

ACUPUNCTURE AND MULTIPLE SCLEROSIS

About multiple sclerosis

Around 100,000 people in the UK have multiple sclerosis (MS) (MS Society 2012), an autoimmune disorder of the central nervous system (Compston 2006). Most patients with MS present with a relapsing-remitting disease that, over years, typically leads to a progressive phase of permanent and increasing disability (secondary progressive disease) (Hawkins 2000).

About 10–15% of patients have progressive symptoms from the outset, with no relapses and remissions (primary progressive disease). Some patients have a relatively benign form of the disease with no significant disability for many years (Hawkins 2000). The underlying pathogenic mechanisms in MS appear to be heterogeneous and involve inflammation and axon degeneration (Compston 2002).

Physical symptoms of MS commonly include vision problems, balance problems and dizziness, fatigue, bladder problems and stiffness and/or spasms (MS Society 2012). It can also affect bowel function, speech and swallowing, and cognitive function. Conventional treatment includes disease-modifying drugs such as interferon beta (-1b and -1a), fingolimod, glatiramer, and natalizumab, physiotherapy and dietary modification.

References

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Hawkins C. Pathogenesis and clinical subtypes of multiple sclerosis. In: Hawkins CP, Wolinsky JS (Eds). *Principles of treatments in multiple sclerosis*. Oxford: Butterworth Heinemann, 2000.

MS Society. Signs and symptoms [online]. Available: <http://www.mssociety.org.uk/what-is-ms/signs-and-symptoms?qclid=CPi8nuTBzLICFYfAodMnEAjQ>

How acupuncture can help

This Factsheet focuses on the evidence for acupuncture in MS.

There has been very little research published. One systematic review, which summarised and evaluated the available evidence of acupuncture for neurological diseases concluded that more rigorous trials are warranted to establish acupuncture's role in MS. (Lee 2007) A randomised controlled trial that compared the effects of 2 types of acupuncture in 14 patients with secondary progressive MS found that minimal acupuncture resulted in greater improvement than Chinese medical acupuncture for psychological health: all other aspects were similar (Donnellan 2008). An uncontrolled open study, which looked at whether electroacupuncture diminishes voiding symptoms and improves quality of life in patients with MS and overactive bladder and urge

incontinence, found that it may have a useful role in patients with MS and mild bladder dysfunction who do not wish to take medication or are unable to because of side effects (Tjon Eng Soe 2009). Both of these studies were tiny, so the results can be seen only as very preliminary.

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.

Research has shown that acupuncture treatment may specifically help to relieve symptoms of multiple sclerosis by:

- reducing numbers of inflammatory and CD4 T cells. This accompanied improved paralytic symptoms in a rat model of MS (Kim 2012);
- promoting NT-3 (a protein growth factor that supports neuronal survival) expression, increasing the cell number and differentiation of endogenous oligodendrocyte precursor cells, and causing remyelination and functional improvement of the demyelinated spinal cord (Huang 2011);
- acting on areas of the brain known to reduce sensitivity to pain and stress, as well as promoting relaxation and deactivating the 'analytical' brain, which is responsible for anxiety and worry (Hui 2010; Hui 2009);
- increasing the release of adenosine, which has antinociceptive properties (Goldman 2010);
- improving muscle stiffness and joint mobility by increasing local microcirculation (Komori 2009), which aids dispersal of swelling;
- reducing inflammation, by promoting release of vascular and immunomodulatory factors (Kavoussi 2007).

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 (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

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The evidence

| Research | Conclusion |
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Systematic reviews

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| Lee H et al. Acupuncture application for neurological disorders. <i>Neurol Res.</i> 2007;29 Suppl 1:S49-54. | A systematic review that summarised and evaluated the available evidence of acupuncture for neurological disorders. Most of the reviewed studies had a lack of methodological rigor. No firm conclusion could be made on the use of acupuncture for epilepsy, Alzheimer's disease, Parkinson's disease, ataxic disorders, multiple sclerosis, amyotrophic lateral sclerosis, spinal cord injury and stroke.. The reviewers concluded that more rigorous trials are warranted to establish acupuncture's role in multiple sclerosis. |
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Randomised controlled trials

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| Donnellan CP, Shanley J. Comparison of the effect of two types of acupuncture on quality of life in secondary progressive multiple sclerosis: a preliminary single-blind randomized controlled trial. <i>Clin Rehabil.</i> 2008;22(3):195-205. | A randomised controlled trial that compared the effects of 2 types of acupuncture on the quality of life of 14 individuals with secondary progressive multiple sclerosis and provided preliminary evidence regarding the safety of this intervention for this population. Participants were allocated to Chinese medical acupuncture or minimal acupuncture. Participants receiving minimal acupuncture demonstrated statistically significant greater improvement in the Multiple Sclerosis Impact Scale 29 psychological subscale compared with those receiving Chinese medical acupuncture in an intention-to-treat analysis ($p=0.04$), with a mean change in Chinese acupuncture group of 6.0 and in minimal acupuncture group of 23.0. No other statistically significant difference between the groups was found. No major adverse events were noted. Minor adverse events such as lower limb muscle spasms or pain were noted in some participants in both intervention groups. The researchers concluded that minimal acupuncture resulted in greater improvement as measured with the MS psychological subscale than Chinese medical acupuncture. No other differences between the groups were found, but, in view of the small sample these results are not conclusive. |
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Other clinical studies

