

# ACUPUNCTURE AND TINNITUS

## About tinnitus

**Tinnitus is the perception of sound in the ear or head that does not arise from the external environment, from within the body (e.g., vascular sounds), or from auditory hallucinations related to mental illness. Up to 18% of the general population in industrialised countries are mildly affected by chronic tinnitus and, for 0.5%, tinnitus has a severe effect on their ability to lead a normal life (Coles 1984).**

The condition can occur as an isolated idiopathic symptom, or in association with any type of hearing loss - age-related hearing loss, noise-induced hearing loss, Menière's disease, or an acoustic neuroma. It can also occur in people with normal hearing thresholds due to aspirin or quinine toxicity. Tinnitus is also associated with depression, but it is not always clear whether it is a cause of the depression or a manifestation of the condition (Sullivan 1988). It can also occur with chronic otitis media, head injury and barotraumas.

Tinnitus can have an insidious onset, with a long delay before clinical presentation. It can persist for many years, particularly when associated with a sensorineural hearing loss. Tinnitus can cause insomnia, an inability to concentrate, and depression (Zoger 2001). Treatment is aimed at reducing the loudness and intrusiveness of the tinnitus, and minimising its impact on daily life.

## References

- Coles RR. Epidemiology of tinnitus: (1) prevalence. *J Laryngol Otol* 1984; 9: 7. 15.
- Sullivan MD et al. Disabling tinnitus: association with affective disorder. *Gen Hosp Psychiatry* 1988; 10: 285. 91.
- Zoger S et al. Psychiatric disorders in tinnitus patients without severe hearing impairment: 24 month follow-up of patients at an audiological clinic. *Audiology* 2001; 40: 133. 40.

## How acupuncture can help

A systematic review in 2000 concluded that research had not demonstrated acupuncture to be efficacious as a **treatment for tinnitus** (Park 2000); however, some of the studies used inadequate acupuncture, some used sham controls of questionable validity and most were a cross-over design that it is generally considered inappropriate for acupuncture evaluation (Jackson, 2006). Controlled trials conducted more recently than this review (Tan 2007, Okada 2006, Azevedo 2007, Jackson 2006) have all found acupuncture to provide effective relief from tinnitus, with one finding it more effective

than western medicine (Tan 2007). However, they were very small, and larger, high-quality studies are required to confirm these findings. (See Table below)

Acupuncture may help relieve tinnitus by:

- acting on the cochlea, specifically on the contractile activity of outer hair cells (Azevedo 2007);
- acting on the function of the efferent olivocochlear system to suppress otoacoustic emissions (Azevedo 2007);
- altering the brain's chemistry, increasing neuropeptide Y levels (Lee 2009; Cheng 2009), and reducing serotonin levels (Zhou 2008);
- reducing inflammation, by promoting release of vascular and immunomodulatory actors (Kavoussi 2007, Zijlstra 2003);
- 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)

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## The evidence

Research	Conclusion
<b>Systematic Reviews</b>	
Park J et al. Efficacy of acupuncture as a treatment for tinnitus: a systematic review. <i>Arch Otolaryngol Head Neck Surg</i> 2000; 126: 489-92.	A systematic review of randomised controlled trials that looked at the efficacy of acupuncture as a treatment for tinnitus compared with any control intervention. Six randomized controlled trials were included, four of which used manual acupuncture and 2 electroacupuncture. Five of 6 studies used inconsistent acupoints. Three studies scored 3 points or more on the Jadad scale. Outcome measurements were visual analogue scale scores for loudness, annoyance, and awareness of tinnitus; subjective severity scale scores for tinnitus; or Nottingham Health Profile scores. Two unblinded studies showed a positive result, whereas 4 blinded studies showed no significant effect of acupuncture. <u>The reviewers concluded that acupuncture had not been demonstrated to be efficacious as a treatment for tinnitus on the evidence of rigorous randomised controlled trials.</u>
<b>Controlled trials</b>	
Tan KQ et al. Comparative study on therapeutic effects of acupuncture, Chinese herbs and Western medicine on nervous tinnitus [Chinese]. <i>Zhongguo Zhenjiu</i> 2007. 27: 249-51.	A randomised controlled trial that compared the clinical therapeutic effects of acupuncture, Chinese herbs and western medicine in 90 patients with nervous tinnitus. The effectiveness rates in the 3 groups were 73.3%, 40.0% and 33.3%, respectively, with significant differences among the 3 groups ( $p < 0.05$ ). <u>The researchers concluded that acupuncture has obvious therapeutic effect on nervous tinnitus, and that its therapeutic effect is better than that of Chinese herbs and western medicine.</u>
Okada DM et al. Acupuncture for tinnitus immediate relief [Portuguese]. <i>Revista Brasileira de Otorrinolaringologia</i> 2006. 72: 182-6.	A double-blind randomised study in 76 patients with tinnitus to assess the effects of acupuncture. A Visual Analogue Scale (VAS, 0 to 10 points) was used to assess the humming sensation experienced by the patients at baseline. The patients were then divided into a real acupuncture group and a sham acupuncture group. After treatment, the humming sensation was assessed again. There was a significant difference ( $p < 0.001$ ) between the VAS scores pre and post needling in the real acupuncture group ( $p = 0.0127$ ). There was also a difference between the real and sham groups ( $p = 0.017$ ). <u>The researchers concluded that there was significant reduction in tinnitus with acupuncture.</u>
Azevedo RF et al. Impact of acupuncture on otoacoustic emissions in patients with tinnitus. <i>Revista Brasileira de Otorrinolaringologia</i> 2007; 73: 599-607.	A study that assessed the effect of acupuncture on the cochlear function in 38 patients with tinnitus by analysing otoacoustic emissions. Measures of transitory otoacoustic emissions and suppression of otoacoustic emissions were obtained from all subjects before and after acupuncture. Patients were assigned to real or sham acupuncture. There was a significant difference between the amplitude of otoacoustic emissions assessed before and after treatment in the real acupuncture group. No difference was observed with sham acupuncture. <u>The researchers concluded that acupuncture had a significant effect on otoacoustic emissions in patients with tinnitus.</u>
Jackson A et al. Acupuncture for tinnitus: a series of six n = 1	Controlled n=1 trials that explored patient perceived benefits of acupuncture for tinnitus. Six patients with tinnitus were included.

