

ACUPUNCTURE AND INSOMNIA

About Insomnia

According to a survey by the Office of National Statistics (ONS 2000), around 29% of adults reported experiencing sleep problems the week before interview. Such problems are more common in women (34%) than men (24%) (ONS 2000). Insomnia that is not due to an organic cause is defined as a condition of unsatisfactory quantity and/or quality of sleep lasting for a considerable period of time (WHO 2007). It includes difficulty falling asleep, difficulty staying asleep, or early final waking (WHO 2007; American Psychiatric Association, 2000).

The choice of treatments for insomnia depends on both the duration and nature of presenting symptoms. People should be given advice on appropriate routines to encourage good sleep, such as avoiding stimulants and maintaining regular sleeping hours with a suitable environment for sleep (NICE 2004). Other non-pharmacological interventions, such as cognitive behavioural therapy, are used for the management of persistent insomnia (NICE 2004). Drugs to induce sleep (hypnotics) can provide relief from the symptoms of insomnia, but do not treat any underlying cause. Expert bodies have long advised that use of hypnotics for insomnia should be limited to short courses for acutely distressed patients (Joint Formulary Committee 2009). Despite this, in England, around 10 million prescriptions for hypnotics are dispensed every year (PCA 2007). Around 80% of all such prescriptions are for people aged 65 years or over (Curren 2003), and many patients remain on the drugs for months or years (Taylor 1998). Such prescribing carries many potential hazards for patients, including risk of dependence, accidents and other adverse effects on health (Joint Formulary Committee 2009).

References

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How acupuncture can help

Reviews are consistent in showing that most trials have found acupuncture (or acupressure or related procedures) to be significantly more effective than hypnotic drugs (usually benzodiazepines), no treatment, or sham acupuncture (Sun 2010, Cao 2009, Yeung 2009, Lee 2008, Cheuk 2007). Meta-analysis supports these conclusions. Nevertheless, reviewers have been cautious in their recommendations because of the poor methodological quality of most trials; rigorous, large scale studies are needed to address this. There are now substantial numbers of more recent (published subsequent to the reviews data collection) randomised trials with positive results, though not for every sleep measure used in every trial (Luo 2010, Reza 2010, Yeung 2009, Lee 2009a, Huang 2009, and others). On the evidence that we have, given that acupuncture appears to be at least as effective as existing conventional drugs, without their level of side effects, it could be considered as one of the therapeutic options for insomnia. (See table overleaf for details).

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 insomnia and anxiety (Hui 2010).

Research has shown that acupuncture treatment may specifically be of benefit in people with insomnia by:

- increasing nocturnal endogenous melatonin secretion (Spence et al 2004).
- stimulating opioid (especially β -endorphin) production and μ -opioid receptor activity (Cheng et al 2009).
- increasing nitric oxide synthase activity and nitric oxide content, helping to promote normal function of brain tissues, which could help to regulate sleep (Gao et al 2007).
- increasing cerebral blood flow (Yan 2010)
- reducing sympathetic nervous system activity, hence increasing relaxation (Lee 2009a)
- regulating levels of neurotransmitters (or their modulators) such as serotonin, noradrenaline, dopamine, GABA and neuropeptide Y; hence altering the brain's mood chemistry to help to increase relaxation and reduce tension (Lee 2009b; Samuels 2008; Zhou 2008).

Acupuncture can be safely combined with conventional medical treatments for insomnia, such as benzodiazepines, helping to reduce their side effects and enhance their beneficial effects (Cao et al 2009).

