture or any of its variations. In Japan and other parts of Asia, acupuncture has been practically rejected." (Ramey and Raso (1999) *Priorities* 11(2))

Kalauokalani et al. (*South Med. J.* 94, 486-492 (2001)) had seven acupuncturists treat the same patient; found considerable variation in the numbers and locations of selected points.

Difficult to control for placebo effect. "Sham" acupuncture works just as well in some studies (although it is difficult to carry out). Experienced patients will be able to tell "real" from "sham" points by the different sensations.

Possible role of distraction in pain relief.

"Chronic pain is often cyclic, with periods of relief. Since people often request help when their pain is most severe, spontaneous improvement may occur independent of the treatment. Most acute (recent onset) pain improves with time and no intervention. Thus, people may report improvement of symptoms from any intervention, even if the method has no effect." (NCAHF Position Paper)

Physical contact in pulse diagnosis may enhance patient feeling of well-being.

Patients may be self-selected (favorably disposed to acupuncture, thus expecting it to work).

Characteristics of pseudoscience

Vague, unscientific terminology and pre-scientific understanding of human anatomy and physiology. There were originally 365 acupuncture points, corresponding to the days of the year.

Meridians do not correspond to any anatomical or physiological entities

Association of some practitioners with other pseudoscientific practices of Eastern medicine, such as animal parts as aphrodisiacs or youth potions, and of practices such as iridology and Kirlian photography.

Alleged energy flow from acupuncturist to patient.

Claim that it is valid because it has been used for thousands of years. (Not only is the logic invalid, but the premise appears to be false. Skeptics who have examined the Chinese literature have concluded that classical "acupuncture" was more like therapeutic phlebotomy, and fine needle acupuncture does not appear in the record until about the 17th century. However, others have concluded that cauterization, rather than lancing, was the precursor of acupuncture.)

In cupping, the vacuum is alleged to suck out bad energy.

Side effects

Infection from unsterilized needles; disease transmission by repeat use of needles. However, sterile, disposable needles are now generally used.

Injury from insertion of needles (e.g. subarachnoid hemorrhage, pneumothorax). Earlier there were many reports of serious complications in the medical literature. However, needles now used are extremely thin (usually 0.3 mm or 30 gauge) and unlikely to cause injury.

A large British survey concluded that "the rate of complications is remarkably low and that most complications are transient, lasting two weeks at most." (*BMJ* 323, 467-8 (2001))

Danger of inhibiting pain without dealing with its underlying cause.

The NIH Consensus Conference

In 1997, the NIH convened a consensus panel on acupuncture. The panel concluded that "there is clear evidence that needle acupuncture treatment is effective for postoperative and chemotherapy nausea and vomiting, nausea of pregnancy, and postoperative dental pain." It also concluded "that there are a number of other pain-related conditions for which acupuncture may be effective as an adjunct therapy, an acceptable alternative, or as part of a comprehensive treatment program, but for which there is less convincing scientific data. These conditions include but are not limited to addiction, stroke rehabilitation, headache, menstrual cramps, tennis elbow, fibromyalgia (general muscle pain), low back pain, carpal tunnel syndrome, and asthma." (NIH press release, Nov. 5, 1997) (*Note: the report represents the conclusions of the panel members; it is not an official position of NIH.*)

However, the report also noted that "there is a paucity of high-quality research assessing efficacy of acupuncture compared with placebo or sham acupuncture. The vast majority of papers studying acupuncture in the biomedical literature consists of case reports, case series, or intervention studies with designs inadequate to assess efficacy." While some studies support use in pain, "there are also studies that do not find efficacy for acupuncture in pain." "Also, particularly in the studies on pain, sham acupuncture often seems to have either intermediate effects between the placebo and 'real' acupuncture points or effects similar to those of the 'real' acupuncture points." It also found no evidence for effectiveness in dealing with smoking addiction.

