

ACUPUNCTURE AND GOUT

About GOUT

Acute gout is an intensely painful condition, and can reduce patients' quality of life.(Annemans 2008; Jordan 2007) Around 1.4% of the UK population have gout, the prevalence of which increases with age to around 3% in women and 7% in men aged over 75 years.(Mikuls 2005; Annemans 2008; Jordan 2007) It occurs when serum uric acid concentration rises (hyperuricaemia) and stays above the solubility threshold of monosodium urate, leading to urate crystal formation that causes arthritis, gouty tophi (nodules) in subcutaneous tissues and renal calculi.(Jordan 2007; Roddy 2007; Fels 2008)

Hyperuricaemia may occur if urate is over-produced (e.g. due to excessive dietary purine intake, or during cancer treatments), or, more commonly, if it is under-excreted (e.g. due to renal impairment).(Jordan 2007) Chronic hyperuricaemia is the most important risk factor for the development of gout; others include male gender; obesity; hypertension; renal impairment; consumption of alcohol, red meat, shellfish, fructose-sweetened soft drinks; and the use of loop and thiazide diuretics.(Jordan 2007) The mainstay of treatment for chronic gout is long-term drug treatment with allopurinol or adenuric to prevent attacks, and NSAIDs during an acute attack to reduce inflammation and alleviate pain.

References

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Mikuls TR et al. Gout epidemiology: results from the UK General Practice Research Database, 1990–1999. *Ann Rheum Dis* 2005; 64: 267–72.

Roddy E et al. Is gout associated with reduced quality of life? A case-control study. *Rheumatology (Oxford)* 2007; 46: 1441–4.

How acupuncture can help

This Factsheet focuses on the evidence for acupuncture in the treatment of gout.

Overall, very little research has been published on the effects of acupuncture in patients with gout. There are no systematic reviews looking at acupuncture for gout, but there are a few randomised controlled trials. These have found: acupuncture combined with infrared irradiation is more effective in acute gouty arthritis than indomethacin, and provides a significant analgesic effect, while not reducing liver function (Zhou 2011); surround needling therapy is more effective and safer than allopurinol for the treatment of acute gouty arthritis (Xie 2009); electroacupuncture combined with local blocking (Liu 2008) or point-injection (Zou 2007) is an effective method for treating acute gouty arthritis, and can decrease blood uric acid levels; electroacupuncture has a better treatment effect than either allopurinol or probenecid, and there are no harmful effects on renal function in the treatment of patients with gout and renal insufficiency (Xie 2007); electroacupuncture is an effective treatment for acute gouty arthritis, and low frequency (2 Hz) electroacupuncture is more effective than higher frequencies (Zou 2006); and, acupuncture may exert good therapeutic effects on early gout complicated with renal damage (Ma 2004). Thus the evidence so far indicates acupuncture to be more effective than medication and without serious side effects. However, all of the trials are from one country (China) and, with no systematic reviews, the quality of the research has not been closely scrutinised.

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 (Hui 2010) It has also be shown to reduce inflammation, by promoting release of vascular and immunomodulatory factors.(Zijlstra 2003; Kavoussi 2007)

Research has shown that acupuncture treatment may help relieve pain and prevent acute attacks of gout by:

- Reducing the production of uric acid and promoting its excretion (Xie 2007);
- Restoring the various metabolic pathways that are disturbed in individuals with gout.(Wen 2011);
- Reducing inflammation, by promoting release of vascular and immunomodulatory factors (Zijlstra 2003; Kavoussi 2007);
- Increasing local microcirculation (Komori 2009);
- 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).