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

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The evidence

Research	Conclusion
Reviews	
Sun JQ, Guo J. [Evaluation on acupuncture treatment of primary insomnia]. <i>Zhen Ci Yan Jiu</i> . 2010 Apr;35(2):151-5.	A systematic review for acupuncture and insomnia that located 20 randomised trials in English and Chinese databases. The authors assessed only 4 of these as being high-quality. <u>They concluded that there were no high quality Chinese trials to date and that they could not definitely confirm the efficacy of acupuncture in relieving insomnia. Rigorous scientific trials are urgently needed.</u>
Cao H, Pan X, Li H, Liu J. Acupuncture for treatment of insomnia: a systematic review of randomized controlled trials. <i>J Altern Complement Med</i> . 2009 Nov;15(11):1171-86.	A systematic review of randomised controlled trials of acupuncture for insomnia from Chinese and Western databases that included 46 studies (3811 patients). Study quality was deemed generally fair for randomization, blinding and intention-to-treat analysis. Meta-analysis showed a beneficial effect of acupuncture compared with no treatment (MD -3.28, p=.02) on total scores of Pittsburgh Sleep Quality Index. Acupuncture was superior to medication for the numbers of patients with total sleep duration increased by >3 hours (RR 1.53, p<.0001), but not significant for average sleep duration (MD -.06, p=.63). Acupuncture plus medication was better than medication alone on total sleep duration (MD 1.09, p<.0001). There were no serious adverse effects related to acupuncture. <u>Acupuncture appears to be affective in treatment of insomnia, though further large, rigorously designed trials are warranted.</u>
Yeung WF et al. Traditional needle acupuncture treatment for insomnia: a systematic review of randomized controlled trials. <i>Sleep Med</i> 2009; 10: 694-704.	A systematic review of Chinese and English literature that included 20 randomised controlled trial comparing traditional acupuncture with placebo, sham acupuncture, drugs, other treatments or non-treated controls for insomnia. Most of the trials concluded that acupuncture was significantly more effective than benzodiazepines for treating insomnia, with mean effective rates for acupuncture and benzodiazepines being 91% and 75%, respectively. Acupuncture also appeared to be more effective in improving sleep than sleep hygiene counselling and sham acupuncture. <u>The reviewers concluded that the results were somewhat promising+ for acupuncture in the treatment of insomnia, but that all the trials had methodological shortcomings so a clear conclusion could not be drawn.</u>
Lee MS et al. Auricular acupuncture for insomnia: a systematic review. <i>Int J Clin Pract</i> 2008; 62: 1744-52.	A systematic review that included 10 randomised placebo-controlled trials (no language restrictions) looking at the effectiveness of ear acupuncture for insomnia. The results suggested beneficial effects on sleep efficiency with ear acupuncture compared with placebo ear acupuncture. Also, four trials found %avourable effects+with ear acupuncture compared to conventional drugs (estazolam or diazepam). <u>The reviewers concluded that the evidence of effectiveness with ear acupuncture for the symptomatic treatment of insomnia is limited because of poor quality trials.</u>
Cheuk DK et al. Acupuncture for insomnia. <i>Cochrane Database Syst Rev</i> 2007; 18: CD005472.	A systematic review that pooled data from 7 randomised controlled trials evaluating any form of acupuncture in a total of 590 people with any type of insomnia. Included trials compared acupuncture with placebo, sham acupuncture or no treatment, or acupuncture

plus other treatments compared with the same other treatments. Participant age ranged from 15 to 98 years, the duration of insomnia varied from 6 months to 19 years, and co-existing medical conditions contributing to insomnia included stroke, end-stage renal disease and pregnancy. Apart from conventional needle acupuncture, acupressure, ear magnetic and seed therapy, and transcutaneous electrical acupoint stimulation were evaluated. The reviewers suggested that acupuncture and acupressure may help to improve sleep quality scores when compared to placebo (SMD -1.08, 95% CI -1.86 to -0.31; $p=0.006$) or no treatment (SMD -0.55, 95% CI -0.89 to -0.21; $p=0.002$). However, the efficacy of acupuncture or its variants was inconsistent between studies for many sleep parameters, such as sleep onset latency, total sleep duration and wake after sleep onset. The reviewers stated that, because the trials were of poor methodological quality and there was significant clinical heterogeneity, larger high quality trials were needed to further investigate the efficacy and safety of acupuncture for insomnia.

Clinical trials

Luo WZ et al. [Effect of acupuncture treatment of relieving depression and regulating mind on insomnia accompanied with depressive disorders]. *Zhongguo Zhen Jiu*. 2010 Nov;30(11):899-903.

Sixty-five patients with insomnia and depression were randomly divided into an acupuncture group and a western medication group (oral Trazodone). After 4 weeks treatment the cured/markedly effective rate in the acupuncture group was superior (73% v. 47%). Total scores of the Pittsburgh Sleep Quality Index and the Self-Rating Depression Scale were significantly reduced in both groups, but sleep quality and daytime function improved more with acupuncture than medication. The latter showed higher levels of side effects. Acupuncture treatment is superior to Trazodone for sleep quality and daytime function, with milder adverse reactions.

Reza H et al. The effect of acupressure on quality of sleep in Iranian elderly nursing home residents. *Complement Ther Clin Pract*. 2010 May;16(2):81-5.

