Acupuncture for tension-type headaches and migraine

Background

Tension-type headache and migraine are primary headaches (i.e., the headache itself is the disorder, rather than secondary to another condition). Tension-type headache is the term used for infrequent and frequent episodic, as well as chronic, tension-type headaches. These headaches are characterised by pain that is typically mild or moderate in intensity, bilateral, and pressing or tightening in quality, but does not worsen with physical activity. There may be accompanying photophobia or phonophobia, but no nausea. Migraine manifests as recurring attacks, usually lasting for 4–72 hours and involving pain of moderate or severe intensity. Typical characteristics of migraine are a unilateral location, pulsating quality, and aggravation by routine physical activity, and there may also be auras, photophobia, phonophobia, nausea and vomiting.

About acupuncture

Acupuncture involves the insertion of fine needles into the body at specific sites (acupuncture points). In the UK, this practice commonly follows a traditional Chinese medicine approach or the medical acupuncture approach. For a painful condition such as headache, needles are typically placed near the painful area, and possibly elsewhere, and may be manipulated manually to produce a ‘needle sensation’; warmed (moxibustion); or stimulated electrically (electroacupuncture). The number of needles used can vary from around two to 30, and usually the needles are left in place for around 15–30 minutes. The treatment typically consists of a course of six or more weekly sessions. Further single treatments might be given from time to time in an attempt to maintain relief in chronic conditions such as migraine.

Traditional acupuncture takes a holistic approach to health and regards illness as a sign that the body is out of balance. The exact pattern and degree of imbalance is seen as being unique to each person, and the choice of acupuncture points will be specific to each patient’s needs (as determined by the practitioner). By contrast, from a biomedical viewpoint, exactly how acupuncture works is not fully understood; however, there is some evidence from animal and human studies that it influences the production of hormones and neurotransmitters. Proposed modes of action for acupuncture in headache and migraine are that it stimulates nerves located in muscles and other tissues, leading to the release of endorphins and other neurohumoral factors to produce analgesia; it promotes the release of vascular and immunomodulatory factors, leading to reduced inflammation, modulation of extracranial and intracranial blood flow; and that it controls and regulates 5-hydroxytryptamine levels in the brain.

The evidence

Problems in acupuncture research

For research on acupuncture, it is hard to devise a suitable placebo control for blinding patients to treatment allocation, and there is no satisfactory way to blind practitioners to the treatment they are giving (although assessors are often blinded); these limitations can lead to uncertainty in interpreting trial findings. ‘Sham’ acupuncture, which has been used as a control in many trials, may involve inserting needles in non-acupuncture points and this might be physiologically active. A novel sham control intervention involves using a blunt, non-penetrating, retractable needle. Assessing whether any benefit is specifically attributable to acupuncture may be difficult. For example, the diagnostic process can take up to an hour, which may have a therapeutic effect of its own. Also, the specific treatment with acupuncture needles involves several components (i.e., the needle site, type and degree of needle stimulation, number of points used and number of sessions given), which could complicate research, as with any complex intervention.

Systematic reviews

One systematic review pooled data from 31 randomised controlled trials, involving a total of 3,916 patients, to evaluate the efficacy of ‘true’ acupuncture as treatment for chronic headache, including migraine, tension-type headache or both. Comparators included sham acupuncture, medication (e.g. ergot, flunarizine, propranolol), and other non-drug treatments (e.g. physiotherapy, relaxation). The proportion of patients with a response (defined as at least 33% improvement by assessing headache index or headache frequency or by overall evaluation) was higher with acupuncture than with sham acupuncture at the early follow-up point (defined as the measurement closest to 8 weeks but no longer than 3 months; 53% vs. 45% of patients, risk ratio [RR] 1.19, 95% CI 1.08 to 1.30). There was also a higher response rate with...
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Acupuncture was superior to sham acupuncture and medication therapy in terms of reducing headache intensity (weighted mean difference [WMD] on a 0–100mm scale −8.54mm, 95% CI −15.52 to −1.57) and headache frequency (standard mean difference in attacks per month −1.22, 95% CI −2.34 to −0.10). The reviewers concluded that acupuncture was superior to sham acupuncture and medication therapy in improving headache intensity, frequency and response rate.

Migraine

One systematic review pooled data from 25 randomised controlled trials, involving a total of 3,004 patients, and aimed to assess the effectiveness of true acupuncture compared to no treatment, waiting-list control management, sham or placebo acupuncture, or other interventions used to treat and prevent migraine. Relative risk calculations were carried out for those high-quality studies that reported responder rates, with the caveat that the calculations should be interpreted with caution because of differing outcome measures in various studies. Response was defined as at least 33% improvement from baseline. Pooling of data from the high-quality trials indicated that, for the treatment and prevention of migraine, acupuncture was superior to waiting-list control management (RR 3.17, 95% CI 2.00 to 5.00), similarly effective to sham acupuncture (RR 1.14, 95% CI 0.98 to 1.34), and more, or comparably, effective to drug therapies (RR 1.38, 95% CI 1.08 to 1.76). The reviewers concluded that acupuncture was likely to reduce the frequency of migraine headache, both in combination with or independent of medication, and that these benefits were associated with minimal unwanted effects.

