Acupuncture

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Acupuncture[note 1] is a form of alternative medicine[2] in which thin needles are inserted into the body.[3] It is a key component of traditional Chinese medicine (TCM).[4] TCM theory and practice are not based upon scientific knowledge,[5] and acupuncture is a pseudoscience.[6][7] There is a diverse range of acupuncture theories based on different philosophies,[8] and techniques vary depending on the country.[9] The method used in TCM is likely the most widespread in the US.[2] It is most often used for pain relief,[10][11] though it is also used for a wide range of other conditions.[4] Acupuncture is generally used only in combination with other forms of treatment.[12]

Acupuncture

Needles being inserted into a person's skin

Alternative therapy

Benefits	Placebo
MeSH	D015670
ICD-10-PCS	[1] (http://www.icd10data.com/ICD10PCS/Codes/)
ICD-9	99.91 (http://icd9cm.chrisendres.com/index.php?srchtype=procs&srchtext=99.91&Submit=Search&action=search) -99.92 (http://icd9cm.chrisendres.com/index.php?srchtype=procs&srchtext=99.92&Submit=Search&action=search)
OPS-301 code	8-975 (http://ops.icd-code.de/ops/code/8-975.html).2

The conclusions of many trials and numerous systematic reviews of acupuncture are largely inconsistent.[10][13] An overview of Cochrane reviews found that acupuncture is not effective for a wide range of conditions, and it suggests acupuncture may be effective only for chemotherapy-induced nausea/vomiting, postoperative nausea/vomiting, and idiopathic headache.[13] An overview of high-quality Cochrane reviews suggests that acupuncture may alleviate certain kinds of pain.[14] A systematic review of systematic reviews found little evidence of acupuncture's effectiveness in treating pain.[10] The evidence suggests that short-term treatment with acupuncture does not produce long-term benefits.[15] Some research results suggest acupuncture can alleviate pain, though the majority of research suggests

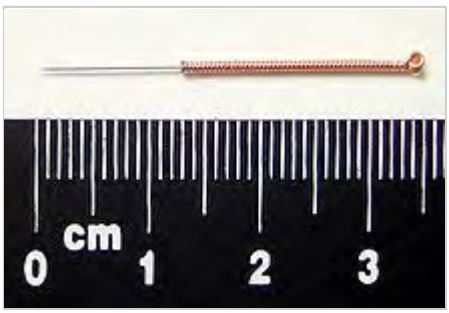
that acupuncture's effects are mainly due to placebo.[9] A systematic review concluded that the analgesic effect of acupuncture seemed to lack clinical relevance and could not be clearly distinguished from bias.[16]

Acupuncture is generally safe when done by an appropriately trained practitioner using clean needle technique and single-use needles.[17][18] When properly delivered, it has a low rate of mostly minor adverse effects.[3][17] Accidents and infections are associated with infractions of sterile technique or neglect of the practitioner.[18] A review stated that the reports of infection transmission increased significantly in the prior decade.[19] The most frequently reported adverse events were pneumothorax and infections.[10] Since serious adverse events continue to be reported, it is recommended that acupuncturists be trained sufficiently to reduce the risk.[10] A meta-analysis found that acupuncture for chronic low back pain was cost-effective as an adjunct to standard care,[20] while a systematic review found insufficient evidence for the cost-effectiveness of acupuncture in the treatment of chronic low back pain.[21]

Scientific investigation has not found any histological or physiological evidence for traditional Chinese concepts such as *qi*, meridians, and acupuncture points,[n 1][25] and many modern practitioners no longer support the existence of life force energy (*qi*) flowing through meridians, which was a major part of early belief systems.[8][26][27] Acupuncture is believed to have originated around 100 BC in China, around the time *The Yellow Emperor's Classic of Internal Medicine* (Huangdi Neijing) was published,[28] though some experts suggest it could have been practiced earlier.[9] Over time, conflicting claims and belief systems emerged about the effect of lunar, celestial and earthly cycles, yin and yang energies, and a body's "rhythm" on the effectiveness of treatment.[29] Acupuncture grew and diminished in popularity in China repeatedly, depending on the country's political leadership and the favor of rationalism or Western medicine.[28] Acupuncture spread first to Korea in the 6th century AD, then to Japan through medical missionaries,[30] and then to Europe, starting with France.[28] In the 20th century, as it spread to the United States and Western countries, the spiritual elements of acupuncture that conflict with Western beliefs were abandoned in favor of tapping needles into nerves.[28][31][32]

Contents

Clinical practice



One type of acupuncture needle

Acupuncture is a form of alternative medicine.[2] It is commonly used for pain relief,[10][11] though it is also used to treat a wide range of conditions.[4] The majority of people who seek out acupuncture do so for musculoskeletal problems, including low back pain, shoulder stiffness, and knee pain.[33] Acupuncture is generally only used in combination with other forms of treatment.[12] For example, American Society of Anesthesiologists states it may be considered in the treatment for nonspecific, noninflammatory low back pain only in conjunction with conventional therapy.[34]

Acupuncture is the insertion in the skin of thin needles.[3] According to the Mayo Foundation for Medical Education and Research (Mayo Clinic), a typical session entails lying still while approximately five to twenty needles are inserted; for the majority of cases, the needles will be left in place for ten to twenty minutes.[35] It can be associated with the application of heat, pressure, or laser light.[3] Classically, acupuncture is individualized and based on philosophy and intuition, and not on scientific research.[36] There is also a non-invasive therapy developed in early 20th century Japan using an elaborate set of "needles" for the treatment of children (*shōnishin* or *shōnihari*).[37][38]

Clinical practice varies depending on the country.[9][39] A comparison of the average number of patients treated per hour found significant differences between China (10) and the United States (1.2).[40] Chinese herbs are often used.[41] There is a diverse range of acupuncture approaches, involving different philosophies.[8] Although various different techniques of acupuncture practice have emerged, the method used in traditional Chinese medicine (TCM) seems to be the most widely adopted in the US.[2] Traditional acupuncture involves needle insertion, moxibustion, and cupping therapy,[17] and may be accompanied by other procedures such as feeling the pulse and other parts of the body and examining the tongue.[2] Traditional acupuncture involves the belief that a "life force" (*qi*) circulates within the body in lines called meridians.[42] The main methods practiced in the UK are TCM and Western medical acupuncture.[43] The term Western medical acupuncture is used to indicate an adaptation of TCM-based acupuncture which focuses less on TCM.[42][44] The Western medical acupuncture approach involves using acupuncture after a medical diagnosis.[42] Limited research has compared the contrasting acupuncture systems used in various countries for determining different acupuncture points and thus there is no defined standard for acupuncture points.[45]

In traditional acupuncture, the acupuncturist decides which points to treat by observing and questioning the patient to make a diagnosis according to the tradition used. In TCM, the four diagnostic methods are: inspection, auscultation and olfaction, inquiring, and palpation. Inspection focuses on the face and particularly on the tongue, including analysis of the tongue size, shape, tension, color and coating, and the absence or presence of teeth marks around the edge.[46] Auscultation and olfaction involves listening for particular sounds such as wheezing, and observing body odor.[46] Inquiring involves focusing on the "seven inquiries": chills and fever; perspiration; appetite, thirst and taste; defecation and urination; pain; sleep; and menses and leukorrhea.[46] Palpation is focusing on feeling the body for tender *"A-shi"* points and feeling the pulse.[46]

Needles

The most common mechanism of stimulation of acupuncture points employs penetration of the skin by thin metal needles, which are manipulated manually or the needle may be further stimulated by electrical stimulation (electroacupuncture).[2] Acupuncture needles are typically made of stainless steel, making them flexible and preventing them from rusting or breaking.[47] Needles are usually disposed of after each use to prevent contamination.[47] Reusable needles when used should be sterilized between applications.[47][48] Needles vary in length between 13 to 130 millimetres (0.51 to 5.12 in), with shorter needles used near the face and eyes, and longer needles in areas with thicker tissues; needle diameters vary from 0.16 mm (0.006 in) to 0.46 mm (0.018 in),[49] with thicker needles used on

Acupuncture needles

more robust patients. Thinner needles may be flexible and require tubes for insertion. The tip of the needle should not be made too sharp to prevent breakage, although blunt needles cause more pain.[50]

Apart from the usual filiform needle, other needle types include three-edged needles and the Nine Ancient Needles.[49] Japanese acupuncturists use extremely thin needles that are used superficially, sometimes without penetrating the skin, and surrounded by a guide tube (a 17th-century invention adopted in China and the West). Korean acupuncture uses copper needles and has a greater focus on the hand.[39]

