

Back pain

* National Institute for Health Research, Health Technology Assessment Spotlight: Acupuncture for back pain.<http://www.hta.ac.uk/project/1082.asp>

Back pain can affect anyone at any age and most people will suffer from it at some point in their lives. It is the UK's leading cause of disability and one of the main reasons for work-related sickness absence.

The condition affects more than 1.1 million people in the UK, with 95% of patients suffering from problems affecting the lower back. Back pain currently costs the NHS and community care services more than £1 billion each year*. Most lower back pain is caused not by serious damage or disease, but by sprains, muscle strains, minor injuries, or a pinched or irritated nerve. It can also occur during pregnancy, or because of stress, viral infection or a kidney infection.

How acupuncture can help

Research has shown that acupuncture is significantly better than no treatment and at least as good as (if not better than) standard medical care for back pain (Witt 2006; Haake 2007; Cherkin 2009; Sherman 2009a). It appears to be particularly useful as an adjunct to conventional care, for patients with more severe symptoms and for those wishing to avoid analgesic drugs (Sherman 2009a, 2009b; Lewis 2010). It may help back pain in pregnancy (Ee 2008) and work-related back pain, with fewer work-days lost (Weidenhammer 2007; Sawazaki 2008). Acupuncture has in some meta-analyses been found superior to sham acupuncture (Hopton 2010) while in others the advantage was not statistically significant (Yuan 2008; Ammendolia 2008). The sham interventions are not inactive placebos, but effectively different versions of acupuncture, so their value in evaluating treatment efficacy is highly questionable (Sherman 2009a). (See Table overleaf).

Acupuncture can help back pain by:

- providing pain relief - by stimulating nerves located in muscles and other tissues, acupuncture leads to release of endorphins and other neurohumoral factors and changes the processing of pain in the brain and spinal cord (Pomeranz 1987; Zhao 2008).
- reducing inflammation - by promoting release of vascular and immunomodulatory factors (Kim 2008, Kavoussi 2007; Zijlstra 2003).
- improving muscle stiffness and joint mobility - by increasing local microcirculation (Komori 2009), which aids dispersal of swelling and bruising.

- reducing the use of medication for back complaints (Thomas 2006).
- providing a more cost-effective treatment over a longer period of time (Radcliffe 2006;Witt 2006).
- improving the outcome when added to conventional treatments such as rehabilitation exercises (Ammendolia 2008; Yuan 2008).

The National Institute for Health and Clinical Excellence guidelines on best practice now recommend that GPs offer a course of 10 sessions of acupuncture as a first line treatment for persistent, non-specific low back pain*

* National Institute for Health and Clinical Excellence clinical guideline 88 - Low back pain. www.nice.org.uk/CG88

Research	Conclusion
Reviews	
<p>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.</p>	<p>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></p>
<p>Lewis K, Abdi S. Acupuncture for lower back pain: A review. <i>Clinical Journal of Pain</i>. 2010; 26(1)(pp 60-69)</p>	<p>A systematic review based on an online search of all articles and other literature in the past 50 years related to acupuncture efficacy in low back pain, including case reports, randomized controlled trials and meta-analyses. They found multiple, generally poor quality studies. Newer studies show promise but effectiveness has not been clearly demonstrated. They conclude that more, high-quality research is needed but that acupuncture can continue to play a significant role as an adjunct to a multidisciplinary approach for managing low back pain.</p>
<p>Sherman KJ, Coeytaux RR. Acupuncture for the treatment</p>	<p>A review of meta-analyses, systematic reviews and recent well-conducted studies of</p>

