

# ACUPUNCTURE AND MIGRAINES

## About migraines

Migraine is a primary headache disorder manifesting as recurring attacks, usually lasting for 4 to 72 hours and involving pain of moderate to severe intensity (IHS 2004). Typical characteristics of the headache are unilateral location, pulsating quality, moderate or severe intensity, and aggravation by routine physical activity. Sufferers may also experience auras, photophobia, phonophobia, nausea and vomiting. Migraine is a common disorder (Olesen 2007); a UK follow-up study found the migraine incidence rate to be 3.69 cases per 1,000 person-years, and to be around 2.5 times higher in women than men (Becker 2008).

Many people with migraine can be adequately treated when the attacks occur, but some need prophylactic interventions, as their attacks are either too frequent or are insufficiently controlled in this way. Several drugs, such as beta-blockers, amitriptyline or sodium valproate, are used in the prophylaxis of migraine in an attempt to reduce attack frequency, but all these drugs are associated with adverse effects (DTB 1998).

### References

- Becker C et al. Migraine incidence, comorbidity and health resource utilization in the UK. *Cephalalgia* 2008;28:57-64.
- IHS 2004. Headache Classification Subcommittee of the International Headache Society. The International Classification of Headache Disorders: 2nd edition. *Cephalalgia* 2004;24:1. 160.
- **Managing migraine. *Drug and Therapeutics Bulletin* 1998;36:41-44**
- Olesen J et al. Funding of headache research in Europe. *Cephalalgia* 2007;27:995. 9.

## How acupuncture can help

There have now been many controlled trials of acupuncture for migraine, with some large, high-quality ones in recent years. The results of the latest reviews are quite consistent: acupuncture is significantly better than no treatment/basic care for managing migraine, and appears to be at least as effective as prophylactic drug therapy, with few contraindications or unpleasant side effects (Linde 2009, Wang 2008, Sun 2008, Scott 2008). Acupuncture has a similar or slightly better effect than sham procedures, which themselves can perform as well as conventional drugs, indicating that sham acupuncture is not an inactive placebo but a contentious alternative intervention. Acupuncture has been found to be cost-effective (Witt 2008; Wonderling 2004). As well as prevention it may also be used to alleviate symptoms in acute attacks (Li 2009). There is preliminary qualitative evidence from patients that acupuncture can increase coping mechanisms as well as relieve migraine symptoms (Rutberg 2009).

Migraine is thought to begin as an electrical phenomenon in the cerebrum that then affects blood vessels, biochemistry, and causes neurogenic inflammation.

Acupuncture can help in the treatment of migraine by:

- Providing pain relief . by stimulating nerves located in muscles and other tissues, acupuncture leads to release of endorphins and other neurochemical factors and changes the processing of pain in the brain and spinal cord (Zhao 2008, Zijlstra 2003, Pomeranz, 1987)
- Reducing inflammation . by promoting release of vascular and immunomodulatory factors (Kim 2008, Kavoussi 2007, Zijlstra 2003).
- Reducing the degree of cortical spreading depression (an electrical wave in the brain associated with migraine) and plasma levels of calcitonin gene-related peptide and substance P (both implicated in the pathophysiology of migraine) (Shi 2010).
- Modulating extracranial and intracranial blood flow (Park 2009).
- Affecting serotonin (5-hydroxytryptamine) levels in the brain (Zhong 2007). (Serotonin may be linked to the initiation of migraines; 5-HT agonists (triptans) are used against acute attacks.)

## About traditional acupuncture

Acupuncture is a tried and tested system of traditional medicine, which has been used in China and other eastern cultures for thousands of years to restore, promote and maintain good health. Its benefits are now widely acknowledged all over the world and in the past decade traditional acupuncture has begun to feature more prominently in mainstream healthcare in the UK. In conjunction with needling, the practitioner may use techniques such as moxibustion, cupping, massage or electro-acupuncture. They may also suggest dietary or lifestyle changes.

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 unique to each individual. The traditional acupuncturist's skill lies in identifying the precise nature of the underlying disharmony and selecting the most effective treatment. The choice of acupuncture points will be specific to each patient's needs. Traditional acupuncture can also be used as a preventive measure to strengthen the constitution and promote general well-being.

An increasing weight of evidence from Western scientific research (see overleaf) is demonstrating the effectiveness of acupuncture for treating a wide variety of conditions. From a biomedical viewpoint, acupuncture is believed to stimulate the nervous system, influencing the production of the body's communication substances - hormones and neurotransmitters. The resulting biochemical changes activate the body's self-regulating homeostatic systems, stimulating its natural healing abilities and promoting physical and emotional well-being.