Traditional and modern Japanese guiding tube needles

Needling technique

Insertion

The skin is sterilized and needles are inserted, frequently with a plastic guide tube. Needles may be manipulated in various ways, including spinning, flicking, or moving up and down relative to the skin. Since most pain is felt in the superficial layers of the skin, a quick insertion of the needle is recommended.[51] Often the needles are stimulated by hand in order to cause a dull, localized, aching sensation that is called *de qi*, as well as "needle grasp," a tugging feeling felt by the acupuncturist and generated by a mechanical interaction between the needle and skin.[2] Acupuncture can be painful.[52] The skill level of the acupuncturist may influence how painful the needle insertion is, and a sufficiently skilled practitioner may be able to insert the needles without causing any pain.[51]

De-qi sensation

De-qi (Chinese: 得气; pinyin: *dé qì*; "arrival of qi") refers to a sensation of numbness, distension, or electrical tingling at the needling site which might radiate along the corresponding meridian. If *de-qi* can not be generated, then inaccurate location of the acupoint, improper depth of needle insertion, inadequate manual manipulation, or a very weak constitution of the patient can be considered, all of which are thought to decrease the likelihood of successful treatment. If the *de-qi* sensation does not immediately occur upon needle insertion, various manual manipulation techniques can be applied to promote it (such as "plucking", "shaking" or "trembling").[53]

Once *de-qi* is achieved, further techniques might be utilized which aim to "influence" the *de-qi*; for example, by certain manipulation the *de-qi* sensation allegedly can be conducted from the needling site towards more distant sites of the body. Other techniques aim at "tonifying" (Chinese: 补; pinyin: *bǔ*) or "sedating" (Chinese: 泄; pinyin: *xiè*) *qi*.[53] The former techniques are used in deficiency patterns, the latter in excess patterns.[53] *De qi* is more important in Chinese acupuncture, while Western and Japanese patients may not consider it a necessary part of the treatment.[39]

Related practices


Acupressure being applied to a hand.


Japanese moxibustion

- Acupressure, a non-invasive form of bodywork, uses physical pressure applied to acupressure points by the hand or elbow, or with various devices.[54]
- Acupuncture is often accompanied by moxibustion, the burning of cone-shaped preparations of moxa (made from dried mugwort) on or near the skin, often but not always near or on an acupuncture point. Traditionally, acupuncture was used to treat acute conditions while moxibustion was used for chronic diseases. Moxibustion could be direct (the cone was placed directly on the skin and allowed to burn the skin, producing a blister and eventually a scar), or indirect (either a cone of moxa was placed on a slice of garlic, ginger or other vegetable, or a cylinder of moxa was held above the skin, close enough to either warm or burn it).[55]
- Cupping therapy is an ancient Chinese form of alternative medicine in which a local suction is created on the skin; practitioners believe this mobilizes blood flow in order to promote healing.[56]
- Tui na is a TCM method of attempting to stimulate the flow of *qi* by various bare-handed techniques that do not involve needles.[57]
- Electroacupuncture is a form of acupuncture in which acupuncture needles are attached to a device that generates continuous electric pulses (this has been described as "essentially transdermal electrical nerve stimulation [TENS] masquerading as acupuncture").[58]
- Fire needle acupuncture also known as fire needling is a technique which involves quickly inserting a flame-heated needle into areas on the body.[59]
- Sonopuncture is a stimulation of the body similar to acupuncture using sound instead of needles.[60] This may be done using purpose-built transducers to direct a narrow ultrasound beam to a depth of 6–8 centimetres at acupuncture meridian points on the body.[61] Alternatively, tuning forks or other sound emitting devices are used.[62]
- Acupuncture point injection is the injection of various substances (such as drugs, vitamins or herbal extracts) into acupoints.[63]
- Auriculotherapy, commonly known as ear acupuncture, auricular acupuncture, or auriculoacupuncture, is considered to date back to ancient China. It involves inserting needles to stimulate points on the outer ear.[64] The modern approach was developed in France during the early 1950s.[64] There is no scientific evidence that it can cure disease; the evidence of effectiveness is negligible.[64]

- Scalp acupuncture, developed in Japan, is based on reflexological considerations regarding the scalp. Hand acupuncture, developed in Korea, centers around assumed reflex zones of the hand. Medical acupuncture attempts to integrate reflexological concepts, the trigger point model, and anatomical insights (such as dermatome distribution) into acupuncture practice, and emphasizes a more formulaic approach to acupuncture point location.[65]
- Cosmetic acupuncture is the use of acupuncture in an attempt to reduce wrinkles on the face.[66]
- Bee venom acupuncture is a treatment approach of injecting purified, diluted bee venom into acupoints.[67]
- A 2006 review of veterinary acupuncture found that there is insufficient evidence to "recommend or reject acupuncture for any condition in domestic animals".[68] Rigorous evidence for complementary and alternative techniques is lacking in veterinary medicine but evidence has been growing.[69]

A woman receiving fire cupping in China.

Effectiveness

Sham acupuncture and research

It is difficult but not impossible to design rigorous research trials for acupuncture.[70][71] Due to acupuncture's invasive nature, one of the major challenges in efficacy research is in the design of an appropriate placebo control group.[72][73] For efficacy studies to determine whether acupuncture has specific effects, "sham" forms of acupuncture where the patient, practitioner, and analyst are blinded seem the most acceptable approach.[70] Sham acupuncture uses non-penetrating needles or needling at non-acupuncture points,[74] e.g. inserting needles on meridians not related to the specific condition being studied, or in places not associated with meridians.[75] The under-performance of acupuncture in such trials may indicate that therapeutic effects are due entirely to non-specific effects, or that the sham treatments are not inert, or that systematic protocols yield less than optimal treatment.[76][77]

A 2014 *Nature Reviews Cancer* review article found that "contrary to the claimed mechanism of redirecting the flow of *qi* through meridians, researchers usually find that it generally does not matter where the needles are inserted, how often (that is, no dose-response effect is observed), or even if needles are actually inserted. In other words, 'sham' or 'placebo' acupuncture generally produces the same effects as 'real' acupuncture and, in some cases, does better."[78] A 2013 meta-analysis found little evidence that the effectiveness of acupuncture on pain (compared to sham) was modified by the location of the needles, the number of needles used, the experience or technique of the practitioner, or by the circumstances of the sessions.[79] The same analysis also suggested that the number of needles and sessions is important, as greater numbers improved the outcomes of acupuncture compared to non-acupuncture controls.[79] There has been little systematic investigation of which components of an acupuncture session may be important for any therapeutic effect, including needle placement and depth,

type and intensity of stimulation, and number of needles used.[76] The research seems to suggest that needles do not need to stimulate the traditionally specified acupuncture points or penetrate the skin to attain an anticipated effect (e.g. psychosocial factors).[2]

A response to "sham" acupuncture in osteoarthritis may be used in the elderly, but placebos have usually been regarded as deception and thus unethical.[80] However, some physicians and ethicists have suggested circumstances for applicable uses for placebos such as it might present a theoretical advantage of an inexpensive treatment without adverse reactions or interactions with drugs or other medications.[80] As the evidence for most types of alternative medicine such as acupuncture is far from strong, the use of alternative medicine in regular healthcare can present an ethical question.[81]

Using the principles of evidence-based medicine to research acupuncture is controversial, and has produced different results.[72] Some research suggests acupuncture can alleviate pain but the majority of research suggests that acupuncture's effects are mainly due to placebo.[9] Evidence suggests that any benefits of acupuncture are short-lasting.[15] There is insufficient evidence to support use of acupuncture compared to mainstream medical treatments.[82] Acupuncture is not better than mainstream treatment in the long term.[75]

Publication bias

Publication bias is cited as a concern in the reviews of randomized controlled trials (RCTs) of acupuncture.[58][83][84] A 1998 review of studies on acupuncture found that trials originating in China, Japan, Hong Kong, and Taiwan were uniformly favourable to acupuncture, as were ten out of eleven studies conducted in Russia.[85] A 2011 assessment of the quality of RCTs on TCM, including acupuncture, concluded that the methodological quality of most such trials (including randomization, experimental control, and blinding) was generally poor, particularly for trials published in Chinese journals (though the quality of acupuncture trials was better than the trials testing TCM remedies).[86] The study also found that trials published in non-Chinese journals tended to be of higher quality.[86] Chinese authors use more Chinese studies, which have been demonstrated to be uniformly positive.[87] A 2012 review of 88 systematic reviews of acupuncture published in Chinese journals found that less than half of these reviews reported testing for publication bias, and that the majority of these reviews were published in journals with impact factors of zero.[88]

