

# ACUNPUNCTURE AND CHRONIC PAIN

## About chronic pain

**Persistent (chronic) pain is a widespread problem that affects around 8 million people of all ages in the UK (Chronic Pain Policy 2010). In 22% of cases, chronic pain leads to depression, and some 25% of those diagnosed with chronic pain go on to lose their jobs (Chronic Pain Policy 2010). In fact, around £3.8 billion a year is spent on incapacity benefit payments to those diagnosed with chronic pain (Chronic Pain Policy 2010)**

The International Association for the Study of Pain has defined pain "as an unpleasant sensory or emotional experience resulting from actual or potential tissue damage". Chronic pain may be defined as pain that lasts beyond the usual course of the acute disease or expected time of healing, and it may continue indefinitely.

Typical chronic pain conditions include: osteoarthritis; rheumatoid arthritis; low back, shoulder and neck pain; headache and migraine; cancer pain; fibromyalgia; neuropathic pain (e.g. sciatica, trigeminal neuralgia, post herpetic neuralgia); chronic overuse conditions (e.g. tendonitis); and chronic visceral pain (e.g. irritable bowel syndrome, interstitial cystitis, endometriosis) (Singh 2010).

## References

Chronic Pain Policy Coalition, 2010. About chronic pain [online]. Available:

<http://www.policyconnect.org.uk/cppc/about-chronic-pain>

Singh MK. Chronic pain syndrome. *eMedicine* 2010 [online]. Available: <http://emedicine.medscape.com/article/310834-overview>

## How acupuncture can help

An early systematic review of acupuncture for chronic pain found very limited evidence to support it (Ezzo 2000), but numerous large, well conducted studies in the last 10 years have substantially changed the picture. Recent reviews have shown that it is more effective than no treatment or usual care for chronic back pain, osteoarthritis, or headache (Sherman 2009). There is also evidence that it is more effective than sham acupuncture for chronic knee pain or headache and, at least in the short term, for chronic back pain (Hopton 2010). Other conditions have been less well researched

For more details of specific research on chronic pain conditions see our other Factsheets: Acupuncture and Back Pain; Acupuncture and Endometriosis; Acupuncture and Frozen Shoulder; Acupuncture and IBS; Acupuncture and GI Tract; Acupuncture and Migraine; Acupuncture and Headache; Acupuncture and Sciatica; Acupuncture and Fibromyalgia; Acupuncture and Osteoarthritis; Acupuncture and Rheumatoid Arthritis; Acupuncture and Dysmenorrhoea; Acupuncture and Neck Pain. There is also evidence from randomised controlled trials and systematic reviews that suggests acupuncture may reduce chronic pain in myofascial syndrome (Shen 2009), chronic shoulder problems (Lathia 2009), chronic prostatitis/chronic pelvic pain syndrome (Lee 2009) and tennis elbow (Trihn 2004). There is preliminary evidence for ear acupuncture in cancer pain (Lee 2005).

In general, acupuncture is believed to stimulate the nervous system and cause the release of neurochemical messenger molecules. The resulting biochemical changes influence the body's homeostatic mechanisms, thus promoting physical and emotional well-being. Stimulation of certain acupuncture points has been shown to affect areas of the brain that are known to reduce sensitivity to pain and stress, as well as promoting relaxation and deactivating the analytical brain, which is responsible for anxiety (Wu 1999).

Acupuncture may help relieve chronic pain by:

- stimulating nerves located in muscles and other tissues, which leads to release of endorphins and other neurohumoral factors (e.g. neuropeptide Y, serotonin), and changes the processing of pain in the brain and spinal cord (Pomeranz 1987, Han 2004, Zhao 2008, Zhou 2008, Lee 2009, Cheng 2009);
- increasing the release of adenosine, which has antinociceptive properties (Goldman 2010);
- modulating the limbic-paralimbic-neocortical network (Hui 2009);
- reducing inflammation, by promoting release of vascular and immunomodulatory factors (Kavoussi 2007, Zijlstra 2003);
- improving muscle stiffness and joint mobility by increasing local microcirculation (Komori 2009), which aids dispersal of swelling.