## About the British Acupuncture Council

With over 3000 members, the British Acupuncture Council (BAcC) is the UK's largest professional body for traditional acupuncturists. Membership of the BAcC guarantees excellence in training, safe practice and professional conduct. To find a qualified traditional acupuncturist, contact the BAcC on 020 8735 0400 or visit [www.acupuncture.org.uk](http://www.acupuncture.org.uk)

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## The evidence

Research	Conclusion
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### Reviews

Linde K et al. Acupuncture for migraine prophylaxis. *Cochrane Database of Systematic Reviews* 2009 Issue 1. Art.No.: CD001218. DOI: 10.1002/14651858.CD001218.pub2.

A review of 22 trials that investigated whether acupuncture is effective for the prevention of migraine attacks. Patients who received acupuncture had fewer headaches than those given basic care. True acupuncture and sham acupuncture seemed to be similarly effective. When acupuncture was compared to proven drug treatment, patients receiving acupuncture tended to report more improvement and fewer side effects. Overall, migraine patients benefited from acupuncture, and it was at least as effective as, or possibly more effective than, drug treatment, with fewer adverse effects.

Sun Y, Gan TJ. Acupuncture for the management of chronic headache: a systematic review. *Anesth Analg* 2008;107:2038-47.

A review of 31 comparative trials of acupuncture for treatment of chronic headache, including migraine, tension-type headache or both. True acupuncture was found to be superior to sham acupuncture and medication in improving headache intensity, frequency, and response rate.

Wang YY, Zheng Z, Xue CCL  
Acupuncture for Migraine.  
*Austral J Acupunc Chin Med* 2008;3(1):1-16

Systematic review of the Chinese literature on acupuncture for migraine, including 17 randomised trials. All compared acupuncture (+/- other Chinese therapies) to western medication. Reporting quality and internal validity were poor. Acupuncture was found to be significantly better than western medication (10 trials: Risk Ratio 1.5; Confidence Interval 1.27-1.88). Acupuncture plus other therapies also performed better than drugs.

Scott SW, Deare JC. Acupuncture for migraine: a systematic review.  
*Australian Journal of Acupuncture and Chinese Medicine* 2006;1:3. 14.

A review of 25 trials that assessed the effectiveness of acupuncture compared to no treatment, sham or placebo acupuncture, or other interventions used to treat and prevent migraine. Overall, acupuncture was found to be superior to no treatment, at least as effective as sham acupuncture, and of comparable efficacy to medication for the treatment and prevention of migraine.

### Clinical studies

Li Y, Liang F, Yang X, Tian X et al. Acupuncture for treating acute attacks of migraine: A randomized controlled trial. *Headache*. 2009; 49 (6) (pp 805-816)

A multicentre controlled trial of acupuncture for acute migraine attacks. 175 patients were randomized to either verum acupuncture or one of two sham acupuncture groups (using Chinese or Western non-points). Patients received 1 session of treatment and were observed over 24 hours. 2 hours after treatment only verum acupuncture patients showed significant decreases in VAS scores from baseline (median 0.7 cm). At 4 hours the acupuncture group had decreased by 1.0 cm, significantly better than the two shams (0.5 cm, 0.1 cm). There were significant differences in pain relief, relapse, or aggravation