Specific conditions

Pain

The conclusions of many trials and numerous systematic reviews of acupuncture are largely inconsistent with each other.[13] A 2011 overview of high-quality Cochrane reviews suggests that acupuncture is effective for certain types of pain.[14] A 2011 systematic review of systematic reviews found that for reducing pain, real acupuncture was no better than sham acupuncture, and concluded that numerous reviews have shown little convincing evidence that acupuncture is an effective treatment for reducing

pain.[10] The same review found that neck pain was one of only four types of pain for which a positive effect was suggested, but cautioned that the primary studies used carried a considerable risk of bias.[10] A 2009 overview of Cochrane reviews found acupuncture is not effective for a wide range of conditions, and suggested that it may be effective for only chemotherapy-induced nausea/vomiting, postoperative nausea/vomiting, and idiopathic headache.[13]

A 2014 systematic review suggests that the nocebo effect of acupuncture is clinically relevant and that the rate of adverse events may be a gauge of the nocebo effect.[89] According to the 2014 *Miller's Anesthesia* book, "when compared with placebo, acupuncture treatment has proven efficacy for relieving pain".[45] A 2012 meta-analysis conducted by the Acupuncture Trialists' Collaboration found "relatively modest" efficiency of acupuncture (in comparison to sham) for the treatment of four different types of chronic pain (back and neck pain, knee osteoarthritis, chronic headache, and shoulder pain) and on that basis concluded that it "is more than a placebo" and a reasonable referral option.[90] Commenting on this meta-analysis, both Edzard Ernst and David Colquhoun said the results were of negligible clinical significance.[91][92] Edzard Ernst later stated that "I fear that, once we manage to eliminate this bias [that operators are not blind] … we might find that the effects of acupuncture exclusively are a placebo response."[93] Andrew Vickers, lead author of the original 2012 paper and chair of the *Acupuncture Trialists' Collaboration*, rejects that analysis, stating that the differences between acupuncture and sham acupuncture are statistically significant.[93]

A 2010 systematic review suggested that acupuncture is more than a placebo for commonly occurring chronic pain conditions, but the authors acknowledged that it is still unknown if the overall benefit is clinically meaningful or cost-effective.[94] A 2010 review found real acupuncture and sham acupuncture produce similar improvements, which can only be accepted as evidence against the efficacy of acupuncture.[95] The same review found limited evidence that real acupuncture and sham acupuncture appear to produce biological differences despite similar effects.[95] A 2009 systematic review and meta-analysis found that acupuncture had a small analgesic effect, which appeared to lack any clinical importance and could not be discerned from bias.[16] The same review found that it remains unclear whether acupuncture reduces pain independent of a psychological impact of the needling ritual.[16] A 2016 Cochrane review found moderate quality evidence that real acupuncture was more effective than sham acupuncture or inactive for short-term relief of neck pain measured either upon completion of treatment or at short-term follow-up.[96]

Low back

A 2013 meta-analysis found that acupuncture was better than no treatment for reducing lower back pain, but not better than sham acupuncture, and concluded that the effect of acupuncture "is likely to be produced by the nonspecific effects of manipulation".[97] A 2013 systematic review found supportive evidence that real acupuncture may be more effective than sham acupuncture with respect to relieving lower back pain, but there were methodological limitations with the studies.[98] A 2013 systematic review found that acupuncture may be effective for nonspecific lower back pain, but the authors noted there were limitations in the studies examined, such as heterogeneity in study characteristics and low

methodological quality in many studies.[99] A 2012 systematic review found some supporting evidence that acupuncture was more effective than no treatment for chronic non-specific low back pain; the evidence was conflicting comparing the effectiveness over other treatment approaches.[12] A 2011 overview of Cochrane reviews found inconclusive evidence regarding acupuncture efficacy in treating low back pain.[14] A 2011 systematic review of systematic reviews found that "for chronic low back pain, individualized acupuncture is not better in reducing symptoms than formula acupuncture or sham acupuncture with a toothpick that does not penetrate the skin."[10] A 2010 review found that sham acupuncture was as effective as real acupuncture for chronic low back pain.[2] The specific therapeutic effects of acupuncture were small, whereas its clinically relevant benefits were mostly due to contextual and psychosocial circumstances.[2] Brain imaging studies have shown that traditional acupuncture and sham acupuncture differ in their effect on limbic structures, while at the same time showed equivalent analgesic effects.[2] A 2005 Cochrane review found insufficient evidence to recommend for or against either acupuncture or dry needling for acute low back pain.[100] The same review found low quality evidence for pain relief and improvement compared to no treatment or sham therapy for chronic low back pain only in the short term immediately after treatment.[100] The same review also found that acupuncture is not more effective than conventional therapy and other alternative medicine treatments.[100]

Headaches and migraines

Two separate 2016 Cochrane reviews found that acupuncture could be useful in the prophylaxis of tension-type headaches and episodic migraines.[101][102] The 2016 Cochrane review evaluating acupuncture for episodic migraine prevention concluded that true acupuncture had a small effect beyond sham acupuncture and found moderate-quality evidence to suggest that acupuncture is at least similarly effective to prophylactic medications for this purpose.[102] A 2012 review found that acupuncture has demonstrated benefit for the treatment of headaches, but that safety needed to be more fully documented in order to make any strong recommendations in support of its use.[103] A 2009 Cochrane review of the use of acupuncture for migraine prophylaxis treatment concluded that "true" acupuncture was no more efficient than sham acupuncture, but "true" acupuncture appeared to be as effective as, or possibly more effective than routine care in the treatment of migraines, with fewer adverse effects than prophylactic drug treatment.[104] The same review stated that the specific points chosen to needle may be of limited importance.[104] A 2009 Cochrane review found insufficient evidence to support acupuncture for tension-type headaches.[104] The same review found evidence that suggested that acupuncture might be considered a helpful non-pharmacological approach for frequent episodic or chronic tension-type headache.[104]

Osteoarthritis

A 2014 review concluded that "current evidence supports the use of acupuncture as an alternative to traditional analgesics in osteoarthritis patients."[105] As of 2014, a meta-analysis showed that acupuncture may help osteoarthritis pain but it was noted that the effects were insignificant in comparison to sham

needles.[106] A 2013 systematic review and network meta-analysis found that the evidence suggests that acupuncture may be considered one of the more effective physical treatments for alleviating pain due to knee osteoarthritis in the short-term compared to other relevant physical treatments, though much of the evidence in the topic is of poor quality and there is uncertainty about the efficacy of many of the treatments.[107] A 2012 review found "the potential beneficial action of acupuncture on osteoarthritis pain does not appear to be clinically relevant."[75] A 2010 Cochrane review found that acupuncture shows statistically significant benefit over sham acupuncture in the treatment of peripheral joint osteoarthritis; however, these benefits were found to be so small that their clinical significance was doubtful, and "probably due at least partially to placebo effects from incomplete blinding".[108]

Extremity conditions

A 2014 systematic review found moderate quality evidence that acupuncture was more effective than sham acupuncture in the treatment of lateral elbow pain.[109] A 2014 systematic review found that although manual acupuncture was effective at relieving short-term pain when used to treat tennis elbow, its long-term effect in relieving pain was "unremarkable".[110] A 2007 review found that acupuncture was significantly better than sham acupuncture at treating chronic knee pain; the evidence was not conclusive due to the lack of large, high-quality trials.[111]

A 2011 overview of Cochrane reviews found inconclusive evidence regarding acupuncture efficacy in treating shoulder pain and lateral elbow pain.[14]

Nausea and vomiting and post-operative pain

A 2014 overview of systematic reviews found insufficient evidence to suggest that acupuncture is an effective treatment for postoperative nausea and vomiting (PONV) in a clinical setting.[112] A 2013 systematic review concluded that acupuncture might be beneficial in prevention and treatment of PONV.[113] A 2009 Cochrane review found that stimulation of the P6 acupoint on the wrist was as effective (or ineffective) as antiemetic drugs and was associated with minimal side effects.[112][114] The same review found "no reliable evidence for differences in risks of postoperative nausea or vomiting after P6 acupoint stimulation compared to antiemetic drugs."[114]

A 2014 overview of systematic reviews found insufficient evidence to suggest that acupuncture is effective for surgical or post-operative pain.[112] For the use of acupuncture for post-operative pain, there was contradictory evidence.[112] A 2014 systematic review found supportive but limited evidence for use of acupuncture for acute post-operative pain after back surgery.[115] A 2014 systematic review found that while the evidence suggested acupuncture could be an effective treatment for postoperative gastroparesis, a firm conclusion could not be reached because the trials examined were of low quality.[116]