Skeptics have complained that the conference involved only proponents of acupuncture, and thus was bound to endorse it despite the weakness of the evidence. In his article on the conference (*Scientific Review of Alternative Medicine* 2(1), 54-55 (1998)), W. Sampson asked, "if 'sham' points can be almost anywhere on the body, and if 'real' acupuncture and 'sham' acupuncture show no consistent, significant differences, then why use 'real' acupuncture at all?" He further noted:

The Consensus Conference underplayed the most obvious and probable reasons for perceived effects. Those are natural history of disease, regression to the mean, suggestion, counter-irritation, distraction, expectation, consensus, the Stockholm effect (identifying with and aiding the desires of a dominant figure), fatigue, habituation, ritual, reinforcement, and other well-known psychological mechanisms.

Mayer (*Annu. Rev. Med.* 51, 49-63 (2000)) reviewed the literature with particular attention to the data considered by the Consensus panel, and found the case for acupuncture less convincing than did the panel. He wrote:

My conclusions partially support those of the NIHCDP. There is evidence that acupuncture is effective for the treatment of postoperative and chemotherapy-induced nausea and vomiting. Also, some data indicate that acupuncture maybe useful for headache, low back pain, alcohol dependence, and paralysis resulting from stroke...For most of the remaining conditions, there is little evidence that acupuncture is either effective or ineffective.

and in another section:

...some of the conclusions of the NIHCDP are either misleading..., difficult to interpret..., or supported by data insufficient to indicate other than experimental use...

QI GONG

Background

Part of traditional Chinese medicine. "Qi Gong...is an ancient skill in which Buddhism, Taoism, and traditional Chinese medicine and the martial arts have been combined for therapeutic effect. Its practitioners say they are able to concentrate their Qi...in particular parts of their body. From there it can be transmitted to other objects --- rocks, floor tiles, gallstones, painful knees, bad hearts." (Brown, *Washington Post*, Sept. 3, 1993)

"It is based on the premise that 'Qi'...can be developed and directed by Qi Gong exercises ...these exercises activate the Qi...so that a person is in what they call the Qi Gong state. The Qi must be balanced for too little Qi is equivalent to illness." (Mechcatie, *Medical News*, March 31, 1986)

Practice and scope

Internal qi gong - includes deep breathing exercises, posture exercises, stylized body movements, visualization, and meditation. Less strenuous and methodical than tai chi (see below).

"Each exercise involves several postures that, according to tradition, focus qi on a particular organ or region of the body." (B. Stone, *Newsweek*, July 28, 1997)

External qi gong - a "qi master" is said to be able to emit energies that can be transmitted to the subject (without touching directly). Claimed to be able to cure cancer and AIDS. Even said that one can receive benefits by watching a videotape of qi gong.

Critique

Lack of well-documented studies for what are (in the case of external qi gong) extraordinary claims.

Mayer (*J. Altern. Complementary Med.* 5, 371-382 (1999)) noted that "many of the studies of qigong practice and hypertension are flawed," but concluded that "The weight of the evidence suggests that practicing qigong may have a positive effect on hypertension."

Representatives of the Committee for the Scientific Investigation of Claims of the Paranormal (CSICOP) tested several qi gong masters during a visit to China in 1988 (see reading list). The masters were unable to demonstrate their alleged powers under controlled conditions. Similarly, qi gong masters in North America cannot perform for skeptics.

A series of in vitro tests of external qi gong by Yount found no significant results.

Characteristics of pseudoscience

Undefined, non-measurable "energy" or "life force."

Claims for external qi gong violate laws of physics.

Said that skeptics cannot acquire the ability to perform it.

TAI CHI

System of exercises involving slow, gentle movements. "It combines deep diaphragmatic breathing and relaxation with many fundamental postures that flow imperceptibly and smoothly from one to the other through slow, gentle, graceful movements" (Wang et al., *Arch. Intern. Med.* 164, 493-501 (2004)).

Supposedly opens blocked channels to stimulate the flow of qi. Some scientific investigations suggest that it may provide various benefits, such as decreased blood pressure, improved strength and coordination in the elderly, reduced chance of sports injuries, decreased arthritis pain, and increased immunity. It is also a way to deal with stress, having aspects similar to meditation. The review by Wang et al. (*ibid*) concluded that it "appears to have physiological and psychosocial benefits and also appears to be safe and effective in

promoting balance control, flexibility, and cardiovascular fitness in older patients with chronic conditions. However, limitations or biases exist in most studies, and it is difficult to draw firm conclusions about the benefits reported.”

