

ACUPUNCTURE AND OSTEOARTHRITIS

About osteoarthritis

Osteoarthritis involves damage to articular cartilage and other structures in and around joints, with variable levels of inflammation.(Hunter 2006) The most commonly affected joints are the knee and the hip. It is a common condition; for example, about 10% of people aged over 55 years in the UK have painful knee osteoarthritis associated with mild to moderate disability.(Peat 2001) Many patients with osteoarthritis have significant pain and loss of function, often episodically, and will require treatment to control their symptoms. Around 25% of those with knee osteoarthritis are severely disabled.(Peat 2001) Every year, symptomatic knee osteoarthritis accounts for about 0.5% of all primary care consultations by those aged over 55 years, rising to 1% for those over 70 years.(Peat 2001) Disability due to osteoarthritis can limit quality of life and independent living, or the ability to care for a disabled spouse.(Arden 2006, Dawson 2005, Dawson 2004)

Treatment options for osteoarthritis involve a combination of non-drug and drug interventions.(National Collaborating Centre for Chronic Conditions 2008; Zhang 2008) The non-drug interventions include ongoing access to appropriate information; lifestyle measures (e.g. weight loss, exercise); walking aids; wedged insoles; local therapy involving heat or cold; physiotherapy; transcutaneous electrical nerve stimulation (TENS); cognitive behavioural therapy; and food supplements (e.g. glucosamine).(National Collaborating Centre for Chronic Conditions 2008; Porcheret 2007) Drugs used include paracetamol, oral or topical NSAIDs, capsaicin, opioids and intra-articular corticosteroid injections.(National Collaborating Centre for Chronic Conditions 2008; Zhang 2008; Porcheret 2007) Joint replacement surgery is an option if pain relief and functional improvements are inadequate with other treatments, and there is a significant impact on quality of life.(National Collaborating Centre for Chronic Conditions 2008, Zhang 2008)

References

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How acupuncture can help

Evidence from a systematic review suggests that moxibustion is more effective than conventional drug therapy for osteoarthritis of the knee, as well as in rheumatic conditions in general, and also that it improves benefits when added to conventional drugs (Choi 2011). Several systematic reviews of acupuncture for osteoarthritis of peripheral joints/knee and hip/knee alone have concluded that it is statistically superior to sham acupuncture and to usual physician care, and similar in benefit to some other active interventions such as exercise regimes (Kwon 2007; White 2007; Manheimer 2007, 2010). All of these, together with the expert consensus guidelines of the Osteoarthritis Research Society International (Zhang 2008, 2009), recognise that it has clinically relevant benefits and a favourable safety profile, and they recommend acupuncture as a treatment option for osteoarthritis. In addition, it has been found to be cost-effective (Reinhold 2008).

There have been many randomised controlled trials of acupuncture and/or moxibustion for osteoarthritis: only those too recent for the systematic reviews are discussed separately here. All seven studies (six for knee and one for hip) reported significantly better changes in the acupuncture than the control groups (Lev-Ari 2011, Sheng 2010, Zhu 2010, Wu 2010, Lu 2010, Ding 2009, Ahsin 2009); in two, this superiority was only manifest in the longer- rather than shorter-term. Most reported outcomes for pain and function, some for overall benefit, and one for gait patterns in particular. The acupuncture was more commonly electro- than manual, and moxibustion was added in two trials. The controls used were either sham acupuncture (four studies) or Western drugs (three). These recent trials thus strengthen the findings of the reviews.

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)

Acupuncture treatment may help to relieve pain and improve function in patients with osteoarthritis 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; Han 2004; Zhao 2008; Cheng 2009; Ahsin 2009);
- inhibiting pain through the modulatory effects of endogenous opioids (Uryu 2007; Ahsin 2009);
- regulating metabolism-related genes and pathways (Tan 2010)
- inhibiting the activity of cytokines that are mediators of inflammation, including interleukin (IL)-1, IL-6 and tumour necrosis factor (TNF)-alpha (Xu 2009; Wu 2010);
- reducing inflammation, by promoting release of vascular and immunomodulatory factors (Zijlstra 2003; Kavoussi 2007);
- 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