Allergies

Acupuncture is an unproven treatment for allergic-immunologic conditions.[117] A 2015 meta-analysis suggests that acupuncture might be a good option for people with allergic rhinitis (AR),[118] and a number of randomized clinical trials (RCTs) support the use of acupuncture for AR and itch.[119] There is some evidence that acupuncture might have specific effects on perennial allergic rhinitis (PAR), though all of the efficacy studies were small and conclusions should be made with caution.[120] There is mixed evidence for the symptomatic treatment or prevention of AR.[121] For seasonal allergic rhinitis (SAR), the evidence failed to demonstrate specific effects for acupuncture.[121] Using acupuncture to treat other allergic conditions such as contact eczema, drug rashes, or anaphylaxis is not recommended.[119]

Cancer-related conditions

A 2015 Cochrane review found that there is insufficient evidence to determine whether acupuncture is an effective treatment for cancer pain in adults.[122] A 2014 systematic review found that acupuncture may be effective as an adjunctive treatment to palliative care for cancer patients.[123] A 2013 overview of reviews found evidence that acupuncture could be beneficial for people with cancer-related symptoms, but also identified few rigorous trials and high heterogeneity between trials.[124] A 2012 systematic review of randomised clinical trials (RCTs) using acupuncture in the treatment of cancer pain found that the number and quality of RCTs was too low to draw definite conclusions.[125]

A 2014 systematic review reached inconclusive results with regard to the effectiveness of acupuncture for treating cancer-related fatigue.[126] A 2013 systematic review found that acupuncture is an acceptable adjunctive treatment for chemotherapy-induced nausea and vomiting, but that further research with a low risk of bias is needed.[127] A 2013 systematic review found that the quantity and quality of available RCTs for analysis were too low to draw valid conclusions for the effectiveness of acupuncture for cancer-related fatigue.[128] A 2012 systematic review and meta-analysis found very limited evidence regarding acupuncture compared with conventional intramuscular injections for the treatment of hiccups in cancer patients.[129] The methodological quality and amount of RCTs in the review was low.[129]

Dyspepsia

A 2015 systematic review and meta-analysis found some evidence that acupuncture was effective for FD, but also called for further well-designed, long-term studies to be conducted to evaluate its efficacy for this condition.[130] A 2014 Cochrane review found that "it remains unknown whether manual acupuncture or electroacupuncture is more effective or safer than other treatments" for functional dyspepsia (FD).[131]

Fertility and childbirth

A 2014 systematic review and meta-analysis found poor quality evidence for use of acupuncture in infertile men to improve sperm motility, sperm concentration, and the pregnancy rate; the evidence was rated as insufficient to draw any conclusion regarding efficacy.[132] A 2013 Cochrane review found no

evidence of acupuncture for improving the success of *in vitro* fertilization (IVF).[133] A 2013 systematic review found no benefit of adjuvant acupuncture for IVF on pregnancy success rates.[134] A 2012 systematic review found that acupuncture may be a useful adjunct to IVF,[135] but its conclusions were rebutted after reevaluation using more rigorous, high quality meta-analysis standards.[136] A 2012 systematic review and meta-analysis found that acupuncture did not significantly improve the outcomes of in vitro fertilization.[137] A 2011 overview of systematic reviews found that the evidence that acupuncture was effective was not compelling for most gynecologic conditions. The exceptions to this conclusion included the use of acupuncture during embryo transfer as an adjunct to in vitro fertilization.[138]

Rheumatological conditions

A 2013 Cochrane review found low to moderate evidence that acupuncture improves pain and stiffness in treating people with fibromyalgia compared with no treatment and standard care.[139] A 2012 review found "there is insufficient evidence to recommend acupuncture for the treatment of fibromyalgia."[75] A 2010 systematic review found a small pain relief effect that was not apparently discernible from bias; acupuncture is not a recommendable treatment for the management of fibromyalgia on the basis of this review.[140]

A 2012 review found that the effectiveness of acupuncture to treat rheumatoid arthritis is "sparse and inconclusive."[75] A 2005 Cochrane review concluded that acupuncture use to treat rheumatoid arthritis "has no effect on ESR, CRP, pain, patient's global assessment, number of swollen joints, number of tender joints, general health, disease activity and reduction of analgesics."[141] A 2010 overview of systematic reviews found insufficient evidence to recommend acupuncture in the treatment of most rheumatic conditions, with the exceptions of osteoarthritis, low back pain, and lateral elbow pain.[142]

Stroke

A 2014 overview of systematic reviews and meta-analyses found that the evidence does not demonstrate acupuncture helps reduce the rates of death or disability after a stroke or improve other aspects of stroke recovery, such as poststroke motor dysfunction, but the evidence suggests it may help with poststroke neurological impairment and dysfunction such as dysphagia, which would need to be confirmed with future rigorous studies.[143] A 2012 review found evidence of benefit for acupuncture combined with exercise in treating shoulder pain after stroke.[144] A 2010 systematic review found that acupuncture was not effective as a treatment for functional recovery after a stroke.[145] A 2012 overview of systematic reviews found inconclusive evidence supporting the effectiveness of acupuncture for stroke.[146]

A 2015 systematic review found limited evidence that the method of *Xingnao Kaiqiao* needling had a better effect than *Xingnao Kaiqiao* alone or combined with other treatments in reducing disability rate for ischemic stroke, and that the long-term effect was better than traditional acupuncture or combination treatment.[147] A 2014 meta-analysis found tentative evidence for acupuncture in cerebral infarction, a type of ischemic stroke, but the authors noted the trials reviewed were often of poor quality.[148] A 2008

Cochrane review found that evidence was insufficient to draw any conclusion about the effect of acupuncture on dysphagia after acute stroke.[149] A 2006 Cochrane review found no clear evidence for acupuncture on subacute or chronic stroke.[150] A 2005 Cochrane review found no clear evidence of benefit for acupuncture on acute stroke.[151]

Sleep

A 2016 systematic review and meta-analysis found that acupuncture was "associated with a significant reduction in sleep disturbances in women experiencing menopause-related sleep disturbances."[152]

Other conditions

For the following conditions, the Cochrane Collaboration or other reviews have concluded there is no strong evidence of benefit: alcohol dependence,[153] angina pectoris,[154] ankle sprain,[155][156] Alzheimer's disease,[157] attention deficit hyperactivity disorder,[158][159] autism,[160][161] asthma,[162][163] bell's palsy,[164][165] traumatic brain injury,[166] carpal tunnel syndrome,[167] chronic obstructive pulmonary disease,[168] cardiac arrhythmias,[169] cerebral hemorrhage,[170] cocaine dependence,[171] constipation,[172] depression,[173][174] diabetic peripheral neuropathy,[175] drug detoxification,[176][177] dry eye,[178] primary dysmenorrhoea,[179] enuresis,[180] endometriosis,[181] epilepsy,[182] erectile dysfunction,[183] essential hypertension,[184] glaucoma,[185] gynaecological conditions (except possibly fertility and nausea/vomiting),[186] hot flashes,[187][188][189] hypoxic ischemic encephalopathy in neonates,[190] insomnia,[191][192][193] induction of childbirth,[194] irritable bowel syndrome,[195] labor pain,[196][197] lumbar spinal stenosis,[198] major depressive disorders in pregnant women,[199] musculoskeletal disorders of the extremities,[200] myopia,[201] obesity,[202][203] obstetrical conditions,[204] Parkinson's disease,[205][206] polycystic ovary syndrome,[207] premenstrual syndrome,[208] preoperative anxiety,[209] psychological symptoms associated with opioid addiction,[210] restless legs syndrome,[211] schizophrenia,[212] sensorineural hearing loss,[213] smoking cessation,[214] stress urinary incontinence,[215] acute stroke,[216] stroke rehabilitation,[217] temporomandibular joint dysfunction,[218][219] tennis elbow,[220] labor induction,[221] tinnitus,[222][223] uremic itching,[224] uterine fibroids,[225] vascular dementia,[226] and whiplash.[227]

Moxibustion and cupping

A 2010 overview of systematic reviews found that moxibustion was effective for several conditions but the primary studies were of poor quality, so there persists ample uncertainty, which limits the conclusiveness of their findings.[228] A 2012 systematic review suggested that cupping therapy seems to be effective for herpes zoster and various other conditions but due to the high risk of publication bias, larger studies are needed to draw definitive conclusions.[229]