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
Randomised controlled trials	
Zhou L et al. Comparative observation of the efficacy on acute gouty arthritis between acupuncture combined with infrared irradiation and western medicine. <i>Zhongguo Zhen Jiu</i> 2011; 31: 787-9.	A randomised controlled trial that compared the efficacy of acupuncture plus infrared irradiation and indomethacin (25mg three times daily) in treatment of acute gouty arthritis in 160 patients. Before and after treatment, pain severity, blood uric acid (BUA) levels, erythrocyte sedimentation rate (ESR), alanine aminotransferase (ALT) and aspartate aminotransferase (AST) were measured. Additionally, the efficacy and the impacts on liver function were assessed. The curative rate was 52.5% in the acupuncture group, which was superior to 22.5% in the indomethacin group ($p<0.01$). Acupuncture gave more effective analgesia than indomethacin ($p<0.01$), while the effect on reducing BUA and ESR levels was the same (all $p>0.05$). After treatment, there were no changes in ALT and AST levels in the acupuncture group, but they increased with indomethacin (all $p<0.01$). The researchers concluded that acupuncture combined with infrared irradiation is more effective in acute gouty arthritis than indomethacin, and that it provides a significant analgesic effect, while not reducing liver function.
Xie XQ et al. Observation on therapeutic effect of surrounded needling therapy on acute gouty arthritis. <i>Zhongguo Zhen Jiu</i> 2009; 29: 375-7.	A randomised controlled trial that compared the clinical therapeutic effect of surround needling therapy on acute gouty arthritis in 60 patients. The total effective rate was 93.3% in the surround needling therapy group and 80.0% in the allopurinol group ($p<0.01$); the serum uric acid contents before and after treatment were 516.85micromol/L and 293.77micromol/L respectively for the acupuncture group, and 509.66micromol/L and 333.66micromol/L for allopurinol, with significant differences before and after treatment in the two groups (both $p<0.05$), and with a significant difference in the serum uric acid after treatment between the two groups ($p<0.01$). The surround needling therapy group had no adverse reaction, and the adverse reaction rate in the allopurinol group was 46.7% ($p<0.01$). The researchers concluded that surround needling therapy is more effective and safer than allopurinol for the treatment of acute gouty arthritis.
Liu B et al. Observation on therapeutic effect of electroacupuncture combined with local blocking therapy on acute gouty arthritis. <i>Zhongguo Zhen Jiu</i> 2008; 28: 659-61.	A randomised controlled trial that compared local blocking plus electroacupuncture with indomethacin (25mg three times daily) and allopurinol (100mg three times daily) for the treatment of acute gouty arthritis in 100 patients. The therapeutic effects and changes of pain score and serum uric acid were observed. The effective rate was 96.4% in the observation group and 84.1% in the control group ($p<0.05$). Before and after treatment, pain scores were 3.48 and 0.94, and 3.45 and 2.11, and serum uric acid contents were 539micromol/L and 376micromol/L, and 552micromol/L and 426micromol/L in the two groups, respectively. After treatment, pain score and serum uric acid content significantly decreased in both groups (both $p<0.01$) and more so with electroacupuncture than drug treatment (both $p<0.01$). The researchers concluded that electroacupuncture combined with local blocking is an effective method for treatment of acute gouty arthritis and it can decrease blood uric acid levels.
Xie JY et al. Study on mechanisms of	A randomised controlled trial that compared therapeutic effects