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The evidence

Research	Conclusion
Systematic reviews	
Choi TY et al. Moxibustion for rheumatic conditions: a systematic review and meta-analysis. <i>Clin Rheumatol</i> . 2011 Feb 18. [Epub ahead of print]	A systematic review that pooled data from 14 randomised controlled trials testing effectiveness of moxibustion for major rheumatic conditions. Trials were included if moxibustion was used alone (8 trials) or as a part of a combination therapy with conventional drugs (6 trials) for rheumatic conditions. All were of low methodological quality. <u>The data suggested favourable effects of moxibustion alone on response rate compared with conventional drug therapy (p<0.02). A subgroup analysis showed significant effects of moxibustion compared with drug therapy in patients with knee osteoarthritis. The results also suggested favourable effects of moxibustion plus drug therapy on the response rate compared with conventional drug therapy alone (p<0.02). The reviewers concluded that the trials included in this review were of low methodological quality, making it difficult to draw firm conclusions.</u>
Manheimer E et al. Acupuncture for peripheral joint osteoarthritis. <i>Cochrane Database Syst Rev</i> 2010; 1: CD001977.	A systematic review that assessed the effects of acupuncture for treating peripheral joint osteoarthritis (OA). It included 16 randomised controlled trials, involving a total of 3,498 people with OA of the knee, hip, or hand. that compared needle acupuncture with a sham, another active treatment, or a waiting list control group. Twelve of the trials included only people with OA of the knee, 3 only OA of the hip, and 1 a mix of people with OA of the hip and/or knee. In comparison with a sham control, acupuncture showed statistically significant, short-term improvements in OA pain and function; however, these pooled short-term benefits did not meet the reviewersqpredefined thresholds for clinical relevance* and there was substantial statistical heterogeneity. In comparison with sham acupuncture at the 6-month follow-up, acupuncture showed borderline statistically significant, clinically irrelevant* improvements in OA pain and function. In a secondary analysis, versus a waiting list control, acupuncture was associated with statistically significant, clinically relevant short-term improvements in OA pain and function. In the head-on comparisons of acupuncture with the 'supervised OA education' and the 'physician consultation' control groups, acupuncture was associated with clinically relevant short- and long-term improvements in pain and function. In the head on comparisons of acupuncture with 'home exercises/advice leaflet' and 'supervised exercise', acupuncture was associated with similar treatment effects as the controls. Acupuncture as an adjuvant to an exercise based physiotherapy program did not result in any greater improvements than the exercise program alone. <u>The reviewers concluded that sham-controlled trials show statistically significant benefits; however, these benefits were small, and probably due at least partially to placebo effects from incomplete blinding. Waiting list-controlled trials of acupuncture for peripheral joint OA suggest statistically significant and clinically relevant benefits.</u>
Zhang W et al. OARSI recommendations for the management of hip and knee osteoarthritis, Part II: OARSI evidence-based, expert consensus guidelines. <i>Osteoarthritis Cartilage</i> 2008; 16: 137-62.	A systematic review to update evidence for available therapies in the treatment of hip and knee osteoarthritis (OA) and to examine whether research evidence has changed from 31 January 2006 to 31 January 2009. Sixty-four systematic reviews, 266 randomised controlled trials and 21 new economic evaluations were published between 2006 and 2009. Of 51 treatment modalities, new data on efficacy have been published for more than half of those for which research evidence was available in 2006. The effect size for pain relief was unchanged for acupuncture; it was still found to be statistically significant and of small to moderate size. <u>Twenty out of 51 treatment modalities addressed by the guidelines were universally recommended, including acupuncture, which it concluded %may be of symptomatic benefit in patients with</u>
Zhang W et al. OARSI recommendations for the management of hip and knee osteoarthritis: part III: Changes in evidence following systematic cumulative update of	

research published through January 2009. *Osteoarthritis Cartilage* 2010; 18: 476-99.

knee OA+

Manheimer E et al. Meta-analysis: acupuncture for osteoarthritis of the knee. *Ann Intern Med* 2007; 146: 868-77.

A systematic review that evaluated the effects of acupuncture for treating knee osteoarthritis (OA). It pooled data from 9 randomised trials longer than 6 weeks in duration that compared needle acupuncture with a sham, usual care, or waiting list control group for patients with knee OA. Compared with patients in waiting list control groups, patients who received acupuncture reported clinically relevant short-term improvements in pain and function. They also reported clinically relevant short- and long-term improvements in pain and function compared with patients in usual care control groups. Compared with a sham control, acupuncture provided both short- and long-term improvements in pain and function. Although statistically superior the differences were deemed clinically irrelevant*. The reviewers concluded that sham-controlled trials showed clinically irrelevant* short-term benefits of acupuncture for treating knee OA, but that waiting list-controlled trials suggested clinically relevant benefits.

White A et al. Acupuncture treatment for chronic knee pain: a systematic review. *Rheumatology (Oxford)* 2007; 46: 384-90.

A systematic review that evaluated the effects of acupuncture on short-term pain and function in patients with chronic knee pain. It included 13 controlled trials in which adults with chronic knee pain or osteoarthritis (OA) of the knee were randomised to receive either acupuncture treatment or a control consisting of sham (placebo) acupuncture, other sham treatments, no additional intervention (usual care), or an active intervention.. Combining 5 studies involving 1,334 patients, acupuncture was found to be superior to sham acupuncture for both pain and for the WOMAC function subscale. The differences were still significant at long-term follow-up. Acupuncture was also significantly superior to no additional intervention. There were insufficient studies to compare acupuncture with other sham or active interventions. The reviewers concluded that acupuncture that meets criteria for adequate treatment, and is significantly superior to sham acupuncture and to no additional intervention in improving pain and function in patients with chronic knee pain.