	<p>within 24 hours after treatment. Most acupuncture patients experienced complete pain relief (40.7%) and did not experience recurrence or intensification of pain (79.6%). <u>Verum acupuncture treatment is more effective than sham in reducing the discomfort of acute migraine and preventing relapse or aggravation.</u></p>
<p>Rutberg S., Ohrling K. Experiences  acupuncture among women with</p> <p><i>Advances in Physiotherapy</i>. 2009; 11 (3)  (pp 130-136)</p>	<p>From narrative interviews with 10 women. They stated that the patient therapist relationship affected the experience both during and after treatment. Acupuncture was found to relieve pain, decreased the use of pharmaceuticals and increased emotional strength. Women felt safer, able to live a fuller life, and with more control over the migraine. <u>In conclusion, acupuncture seems to relieve the consequences of migraine and can be viewed as an alternative for physiotherapists in treating persons with migraine.</u></p>
<p>Zhang Y., Zhang L., Li B., Wang L.P.  Effects of acupuncture preventive treatment on the quality of life in patients of no-aura migraine. <i>Zhongguo zhen jiu [Chinese acupuncture &amp; moxibustion]</i>. 2009;29 (6) (pp 431-435)</p>	<p>A randomized controlled, double-blind and double-dummy design: 60 cases were assigned either to real acupuncture plus sham Flunarizine pills or real pills plus sham acupuncture. Three treatments per week for 4 weeks. There were significant differences in physiological function between the two groups after treatment but not in any of the other SF36 dimensions. After treatment and 3 months later, the effective rates were 68%, 68% in the real acupuncture/sham pill group and 24%, 32% in the control. <u>It was concluded that acupuncture can effectively improve the life quality of migraine patients and reduce the frequency of attacks. There is no significant difference in improving physical and psychological health between acupuncture and Flunarizine but the former is more effective in reducing migraine frequency.</u></p>
<p>Jena S et al. Acupuncture in patients with headache. <i>Cephalalgia</i> 2008;28:969-79.</p> <p>Witt CM, Reinhold T, Jena S, Brinkhaus B, Willich SN. Cost-effectiveness of acupuncture treatment in patients with headache. <i>Cephalalgia</i>. 2008 Apr;28(4):334-45</p>	<p>A randomised controlled trial that assessed the effectiveness of acupuncture in addition to routine care in 3,182 patients with migraine and/or tension headache compared with routine care alone. At 3 months, the number of days with headache had decreased more in the acupuncture group than the routine care alone group. Similarly, intensity of pain and quality of life improvements were greater in the acupuncture group. <u>The researchers concluded that acupuncture plus routine care in patients with headache was associated with marked clinical improvements compared with routine care alone.</u></p> <p>The incremental cost-effectiveness ratio was calculated as " 11,657 per QALY gained. <u>According to international cost-effectiveness threshold values, acupuncture is a cost-effective treatment in patients with primary headache.</u></p>
<p>Diener HC et al. Efficacy of acupuncture for the prophylaxis of migraine: a multicentre randomised controlled clinical trial. <i>Lancet Neurol</i></p>	<p>A randomised controlled trial that compared acupuncture with sham acupuncture and standard migraine drug treatment used to prevent attacks in 960 patients who had two to six migraine attacks per month. Days with migraine were reduced significantly with all</p>

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2006;5:310-6.

the treatments, but the groups were similar. The researchers concluded that true acupuncture, sham acupuncture or standard drug therapy are similarly effective for migraine.

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Streng A et al. Effectiveness and tolerability of acupuncture compared with metoprolol in migraine prophylaxis. *Headache* 2006;46:1492-502.

A randomised controlled trial that compared acupuncture with the prophylactic drug metoprolol in 114 patients with migraine. The number of days with migraine fell similarly in both groups, but there were fewer side effects with acupuncture. The researchers concluded that acupuncture might be an effective and safe treatment option for patients unwilling or unable to take medication.

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Vickers AJ et al. Acupuncture for chronic headache in primary care: large, pragmatic, randomised trial. *BMJ* 2004;328:744.

A 12-month randomised controlled trial that compared acupuncture with no acupuncture in 401 patients with chronic headache, predominantly migraine. Patients in the acupuncture group experienced 22 fewer days of headache per year, used 15% less medication, made 25% fewer visits to GPs, and had 15% fewer days off sick than patients given usual care. The researchers concluded that acupuncture leads to lasting benefits for patients with chronic headache, particularly migraine, and that expansion of NHS acupuncture services should be considered.

Wonderling D, Vickers AJ, Grieve R, McCarney R. Cost effectiveness analysis of a randomised trial of acupuncture for chronic headache in primary care. *BMJ*. 2004 Mar 27;328(7442):747.

Total costs were higher for the acupuncture group than controls due to the practitioners' costs. This was more than outweighed by the health gain, leading to an estimate of £9180 per QALY gained. Acupuncture for chronic headache improves health related quality of life at a small additional cost; it is relatively cost effective compared with a number of other interventions provided by the NHS.

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Allais G et al. Acupuncture in the prophylactic treatment of migraine without aura: a comparison with flunarizine. *Headache* 2002;42:855-61.

A randomised controlled trial that compared acupuncture and flunarizine for the prevention of migraine attacks in 160 women. The frequency of attacks and use of drugs to treat migraine symptoms fell significantly in both groups, but the number of attacks after 2 and 4 months was lower with acupuncture. Pain intensity was significantly reduced only with acupuncture and side effects were significantly less frequent in this group. The researchers concluded that acupuncture could be used to prevent migraine attacks, and was more effective and better tolerated than flunarizine in the first months of treatment.

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### Physiological studies

[Shi H](#), [Li JH](#), [Ji CF](#), [Shang HY](#), [Qiu EC](#) et al. [Effect of electroacupuncture on cortical spreading depression and plasma CGRP and substance P contents in migraine rats]. *Zhen Ci Yan Jiu*. 2010 Feb;35(1):17-21.

30 rats were randomized into control (no migraine), model (migraine, no acupuncture) and electroacupuncture (migraine, 30 mins EA) groups. KCI stimulation evoked cortical spreading depression (CSD). The average CSD amplitude for the EA group was significantly lower ( $p < .01$ ) than that for the model group (-19.19 v. -23.13 mV). Plasma contents of both calcitonin gene-related peptide and substance P were lowered in the EA group compared to the model control ( $P < 0.05$ ,  $P < 0.001$ ), suggesting an inhibitory effect of EA on pain-producing substances that may contribute to migraine relief.

