



ACUPUNCTURE AND POST-OPERATIVE PAIN

About post-operative pain

Pain after surgery is common, often severe and largely unnecessary. Effective relief of post-operative pain is vital, and not just for humanitarian reasons. Such pain probably prolongs hospital stay, as it can affect all organ systems, including: respiratory (e.g. reduced cough, sputum retention, hypoxaemia); cardiovascular (e.g. increased myocardial oxygen consumption, ischaemia); gastrointestinal (e.g. decreased gastric emptying, reduced gut motility, constipation); genitourinary (e.g. urinary retention); neuroendocrine (e.g. hyperglycaemia, protein catabolism, sodium retention); musculoskeletal (e.g. reduced mobility, pressure sores, increased risk of DVT); and psychological (e.g. anxiety, fatigue). There is now evidence that post-operative pain relief has significant physiological benefit (Charlton 1997). Not only can it result in earlier discharge from hospital, but it may also reduce the onset of chronic pain syndromes. Nevertheless, post-operative pain remains grossly under treated, with up to 70% of patients reporting moderate to severe pain following surgery (Pyati 2007).

The goal for postoperative pain management is to reduce or eliminate pain and discomfort with a minimum of side effects as cheaply as possible (Breivik 2008). The standard method of treating postoperative pain in the developed world is an intramuscular opioid (usually diamorphine or morphine), but other analgesics (paracetamol, NSAIDs) and local anesthetics may also be used (Taylor 2001). Nonpharmacological treatments include hypnosis, transcutaneous electrical stimulation, and hot and cold application.

References

Breivik H, Stubhaug A. Management of Acute postoperative pain: still a long way to go! *Pain* 2008; 137: 233-4.

Charlton E. The management of postoperative pain. *Practical Procedures* 1997; 7: 1-7.

Pyati S, Gan TJ. Perioperative pain management. *CNS Drugs* 2007; 21: 185 - 211.

Taylor M S. Managing postoperative pain. *Hosp Med* 2001; 62: 560-3.

How acupuncture can help

Systematic reviews suggest that acupuncture and ear acupuncture are useful adjunctive treatments for post-operative pain management (Sun 2008; Usinchenko 2008). Several recent randomised controlled trials have found acupuncture and electroacupuncture to reduce post-operative pain, the use of patient-controlled

analgesia (opioids), and post-operative nausea and vomiting (Salmeddini 2010; Larson 2010; Parthasarathy 2009; Wu 2009; Grube 2009; Wong 2006).

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 anxiety (Wu 1999).

Acupuncture may help relieve post-operative pain by:

- altering the brain's chemistry, increasing endorphins (Han 2004) and neuropeptide Y levels (Lee 2009; Cheng 2009), and reducing serotonin levels (Zhou 2008).