## 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)

# ACUPUNCTURE AND CHRONIC PAIN

## The evidence

Research	Conclusion
<b>Systematic Reviews (SRs)</b>	
Hopton A, MacPherson H. Acupuncture for chronic pain: is acupuncture more than an effective placebo? A systematic review of pooled data from meta-analyses. <i>Pain Pract</i> 2010; 10: 94-102.	A synthesis of evidence from systematic reviews on the pooled data of high-quality randomized controlled trials comparing acupuncture to sham acupuncture for chronic pain. For short-term outcomes, acupuncture showed significant superiority over sham for back pain, knee pain, and headache. For longer-term outcomes (6 to 12 months), acupuncture was significantly more effective for knee pain and tension-type headache but inconsistent for back pain (one positive and one inconclusive). <u>The reviewers concluded that the accumulating evidence from recent reviews suggests acupuncture is more than a placebo for commonly occurring chronic pain conditions.</u>
Sherman KJ, Coeytaux RR. Acupuncture for Improving Chronic Back Pain, Osteoarthritis and Headache. <i>J Clin Outcomes Manag</i> 2009; 16: 224-30.	A critical review and meta-analysis of the literature on acupuncture for chronic back pain, osteoarthritis and headache. It found that, overall, acupuncture appeared to be superior to no treatment or usual care for people with chronic back pain, osteoarthritis, or headache, but was not clearly superior to sham acupuncture, although the latter is a controversial control group. Acupuncture was also found to have a favourable safety profile, with relatively few side effects. <u>The reviewers concluded that limited evidence suggests that acupuncture is a cost effective treatment, and that it may be particularly valuable for patients who prefer it to other options or are concerned about using analgesic medications.</u>
Lee H et al. Acupuncture for the relief of cancer-related pain--a systematic review. <i>Eur J Pain</i> 2005; 9: 437-44.	A systematic review that summarised the existing evidence on acupuncture for cancer-related pain from 7 studies. One high quality randomised clinical trial of ear acupuncture showed statistically significant pain relief in comparison with placebo ear acupuncture. All the other studies were either non-blinded (n=2) or uncontrolled clinical trials (n=4), and most suffered from methodological flaws such as inadequate study design, poor reporting of results, small sample size and overestimation of the results. <u>The reviewers concluded that that there are insufficient high quality data to assess the effect of acupuncture as analgesic adjunctive method for cancer patients</u>
Trinh KV et al. Acupuncture for the alleviation of lateral epicondyle pain: a systematic review. <i>Rheumatology</i> 2004; 43: 1085-90.	A systematic review that evaluated the effectiveness of acupuncture as a treatment for lateral epicondylitis. Six randomised controlled trials (4 sham-controlled) were included. All the studies suggested that acupuncture was effective in the short-term relief of lateral epicondyle pain. Five of six studies indicated that acupuncture treatment was more effective compared to a control treatment. <u>The reviewers concluded that there was strong evidence suggesting that acupuncture is effective in the short-term relief of lateral epicondyle pain.</u>
Ezzo J et al. Is acupuncture effective for the treatment of chronic pain? A systematic review. <i>Pain</i> 2000 ; 86: 217-25.	A systematic review that assessed the effectiveness of acupuncture as a treatment for chronic pain within the context of the methodological quality of the studies. Fifty one studies met inclusion criteria. Clinical heterogeneity precluded statistical pooling. Results were positive in 21 studies, negative in 3 and neutral in 27. Six or more acupuncture treatments were significantly associated with positive outcomes (p=0.03), even after adjusting for study quality. <u>The reviewers concluded there is limited</u>

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evidence that acupuncture is more effective than no treatment for chronic pain; and inconclusive evidence that acupuncture is more effective than placebo, sham acupuncture or standard care.

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### Randomised controlled trials

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Shen YF et al. Randomized clinical trial of acupuncture for myofascial pain of the jaw muscles. *J Orofac Pain* 2009; 23: 353-9.

A randomised controlled trial that compared real and sham acupuncture for chronic myofascial pain of the jaw muscles in 28 patients. Real acupuncture was given by penetrating the needle through a sticky foam pad at the acupoint. Sham acupuncture was conducted by pricking the skin, without penetration, with a shortened, blunted acupuncture needle through a foam pad placed away from the acupoint. General head and neck pain ratings were obtained before and after treatment on a numerical rating scale. Real acupuncture significantly reduced jaw pain ( $p=0.04$ ), jaw/face tightness ( $p=0.04$ ), and neck pain ( $p=0.04$ ), and significantly increased pain tolerance of the masseter muscle ( $p=0.001$ ) compared with sham acupuncture. Patients were not able to determine whether they received real or sham acupuncture ( $p=0.69$ ). No significant pain reductions were observed in the sham acupuncture group. The researchers concluded that a single acupuncture session significantly reduced most myofascial pain endpoints when compared to sham acupuncture.