CHINESE AND JAPANESE HERBALISM

"At least 7,000 plant species are used as medicines in China. Of the 150 most commonly used species, ten are poisonous at 'doses' recommended by herbalists. Unquestionably, many of these thousands of plant species have at least marginal therapeutic utility, but the pre-scientific system that guides their use is unreliable." (Raso)

Chinese “herbs” include not just plant material but also animal parts and minerals. “Animal substances include: antelope and deer horn, donkey skin gelatin, earthworms, human placenta, bat feces, cicada exoskeleton, wingless cockroach, bear gallbladder, charred human hair, and seal penis.” (Bill Burley in Healthfraud e-mail list)

Herbs are often given in combination, so effect, if any, of one component is difficult to establish. The descriptions of the components are often inadequate (e.g., Chinese names whose translation is ambiguous, or general words that could describe thousands of plant species). Thus, one does not know for sure what the remedy consists of.

Some Chinese herbal preparations have been found to be contaminated with heavy metals, or adulterated with conventional drugs. Fatal cases of hepatitis arising from Chinese herbs have been reported. (see also handout on herbs)

Studies supported the effectiveness of Chinese formulations for irritable bowel syndrome (Bensoussans et al. (1998) *JAMA* 280, 1585-1589), allergic rhinitis (Hu et al. (2002) *Ann. Allergy Asthma Immunol.* 88, 478-487) and asthma (Wen et al. (2005) *J. Allergy Clin. Immunol.* 116, 517-524).

A review of trials of Chinese herbal medicine for hepatitis B found encouraging results, though the quality of the studies was poor (McCulloch et al. (2002) *Am. J. Public Health* 92, 1619-1627). A study of treatment of hepatitis C did not find benefits (Jakkula et al., *Arch. Intern. Med.* 164, 1341-1346 (2004)).

Japan has its own traditional herbal medical system, *kampo*.

AYURVEDIC MEDICINE (AYUR VEDA)

Background

Healing tradition from India, going back thousands of years. Name from *ayur* (or *ayu*) (life, life-span), *veda* (knowledge, science)

"Vedic medicine developed as a combination of religious, magical, and empirical views and practices. The causes of disease include sin, violation of a norm, the unjust cursing of a fellow man, and the wrongs committed by one's parents or by 'oneself' in a previous incarnation. Disease is either punishment meted out by the gods directly or through demons, or the result of witchcraft. Remedies include prayer, sacrifice, magic, exorcism, and water as a 'purifier.'" (Raso, *Mystical Diets*)

In India, over 200 colleges offer degrees, and over 450,000 practitioners, of ayurveda and other traditional systems. Government-sponsored research. Official interactions with World Health Organization and UNICEF.

Pharmacopeia with thousands of plants and plant derivatives

Promoted in the U.S. by Maharishi Mahesh Yogi's Transcendental Meditation organization as "Maharishi Ayur-Veda." Maharishi University of Management (Fairfield, IA) conducts research on ayurvedic medicine. However, Viswanathan and Raso (*Priorities* 12(2), 2000) wrote, "What passes for Ayurveda in the Western Hemisphere may have little relation to Ayurveda of the traditional kind...While the trend in India is somewhat to technologize the practice of classical Ayurveda, the trend in developed countries of the West is to mysticize and supernaturalize classical Ayurveda itself."

Author *Deepak Chopra*, M.D. (*Quantum Healing; Perfect Health; Ageless Body, Timeless Mind*) became prominent with the Maharishi group, and then established his own center in California.

Principles

Body composed of five elements: earth, air, fire, water, ether. Combinations of these produce three "humors" or *doshas*: *pitta*, *kapha*, and *vata*.

Vata relates to movement, circulation, nerve impulses and respiration. *Kapha* has to do with solidarity, muscularity and physical strengths, while *pitta* is associated with digestion and metabolism. (NCAHF, "Ayurvedic Medicine/TM")

"*Doshas* are constantly being formed and reformed by food, activity, and bodily processes" (NCCAM, "What is Ayurvedic Medicine"). Individuals are classified into types characterized by a predominant *dosha*. The "constitution" of an individual is referred to as the *prakriti*. Excess or deficiency of a *dosha* results in disease (e.g., *kapha* imbalance predisposes one to atherosclerosis).