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 (SRs)	
Usichenko TI et al. Auricular acupuncture for postoperative pain control: a systematic review of randomised clinical trials. <i>Anaesthesia</i> 2008; 63: 1343-8.	A systematic review that evaluated clinical evidence on the efficacy of auricular acupuncture for postoperative pain control. Nine randomised clinical trials on the treatment of postoperative pain with auricular acupuncture were included. Pain intensity and analgesic requirements were defined as the primary outcome measures. The data could not be pooled because of the heterogeneity of the primary studies. In eight of the trials, auricular acupuncture was superior to control conditions but many of the trials had flawed methodology. <u>The reviewers concluded that the evidence that auricular acupuncture reduces postoperative pain is promising but not compelling.</u>
Sun Y et al. Acupuncture and related techniques for postoperative pain: a systematic review of randomized controlled trials. <i>Br J Anaesth</i> 2008; 101: 151-60.	A systematic review that evaluated the efficacy of acupuncture and related techniques as adjunct analgesics for acute post-operative pain management. Fifteen randomised controlled trials comparing acupuncture with sham control were included. Weighted mean difference for cumulative opioid analgesic consumption in favour of acupuncture was -3.14 mg (95% CI -5.15 to -1.14), -8.33 mg (95% CI -11.06 to -5.61), and -9.14 mg (95% CI -16.07 to -2.22) at 8, 24, and 72 hours, respectively. Post-operative pain intensity (visual analogue scale) was also significantly decreased in the acupuncture group at 8 and 72 hours compared with the control group. The acupuncture treatment group was associated with a lower incidence of opioid-related side effects such as nausea (relative risk [RR] 0.67, 95% CI 0.53 to 0.86), dizziness (RR 0.65, 95% CI 0.52 to 0.81), sedation (RR 0.78, 95% CI 0.61 to 0.99), pruritus (RR 0.75, 95% CI 0.59 to 0.96), and urinary retention (RR 0.29, 95% CI 0.12 to 0.74). <u>The reviewers concluded that peri-operative acupuncture may be a useful adjunct for acute post-operative pain management.</u>
Clinical trials	
Sahmeddini MA et al. Electro-acupuncture for pain relief after nasal septoplasty: a randomized controlled study. <i>J Altern Complement Med</i> 2010; 16: 53-7.	A randomised controlled trial to compare electro-acupuncture (EA) with 0.1 mg/kg IV morphine for acute post-operative pain in 90 patients undergoing nasal septoplasty. Both groups also received midazolam intravenously. The time to the first analgesic request, and pain intensity (on a 100-mm visual analogue scale) were used to evaluate pain, and the amount of post-operative meperidine and incidence of analgesia related to side-effects were recorded. Post-operative pain intensity and respiratory depression were similar in both groups ($p > 0.05$), but nausea and vomiting were less in the acupuncture group than in the control

group ($p < 0.05$). Post-operative meperidine was not needed in either group because the pain scores remained below the VAS threshold of 40mm. The reviewers concluded that EA and morphine given intra-operatively resulted in a similar post-operative pain score and analgesic requirement.

Larson JD et al. The effect of electroacustimulation on postoperative nausea, vomiting, and pain in outpatient plastic surgery patients: a prospective, randomized, blinded, clinical trial. *Plast Reconstr Surg* 2010; 125: 989-94.

A randomised controlled trial to evaluate the effects of using a device that electrically stimulates acupuncture points in addition to standardised pharmacological post-operative nausea and vomiting prevention alone, in 122 outpatient plastic surgery patients. Outcomes measured were pain and nausea symptoms, emetic events, the need for rescue medications, and the time to discharge. The electroacustimulation arm reported statistically significant lower nausea scores at 30 minutes and 120 minutes postoperatively ($p < 0.05$). In addition, some anatomical subsets of surgical patients required significantly less pain medication and shorter times from surgery to discharge when compared with the standard treatment. However, electroacustimulation did not have a significant effect on the amount of pain experienced by patients in any group. The researchers concluded that electroacustimulation offers added protection against symptoms of postoperative nausea and vomiting in an outpatient cosmetic surgery population, representing a safe and cost-effective addition to current pharmacologic preventive measures.

Grube T et al. Influence of acupuncture on postoperative pain, nausea and vomiting after visceral surgery: a prospective, randomized comparative study of metamizole and standard treatment [Article in German]. *Schmerz* 2009; 23: 370-6.

A randomised controlled trial that compared acupuncture with metamizole or a control group for the treatment of post-operative pain and nausea in 66 patients who had had visceral surgery (hysterectomy, cholecystectomy). All patients received patient-controlled analgesia (PCA) using piritramide. Primary outcome measures were defined as pain intensity, analgesic consumption, and frequency of nausea and vomiting in a period up to the morning of the second post-operative day. The acupuncture group reported significantly less pain, nausea, and vomiting compared to the control group. Mean cumulative piritramide consumption was significantly lower in the acupuncture group (25.0 mg) than in the metamizole group (34.5 mg) and the control group (55.2 mg). The researchers concluded that acupuncture may be effective in post-operative pain relief, and the treatment of nausea and vomiting in the postoperative period.