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Park K.-H. Kim H.-J. Baek S.-Y. Cho B.-M. Yoo T.-W. Effect of acupuncture on blood flow velocity and volume in common carotid and

To study blood flow in extracranial arteries after performing Korean Hand Acupuncture (KHT) on migraine patients. 40 healthy volunteers and 40 with a history of migraines were used. Blood flow volume and velocity were measured in the

<p>vertebral arteries in migraine patients. <i>Medical Acupuncture</i>. 2009; 21(1)(pp 47-54</p>	<p>carotid and vertebral arteries by MRI. The predominant pattern for migraineurs was decreased velocity and volume in the carotid artery but increased in the vertebral artery. Acupuncture had a significant effect on these blood flow characteristics in both groups (P &lt; .001), indicating that KHT can modulate extracranial blood flow through the collateral circulation, and may affect the intracranial blood flow in migraine patients.</p>
<p>Kim HW, Uh DK, Yoon SY et al. Low-frequency electroacupuncture suppresses carrageenan-induced paw inflammation in mice via sympathetic post-ganglionic neurons, while high-frequency EA suppression is mediated by the sympathoadrenal medullary axis. <i>Brain Res Bull</i>. 2008 Mar 28;75(5):698-705.</p>	<p>Experimental study on rats. Results suggest that suppressive effects of low frequency electroacupuncture on carrageenan-induced paw inflammation are mediated by sympathetic post-ganglionic neurons, while suppressive effects of high frequency electroacupuncture are mediated by the sympatho-adrenal medullary axis.</p>
<p>Zhong G.-W. Li W. Effects of acupuncture on 5-hydroxytryptamine<sub>1F</sub> and inducible nitricoxide synthase gene expression in the brain of migraine rats. <i>Journal of Clinical Rehabilitative Tissue Engineering Research</i>. 2007;11(29)(pp 5761-5764)</p>	<p>Forty SD rats were randomly divided into 4 groups. Electroacupuncture (EA) was given daily for 5 days in 2 groups, one after migraine was established and one before. Compared with non-acupuncture controls, EA significantly moderated the effects of migraine on 5-hydroxytryptamine<sub>1F</sub> and nitricoxide synthase gene expression in the brain. It was concluded that acupuncture may prevent and cure migraine by controlling and regulating the expression of mRNA for these substances.</p>
<p>Zhao ZQ. Neural mechanism underlying acupuncture analgesia. <i>Prog Neurobiol</i>. 2008 Aug;85(4):355-75.</p>	<p>Review article. Discusses the various peripheral and central nervous system components of acupuncture anaesthesia in detail.</p>
<p>Kavoussi B, Ross BE. The neuroimmune basis of anti-inflammatory acupuncture. <i>Integr Cancer Ther</i>. 2007 Sep;6(3):251-7.</p>	<p>Review article. Suggests that anti-inflammatory actions of traditional and electro-acupuncture are mediated by efferent vagus nerve activation and inflammatory macrophage deactivation.</p>
<p>Zijlstra FJ, van den Berg-de Lange I, Huygen FJ, Klein J. Anti-inflammatory actions of acupuncture. <i>Mediators Inflamm</i>. 2003 Apr;12(2):59-69.</p>	<p>Suggests hypothesis for anti-inflammatory action of acupuncture. Insertion of acupuncture needle initially stimulates production of beta-endorphins, CGRP and substance P, leading to further stimulation of cytokines and NO. While high levels of CGRP have been shown to be pro-inflammatory, CGRP in low concentrations exerts potent anti-inflammatory actions, therefore, a frequently applied 'low-dose' treatment of acupuncture could provoke a sustained release of CGRP with anti-inflammatory activity, without stimulation of pro-inflammatory cells.</p>
<p>Pomeranz B. Scientific basis of acupuncture. In: Stux G, Pomeranz B, eds. <i>Acupuncture Textbook and Atlas</i>. Heidelberg: Springer-Verlag; 1987:1-18.</p>	<p>Needle activation of A delta and C afferent nerve fibres in muscle send signals to spinal cord, where dynorphin and enkephalins are released. Afferent pathways continue to midbrain, triggering excitatory and inhibitory mediators in spinal cord. Ensuing release of neurotransmitters serotonin and norepinephrine onto spinal cord leads to pain transmission being inhibited both pre- and postsynaptically in spinothalamic tract. Finally, these signals reach hypothalamus and pituitary, triggering release of adrenocorticotrophic hormones and beta-endorphin.</p>

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