The *vata dosha* is thought to be a combination of the elements space and air. It is considered the most powerful *dosha* because it controls very basic body processes such as cell division, the heart, breathing, and the mind. *Vata* can be thrown out of balance by, for example, staying up late at night, eating dry fruit, or eating before the previous meal is digested. People with *vata* as their main *dosha* are thought to be especially susceptible to skin, neurological, and mental diseases. (NCCAM)

Treatments aim to balance the *doshas*. In addition to *doshas*, the body is composed of seven basic tissues plus the waste products (feces, urine, sweat).

"Maharishi Ayur-Veda emphasizes host factors, particularly imbalances resulting from disruption of homeostatic or immune mechanisms, as the primary factor in the etiology of disease. It also places importance on mental and emotional factors, which it sees as critical to the development of these imbalances." (Sharma et al. (1991) *JAMA* 265, 2633-7)

Practice and scope

Emphasis on healthy lifestyle

Pulse diagnosis to detect diseases and imbalances (even in latent stages). In addition to a general physical exam and pulse diagnosis, there is examination of the urine, feces, tongue, eyes, skin and ears.

Types of treatment:

- *Treatment of the mind*: meditation (e.g., Transcendental Meditation), reduction of stress
- *Treatment of the body*: "These approaches include the use of diet, exercise, herbs, sensory modalities, and *panchakarma* (purification procedures that consist of medicated oil massages, herbalized heat treatments, and elimination therapies)." (Sharma et al.) The latter include enemas to "flush the loosened *doshas* out through the intestinal tract." (Chopra, quoted by Raso)
- *Treatment of behavior*: keeping of daily and seasonal routines related to health

Another classification of treatments (from indianmedicine.nic.in):

- *Shodhana* therapy (Purification Treatment)
- *Shamana* therapy (Palliative Treatment)
- *Pathya Vyavastha* (Prescription of diet and activity)
- *Nidan Parivarjan* (Avoidance of disease causing and aggravating factors)
- *Satvavajaya* (Psychotherapy)
- *Rasayana* therapy (use of immunomodulators and rejuvenation medicines)

“Vital points therapy and/or massage may be used to reduce pain, lessen fatigue, or improve circulation. Ayurveda proposes that there are 107 ‘vital points’ in the body where life energy is stored, and that these points may be massaged to improve health.” (NCCAM)

Foods classified by effects on doshas. Are not to be eaten in the season in which the dosha predominates. Emphasis on fresh fruits and vegetables, grains, nuts, high-fiber foods.

Herbal treatments: plant parts to be used in entirety to prevent toxic side effects of active ingredient.

“Because of putative synergistic effects, multiple herbs are often combined in a single preparation.” (Nader et al. (2000) *Behavioral Med.* 26, 34-46)

Herbal compounds called *rasayanas* said to increase longevity and resistance to disease.

Guggul is used for obesity and high cholesterol, triphala for constipation, and turmeric for various conditions.

Two examples of oil treatments, described in *Time*, November 4, 1991: "A 20-minute drip of warm, herb-infused oil is helpful to those suffering from insomnia, hypertension and digestive problems." "...therapists will pour warm sesame oil over your body to release toxins and blocked energy."

Vedic sound therapy: "...listening to traditional recitations of selected portions of the classical Veda and Vedic literature, which have been suggested to correspond to specific areas of the human physiology and to promote homeostatic self-repair processes in those respective areas." (Nader)

Arguments in support:

Some herbs used in traditional Ayur Veda have been shown to contain pharmacologically useful compounds. Studies in support of antitumor effects of rasayana compounds; of herbal treatments for various diseases.

Studies in support of meditation for general improvement of health; for reduction of hypertension and cholesterol

Arguments against:

Doshas do not correspond to known physiological entities

Dubious claims concerning ability to diagnose metabolic diseases through pulse. "Ayurvedic practitioners utilize methods similar to those of fortune tellers relying upon 'cold reading,' ...multiple choice fishing expeditions to elicit information..." (NCAHF, "Ayurvedic Medicine/TM")

Poor quality of some of favorable research. "Most clinical trials of Ayurvedic approaches have been small, had problems with research designs, lack appropriate control groups, or had other issues that affected how meaningful the results were." (NCCAM)

Herbal treatments may have dangerous side effects. Some have carcinogenic or toxic components; contamination by heavy metals is widespread. In some cases, heavy metals are used intentionally. In 2005, Health Canada issued a warning for consumers not to use 12 Ayurvedic products because of their contents of lead, mercury, and/or cadmium.