Safety

Adverse events

Acupuncture is generally safe when administered by an experienced, appropriately trained practitioner using clean-needle technique and sterile single-use needles.[17][18] When improperly delivered it can cause adverse effects.[17] Accidents and infections are associated with infractions of sterile technique or neglect on the part of the practitioner.[18] To reduce the risk of serious adverse events after acupuncture, acupuncturists should be trained sufficiently.[10] People with serious spinal disease, such as cancer or infection, are not good candidates for acupuncture.[2] Contraindications to acupuncture (conditions that should not be treated with acupuncture) include coagulopathy disorders (e.g. hemophilia and advanced liver disease), warfarin use, severe psychiatric disorders (e.g. psychosis), and skin infections or skin trauma (e.g. burns).[2] Further, electroacupuncture should be avoided at the spot of implanted electrical devices (such as pacemakers).[2]

A 2011 systematic review of systematic reviews (internationally and without language restrictions) found that serious complications following acupuncture continue to be reported.[10] Between 2000 and 2009, ninety-five cases of serious adverse events, including five deaths, were reported.[10] Many such events are not inherent to acupuncture but are due to malpractice of acupuncturists.[10] This might be why such complications have not been reported in surveys of adequately-trained acupuncturists.[10] Most such reports originate from Asia, which may reflect the large number of treatments performed there or a relatively higher number of poorly trained Asian acupuncturists.[10] Many serious adverse events were reported from developed countries.[10] These included Australia, Austria, Canada, Croatia, France, Germany, Ireland, the Netherlands, New Zealand, Spain, Sweden, Switzerland, the UK, and the US.[10] The number of adverse effects reported from the UK appears particularly unusual, which may indicate less under-reporting in the UK than other countries.[10] Reports included 38 cases of infections and 42 cases of organ trauma.[10] The most frequent adverse events included pneumothorax, and bacterial and viral infections.[10]

A 2013 review found (without restrictions regarding publication date, study type or language) 295 cases of infections; mycobacterium was the pathogen in at least 96%.[19] Likely sources of infection include towels, hot packs or boiling tank water, and reusing reprocessed needles.[19] Possible sources of infection include contaminated needles, reusing personal needles, a person's skin containing mycobacterium, and reusing needles at various sites in the same person.[19] Although acupuncture is generally considered a safe procedure, a 2013 review stated that the reports of infection transmission increased significantly in the prior decade, including those of mycobacterium.[19] Although it is recommended that practitioners of acupuncture use disposable needles, the reuse of sterilized needles is still permitted.[19] It is also recommended that thorough control practices for preventing infection be implemented and adapted.[19]

The *Xingnao Kaiqiao* approach appears to be a safe form of treatment.[147] Fainting was the most frequent adverse event.[147] Fainting while being treated, hematoma, and pain while being treated are associated with individual physical differences and with needle manipulation.[147]

English-language

A 2013 systematic review of the English-language case reports found that serious adverse events associated with acupuncture are rare, but that acupuncture is not without risk.[17] Between 2000 and 2011 the English-language literature from 25 countries and regions reported 294 adverse events.[17] The majority of the reported adverse events were relatively minor, and the incidences were low.[17] For example, a prospective survey of 34,000 acupuncture treatments found no serious adverse events and 43 minor ones, a rate of 1.3 per 1000 interventions.[17] Another survey found there were 7.1% minor adverse events, of which 5 were serious, amid 97,733 acupuncture patients.[17] The most common adverse effect observed was infection (e.g. mycobacterium), and the majority of infections were bacterial in nature, caused by skin contact at the needling site.[17] Infection has also resulted from skin contact with unsterilized equipment or with dirty towels in an unhygienic clinical setting.[17] Other adverse complications included five reported cases of spinal cord injuries (e.g. migrating broken needles or needling too deeply), four brain injuries, four peripheral nerve injuries, five heart injuries, seven other organ and tissue injuries, bilateral hand edema, epithelioid granuloma, pseudolymphoma, argyria, pustules, pancytopenia, and scarring due to hot-needle technique.[17] Adverse reactions from acupuncture, which are unusual and uncommon in typical acupuncture practice, included syncope, galactorrhoea, bilateral nystagmus, pyoderma gangrenosum, hepatotoxicity, eruptive lichen planus, and spontaneous needle migration.[17]

A 2013 systematic review found 31 cases of vascular injuries caused by acupuncture, three resulting in death.[230] Two died from pericardial tamponade and one was from an aortoduodenal fistula.[230] The same review found vascular injuries were rare, bleeding and pseudoaneurysm were most prevalent.[230] A 2011 systematic review (without restriction in time or language), aiming to summarize all reported case of cardiac tamponade after acupuncture, found 26 cases resulting in 14 deaths, with little doubt about causality in most fatal instances.[231] The same review concluded cardiac tamponade was a serious, usually fatal, though theoretically avoidable complication following acupuncture, and urged training to minimize risk.[231]

A 2012 review found a number of adverse events were reported after acupuncture in the UK's National Health Service (NHS) but most (95%) were not severe,[43] though miscategorization and under-reporting may alter the total figures.[43] From January 2009 to December 2011, 468 safety incidents were recognized within the NHS organizations.[43] The adverse events recorded included retained needles (31%), dizziness (30%), loss of consciousness/unresponsive (19%), falls (4%), bruising or soreness at needle site (2%), pneumothorax (1%) and other adverse side effects (12%).[43] Acupuncture practitioners should know, and be prepared to be responsible for, any substantial harm from treatments.[43] Some acupuncture proponents argue that the long history of acupuncture suggests it is safe.[43] However, there is an increasing literature on adverse events (e.g. spinal-cord injury).[43]

Acupuncture seems to be safe in people getting anticoagulants, assuming needles are used at the correct location and depth.[232] Studies are required to verify these findings.[232] The evidence suggests that acupuncture might be a safe option for people with allergic rhinitis.[118]

Chinese, South Korean, and Japanese-language

A 2010 systematic review of the Chinese-language literature found numerous acupuncture-related adverse events, including pneumothorax, fainting, subarachnoid hemorrhage, and infection as the most frequent, and cardiovascular injuries, subarachnoid hemorrhage, pneumothorax, and recurrent cerebral hemorrhage as the most serious, most of which were due to improper technique.[233] Between 1980 and 2009, the Chinese-language literature reported 479 adverse events.[233] Prospective surveys show that mild, transient acupuncture-associated adverse events ranged from 6.71% to 15%.[233] In a study with 190,924 patients, the prevalence of serious adverse events was roughly 0.024%.[233] Another study showed a rate of adverse events requiring specific treatment of 2.2%, 4,963 incidences among 229,230 patients.[233] Infections, mainly hepatitis, after acupuncture are reported often in English-language research, though are rarely reported in Chinese-language research, making it plausible that acupuncture-associated infections have been underreported in China.[233] Infections were mostly caused by poor sterilization of acupuncture needles.[233] Other adverse events included spinal epidural hematoma (in the cervical, thoracic and lumbar spine), chylothorax, injuries of abdominal organs and tissues, injuries in the neck region, injuries to the eyes, including orbital hemorrhage, traumatic cataract, injury of the oculomotor nerve and retinal puncture, hemorrhage to the cheeks and the hypoglottis, peripheral motor-nerve injuries and subsequent motor dysfunction, local allergic reactions to metal needles, stroke, and cerebral hemorrhage after acupuncture.[233]

A causal link between acupuncture and the adverse events cardiac arrest, pyknolepsy, shock, fever, cough, thirst, aphonia, leg numbness, and sexual dysfunction remains uncertain.[233] The same review concluded that acupuncture can be considered inherently safe when practiced by properly trained practitioners, but the review also stated there is a need to find effective strategies to minimize the health risks.[233] Between 1999 and 2010, the Republic of Korean-literature contained reports of 1104 adverse events.[234] Between the 1980s and 2002, the Japanese-language literature contained reports of 150 adverse events.[235]

Children and pregnancy

Although acupuncture has been practiced for thousands of years in China, its use in pediatrics in the United States did not become common until the early 2000s. In 2007, the National Health Interview Survey (NHIS) conducted by the National Center For Health Statistics (NCHS) estimated that approximately 150,000 children had received acupuncture treatment for a variety of conditions.[236]

Acupuncture can potentially improve a number of common pediatric issues, including gastrointestinal issues, reflux, colic, asthma, allergies, ADHD, and headaches,[237] however, its safety has been debated. In 2008 a study determined that the use of acupuncture-needle treatment on children was "questionable"

due to the possibility of adverse side-effects and the pain manifestation differences in children versus adults. The study also includes warnings against practicing acupuncture on infants, as well as on children who are over-fatigued, very weak, or have over-eaten.[238]