A later systematic review pooled data from 22 randomised controlled trials (16 of which were included in the previous review), involving a total of 4,419 patients, to assess true acupuncture for migraine prophylaxis. In six trials comparing acupuncture to no prophylactic treatment or to routine care, there was strong clinical heterogeneity, and the methods and timing of outcome measurement differed considerably; this meant that pooled findings could be interpreted only as very crude indicators of the overall outcomes. Nevertheless, the reviewers concluded that the results clearly showed that with acupuncture there was a significantly more favourable outcome in terms of response (classified, where possible, as a reduction in attack frequency by at least 50%), headache frequency, migraine attacks, migraine days, headache days, headache intensity and headache scores 3–4 months after randomisation, and also a significant reduction in headache frequency, migraine attacks, migraine days, and headache intensity, as well as fewer unwanted effects. No difference was seen in analgesic use between acupuncture and any of the other comparators. The reviewers concluded that there was consistent evidence that acupuncture for migraine prophylaxis provided additional benefit either to treatment for acute attacks or to routine care (i.e. prophylaxis), but that there was no evidence for an effect of acupuncture over sham interventions. They also concluded that acupuncture was at least as effective as, and possibly more effective than, prophylactic drug treatment, and had fewer unwanted effects.

Tension-type headache

One systematic review, including eight randomised controlled trials with a total of 896 patients, investigated the efficacy and safety of true acupuncture as treatment for tension-type headache. During treatment, the groups had a similar number of headache days per month (the primary outcome measure; 8.95 days in acupuncture group vs. 10.5 in sham group, WMD −2.93, 95% CI −7.49 to +1.64, five trials). However, at long-term follow-up (20–25 weeks), the acupuncture group reported fewer headache days per month (8.21 vs. 9.54 in sham group, WMD −1.8, 95% CI −3.01 to −0.64, four trials). Headache intensity (defined as the score of subjective pain level recorded on a numerical scale, such as the visual analogue scale [VAS] for pain) was no less in the acupuncture group than in the sham group during treatment (which lasted for 3–8 weeks), but was reduced in the acupuncture group at long-term follow-up (WMD −3.64, 95% CI −6.55 to −0.73). The most commonly reported adverse events were bruising, headache exacerbation and dizziness. The reviewers concluded that their results suggested “limited efficacy for the reduction of headache days and headache intensity for tension-type headache with acupuncture compared with sham”.

A later systematic review pooled data from 11 randomised controlled trials (six the same as in the previous review), involving a total of 2,317 patients, to investigate whether true acupuncture was more effective than no prophylactic treatment or routine care only; more effective than sham acupuncture; or as effective as other interventions in reducing headache frequency in patients with episodic or chronic tension-type headache. The primary outcome measure was the proportion of responders for a 3–4-month window (a responder being a patient with a reduction of at least 50% in the number of headache days per 4 weeks). Two trials compared acupuncture to routine care only as treatment for acute headaches, and both found benefits in terms of the primary outcome measure (RR 2.68, 95% CI 2.22 to 3.23 and 11.36, 95% CI 3.69 to 34.98). Six trials compared acupuncture with sham acupuncture, and five of them provided data for meta-analysis. Benefits were found in favour of acupuncture for the primary outcome measure (50% responders with acupuncture vs. 41% with sham, RR 1.24, 95% CI 1.05 to 1.46). There was also statistically significant and clinically relevant short-term (up to 3–4 months) advantages with acupuncture over control for headache frequency, headache intensity,
headache scores and analgesic use, and of acupuncture over sham acupuncture for headache frequency and analgesic use. Overall, the reviewers concluded that "the available evidence suggests that acupuncture could be considered as a non-pharmacological tool in patients with frequent episodic or chronic tension-type headache".

**Trial since the systematic reviews**

A randomised controlled trial published since the systematic reviews described above included 175 patients and compared true acupuncture (one group) with sham acupuncture (two groups) for an acute migraine attack. Each patient received one session of treatment and was observed over a period of 24 hours. The primary outcome measure was the difference in VAS scores for pain before treatment and 0.5, 1, 2, and 4 hours after treatment. Significant decreases in VAS scores from baseline were observed only 4 hours after treatment in the patients who received either true or sham acupuncture (p<0.05). The VAS scores 2 and 4 hours (but not 0.5 and 1 hours) after treatment had decreased more from baseline in the true acupuncture group than the two sham acupuncture groups (p=0.006 and p=0.012 at 2 and 4 hours, respectively). Significant differences between the groups were also observed in favour of true acupuncture for pain relief, relapse, or aggravation within 24 hours after treatment (p<0.05). In all, 40.7% patients in the acupuncture group experienced complete pain relief (vs. around 17% with sham acupuncture, p=0.003) and 79.6% no recurrence or intensification of pain (vs. around 57%, p=0.002). The researchers concluded that true acupuncture was more effective than sham acupuncture in reducing the discomfort of acute migraine.