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Lathia AT et al. Efficacy of acupuncture as a treatment for chronic shoulder pain. *J Altern Complement Med* 2009; 15: 613-8.

A randomised controlled trial that compared individualized acupuncture points according to the approaches of Traditional Chinese Medicine (group 1); fixed, standard acupuncture points conventionally used for shoulder pain (group 2); and sham non-penetrating acupuncture for chronic shoulder pain (group 3) in 31 patients. The primary outcome - total Shoulder Pain and Disability Index (SPADI) score at 6 weeks - improved in all three groups, but the change was clinically significant ( $> \text{ or } =10$  points) only in groups 1 and 2 (-20.3 and -20.4, respectively, versus -6.5 in group 3). The treatment effects of groups 1 and 2 compared to the sham acupuncture group were -13.8 (95% CI -2.2 to -25.4,  $p<0.015$ ) and -13.9 (-2.0 to -25.8,  $p<0.013$ ), respectively. There was no difference between the individualized acupuncture and standardized acupuncture treatments. The researchers concluded that acupuncture may be an effective treatment for chronic shoulder pain.

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Lee SH, Lee BC. Electroacupuncture relieves pain in men with chronic prostatitis/chronic pelvic pain syndrome: three-arm randomized trial. *Urology* 2009; 73: 1036-41.

A randomised controlled trial that compared real and sham electroacupuncture plus exercise with exercise alone for chronic prostatitis/chronic pelvic pain syndrome in 63 participants. At 6 weeks, patients in the real acupuncture group showed significant decreases in pain-related symptoms compared with the sham acupuncture and exercise alone groups ( $p<0.01$ ). The researchers concluded that electroacupuncture has independent therapeutic effects in chronic prostatitis/chronic pelvic pain syndrome, particularly for pain relief, which is superior to sham treatment or exercise.

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### Research on mechanisms for acupuncture

Goldman N et al. Adenosine A1 receptors mediate local anti-nociceptive effects of acupuncture. *Nat Neurosci* 2010 May 30. [Epub ahead of print]

A study that the neuromodulator adenosine, which has anti-nociceptive properties, was released during acupuncture in mice, and that its anti-nociceptive actions required adenosine A1 receptor expression. Direct injection of an adenosine A1 receptor agonist replicated the analgesic effect of acupuncture. Inhibition of