When used on children, acupuncture is considered safe when administered by well-trained, licensed practitioners using sterile needles; however, a 2011 review found there was limited research to draw definite conclusions about the overall safety of pediatric acupuncture.[3] The same review found 279 adverse events, 25 of them serious.[3] The adverse events were mostly mild in nature (e.g. bruising or bleeding).[3] The prevalence of mild adverse events ranged from 10.1% to 13.5%, an estimated 168 incidences among 1,422 patients.[3] On rare occasions adverse events were serious (e.g. cardiac rupture or hemoptysis); many might have been a result of substandard practice.[3] The incidence of serious adverse events was 5 per one million, which included children and adults.[3]

When used during pregnancy, the majority of adverse events caused by acupuncture were mild and transient, with few serious adverse events.[239] The most frequent mild adverse event was needling or unspecified pain, followed by bleeding.[239] Although two deaths (one stillbirth and one neonatal death) were reported, there was a lack of acupuncture-associated maternal mortality.[239] Limiting the evidence as certain, probable or possible in the causality evaluation, the estimated incidence of adverse events following acupuncture in pregnant women was 131 per 10,000.[239] Although acupuncture is not contraindicated in pregnant women, some specific acupuncture points are particularly sensitive to needle insertion; these spots, as well as the abdominal region, should be avoided during pregnancy.[2]

Moxibustion and cupping

Four adverse events associated with moxibustion were bruising, burns and cellulitis, spinal epidural abscess, and large superficial basal cell carcinoma.[17] Ten adverse events were associated with cupping.[17] The minor ones were keloid scarring, burns, and bullae;[17] the serious ones were acquired hemophilia A, stroke following cupping on the back and neck, factitious panniculitis, reversible cardiac hypertrophy, and iron deficiency anemia.[17]

Cost-effectiveness

A 2013 meta-analysis found that acupuncture for chronic low back pain was cost-effective as a complement to standard care, but not as a substitute for standard care except in cases where comorbid depression presented.[20] The same meta-analysis found there was no difference between sham and non-sham acupuncture.[20] A 2011 systematic review found insufficient evidence for the cost-effectiveness of acupuncture in the treatment of chronic low back pain.[21] A 2010 systematic review found that the cost-effectiveness of acupuncture could not be concluded.[94] A 2012 review found that acupuncture seems to be cost-effective for some pain conditions.[240]

Risk of forgoing conventional medical care

As with other alternative medicines, unethical or naïve practitioners may induce patients to exhaust financial resources by pursuing ineffective treatment.[5][241] Profession ethical codes set by accrediting organizations such as the National Certification Commission for Acupuncture and Oriental Medicine require practitioners to make "timely referrals to other health care professionals as may be appropriate."[242] Stephen Barrett states that there is a "risk that an acupuncturist whose approach to diagnosis is not based on scientific concepts will fail to diagnose a dangerous condition".[243]

Conceptual basis

Traditional

Acupuncture	
Simplified Chinese	针刺
Transcriptions	
Standard Mandarin	
Hanyu Pinyin	zhēncì

Acupuncture is a substantial part of traditional Chinese medicine (TCM).[4] Early acupuncture beliefs relied on concepts that are common in TCM, such as a life force energy called *qi*.[244] *Qi* was believed to flow from the body's primary organs (zang-fu organs) to the "superficial" body tissues of the skin, muscles, tendons, bones, and joints, through channels called meridians.[245] Acupuncture points where needles are inserted are mainly (but not always) found at locations along the meridians.[246] Acupuncture points not found along a meridian are called extraordinary points and those with no designated site are called "A-shi" points.[246]

Old Chinese medical chart of acupuncture meridians

In TCM, disease is generally perceived as a disharmony or imbalance in energies such as yin, yang, *qi*, xuě, zàng-fǔ, meridians, and of the interaction between the body and the environment.[247] Therapy is based on which "pattern of disharmony" can be identified.[248][249] For example, some diseases are believed to be caused by meridians being invaded with an excess of wind, cold, and damp.[250] In order to determine which pattern is at hand, practitioners examine things like the color and shape of the tongue, the relative strength of pulse-points, the smell of the breath, the quality of breathing, or the sound of the voice.[251][252] TCM and its concept of disease does not strongly differentiate between the cause and effect of symptoms.[253]

Purported scientific basis

Scientific research has not supported the existence of *qi*, meridians, or yin and yang.[n 1][25][26] A *Nature* editorial described TCM as "fraught with pseudoscience", with the majority of its treatments having no logical mechanism of action.[254] Quackwatch states that "TCM theory and practice are not based upon

the body of knowledge related to health, disease, and health care that has been widely accepted by the scientific community. TCM practitioners disagree among themselves about how to diagnose patients and which treatments should go with which diagnoses. Even if they could agree, the TCM theories are so nebulous that no amount of scientific study will enable TCM to offer rational care."[5]


Modern acupuncture model

Some modern practitioners support the use of acupuncture to treat pain, but have abandoned the use of *qi*, meridians, *yin*, *yang* and other energies based in mysticism, as explanatory frameworks.[8][26][27] The use of *qi* as an explanatory framework has been decreasing in China, even as it becomes more prominent during discussions of acupuncture in the US.[255] Academic discussions of acupuncture still make reference to pseudoscientific concepts such as *qi* and meridians despite the lack of scientific evidence.[255] Many within the scientific community consider attempts to rationalize acupuncture in science to be quackery, pseudoscience and "theatrical placebo".[256] Academics Massimo Pigliucci and Maarten Boudry describe it as a "borderlands science" lying between science and pseudoscience.[257]

Many acupuncturists attribute pain relief to the release of endorphins when needles penetrate, but no longer support the idea that acupuncture can affect a disease.[27][255] It is a generally held belief within the acupuncture community that acupuncture points and meridians structures are special conduits for electrical signals but no research has established any consistent anatomical structure or function for either acupuncture points or meridians.[n 1][25] Human tests to determine whether electrical continuity was significantly different near meridians than other places in the body have been inconclusive.[25]

Some studies suggest acupuncture causes a series of events within the central nervous system,[258] and that it is possible to inhibit acupuncture's analgesic effects with the opioid antagonist naloxone.[259] Mechanical deformation of the skin by acupuncture needles appears to result in the release of adenosine.[2] The anti-nociceptive effect of acupuncture may be mediated by the adenosine A1 receptor.[260] A 2014 *Nature Reviews Cancer* review article found that since the key mouse studies that suggested acupuncture relieves pain via the local release of adenosine, which then triggered close-by A1 receptors "caused more tissue damage and inflammation relative to the size of the animal in mice than in humans, such studies unnecessarily muddled a finding that local inflammation can result in the local release of adenosine with analgesic effect."[78]

It has been proposed that acupuncture's effects in gastrointestinal disorders may relate to its effects on the parasympathetic and sympathetic nervous system, which have been said to be the "Western medicine" equivalent of "yin and yang".[261] Another mechanism whereby acupuncture may be effective for gastrointestinal dysfunction involves the promotion of gastric peristalsis in subjects with low initial gastric motility, and suppressing peristalsis in subjects with active initial motility.[262] Acupuncture has

also been found to exert anti-inflammatory effects, which may be mediated by the activation of the vagus nerve and deactivation of inflammatory macrophages.[263] Neuroimaging studies suggest that acupuncture stimulation results in deactivation of the limbic brain areas and the default mode network.[264]

History

Origins

Acupuncture, along with moxibustion, is one of the oldest practices of Traditional Chinese Medicine.[30] Most historians believe the practice began in China, though there are some conflicting narratives on when it originated.[28][31] Academics David Ramey and Paul Buell said the exact date acupuncture was founded depends on the extent dating of ancient texts can be trusted and the interpretation of what constitutes acupuncture.[265]

According to an article in *Rheumatology*, the first documentation of an "organized system of diagnosis and treatment" for acupuncture was in *The Yellow Emperor's Classic of Internal Medicine* (Huangdi Neijing) from about 100 BC.[28] Gold and silver needles found in the tomb of Liu Sheng from around 100 BC are believed to be the earliest archeological evidence of acupuncture, though it is unclear if that was their purpose.[265] According to Dr. Plinio Prioreschi, the earliest known historical record of acupuncture is the Shih-Chi ("Record of History"), written by a historian around 100 BC.[29] It is believed that this text was documenting what was established practice at that time.[28]

Acupuncture chart from the Ming dynasty (c. 1368–1644)

Alternate theories

The 5,000-year-old mummified body of Ötzi the Iceman was found with 15 groups of tattoos,[266] many of which were located at points on the body where acupuncture needles are used for abdominal or lower back problems. Evidence from the body suggests Otzi suffered from these conditions.[31] This has been cited as evidence that practices similar to acupuncture may have been practiced elsewhere in Eurasia during the early Bronze Age;[266] however, *The Oxford Handbook of the History of Medicine* calls this theory "speculative".[32] It is considered unlikely that acupuncture was practiced before 2000 BC.[265] The Ötzi the Iceman's tattoo marks suggest to some experts that an acupuncture-like treatment was previously used in Europe 5 millennia ago.[9]