90 elderly patients with moderate to marked sleep disturbances were randomly assigned to acupressure, sham acupressure or a control group. There were significant differences between the acupressure groups and control group in subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency and sleep disturbance; there were no significant differences in sleep indices between the sham and the control. Sleep log data showed a significant decrease in nocturnal awakenings in the acupressure group compared to the other two. The findings indicated that acupressure has an effect on improvement of sleep quality and can be endorsed for sleep-disturbed elderly people.

Yeung WF et al. Electroacupuncture for primary insomnia: a randomized controlled trial. *Sleep* 2009; 32: 1039-47.

A single-blind randomised controlled trial that compared the short-term (3 weeks) efficacy and safety of electroacupuncture with placebo acupuncture for the treatment of primary insomnia in 60 Chinese adult volunteers who reported having insomnia 3 or more nights per week. Both groups showed significant improvement compared with the pre-treatment baseline in the Insomnia Severity Index (the primary outcome measure), but there was no difference between groups. However, there were significantly greater improvements in sleep efficiency as measured by a sleep diary and actigraphy in the electroacupuncture group. Also, the proportions of subjects having less than 30 minutes awake after sleep onset and a sleep efficiency of at least 85% at the post-treatment visit were significantly higher in the electroacupuncture group. All adverse events were mild in severity. The trialists concluded that there was a slight advantage of electroacupuncture over placebo acupuncture in the short-term treatment of primary insomnia.

Lee SY et al. Intradermal acupuncture Hospitalized stroke patients with insomnia received either real

on shen-men and nei-kuan acupoints improves insomnia in stroke patients by reducing the sympathetic nervous activity: a randomized clinical trial. *Am J Chin Med.* 2009a;37(6):1013-21.

intradermal acupuncture) or sham acupuncture (at the same two points) for three days. Fifty-two subjects were included in the final analysis. Two insomnia-related scales showed greater improvement in the real acupuncture group than in the sham. Acupuncture was also associated with superior stabilization of sympathetic nervous system activity (according to measures of heart rate variability and numbers of patients with non-dipping nocturnal BP) and the authors concluded that it was a useful therapeutic method for post-stroke insomnia

Huang L.-S et al. The needle-rolling therapy for treatment of non-organic chronic insomnia in 90 cases. *Journal of Traditional Chinese Medicine.* 29(1)(pp 19-23), 2009.

180 cases of chronic insomnia were randomly divided into two groups, one treated by needle-rolling therapy and the control group with clonazepam. After four weeks, there were significant differences between the two groups in the effective rate of symptom relief ($P < 0.05$) and in the total score of the Pittsburgh Sleep Quality Index (PSQI) and the scores of its 4 sub-items (sleep-quality, sleep-efficiency, hypnotic and daytime function). There was no significant difference in effective rate at 3-month follow-up, but the needle therapy was still superior for three of the PQSI items. As compared with clonazepam the needle-rolling therapy may show better therapeutic effects for chronic insomnia patients.

Nordio M, Romanelli F. Efficacy of wrists overnight compression (HT 7 point) on insomniacs: possible role of melatonin? *Minerva Med* 2008; 99: 539-47.

A randomised placebo-controlled trial that evaluated the effects of an acupressure wrist device, used for 20 nights, on general health and anxiety levels, sleep quality and urine levels of a melatonin metabolite in 40 patients with insomnia.. Quality of sleep was improved and anxiety levels reduced to a greater extent in the acupressure group than in the placebo group. In addition, the 24-hour urinary melatonin metabolite rhythm, obtained at the end of treatment, was considered as being normal in more of the acupressure-treated patients. The trialists concluded that the acupressure wrist device is able to naturally ameliorate sleep quality in patients with insomnia, possibly acting through a mechanism involving melatonin.

Sjoling M et al Auricular acupuncture versus sham acupuncture in the treatment of women who have insomnia. *J Altern Complement Med* 2008; 14: 39-46.

A 6-week single-blind randomised trial that compared ear acupuncture with sham acupuncture on the effect on sleep parameters in 28 women with insomnia. The women filled out a sleep diary. No statistically significant differences were seen between the groups in terms of sleep parameters, but both groups significantly improved from baseline. The acupuncture group also found it easier to wake up in the morning ($p = 0.04$ vs. sham). Despite the lack of superiority over sham treatment for the primary outcome the trialists concluded that there was modest evidence to show that ear acupuncture may have an effect on insomnia.