	<p>enzymes involved in adenosine degradation potentiated the acupuncture-elicited increase in adenosine, as well as its anti-nociceptive effect. <u>The researchers concluded that their observations indicate that adenosine mediates the effects of acupuncture and that interfering with adenosine metabolism may prolong the clinical benefit of acupuncture.</u></p>
<p>Hui K.K.-S. The salient characteristics of the central effects of acupuncture needling: limbic-paralimbic-neocortical network modulation. <i>Human Brain Mapping</i> 2009; 30: 1196-206.</p>	<p>A study assessed the results of fMRI on 10 healthy adults during manual acupuncture at 3 acupuncture points and a sham point on the dorsum of the foot. Although certain differences were seen between real and sham points, the hemodynamic and psychophysical responses were generally similar for all 4 points. Acupuncture produced extensive deactivation of the limbic-paralimbic-neocortical system. Clusters of deactivated regions were seen in the medial prefrontal cortex, the temporal lobe and the posterior medial cortex. The sensorimotor cortices, thalamus and occasional paralimbic structures such as the insula and anterior middle cingulate cortex showed activation. <u>The researchers concluded that their results provided additional evidence that acupuncture modulates the limbic-paralimbic-neocortical network. They hypothesised that acupuncture may mediate its analgesic, anti-anxiety, and other therapeutic effects via this intrinsic neural circuit that plays a central role in the affective and cognitive dimensions of pain.</u></p>
<p>Cheng CH et al. Endogenous Opiates in the Nucleus Tractus Solitarius Mediate Electroacupuncture-induced Sleep Activities in Rats. <i>Evid Based Complement Alternat Med</i> 2009 Sep 3. [Epub ahead of print]</p>	<p>An animal study that investigated the involvement of the nucleus tractus solitarius opioidergic system in electroacupuncture-induced alterations in sleep, the findings of which suggested that mechanisms of sleep enhancement may be mediated, in part, by cholinergic activation, stimulation of the opioidergic neurons to increase the concentrations of beta-endorphin and the involvement of the <math>\mu</math>-opioid receptors.</p>
<p>Lee B et al. Effects of acupuncture on chronic corticosterone-induced depression-like behavior and expression of neuropeptide Y in the rats. <i>Neuroscience Letters</i> 2009; 453: 151-6.</p>	<p>In animal studies, acupuncture has been found to significantly reduce anxiety-like behaviour, and increase brain levels of neuropeptide Y, the brain levels of which appear to correlate with reported anxiety.</p>
<p>Komori M et al. Microcirculatory responses to acupuncture stimulation and phototherapy. <i>Anesth Analg</i> 2009; 108: 635-40.</p>	<p>Experimental study on rabbits in which acupuncture stimulation was directly observed to increase diameter and blood flow velocity of peripheral arterioles, enhancing local microcirculation.</p>
<p>Zhao ZQ. Neural mechanism underlying acupuncture analgesia. <i>Prog Neurobiol</i> 2008; 85: 355-75.</p>	<p>Review article that discusses the various peripheral and central nervous system components of acupuncture anaesthesia in detail.</p>
<p>Zhou Q et al. The effect of electro-acupuncture on the imbalance between monoamine neurotransmitters and GABA in the CNS of rats with chronic emotional stress-induced anxiety. <i>Int J Clin Acupunct</i> 2008 ;17: 79-84.</p>	<p>A study of the regulatory effect of electro-acupuncture on the imbalance between monoamine neurotransmitters and GABA in the central nervous system of rats with chronic emotional stress-induced anxiety. The levels of serotonin, noradrenaline and dopamine fell significantly, while GABA levels were significantly higher in the rats given acupuncture (<math>P &lt; 0.05</math>, or <math>P &lt; 0.0</math>). The researchers concluded that the anti-anxiety effect of electro-acupuncture may relate to its regulation of the imbalance of neurotransmitters.</p>
<p>Kavoussi B, Ross BE. The neuroimmune basis of anti-inflammatory acupuncture. <i>Integr Cancer Ther</i> 2007; 6: 251-7.</p>	<p>Review article that suggests the anti-inflammatory actions of traditional and electro-acupuncture are mediated by efferent vagus nerve activation and inflammatory macrophage deactivation.</p>
<p>Han JS. Acupuncture and endorphins. <i>Neurosci Lett</i> 2004; 361: 258-61.</p>	<p>A literature review of studies relating to the release of endorphins by acupuncture.</p>

Zijlstra FJ et al. Anti-inflammatory actions of acupuncture. <i>Mediators Inflamm</i> 2003; 12: 59-69.	An article that suggests a hypothesis for anti-inflammatory action of acupuncture: Insertion of acupuncture needles 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.
Wu MT et al. Central nervous pathway for acupuncture stimulation: localization of processing with functional MR imaging of the brain--preliminary experience. <i>Radiology</i> 1999 ; 212: 133-41.	An experimental study using MRI to characterise the central nervous system pathway for acupuncture stimulation, which found that acupuncture activates structures of descending antinocioceptive pathway and deactivates areas mediating pain modulation.
Pomeranz B. Scientific basis of acupuncture. In: Stux G, Pomeranz B, eds. <i>Acupuncture Textbook and Atlas</i> . Heidelberg: Springer-Verlag; 1987: 1-18.	Needle activation of A delta and C afferent nerve fibres in muscle sends signals to the spinal cord, where dynorphin and enkephalins are released. Afferent pathways continue to the midbrain, triggering excitatory and inhibitory mediators in spinal cord. Ensuing release of serotonin and norepinephrine onto the spinal cord leads to pain transmission being inhibited both pre- and postsynaptically in the spinothalamic tract. Finally, these signals reach the hypothalamus and pituitary, triggering release of adrenocorticotrophic hormones and beta-endorphin.

### **Terms and conditions**

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