<p>electroacupuncture treatment of acute gouty arthritis. Zhongguo Zhen Jiu 2007; 27: 898-900.</p>	<p>of electroacupuncture (EA), allopurinol and probenecid on acute gouty arthritis in 90 patients with gout and renal insufficiency. There were significant differences in blood (BUA) and urinary (UUA) uric acid levels before and after treatment ($p < 0.01$). There was no significant difference between the EA group and the allopurinol group in blood uric acid levels after treatment ($p > 0.05$) nor between the EA group and the probenecid group in the urinary uric acid levels ($p > 0.05$). Comparison of therapeutic effects among the 3 groups indicated that the mean rank was 56.23 in the EA group, 43.17 in the allopurinol group and 37.10 in the probenecid group. The researchers concluded that electroacupuncture can reduce the production of uric acid and promote the excretion of uric acid, has a better treatment effect than either allopurinol or probenecid, and that there are no harmful effects on renal function. Overall, they concluded that electroacupuncture is an effective therapeutic method for treatment of gout with renal insufficiency.</p>
<p>Zou R et al. Observation on therapeutic effect of electroacupuncture combined with acupoint-injection on acute gouty arthritis. Zhongguo Zhen Jiu 2007; 27: 15-7.</p>	<p>A randomised controlled trial that compared electroacupuncture plus point-injection and western medicine in 60 patients with acute gouty arthritis. There was a significant difference between the two groups in the therapeutic effect in favour of electroacupuncture ($p < 0.01$), and the analgesic effect was better than that in the control group ($p < 0.01$). Electroacupuncture was also superior to the control group in terms of decreasing blood uric acid ($p < 0.01$). The researchers concluded that electroacupuncture combined with point-injection is an effective method for the treatment of acute gouty arthritis, and that it can decrease blood uric acid content.</p>
<p>Zou R et al. Comparative study on treatment of acute gouty arthritis by electroacupuncture with different frequency. Chin J Integr Med 2006; 12: 212-4.</p>	<p>A randomised controlled trial that compared electroacupuncture (EA) of different frequencies and conventional medicine in the treatment of acute gouty arthritis in 72 patients. The time to pain relief was shorter and it lasted longer in the electroacupuncture group than the medication group (all $p < 0.01$). The analgesic effect was better in low frequency electroacupuncture group than the high frequency group, as was the reduction in serum uric acid levels ($p < 0.01$). The researchers concluded that electroacupuncture is an effective treatment for acute gouty arthritis, and that low frequency (2 Hz) EA showed a better efficacy.</p>
<p>Ma X. Clinical analysis for the acupuncture treatment in 42 cases of gouty renal damage. J Tradit Chin Med 2004; 24: 185-7.</p>	<p>A randomised controlled trial that observed the therapeutic effects of acupuncture on gouty renal damage in 72 patients. Changes in 24-hour urinary protein content, blood creatinine, uric acid and urea nitrogen in the blood before and 1 month after treatment were also recorded. The total effective rate in the treatment group reached 95.2%, which was higher than 63.3% in the control group. After 1 month of treatment, urinary protein content, blood creatinine, uric acid and urea nitrogen in the blood were reduced in both groups, but the reduction rate in the treatment group was greater than that in the control group. The researchers concluded that acupuncture may exert good therapeutic effects on early gout complicated with renal damage by adjusting the metabolism and improving renal function.</p>

Possible mechanisms of acupuncture

<p>Wen SL et al. Effect of acupuncture on rats with acute gouty arthritis inflammation: a metabonomic method for profiling of both urine and plasma metabolic perturbation. Am J Chin Med 2011; 39: 287-300.</p>	<p>An animal-based study that assessed the effects of acupuncture in acute gouty arthritis model rats. The results showed that acupuncture could restore the metabolite network disturbed by monosodium urate administration.</p>
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<p>Goldman N et al. Adenosine A1 receptors mediate local anti-nociceptive effects of acupuncture. <i>Nat Neurosci</i> 2010; May 30.</p>	<p>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.</p>
<p>Hui KK et al. Acupuncture, the limbic system, and the anticorrelated networks of the brain. <i>Auton Neurosci</i> 2010; 157: 81-90.</p>	<p>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.</p>
<p>Hui K.K.-S. The salient characteristics of the central effects of acupuncture needling: limbic-paralimbic-neocortical network modulation. <i>Human Brain Mapping</i> 2009; 30: 1196-206.</p>	<p>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.</p>
<p>Komori M et al. Microcirculatory responses to acupuncture stimulation and phototherapy. <i>Anesth Analg</i> 2009; 108: 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>Kavoussi B, Ross BE. The neuroimmune basis of anti-inflammatory acupuncture. <i>Integr Cancer Ther</i> 2007;</p>	<p>Review article that suggests the anti-inflammatory actions of traditional and electro-acupuncture are mediated by efferent vagus nerve activation and inflammatory macrophage</p>

6: 251-7.

deactivation.

Zijlstra FJ et al. Anti-inflammatory actions of acupuncture. Mediators Inflamm 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.
