

## About sciatica

Sciatica, more accurately termed lumbar radiculopathy, is a syndrome involving nerve root impingement and/or inflammation that has progressed enough to cause neurological symptoms (e.g. pain, numbness, paraesthesia) in the areas that are supplied by the affected nerve root(s) (Tarulli 2007). Posterior sciatica involves pain that radiates along the posterior thigh and the posterolateral aspect of the leg, and is due to an S1 or L5 radiculopathy. When caused by S1 irritation, the pain may radiate to the lateral aspect of the foot, while pain due to L5 radiculopathy may radiate to the dorsum of the foot and to the large toe. Anterior sciatica involves pain that radiates along the anterior aspect of the thigh into the anterior leg, and is due to L4 or L3 radiculopathy. Pain due to L2 radiculopathy is antero-medial in the thigh, and pain in the groin usually arises from an L1 lesion. Sciatica is almost invariably accompanied or preceded by back pain, and mobility is often affected (Koes 2007). Indicators for sciatica include unilateral leg pain that is greater than low back pain; pain radiating to the foot or toes, numbness and paraesthesia; increased pain on straight leg raising, and neurological symptoms limited to one nerve root (Waddell 1998).

The prevalence of lumbar radiculopathy is around 3% to 5%, and equally common in men and women (Tarulli 2007), and an estimated 5%-10% of patients with low back pain have sciatica (Health Council 1999). The annual prevalence of disc related sciatica in the general population is estimated at 2.2% (Younes 2006). In most patients, the prognosis is good, but up to 30% will have pain for one year or longer (Weber 1993, Vroomen 2000).

Conventional management includes advice to stay active and continue daily activities; exercise therapy; analgesics (e.g. paracetamol, NSAIDs, an opioid); muscle relaxants; corticosteroid spinal injections; and referral for consideration of surgery. However, there is a lack of strong evidence of effectiveness for most of these interventions (Hagen 2007, Luijsterburg 2007).

## References

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## How acupuncture can help

There is substantial research to show that acupuncture is significantly better than no treatment and also at least as good, if not better than, standard medical care for back pain (Yuan 2008, Furlan 2008). There is less specific research on acupuncture for sciatica, but there is evidence to suggest that it does provide some pain relief (Wang 2009, Chen 2009, Inoue 2008, Wang 2004). (see overleaf)

Acupuncture can help relieve back pain and sciatica by:

- stimulating nerves located in muscles and other tissues, which 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 (Kavoussi 2007, Zijlstra 2003).
- improving muscle stiffness and joint mobility by increasing local microcirculation (Komori 2009), which aids dispersal of swelling.
- causing a transient change in sciatic nerve blood flow, including circulation to the cauda equine and nerve root. This response is eliminated or attenuated by administration of atropine, indicating that it occurs mainly via cholinergic nerves (Inoue 2008).
- influencing the neurotrophic factor signalling system, which is important in neuropathic pain (Dong 2006).
- increasing levels of serotonin and noradrenaline, which can help reduce pain and speed nerve repair (Wang 2005).
- improving the conductive parameters of the sciatic nerve (Zhang 2005).
- promoting regeneration of the sciatic nerve (La 2005)

## 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 wellbeing.

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 wellbeing.