Kwon YD et al. Acupuncture for peripheral joint osteoarthritis: a systematic review and meta-analysis. *Rheumatology (Oxford)* 2006; 45: 1331-7.

A systematic review that evaluated the evidence for the effectiveness of acupuncture in peripheral joint osteoarthritis (OA). In all, 18 trials were included assessing needle acupuncture with or without electrical stimulation and controlled against sham or a comparator intervention. Ten trials tested manual acupuncture and eight trials tested electro-acupuncture. Overall, ten studies demonstrated greater pain reduction in acupuncture groups compared with controls. A meta-analysis of homogeneous data showed a significant effect of manual acupuncture compared with sham acupuncture ($p=0.04$). The reviewers concluded that their results suggest specific effects of acupuncture for pain control in patients with peripheral joint OA and that, considering its favourable safety profile acupuncture seems an option worthy of consideration particularly for knee OA.

Randomised controlled trials

Lev-Ari S et al. Delayed effect of acupuncture treatment in OA of the knee: A blinded, randomized, controlled trial. *Evidence-based Complementary and Alternative Medicine* 2011; Article Number: 792975.

A randomised controlled trial that assessed function and pain relief from 8 weeks of acupuncture as adjunctive therapy to standard care in 55 elderly patients with osteoarthritis (OA) of the knee. Patients were allocated to biweekly acupuncture treatment or a control group that received sham acupuncture, both in addition to standard therapy. Primary outcomes measures were changes in the Knee Society Score (KSS) knee score and in KSS function and pain ratings at therapy onset, at 8 weeks (closure of study) and at 12 weeks. There was significant improvement in all three scores in both groups after 8 and 12 weeks compared with baseline ($p<0.05$). Significant differences between the intervention and control groups in the KSS knee score ($p=.0036$) was apparent only after 12 weeks. Patient satisfaction was higher in the intervention group. The researchers concluded that adjunctive acupuncture treatment seems to provide added improvement to standard care in elderly patients with OA of the knee.