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| Tjon Eng Soe SH et al. Multiple sclerosis patients with bladder dysfunction have decreased symptoms after electro-acupuncture. <i>Mult Scler.</i> 2009;15(11):1376-7. | An uncontrolled open study that assessed whether electroacupuncture (EA) diminishes voiding symptoms and improves quality of life in patients with MS and overactive bladder and urge incontinence. Nine patients completed the study, 8 of whom completed the 3-day diary and quality of life questionnaire; 1 patient was withdrawn because of memory problems. No patient had a relapse or urinary tract infection |
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during treatment and there were no side effects. Mean urge frequency decreased significantly from 3.89 to 1.68 times a day, and mean number of daytime leaking episodes decreased significantly from 1.18 to 0.40. The magnitude of the decrease in mean urge frequency was in the same range as that seen in MS patients treated with tolterodine in another study. After EA, mean values for total quality-of-life were higher than at baseline. The researchers concluded that EA may have a useful role in patients with MS and mild bladder dysfunction who do not wish to take medication or are unable to because of side effects.

Possible mechanisms of acupuncture

Kim KY et al. Impact of acupuncture by using life-energy (qi) oriental needle on the paralysis of rats with experimental autoimmune encephalomyelitis. *Am J Chin Med.* 2012;40(4):769-78.

An animal study using a rat model of human demyelinating multiple sclerosis. Acupuncture reduced the duration and amount of paralysis, as well as the numbers of inflammatory cells and CD4(+) T cells. The researchers concluded that their findings suggest that acupuncture may ameliorate the paralysis in rats in an experimental autoimmune-encephalomyelitis rat model.

Huang SF et al. An experimental electro-acupuncture study in treatment of the rat demyelinated spinal cord injury induced by ethidium bromide. *Neurosci Res.* 2011;70(3):294-304.

An animal study using a rat model demyelinated model of multiple sclerosis to assess the effects of electroacupuncture on oligodendrocyte precursor cells, one of the potential treating tools for multiple sclerosis (MS). The researchers concluded that their results suggest electroacupuncture treatment can promote NT-3 expression, increase the cell number and differentiation of endogenous oligodendrocyte precursor cells, and remyelination in the spinal cord, as well as the functional improvement of the demyelinated spinal cord.

Goldman N et al. Adenosine A1 receptors mediate local anti-nociceptive effects of acupuncture. *Nat Neurosci* 2010; May 30.

A study showing 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 enzymes involved in adenosine degradation potentiated the acupuncture-elicited increase in adenosine, as well as its anti-nociceptive effect. 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.

Hui KK et al. Acupuncture, the limbic system, and the anticorrelated networks of the brain. *Auton Neurosci* 2010; 157: 81-90.

Studies have shown that acupuncture stimulation, when associated with sensations comprising deqi, evokes deactivation of a limbic-paralimbic-neocortical network, as well as activation of somatosensory brain regions. These networks closely match the default mode network and the anti-correlated task-positive network. The effect of acupuncture on the brain is integrated at multiple levels, down to the brainstem and cerebellum and appears to go beyond either simple placebo or somatosensory needling effects. Needling needs to be done carefully, as very strong or painful sensations can attenuate or even reverse the desired effects. Their results suggest that acupuncture mobilises the functionally anti-correlated networks of the brain to mediate

its actions, and that the effect is dependent on the psychophysical response. They discuss potential clinical application to disease states including chronic pain, major depression, schizophrenia, autism, and Alzheimer's disease.

Hui K.K.-S. The salient characteristics of the central effects of acupuncture needling: limbic-paralimbic-neocortical network modulation. *Human Brain Mapping* 2009; 30: 1196-206.

This 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. 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.

Komori M et al. Microcirculatory responses to acupuncture stimulation and phototherapy. *Anesth Analg* 2009; 108: 635-40.

Experimental study on rabbits in which acupuncture stimulation was directly observed to increase diameter and blood flow velocity of peripheral arterioles, enhancing local microcirculation.

Kavoussi B, Ross BE. The neuroimmune basis of anti-inflammatory acupuncture. *Integr Cancer Ther* 2007; 6: 251-7.

Review article that suggests the anti-inflammatory actions of traditional and electro-acupuncture are mediated by efferent vagus nerve activation and inflammatory macrophage deactivation.