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controlled trials. *Complementary Therapies in Medicine* 2006; 14: 39-46.

Primary outcome was Daily Diary records related to four tinnitus symptoms: loudness of tinnitus; pitch of tinnitus; waking hours affected with tinnitus; quality of sleep. Secondary outcomes were the Tinnitus Handicap Inventory (THI) and Measure Your Medical Outcome Profile (MYMOP). Outcomes were measured during a course of 10 acupuncture treatments over a 2-week period, and also during a 14 day pre-treatment (phase A) and 14 days post-treatment (phase B). For the symptoms of loudness and pitch, there were variable treatment effects between patients. There was a trend (not statistically significant) to an overall reduction of loudness and pitch. For waking hours affected and quality of sleep, patients' responses were more consistent and there was a significant overall median reduction. The THI and MYMOP measures showed a trend towards improvement after treatment. The researchers concluded that the results of their study suggest that acupuncture may have a beneficial role in the treatment of tinnitus.

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### Case series

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Shaladi AM et al. Auricular acupuncture plus antioxidants in the treatment of subjective tinnitus: A case series. *Medical Acupuncture* 2009; 21: 131-4.

A case series that assessed the benefit of auricular acupuncture and antioxidants on subjective tinnitus. A prospective questionnaire including an 11-point scale of the subjective volume, an 11-point scale of the severity of tinnitus, and the Zung Self-Rating Anxiety Scale were used to assess the response to acupuncture. In all, 13 patients who had had symptoms of tinnitus for 3 to 5 years were evaluated at baseline, 1 month, and 4 months. Patients were given oral antioxidants and auricular acupuncture 2 times a week, for 4 weeks. From baseline to 1 month, there was a nonsignificant reduction in the subjective volume of the tinnitus and severity of the tinnitus; and also a nonsignificant reduction on the anxiety scale. No variation was registered between months 1 and 4, but patients reported improved sleep. The researchers concluded that auricular acupuncture plus oral antioxidants nonsignificantly reduced the noise and the intensity of subjective tinnitus.

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### Research on mechanisms for acupuncture

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Cheng CH et al. Endogenous Opiates in the Nucleus Tractus Solitarius Mediate Electroacupuncture-induced Sleep Activities in Rats. *Evid Based Complement Alternat Med* 2009 Sep 3. [Epub ahead of print]

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  $\mu$ -opioid receptors.

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Lee B et al. Effects of acupuncture on chronic corticosterone-induced depression-like behavior and expression of neuropeptide Y in the rats. *Neuroscience Letters* 2009; 453: 151-6.

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.

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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.

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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

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

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stress-induced anxiety. <i>Int J Clin Acupunct</i> 2008 ;17: 79-84.	higher in the rats given acupuncture (P<0.05, or P<0.0). The researchers concluded that the anti-anxiety effect of electro-acupuncture may relate to its regulation of the imbalance of neurotransmitters.
Kavoussi B, Ross BE. The neuroimmune basis of anti-inflammatory acupuncture. <i>Integr Cancer Ther</i> 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.
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.

### **Terms and conditions**

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