Acupuncture may have been practiced during the Neolithic era, near the end of the stone age, using sharpened stones called Bian shi.[30]:70 Many Chinese texts from later eras refer to sharp stones called "plen", which means "stone probe", that may have been used for acupuncture purposes.[30]:70 The ancient Chinese medical text, Huangdi Neijing, indicates that sharp stones were believed at-the-time to cure illnesses at or near the body's surface, perhaps because of the short depth a stone could penetrate.[30]:71 However, it is more likely that stones were used for other medical purposes, such as puncturing a growth to drain its pus.[28][31] The *Mawangdui* texts, which are believed to be from the 2nd century BC, mention the use of pointed stones to open abscesses, and moxibustion, but not for acupuncture.[29] It is also speculated that these stones may have been used for bloodletting, due to the ancient Chinese belief that illnesses were caused by demons within the body that could be killed or released.[267] It is likely bloodletting was an antecedent to acupuncture.[31]

According to historians Lu Gwei-djen and Joseph Needham, there is substantial evidence that acupuncture may have begun around 600 BC.[30] Some hieroglyphs and pictographs from that era suggests acupuncture and moxibustion were practiced.[268] However, historians Gwei-djen and Needham said it was unlikely a needle could be made out of the materials available in China during this time period.[30]:71-72 It is possible Bronze was used for early acupuncture needles. Tin, copper, gold and silver are also possibilities, though they are considered less likely, or to have been used in fewer cases.[30]:69 If acupuncture was practiced during the Shang dynasty (1766 to 1122 BC), organic materials like thorns, sharpened bones, or bamboo may have been used.[30]:70 Once methods for producing steel were discovered, it would replace all other materials, since it could be used to create a very fine, but sturdy needles.[30]:74 Gwei-djen and Needham noted that all the ancient materials that could have been used for acupuncture and which often produce archeological evidence, such as sharpened bones, bamboo or stones, were also used for other purposes.[30] An article in *Rheumatology* said that the absence of any mention of acupuncture in documents found in the tomb of Ma-Wang-Dui from 198 BC suggest that acupuncture was not practiced by that time.[28]

Belief systems

Several different and sometimes conflicting belief systems emerged regarding acupuncture. This may have been the result of competing schools of thought.[28] Some ancient texts referred to using acupuncture to cause bleeding, while others mixed the ideas of blood-letting and spiritual ch'i energy. Over time, the focus shifted from blood to the concept of puncturing specific points on the body, and eventually to balancing Yin and Yang energies as well.[29] According to Dr. David Ramey, no single "method or theory" was ever predominantly adopted as the standard.[269] At the time, scientific knowledge of medicine was not yet developed, especially because in China dissection of the deceased was forbidden, preventing the development of basic anatomical knowledge.[28]

It is not certain when specific acupuncture points were introduced, but the autobiography of Pien Chhio from around 400–500 BC references inserting needles at designated areas.[30] Bian Que believed there was a single acupuncture point at the top of one's skull that he called the point "of the hundred meetings."[30]:83 Texts dated to be from 156–186 BC document early beliefs in channels of life force energy called meridians that would later be an element in early acupuncture beliefs.[265]

Ramey and Buell said the "practice and theoretical underpinnings" of modern acupuncture were introduced in the *The Yellow Emperor's Classic* (Huangdi Neijing) around 100 BC.[29][265] It introduced the concept of using acupuncture to manipulate the flow of life energy (*qi*) in a network of meridian (channels) in the body.[265][270] The network concept was made up of acu-tracts, such as a line down the arms, where it said acupoints were located. Some of the sites acupuncturists use needles at today still have the same names as those given to them by the *Yellow Emporer's Classic*.[30]:93 Numerous additional documents were published over the centuries introducing new acupoints.[30]:101 By the 4th century AD, most of the acupuncture sites in use today had been named and identified.[30]:101

Early development in China

Establishment and growth

In the first half of the 1st century AD, acupuncturists began promoting the belief that acupuncture's effectiveness was influenced by the time of day or night, the lunar cycle, and the season.[30]:140-141 The Science of the Yin-Yang Cycles (*Yün Chhi Hsüeh*) was a set of beliefs that curing diseases relied on the alignment of both heavenly (thien) and earthly (ti) forces that were attuned to cycles like that of the sun and moon.[30]:140-141 There were several different belief systems that relied on a number of celestial and earthly bodies or elements that rotated and only became aligned at certain times.[30]:140-141 According to Needham and Gwei-djen, these "arbitrary predictions" were depicted by acupuncturists in complex charts and through a set of special terminology.[30]

Acupuncture needles during this period were much thicker than most modern ones and often resulted in infection. Infection is caused by a lack of sterilization, but at that time it was believed to be caused by use of the wrong needle, or needling in the wrong place, or at the wrong time.[30]:102-103 Later, many needles were heated in boiling water, or in a flame. Sometimes needles were used while they were still hot, creating a cauterizing effect at the injection site.[30]:104 Nine needles were recommended in the *Chen Chiu Ta Chheng* from 1601, which may have been because of an ancient Chinese belief that nine was a magic number.[30]:102-103

Other belief systems were based on the idea that the human body operated on a rhythm and acupuncture had to be applied at the right point in the rhythm to be effective.[30]:140-141 In some cases a lack of balance between Yin and Yang were believed to be the cause of disease.[30]:140-141

In the 1st century AD, many of the first books about acupuncture were published and recognized acupuncturist experts began to emerge. The *Zhen Jiu Jia Yi Jing*, which was published in the mid-3rd century, became the oldest acupuncture book that is still in existence in the modern era.[30] Other books like the *Yu Kuei Chen Ching*, written by the Director of Medical Services for China, were also influential during this period, but were not preserved.[30] In the mid 7th century, Sun Simiao published acupuncture-related diagrams and charts that established standardized methods for finding acupuncture sites on people of different sizes and categorized acupuncture sites in a set of modules.[30]

Acupuncture became more established in China as improvements in paper led to the publication of more acupuncture books. The Imperial Medical Service and the Imperial Medical College, which both supported acupuncture, became more established and created medical colleges in every province.[30]:129 The public was also exposed to stories about royal figures being cured of their diseases by prominent acupuncturists.[30]:129–135 By time *The Great Compendium of Acupuncture and Moxibustion* was published during the Ming dynasty (1368–1644 AD), most of the acupuncture practices used in the modern era had been established.[28]

Decline

By the end of the Song dynasty (1279 AD), acupuncture had lost much of its status in China.[271] It became rarer in the following centuries, and was associated with less prestigious professions like alchemy, shamanism, midwifery and moxibustion.[272] Additionally, by the 18th century, scientific rationality was becoming more popular than traditional superstitious beliefs.[28] By 1757 a book documenting the history of Chinese medicine called acupuncture a "lost art".[30]:160 Its decline was attributed in part to the popularity of prescriptions and medications, as well as its association with the lower classes.[273]

In 1822, the Chinese Emperor signed a decree excluding the practice of acupuncture from the Imperial Medical Institute.[28] He said it was unfit for practice by gentlemen-scholars.[274] In China acupuncture was increasingly associated with lower-class, illiterate practitioners.[275] It was restored for a time, but banned again in 1929 in favor of science-based Western medicine. Although acupuncture declined in China during this time period, it was also growing in popularity in other countries.[31]

International expansion

Korea is believed to be the first country in Asia that acupuncture spread to outside of China.[30] Within Korea there is a legend that acupuncture was developed by emperor Dangun, though it is more likely to have been brought into Korea from a Chinese colonial prefecture in 514 AD.[30]:262-263 Acupuncture use was commonplace in Korea by the 6th century. It spread to Vietnam in the 8th and 9th centuries.[31] As Vietnam began trading with Japan and China around the 9th century, it was influenced by their acupuncture practices as well.[28] China and Korea sent "medical missionaries" that spread traditional Chinese medicine to Japan, starting around 219 AD. In 553, several Korean and Chinese citizens were

appointed to re-organize medical education in Japan and they incorporated acupuncture as part of that system.[30]:264 Japan later sent students back to China and established acupuncture as one of five divisions of the Chinese State Medical Administration System.[30]:264-265

Acupuncture chart from *Shisi jing fahui* (Expression of the Fourteen Meridians) written by Hua Shou (fl. 1340s, Ming dynasty). Japanese reprint by Suharaya Heisuke (Edo, 1. year Kyōhō = 1716).