A trial of guggulipid found that it did *not* reduce cholesterol and may actually *increase* LDL (Szapary et al. (2003) *JAMA* 290, 765-772). It may also induce cytochrome P450, reducing the effectiveness of other drugs.

In response to a criticism that "The evidence is not there," Deepak Chopra replied, "So we become fanatical about scientifically validating everything. To tell you the truth, I don't care." "48 Hours," 1/12/95). He has also compared "gut feelings" favorably to rational thinking.

Characteristics of pseudoscience

Nonscientific, unmeasurable concepts (motion, flow, imbalances, etc.)

Contains religious and metaphysical concepts. "Since Ayurveda attributes many diseases to demons and astrological influences, it is not surprising that incantations, amulets, spells, and mantras are commonly used as remedies." (Butler, p. 112) "Ayurveda is considered to have divine origin..." (indianmedicine.nic.in)

Astrological component: "The Vedic approach to the patient considers that the individual is in a dynamic state of equilibrium with the entire environment, extending to the universe as a whole, including the influences of the cycles and rhythms of the sun, moon, stars, and planets." (Nader)

Primitive folk remedies involving blood, urine, feces, and body parts from animals.

False claims that Maharishi Ayur-Veda is supported by quantum physics. Deepak Chopra also has made invalid statements related to physics, as well as other pseudoscientific claims.

OTHER MEDICAL TRADITIONS OF INDIA

In addition to Ayurveda, other forms of medicine in India include yoga, Siddha and Unani; all of these have official government recognition (along with homeopathy and naturopathy). Quotes in this section are from the government web site indianmedicine.nic.in unless otherwise noted.

While **yoga** is commonly thought (in the U.S.) to be a merely a program of exercise, in the Indian tradition it is an entire philosophy. It is thought to provide various benefits, such as relaxation and reduction of hypertension. Therapeutic yoga "incorporates poses (asanas), breathing ("pranayama") and meditation techniques to improve quality of life and manage symptoms of various diseases, chronic conditions and illnesses - including asthma, back pain, fibromyalgia, depression and cancer" (J. Stein, Los Angeles Times (2004)). "Unlike hatha and ashtanga, more mainstream yoga practices, kundalini doesn't focus on holding static poses. Movement is dynamic, constant and often paired with a shallow, quick breath called 'breath of fire.'...The theory is, there's a coil of energy at the base of the spine that can be moved and freed through kundalini exercises...The 'breath of fire' supposedly helps balance the body's systems and detoxify the internal organs." (T. Ikenberg, Louisville Courier-Journal (2004)). In 2005 two studies reported evidence for benefits of yoga in treating chronic low back pain (Williams et al., *Pain* 115, 107-117; Sherman et al., *Ann. Intern. Med.* 143, 849-856). Some claimed benefits for yoga are, however, incredible.

The **Siddha** system "developed within the Dravidian culture, which is of the pre-vedic period...Like Ayurveda, this system believes that all objects in the universe including human body are composed of five basic elements namely, earth, water, fire, air and sky...As in Ayurveda, This system also considers the human body

as a conglomeration of three humours, seven basic tissues and the waste products of the body...This system also deals with the concept of salvation in life..." Among the drugs there is an emphasis on metals and minerals (including mercury), with roots in alchemy.

Rather than being indigenous, **Unani** is based on ancient Greek ideas that were brought to India by the Arabs in the 1300's. "Unani Medicine is based on the Greece philosophy. According to Basic Principals of Unani the body is made up of the four Basic elements i.e. Earth, Air, Water, Fire...The body have the Simple and Compound Organs which got their nourishment through four Humours i.e. Blood, Phlegm, Yellow Bile, Black Bile...Diseases are mainly diagnosed with the help of Pulse (Nabz), physical examination of the Urine and Stool." Treatments include regimenal therapy (e.g., exercise, massage, Turkish bath, douches); diet therapy; pharmacotherapy (mostly with herbal medicine); and surgery.