Sheng XP, Fan TY. Comparative

A randomised controlled trial that observed the differences of effect of

<p>observation on hip osteoarthritis treated with electroacupuncture and medication [Article in Chinese]. <i>Zhongguo Zhen Jiu</i> 2010; 30: 982-4.</p>	<p>electroacupuncture and medication on hip osteoarthritis (OA). Sixty patients were allocated to electroacupuncture or oral diclofenac. One month after treatment, Visual Analogue Scale (VAS) scores and Harris scores were compared between the groups. VAS scores were significantly reduced in both groups after treatment ($p<0.001$), being 67.8 and 55.8 before and after electroacupuncture, and 68.7 and 61.5 in the diclofenac group. Both the pain and Harris scores improved more with electroacupuncture than with the medication ($p<0.05$). <u>The researchers concluded that electroacupuncture can treat hip OA effectively, relieve joint pain and improve joint function, and is more effective than oral diclofenac.</u></p>
<p>Zhu Y et al. Clinical observation on the therapeutic effect of drugs-paste separated moxibustion combined with electroacupuncture for knee osteoarthritis patients of cold-damp type. [Article in Chinese] <i>Zhen Ci Yan Jiu</i> 2010; 35: 293-7.</p>	<p>A randomised controlled trial that compared the effects of moxibustion plus electroacupuncture (EA) with the NSAID diclofenac for knee osteoarthritis (OA) in 124 patients. After 4 weeks of treatment, the knee-joint pain scores and the index of severity of OA in both groups had decreased significantly and was still significantly less 10 weeks after the treatment had been stopped ($p<0.01$). The scores were also significantly less in the moxa plus EA group than the diclofenac group ($p<0.05$). <u>The researchers concluded that Chinese drugs-paste-separated moxibustion combined with EA is effective in the treatment of knee OA of the Cold-Damp type.</u></p>
<p>Wu MX et al. Clinical study on the treatment of knee osteoarthritis of Shen-Sui insufficiency syndrome type by electroacupuncture. <i>Chin J Integr Med</i> 2010; 16: 291-7.</p>	<p>A randomised controlled trial to assess the clinical efficacy of electroacupuncture (EA) on knee osteoarthritis (OA). A total of 245 patients (279 knees) were assigned to two groups - the treatment group was managed with EA and the control group was treated with intra-articular injection of 2mL hyaluronic acid into the affected joint. As well as clinical outcomes, changes in levels of various cytokines in the knee joint fluid were measured before and after treatment. Comparison of therapeutic effects (excellent and effective rates) between the two groups showed insignificant differences ($p>0.05$) in favour of EA. Symptom scores and cytokine levels in the knee fluid after treatment were significantly lowered in both groups ($p<0.05$ or $p<0.01$). <u>The researchers concluded that EA could effectively alleviate the clinical symptoms in knee OA and its effects were superior to those of hyaluronic acid. They also concluded that EA also suppresses the secretion of IL-1, IL-6, TNF-alpha, PGE(2alpha) and MMP-3 in the knee fluid.</u></p>
<p>Lu TW et al. Immediate effects of acupuncture on gait patterns in patients with knee osteoarthritis. <i>Chin Med J</i> 2010; 20; 123: 165-72.</p>	<p>A randomised controlled trial that investigated the immediate effects of acupuncture on gait patterns in patients with knee osteoarthritis (OA). Twenty patients with bilateral medial knee OA were assigned either to sham acupuncture treatment or a 30-minute formula electro-acupuncture treatment. Before and after treatment, each patient was evaluated for knee pain using visual analogue scales (VAS) and their performance of level walking using gait analysis. The VAS scores were decreased significantly after treatment in both groups, but the mean change was 2 times greater with acupuncture than in the sham group. No significant changes were found in the gait variables in the sham group, but the acupuncture group had significant increases in the gait speed, step length, as well as in several components of the joint angles and moments. <u>The researchers concluded that the significantly improved gait performance with acupuncture may be associated with pain relief after treatment.</u></p>
<p>Ding MH et al. A randomized controlled study on warming needle moxibustion for treatment of knee osteoarthritis. <i>Zhongguo Zhen Jiu</i> 2009; 29: 603-7.</p>	<p>A randomised controlled trial that assessed the short- and long-term therapeutic effects of acupuncture plus moxibustion for treatment of knee osteoarthritis (OA). Ninety patients were allocated to acupuncture plus moxibustion, oral ibuprofen or a waiting group, 30 cases in each group. After 2 weeks, the total effective rate was 86.7% in the acupuncture plus moxibustion group, 90.0% in the ibuprofen group, both of which were better than the waiting group (60.0%; $p<0.05$). There was no difference between the acupuncture plus moxibustion group and the ibuprofen group ($p>0.05$). Ten weeks after treatment, the total effective rate was 83.3% in the acupuncture plus moxibustion group, which was better than that in the ibuprofen group (60.0%; $p<0.05$). <u>The researchers concluded that acupuncture plus moxibustion is effective for the treatment of knee OA, and the short-term</u></p>

therapeutic effect is same as that of oral ibuprofen, while the long-term therapeutic effect is better than that of ibuprofen.

Ahsin S et al. Clinical and endocrinological changes after electroacupuncture treatment in patients with osteoarthritis of the knee. *Pain* 2009; 147: 60-6.

A single-blinded, sham-controlled study that compared plasma beta-endorphin and cortisol levels with self-assessment scores of intensity of pain, before and after 10 days of electroacupuncture treatment in 40 patients with chronic pain as a result of osteoarthritis(OA) of the knees. Pre- and post-treatment Western Ontario and McMaster Universities (WOMAC) index of OA of the knee and VAS for pain were recorded, and blood samples were taken for the measurement of plasma cortisol and beta-endorphin levels. Following electroacupuncture treatment there was a significant improvement in WOMAC index and VAS ($p=0.001$), a significant rise in plasma beta-endorphin ($p=0.001$), and a significant fall in plasma cortisol ($p=0.016$). The researchers concluded that electroacupuncture resulted in an improvement in pain, stiffness and disability. Both objective pain measures and biomarkers for stress/pain improved more with acupuncture than with sham, indicating physiological changes beyond that of placebo.

Reinhold T et al. Quality of life and cost-effectiveness of acupuncture treatment in patients with osteoarthritis pain. *Eur J Health Econ* 2008; 9: 209-19.

A randomised controlled trial that assessed quality of life (QoL), costs, and cost-effectiveness of acupuncture treatment plus routine care versus routine care alone in 489 patients with chronic pain due to osteoarthritis (OA) of the knee or hip in 255 general practices in Germany. QoL and costs were evaluated at baseline and after 3 months using health insurance funds data and standardised questionnaires. Patients receiving acupuncture had an improved QoL associated with significantly higher costs over the 3-month treatment period compared to routine care alone (mean cost-difference: 469.50 Euros). This increase in costs was primarily due to the costs of acupuncture. The overall ICER (incremental cost effectiveness ratio) was 17,845 Euros per QALY (quality adjusted life year) gained (considered indicative of cost-effectiveness according to NICE guidelines). The degree of cost-effectiveness was influenced by gender, with female patients achieving a better cost-effectiveness ratio than men. The researchers concluded that acupuncture was a cost-effective treatment strategy in patients with chronic OA pain.

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