Acupuncture began to spread to Europe in the second half of the 17th century. Around this time the surgeon-general of the Dutch East India Company met Japanese and Chinese acupuncture practitioners and later encouraged Europeans to further investigate it.[30]:264-265 He published the first in-depth description of acupuncture for the European audience and created the term "acupuncture" in his 1683 work *De Acupunctura*.[267] France was an early adopter among the West due to the influence of Jesuit missionaries, who brought the practice to French clinics in the 16th century.[28] The French doctor Louis Berlioz (the father of the composer Hector Berlioz) is usually credited with being the first to experiment with the procedure in Europe in 1810, before publishing his findings in 1816.[274]

By the 19th century, acupuncture had become commonplace in many areas of the world.[30]:295 Americans and Britains began showing interest in acupuncture in the early 20th century.[28] Western practitioners abandoned acupuncture's traditional beliefs in spiritual energy, pulse diagnosis, and the cycles of the moon, sun or the body's rhythm. Diagrams of the flow of spiritual energy, for example, conflicted with the West's own anatomical diagrams. It adopted a new set of ideas for acupuncture based on tapping needles into nerves.[28][31][32] In Europe it was speculated that acupuncture may allow or prevent the flow of electricity in the body, as electrical pulses were found to make a frog's leg twitch after death.[267]

The West eventually created a belief system based on Travell trigger points that were believed to inhibit pain. They were in the same locations as China's spiritually identified acupuncture points, but under a different nomenclature.[28] The first elaborate Western treatise on acupuncture was published in 1683 by Willem ten Rhijne.[276]

Modern era

In China, the popularity of acupuncture rebounded in 1949 when Mao Zedong took power and sought to unite China behind traditional cultural values. It was also during this time that many Eastern medical practices were consolidated under the name Traditional Chinese Medicine (TCM).[31]

New practices were adopted in the 20th century, such as using a cluster of needles,[30]:164 electrified needles, or leaving needles inserted for up to a week.[30]:164 A lot of emphasis developed on using acupuncture on the ear.[30]:164 Acupuncture research organizations were founded in the 1950s and

acupuncture services became available in modern hospitals.[28] China, where acupuncture was believed to have originated, was increasingly influenced by Western medicine.[28] Meanwhile, acupuncture grew in popularity in the US. The US Congress created the Office of Alternative Medicine in 1992 and the National Institutes of Health (NIH) declared support for acupuncture for some conditions in November 1997. In 1999, the National Center for Complementary and Alternative Medicine was created within the NIH. Acupuncture became the most popular alternative medicine in the US.[258]

Politicians from the Chinese Communist Party said acupuncture was superstitious and conflicted with the party's commitment to science.[277] Communist Party Chairman Mao Zedong later reversed this position,[277] arguing that the practice was based on scientific principles.[278]

In 1971, a *New York Times* reporter published an article on his acupuncture experiences in China, which led to more investigation of and support for acupuncture.[28] The US President Richard Nixon visited China in 1972.[279] During one part of the visit, the delegation was shown a patient undergoing major surgery while fully awake, ostensibly receiving acupuncture rather than anesthesia.[279] Later it was found that the patients selected for the surgery had both a high pain tolerance and received heavy indoctrination before the operation; these demonstration cases were also frequently receiving morphine surreptitiously through an intravenous drip that observers were told contained only fluids and nutrients.[279] One patient receiving open heart surgery while awake was ultimately found to have received a combination of three powerful sedatives as well as large injections of a local anesthetic into the wound.[58] After the National Institute of Health expressed support for acupuncture for a limited number of conditions, adoption in the US grew further.[28] In 1972 the first legal acupuncture center in the US was established in Washington DC[280] and in 1973 the American Internal Revenue Service allowed acupuncture to be deducted as a medical expense.[281]

In 2006, a BBC documentary *Alternative Medicine* filmed a patient undergoing open heart surgery allegedly under acupuncture-induced anesthesia. It was later revealed that the patient had been given a cocktail of anesthetics.[282][283]

Adoption

Acupuncture is popular in China,[233] the US,[17] Australia,[284] and Europe[285] including all five Nordic countries, though less so in Finland.[286] It is most heavily practiced in China[233] and is one of the most common alternative medicine practices in Europe.[285]:45 In Switzerland, acupuncture has become the most frequently used alternative medicine since 2004.[287] In the United Kingdom, a total of 4 million acupuncture treatments were administered in 2009.[288] Acupuncture is used in most pain clinics and hospices in the UK.[42] An estimated 1 in 10 adults in Australia used acupuncture in 2004.[284] In Japan, it is estimated that 25 percent of the population will try acupuncture at some point,[33] though in most cases it is not covered by public health insurance.[33] Users of acupuncture in Japan are more likely to be elderly and to have a limited education.[33] Approximately half of users surveyed indicated a likelihood

to seek such remedies in the future, while 37% did not.[33] Less than one percent of the US population reported having used acupuncture in the early 1990s.[289] By the early 2010s, more than 14 million Americans reported having used acupuncture as part of their health care.[289]

In the US, acupuncture is increasingly (as of 2014) used at academic medical centers,[78] and is usually offered through CAM centers or anesthesia and pain management services.[290] Examples include those at Harvard University, Stanford University, Johns Hopkins University, and UCLA.[290][291] This usage has been criticized owing to there being little scientific evidence for explicit effects, or the mechanisms for its supposed effectiveness, for any condition that is discernible from placebo.[78] Acupuncture has been called 'theatrical placebo',[58] and David Gorski argues that when acupuncture proponents advocate 'harnessing of placebo effects' or work on developing 'meaningful placebos', they essentially concede it is little more than that.[78]

The use of acupuncture in Germany increased by 20% in 2007, after the German acupuncture trials supported its efficacy for certain uses.[292] In 2011, there were more than one million users,[292] and insurance companies have estimated that two-thirds of German users are women.[292] As a result of the trials, German public health insurers began to cover acupuncture for chronic low back pain and osteoarthritis of the knee, but not tension headache or migraine.[293] This decision was based in part on socio-political reasons.[293] Some insurers in Germany chose to stop reimbursement of acupuncture because of the trials.[294] For other conditions, insurers in Germany were not convinced that acupuncture had adequate benefits over usual care or sham treatments.[295] Highlighting the results of the placebo group, researchers refused to accept a placebo therapy as efficient.[296]

Regulation

There are various government and trade association regulatory bodies for acupuncture in the United Kingdom, the United States, Saudi Arabia, Australia, Japan, Canada, and in European countries and elsewhere. The World Health Organization recommends that before being licensed or certified, an acupuncturist receive 200 hours of specialized training if they are a physician and 2,500 hours for non-physicians; many governments have adopted similar standards.[297]

In China, the practice of acupuncture is regulated by the Chinese Medicine Council that was formed in 1999 by the Legislative Council. It includes a licensing exam and registration, as well as degree courses approved by the board.[298] Canada has acupuncture licensing programs in the provinces of British Columbia, Ontario, Alberta and Quebec; standards set by the Chinese Medicine and Acupuncture Association of Canada are used in provinces without government regulation.[285] Regulation in the US began in the 1970s[299] in California, which was eventually followed by every state but Wyoming and Idaho.[297][300] Licensing requirements vary greatly from state to state. The needles used in acupuncture

are regulated in the US by the Food and Drug Administration.[300] In some states acupuncture is regulated by a board of medical examiners, while in others by the board of licensing, health or education.[297]

In Japan, acupuncturists are licensed by the Minister of Health, Labour and Welfare after passing an examination and graduating from a technical school or university.[301] Australia regulates Chinese medical traditions through the Chinese Medicine Board of Australia and the Public Health (Skin Penetration) Regulation of 2000. It restricts the use of words like "Acupuncture" and "Registered Acupuncturist". At least 28 countries in Europe have professional associations for acupuncturists.[301] In France, the Académie Nationale de Médecine (National Academy of Medicine) has regulated acupuncture since 1955.[302]

See also

- Baunscheidtism
- Colorpuncture
- List of acupuncture points
- List of ineffective cancer treatments – Includes moxibustion
- Pressure point

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Notes

1. (From Latin, *acus* (needle) and *punctura* (to puncture)[1])

1. Singh & Ernst (2008) stated, "Scientists are still unable to find a shred of evidence to support the existence of meridians or Ch'i",[22] "The traditional principles of acupuncture are deeply flawed, as there is no evidence at all to demonstrate the existence of Ch'i or meridians"[23] and "As yin and yang, acupuncture points and meridians are not a reality, but merely the product of an ancient Chinese philosophy".[24]

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