<p>of common pain conditions: Chronic back pain, osteoarthritis, and headache. Journal of Clinical Outcomes Management. 2009a; 16(5)(pp 224-230), 2009a.</p>	<p>acupuncture for chronic back pain, osteoarthritis (OA), and headache. Overall, acupuncture appears superior to no treatment or usual care for persons with chronic back pain, OA, or headache. The size of the effect varies but is small to moderate in most cases. Acupuncture is not clearly superior to sham acupuncture, although the latter is a controversial control therapy. Acupuncture has a favorable safety profile, and the limited evidence suggests it is cost-effective. Concludes that acupuncture is a reasonable therapeutic option for chronic back pain, OA, and headache but is not the clear therapy of choice. It may be especially valuable for patients who prefer it to other options or those concerned about using analgesic medications.</p>
<p>Yuan J, Purepong N, Kerr DP, Park J et al. Effectiveness of acupuncture for low back pain: a systematic review. Spine. 2008 Nov 1;33(23):E887-900.</p>	<p>Systematic review and meta-analysis looking at the most recent clinical studies of acupuncture in the treatment of LBP. Analysed pooled results of 23 trials involving 6359 patients. Found moderate evidence that acupuncture is more effective than no treatment and strong evidence that acupuncture is a useful supplement to other forms of conventional therapy. Concludes that acupuncture should be advocated for the treatment of chronic LBP.</p>
<p>Ammendolia C, Furlan AD, Imamura M, Irvin E, van Tulder M. Evidence-informed management of chronic low back pain with needle acupuncture. Spine J. 2008 Jan-Feb;8(1):160-72.</p>	<p>Review article on management of chronic LBP with acupuncture. Explains theories of acupuncture' mechanisms of action on pain and reviews evidence of its efficacy. Cites evidence that, compared with no treatment, acupuncture is effective in pain relief and functional improvement immediately after treatment and in short-term follow-up. Also that acupuncture is as effective for pain relief and functional improvement as conventional treatments. Concludes that the most consistent evidence is for the addition of acupuncture to other therapies, which demonstrated more effect in pain relief and functional improvement than the same therapies without acupuncture.</p>
<p>Ee CC, Manheimer E, Pirotta MV, White AR. Acupuncture for pelvic and back pain in pregnancy: a systematic review. Am J Obstet Gynecol.</p>	<p>Systematic review of trials of acupuncture as a treatment for pelvic and back pain in pregnancy. Analysed pooled results of 3 trials. Found that acupuncture, as an adjunct to standard treatment, was superior to standard treatment alone and</p>

2008; 198(3):254-9.	physiotherapy in relieving mixed pelvic/back pain in pregnancy.
Clinical studies	
<p>Cherkin DC, Sherman KJ, Avins AL, Erro JH, et al. A randomized trial comparing acupuncture, simulated acupuncture, and usual care for chronic low back pain. Arch Intern Med. 2009; 169(9):858-66.</p> <p>Sherman KJ., Cherkin DC, Ichikawa L, Avins AL et al. Characteristics of patients with chronic back pain who benefit from acupuncture. BMC Musculoskeletal Disorders. 2009b; 10(1): article 114</p>	<p>Randomized controlled trial of acupuncture for chronic lower back pain (LBP). Compared individualized acupuncture with standardized acupuncture, simulated acupuncture and usual care. 638 adults received 10 treatments over 7 weeks. After 8 weeks, 60% of patients receiving any type of acupuncture showed improvement in their level of pain and function, compared with 39% for those receiving normal care. This superiority persisted at one year though to a lesser degree. Concludes that, compared with usual care, acupuncture (of whichever type, including simulated) has beneficial and persistent effects on chronic LBP, which resulted in clinically meaningful improvements in function. They performed a secondary analysis to try to identify subgroups of participants particularly responsive to acupuncture. The strongest predictors of improvement in back function and symptoms were higher baseline levels of these measures, receipt of an acupuncture treatment, and non-use of narcotic analgesics. Benefit from acupuncture compared to usual care was greater with worse pre-treatment levels of back dysfunction. No other factors were important in this respect.</p>
<p>Sawazaki K, Mukaino Y, Kinoshita F, Honda T et al. Acupuncture can reduce perceived pain, mood disturbances and medical expenses related to low back pain among factory employees. Ind Health. 2008 Aug;46(4):336-40.</p>	<p>Clinical intervention study investigating the effects of acupuncture on LBP in employees of a Japanese steel company. 72 employees received acupuncture treatment once a week for 8 weeks. After 8 weeks of treatment, patients with LBP reported diminished pain and improved mood. The number of hospital visits and medical expenses for LBP after acupuncture were significantly decreased, compared with those before intervention and at a control factory.</p>
<p>Weidenhammer W, Linde K, Streng A, Hoppe A, Melchart D. Acupuncture for chronic low back pain in routine care: a multicenter observational study. Clin J Pain. 2007 Feb;23(2):128-35.</p>	<p>Observational study of acupuncture for chronic LBP. 2564 patients received routine acupuncture care for 8 weeks. 6 months later 45.5% of patients demonstrated clinically significant improvements in functional ability. Mean number of days with pain was reduced by half and there was a 30% decrease in work days lost. Concluded that acupuncture is associated with</p>