Freire AO et al. Treatment of moderate obstructive sleep apnea syndrome with acupuncture: a randomised, placebo-controlled pilot trial. *Sleep Med.* 2007 Jan;8(1):43-50..

36 patients with sleep apnoea were randomly assigned to acupuncture, sham (needle insertion in non-acupoints), or no intervention. Treatment was given once a week for 10 weeks. The Apnea/Hypopnea index (AHI), the Apnea index and the number of respiratory events all decreased significantly in the acupuncture group but not in the sham group. The no treatment group deteriorated significantly in some of the polysomnographic parameters, Acupuncture treatment significantly improved several dimensions of the SF-36 and Epworth questionnaires. Acupuncture is more effective than sham acupuncture in ameliorating the respiratory events of patients presenting with sleep apnoea.

Freire AO et al. Immediate effect of acupuncture on the sleep pattern of patients with obstructive sleep apnoea. *Acupunct Med.* 2010 Sep;28(3):115-9.

In a subsequent trial the same group found that a single session of either manual or electroacupuncture (at 10Hz but not 2 Hz) had an acute effect in reducing the AHI as well as the number of nocturnal respiratory events

da Silva JB et al. Acupuncture for insomnia in pregnancy - a prospective, quasi-randomised, controlled study. *Acupuncture in Medicine* 2005; 23: 47-51.

A randomised controlled trial of acupuncture on insomnia in 30 pregnant women, compared with a group of patients undergoing conventional treatment alone (sleep hygiene). The acupuncture group reported a larger reduction on insomnia rating than the control group (5.1 vs. 0.0, $p=0.0028$). Average insomnia scores decreased by at least 50% over time in nine (75%) patients in the study group and in three (30%) of the control group. The trialists concluded that the results suggest acupuncture alleviates insomnia during pregnancy.

Physiological mechanisms

Hui KK et al. Acupuncture, the limbic system, and the anticorrelated networks of the brain. *Auton Neurosci*. 2010 Oct 28;157(1-2):81-90.

Studies have shown that acupuncture stimulation 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. Their results suggest that acupuncture mobilizes the functionally anti-correlated networks of the brain to mediate its actions, and that the effect is dependent on the psychophysical response.

Yan XK et al. [Effect of tranquilizing and allaying excitement needling method on brain blood flow in the patients of insomnia of heart and spleen deficiency]. *Zhongguo Zhen Jiu*. 2010 Feb;30(2):113-6.

Sixty cases were randomly assigned to two different acupuncture regimes. Both were effective in treating insomnia and both also showed significant increases in peak systolic and diastolic blood flow velocities in the middle cerebral, basilar and vertebral arteries. One regime was superior to the other both in clinical effect and cerebral blood flow.

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 NTS 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 μ -opioid receptors.

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

Samuels N et al. Acupuncture for psychiatric illness: a literature review. *Behav Med* 2008; 34: 55-64.

A literature review of acupuncture for psychiatric illness, which presents research that found acupuncture to increase central nervous system hormones, including ACTH, beta-endorphins, serotonin, and noradrenaline.

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. *Int J Clin*

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

Acupunct 2008 ;17: 79-84.

higher in the rats given acupuncture ($P < 0.05$, or $P < 0.0$).

Gao XY et al. [Effects of acupuncture at "Sishencong" (EX-HN 1) on physiological functions in the sleep disorder model mouse]. [Chinese] *Zhongguo Zhenjiu* 2007; 27: 681-3.

An animal study that investigated the effect of acupuncture on sleep and the mechanism of this effect. Circadian activities were observed, and an increase nitric oxide synthase (NOS) activity and nitric oxide (NO) content in the brain were detected.

Spence et al. Acupuncture Increases Nocturnal Melatonin Secretion and Reduces Insomnia and Anxiety: A Preliminary Report. *J Neuropsych Clin Neurosciences* 2004; 16: 19-28.

A study in 18 anxious adults with insomnia found a significant ($p = 0.002$) nocturnal increase in endogenous melatonin secretion after 5 weeks of acupuncture, as well as significant improvements in polysomnographic measures of sleep onset latency ($p = 0.003$), arousal index ($p = 0.001$), total sleep time ($p = 0.001$), and sleep efficiency ($p = 0.002$).

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