**Unwanted effects**

When a trained practitioner gives acupuncture, the risk of serious injury (e.g. a punctured lung) or infection is very low (estimated risk 0.05 serious adverse events per 10,000 treatments and 0.55 per 10,000 patients). In a prospective observational study to investigate acupuncture safety within usual care in Germany, 229,230 patients were asked to document adverse effects they associated with the intervention. The acupuncture was provided by 13,579 physicians, each with at least 140 hours of acupuncture training. Altogether, 8.6% of patients reported experiencing at least one adverse effect, and 2.2% had effects requiring treatment. Common effects were minor bleeding or haematoma (6.1%) and pain (1.7%). In all, 0.1% of the adverse effects suggested negligence or malpractice (e.g. broken or forgotten needle, pneumothorax, burns after moxibustion).

In one UK survey, of 32,000 individual acupuncture treatments for various indications given by doctors and physiotherapists, 2,135 minor events were recorded, the most common being bleeding (3.1%), and needling pain (1.1%). In another UK survey of 34,407 acupuncture treatments for various indications given by 574 traditional acupuncturists, 10,920 "mild transient reactions" occurred in 5,136 individual treatments, but the most common of these were "feeling relaxed" (11.9% of treatments) and "feeling energised" (6.6%). Reactions at the site of needling included bleeding (0.4%), superficial bruising (1.7%) and pain (1.2%). Data from 9,408 acupuncture patients in this survey also indicated minimal risk of adverse events associated with a missed medical diagnosis, delayed conventional treatment or inappropriate advice on medication due to treatment by independent acupuncturists who did not have a conventional medical qualification.

**Precautions**

Precautions should be taken to prevent infection by using sterile disposable needles for acupuncture treatment. Indwelling needles (i.e. small needles left in place for a few days) should be avoided in patients with heart valve disease, those who are neutropenic, and those who have had a splenectomy (i.e. are immunocompromised). Acupuncture should not be used in patients who have spontaneous bruising that has not been fully evaluated, and needles should not be inserted directly into a tumour or lymphoedematous limb. Electroacupuncture is contraindicated in patients with an intracardiac defibrillator. Patients who experience acupuncture-related drowsiness or seizures should be advised not to drive immediately after a treatment.

**Costs**

One 3-month randomised controlled trial in Germany (published in 2008), which included 3,182 adult patients with primary headache (including migraine) for more than 12 months (at least two headaches per month), compared costs and cost-effectiveness of additional acupuncture treatment to those of conventional routine medical care alone. The mean overall costs were higher in the acupuncture group compared with the control group (£857, 95% CI 791 to 924 vs. £527, 95% CI 460 to 595). The mean cost difference (£330, 95% CI 235 to 425) between the two groups was primarily due to the acupuncture costs in the acupuncture group (£366, 95% CI 362 to 369). The incremental cost-effectiveness ratio was £11,657 (about £10,125) per quality adjusted life-year (QALY) gained. The researchers concluded that, according to international cost-effectiveness threshold values, acupuncture was a cost-effective treatment in patients with primary headache.

In another 3-month randomised controlled trial published in 2004, involving 401 adults in the UK with chronic headache disorder (predominantly migraine), total costs were on average higher for acupuncture (£403) than for usual care alone (£217) because of the acupuncture practitioners’ costs. The mean health gain from acupuncture was 0.021 QALYs, leading to a base case estimate of £9,180 per QALY gained, suggesting that acupuncture for chronic headache improves health-related quality of life at a small additional cost and is relatively cost-effective compared with a number of other interventions provided by the NHS.

**What guidelines say**

A Scottish Intercollegiate Guidelines Network guideline on headache in adults concludes that acupuncture should be...
considered for preventive management in patients with migraine, and also suggests it for chronic headaches. Guidelines from the British Association for the Study of Headache state that “the role of acupuncture is unproven but worth trying in the absence of other options” for tension-type headache, but concludes it is “of little benefit” for migraine.

**Practical issues**

In many Primary Care Trusts, there are restrictions on commissioning of acupuncture services. An increasing number of general practitioners, nurses and physiotherapists are providing acupuncture themselves (usually medical acupuncture rather than the traditional Chinese medicine approach), and acupuncture is offered by independent practitioners (both within the NHS and privately). In practice, the waiting time for NHS treatment might result in patients seeking private treatment first, which could cost from around £15 to £60 per treatment. Anyone can legally call themselves an acupuncturist without any training. However, training standards, qualifications and registration are operated by self-regulating professional organisations, and patients should be advised to check whether their intended practitioner belongs to one of these bodies.*

**Conclusion**

Published evidence suggests that a course of acupuncture is better than no treatment for migraine or tension-type headache, and can be at least as effective as drug therapy, with few contraindications or unwanted effects. However, there are methodological problems with many of the trials of the intervention, and ‘true’ acupuncture has not always been shown to be more effective than sham acupuncture. The results of cost-effectiveness analyses from randomised controlled trials suggest that acupuncture can also be a cost-effective treatment. Overall, acupuncture seems a reasonable adjunctive treatment for migraine or tension-type headaches, particularly in patients not managed by medication or those wishing to pursue non-drug options. However, provision of NHS acupuncture services is limited.

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