	clinically relevant improvements in patients suffering from chronic LBP.
Haake M, MÄ¼ller HH, Schade-Brittinger C, Basler HD, et al. German Acupuncture Trials (GERAC) for chronic low back pain: randomized, multicenter, blinded, parallel-group trial with 3 groups. Arch Intern Med. 2007 Sep 24;167(17):1892-8.	Randomized controlled trial of acupuncture for chronic LBP. 1162 patients underwent ten sessions, twice per week, of traditional acupuncture, sham acupuncture or conventional therapy (a combination of drugs, physical therapy and exercise). Found that LBP improved after acupuncture and improvement lasted for at least 6 months after treatment ended. Concluded that the effectiveness of any type of acupuncture was almost twice that of conventional therapy.
Witt CM, Jena S, Selim D, Brinkhaus B et al. Pragmatic randomized trial evaluating the clinical and economic effectiveness of acupuncture for chronic low back pain. Am J Epidemiol. 2006 Sep 1;164(5):487-96.	Pragmatic randomized trial evaluating the clinical and economic effectiveness of acupuncture for chronic LBP. 11,630 patients with chronic low back pain were allocated to an acupuncture group or a no-acupuncture control group. All patients were also allowed to receive routine medical care. At 3 months, back function improved significantly in the acupuncture group compared with controls. Concluded that acupuncture plus routine care was associated with marked clinical improvements and was cost-effective.
Thomas KJ, MacPherson H, Thorpe L, Brazier J et al. Randomised controlled trial of a short course of traditional acupuncture compared with usual care for persistent non-specific low back pain. BMJ. 2006 Sep 23;333(7569):623. Ratcliffe J, Thomas KJ, MacPherson H, Brazier J. A randomised controlled trial of acupuncture care for persistent low back pain: cost effectiveness analysis, BMJ. 2006 Sep 23;333(7569):626.	Pragmatic, open, randomized controlled trial and cost effectiveness study of acupuncture for chronic LBP. 241 adults were randomised to up to 10 sessions of individualised acupuncture or usual care. Found that referral to a qualified traditional acupuncturist was safe and acceptable to patients with LBP. Acupuncture showed a more beneficial effect than usual care on patients with LBP over the 12-24 month trial period, with patients reporting lower pain levels and reduced use of pain killers. Although the initial cost was more expensive compared with usual NHS care, acupuncture was a more cost-effective treatment in the longer term, as it provided more health benefits in terms of patients' quality of life.
Brinkhaus B, Witt CM, Jena S, Linde K et al. Acupuncture in patients with chronic low back pain: a randomized controlled trial. Arch Intern Med. 2006 Feb 27;166(4):450-7.	Randomised controlled trial of acupuncture for chronic LBP. 298 patients were randomized to acupuncture or minimal acupuncture (12 sessions over 8 weeks) or no treatment. Found that any type of acupuncture was more effective in improving pain than no treatment.

Physiological studies	
Komori M, Takada K, Tomizawa Y, Nishiyama K, et al. Microcirculatory responses to acupuncture stimulation and phototherapy. <i>Anesth Analg</i> . 2009 Feb;108(2):635-40.	Experimental study on rabbits. Acupuncture stimulation was directly observed to increase diameter and blood flow velocity of peripheral arterioles, enhancing local microcirculation.
Zhao ZQ. Neural mechanism underlying acupuncture analgesia. <i>Prog Neurobiol</i> . 2008 Aug;85(4):355-75.	Review article. Discusses the various peripheral and central nervous system components of acupuncture anaesthesia in detail.
Kim HW, Uh DK, Yoon SY, Roh DH 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.	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.
Kavoussi B, Ross BE. The neuroimmune basis of anti-inflammatory acupuncture. <i>Integr Cancer Ther</i> . 2007 Sep;6(3):251-7.	Review article. Suggests that anti-inflammatory actions of traditional and electro-acupuncture are mediated by efferent vagus nerve activation and inflammatory macrophage deactivation.
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.	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.
Pomeranz B. Scientific basis of acupuncture. In: Stux G, Pomeranz B, eds. <i>Acupuncture Textbook and Atlas</i> .	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,

<p>Heidelberg: Springer-Verlag; 1987:1-18.</p>	<p>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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