Parthasarathy S., Ravishankar M. Acupuncture - A preemptive analgesic technique. *Journal of Anaesthesiology Clinical Pharmacology* 2009; 25: 214-6.

A randomised controlled study to assess acupuncture as a pre-emptive analgesic technique in surgery. Fifty patients having inguinal herniorrhaphy under intrathecal lignocaine were assigned either to pre-emptive acupuncture or no acupuncture. Intra-operative sedation, post-operative pain scores, post-operative sedation, analgesic requirement and side effect were observed by a blinded observer. The intra-operative sedation was significantly better and post-operative pain scores and analgesic requirements were significantly less in the acupuncture group. There were no significant side effects in any patient. The researchers concluded that pre-emptive acupuncture technique

can be safely and effectively used as a post-operative analgesic technique.

Wu HC et al. Effects of acupuncture on post-caesarean section pain. Chinese Medical Journal 2009; 122: 1743-8.

A randomised controlled trial to find out the effects of acupuncture or electro-acupuncture (EA) on post-caesarean pain. Sixty women, who had had spinal anaesthesia during caesarean section, were assigned to the control group, the acupuncture group, and the EA group after surgery. Acupuncture and EA delayed the time to first requesting morphine by up to 10-11 minutes when compared with the control group. The total dose of patient-controlled analgesia (PCA) used within the first 24 hours was significantly (30%-35%) less in the acupuncture and EA groups compared with the control group. The EA group's and the acupuncture group's pain scores were significantly lower than the control group's in the first 2 hours. Finally, the incidence of opioid-related side effects, such as dizziness, was less in the acupuncture and EA groups than in the control group. There was no significant difference between the acupuncture group and the EA group. The researchers concluded that the study showed that acupuncture and electro-acupuncture could definitely delay the time of requesting pain relief medication after caesarean section and decrease the PCA doses used within the first 24 hours.

Wong RH et al. Analgesic effect of electroacupuncture in postthoracotomy pain: a prospective randomized trial. *Ann Thorac Surg* 2006; 81: 2031-6.

A randomised controlled pilot study to evaluate the role of electroacupuncture in the management of early post-thoracotomy wound pain in 27 patients with operable non-small cell lung carcinoma. Patients were given electroacupuncture or sham acupuncture in addition to routine oral analgesics and patient-controlled intravenous analgesia for post-operative pain control. There was a trend for lower visual analogue scale pain scores in the electro-acupuncture group between post-operative days 2 and 6, although this did not reach statistical significance. The cumulative dose of patient-controlled analgesia morphine used on post-operative day 2 was significantly lower in the electroacupuncture group (7.5 +/- 5 mg vs. 15.6 +/- 12 mg; p<0.05). The researchers concluded that electroacupuncture may reduce narcotic analgesic usage in the early post-operative period.

Research on mechanisms for acupuncture

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 to investigate 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 μ -opioid receptors.

Lee B et al. Effects of acupuncture on chronic corticosterone-induced depression-like behavior and

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

expression of neuropeptide Y in the rats. *Neuroscience Letters* 2009; 453: 151-6. reported anxiety.

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 Acupunct* 2008 ;17: 79-84. 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 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.

Han JS. Acupuncture and endorphins. *Neurosci Lett* 2004; 361: 258-61. A literature review of studies relating to the release of endorphins by acupuncture.

Wu MT et al. Central nervous pathway for acupuncture stimulation: localization of processing with functional MR imaging of the brain--preliminary experience. *Radiology* 1999 ;212: 133-41. An experimental study using fMRI to characterise the central nervous system pathway for acupuncture stimulation, which found that acupuncture activates structures of descending antinocioceptive pathway and deactivates areas mediating pain modulation.

Terms and conditions

The use of this fact sheet is for the use of British Acupuncture Council members and is subject to the strict conditions imposed by the British Acupuncture Council details of which can be found in the members area of its' website www.acupuncture.org.uk.