## About the British Acupuncture Council

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

## The evidence

Research	Conclusion
<b>Reviews – low back pain</b>	
Yuan J et al. Effectiveness of acupuncture for low back pain: a systematic review. <i>Spine</i> 2008; 33(23): E887-900.	Systematic review and meta-analysis of 23 trials involving 6,359 patients, which looked at acupuncture in the treatment of low back pain. It 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. <u>The reviewers concluded that acupuncture should be advocated for the treatment of chronic low back pain.</u>
Furlan AD et al. Acupuncture and dry-needling for low back pain. <i>Cochrane Database Syst Rev</i> 2005; (1): CD001351.	Systematic review and meta-analysis of 35 trials involving 2,861 patients, which assessed acupuncture for low back pain. <u>The reviewers concluded that for chronic low back pain, acupuncture is more effective for pain relief and functional improvement than no treatment or sham treatment, and that acupuncture may be a useful adjunct to other therapies for chronic low back pain.</u>
Ammendolia C et al. Evidence-informed management of chronic low back pain with needle acupuncture. <i>Spine J</i> 2008 Jan-Feb; 8(1): 160-72.	Review article on management of chronic low back pain with acupuncture, which explains theories on the mechanisms of action on pain with acupuncture. <u>It concludes that the most consistent evidence is for the addition of acupuncture to other therapies.</u>
<b>Clinical trials - sciatica</b>	
Wang ZX. [Clinical observation on electroacupuncture at acupoints for treatment of senile radical sciatica]. <i>Zhongguo Zhenjiu</i> 2009; 29(2): 126-8.	A randomised trial that compared therapeutic effects of electroacupuncture and TENS on radical sciatica in a total of 139 patients. At the end of the first course of treatment, the cure rate was greater (41.4%) in the electroacupuncture group than the TENS group (29.0%, $p < 0.05$ ), and at the end of second course, was still greater (80.0% vs. 44.9%, $p < 0.005$ ). <u>The researchers concluded that the therapeutic effect of electroacupuncture on senile radical sciatica is significantly better than TENS.</u>
Chen M-R et al. The warming acupuncture for treatment of sciatica in 30 cases. <i>Journal of Traditional Chinese Medicine</i> 2009; 29(1): 50-53.	A clinical study to observe the relationship between the pain threshold and the therapeutic effects of acupuncture for sciatica. Ninety sciatica patients were randomised to an acupuncture group (needles warmed with moxa), a western medicine group (nimesulide) or a point-injection group (anisodamine). Pain threshold was tested before treatment and after the first, second and third treatment courses. Acupuncture had better therapeutic effects than the other two groups, with significant differences in the change in pain threshold and the improvement of clinical symptoms and signs ( $p < 0.01$ ). <u>The researchers concluded that acupuncture can relieve the symptoms of sciatica with an increase in pain threshold.</u>
Inoue M et al. Acupuncture treatment for low back pain and lower limb symptoms - The relation between acupuncture or electroacupuncture stimulation and sciatic nerve blood flow. <i>Evidence-based Complementary and Alternative Medicine</i> 2008; 5(2): 133-43.	<p>A clinical trial to investigate the clinical efficacy of acupuncture for lumbar spinal canal stenosis and herniated lumbar disc, and an animal study to clarify the mechanisms of acupuncture on sciatic nerve blood flow. In the clinical trial, patients were divided into three treatment groups: needling of acupuncture points on either side of the spine, electroacupuncture on the pudendal nerve or electroacupuncture at the nerve root. Primary outcome measurements were pain and dysaesthesia [evaluated with a visual analogue scale (VAS)] and continuous walking distance. About half the patients in the spinal acupuncture points group had improvement in symptoms, while electroacupuncture on the pudendal nerve was effective for the symptoms that had not improved with that treatment. <u>Considerable immediate and sustained relief was observed in patients who received electroacupuncture at the nerve root.</u></p> <p>In the animal study, sciatic nerve blood flow was measured with laser-Doppler flowmetry at, before and during three kinds of stimulation (manual acupuncture on lumbar muscle, electrical stimulation on the pudendal nerve and electrical stimulation on the sciatic nerve) in anaesthetised rats. Increase in sciatic nerve blood flow was observed in 56.9% of the animals given lumbar muscle acupuncture, 100% with pudendal nerve stimulation and 100% with sciatic nerve stimulation. Sciatic nerve stimulation sustained the increase longer than pudendal nerve stimulation.</p> <p><u>The researchers concluded that one mechanism of action of acupuncture and electrical acupuncture stimulation could be that, in addition to its influence on the pain inhibitory system, it participates in causing a transient change in sciatic nerve blood flow, including circulation to the cauda equine and nerve root.</u></p>

<p>Wang B-X, La J-L. Therapeutic effects of electroacupuncture and diclofenac on herniation of lumbar intervertebral disc. <i>Chinese Journal of Clinical Rehabilitation</i> 2004; 8(17): 3413-5.</p>	<p>A randomised trial to compare the effects of electroacupuncture and diclofenac treatment in 40 patients with sciatica caused by herniation of an intervertebral disc. The main outcome measures were Laseque's sign, and tenderness and numbness of the buttock, posterior side of the thigh, and the leg. After the treatment, the angle of Laseque's sign in the acupuncture group was significantly greater than that in the medication group (<math>p &lt; 0.05</math>). Also, the mean score of buttock tenderness was significantly lower in the acupuncture group than in the medication group (<math>p &lt; 0.05</math>). However, the mean scores of tenderness relief in the posterior side of the thigh and of the leg were not significantly different between the two groups. There was no significant difference in alleviation of numbness of the feet between the two groups (<math>p &gt; 0.05</math>). <u>The researchers concluded that electro-acupuncture is more effective than diclofenac for increasing the Laseque's sign angles and relieving tenderness at needled sites in patients with sciatica.</u></p>
<p><b>Animal studies</b></p>	
<p>Inoue M et al. The effect of electrical stimulation of the pudendal nerve on sciatic nerve blood flow in animals. <i>Acupuncture in Medicine</i> 2008; 26(3): 145-8.</p>	<p>An animal study that investigated the mechanism of the clinical effect of electroacupuncture of the pudendal nerve on the lumbar and lower limb symptoms caused by lumbar spinal canal stenosis. Electrical stimulation of the pudendal nerve significantly increased blood flow in the sciatic nerve, transiently and without increasing heart rate and systemic blood pressure. The significant increase in the sciatic nerve blood flow disappeared after administration of atropine, indicating that it occurs mainly via cholinergic nerves.</p>
<p>Dong Z-Q et al. Down-regulation of GFRalpha-1 expression by antisense oligodeoxynucleotide attenuates electroacupuncture analgesia on heat hyperalgesia in a rat model of neuropathic pain. <i>Brain Research Bulletin</i> 2006; 69(1): 30-6.</p>	<p>An animal study that found the endogenous glial cell line-derived neurotrophic factor signalling system (important in neuropathic pain) is involved in the effects of electroacupuncture analgesia on neuropathic pain in rats.</p>
<p>Wang S et al. Effects of acupuncture on monoamine neurotransmitters in brain tissue of experimental rat models of sciatic nerve compression. <i>Chinese Journal of Clinical Rehabilitation</i> 2005; 9(33): 94-6.</p>	<p>An animal study that looked at the influence of acupuncture on the level of monoamine neurotransmitters in brain tissue of rat models of sciatic nerve compression, and how this affects analgesia and repair of nerve injury. Electroacupuncture resulted in significantly higher levels of serotonin and noradrenaline, which can help reduce pain and speed nerve repair.</p>
<p>Zhang W-G et al. Effect of acupuncture on the recovery of injured sciatic nerve in rats quantitatively evaluated with the changes of electrophysiological parameters. <i>Chinese Journal of Clinical Rehabilitation</i> 2005. 9(25): 140-1.</p>	<p>An animal study that observed the effect of acupuncture on injured sciatic nerves. It found that every conductive parameter of the sciatic nerve improved after acupuncture.</p>
<p>La J-L et al. Morphological studies on crushed sciatic nerve of rabbits with electroacupuncture or diclofenac sodium treatment. <i>American Journal of Chinese Medicine</i> 2005; 33(4): 663-9.</p>	<p>An animal study that compared the effects of electroacupuncture with diclofenac and a control on the regeneration of crushed sciatic nerves in rabbits. Electroacupuncture was found to promote nerve regeneration more effectively than diclofenac and the control (<math>p &lt; 0.01</math> and <math>p &lt; 0.001</math>, respectively).</p>
<p>Komori M, Takada K, Tomizawa Y, Nishiyama K, Kondo I, Kawamata M, Ozaki M. Microcirculatory responses to acupuncture stimulation and phototherapy. <i>Anesth Analg.</i> 2009 Feb;108(2):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><b>General review articles of acupuncture</b></p>	
<p>Zhao ZQ. Neural mechanism underlying acupuncture analgesia. <i>Prog Neurobiol</i> 2008; 85(4): 355-75.</p>	<p>Review article that 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; 6(3): 251-7.</p>	<p>Review article that suggests the anti-inflammatory actions of traditional and electroacupuncture 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>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.</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 sends signals to the spinal cord, where dynorphin and enkephalins are released. Afferent pathways continue to the 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.</p>

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