



## ACUPUNCTURE AND COPD

### About COPD

**Chronic obstructive pulmonary disease (COPD) is thought to be the fourth most common cause of death worldwide, and the World Health Organisation anticipates that by 2020 it will have become the third (WHO 2006). In 2004, 27,478 men and women living in the UK died of chronic obstructive lung disease; more than 90% of these deaths occurred in those aged over 65 years (BTS 2006).**

COPD is characterised by airflow limitation that is largely irreversible because of damage to the airways and lung tissue; it therefore does not include asthma, where the airflow obstruction is potentially fully reversible (DTB 2001). However, both diseases are common and in some patients coexist. The main cause of COPD is tobacco smoking (Chen 1999). Patients with stable COPD experience chronic symptoms such as breathlessness, cough, sputum production, wheeze and chest tightness, which worsen slowly over time, and they may eventually develop respiratory failure or signs of right heart failure (NICE 2004).

The aim of treatment is to alleviate symptoms; to prevent exacerbations; to preserve optimal lung function; to improve activities of daily living, quality of life, and survival, with minimal adverse effects from treatment. Conventional medical treatment includes short-acting inhaled  $\beta_2$ -agonists used on an 'as required' basis, regular use of an inhaled antimuscarinic bronchodilator or a long-acting  $\beta_2$ -agonist, oral theophylline, mucolytics, inhaled corticosteroids, pulmonary rehabilitation programmes, oxygen therapy, and surgery to remove a single large bulla or functionless areas of lung, or lung transplantation (NICE 2004, DTB 2001).

### References

British Thoracic Society, 2006. *The Burden of Lung Disease*. 2nd Edition. British Thoracic Society [online]. Available: <http://www.brit-thoracic.org.uk/c2/uploads/finalproof.pdf>

Chen JC, Mannino DM. Worldwide epidemiology of chronic obstructive pulmonary disease. *Curr Opin Pulm Med* 1999; **5**: 93–9.

Managing stable chronic obstructive pulmonary disease. *DTB* 2001; 39: 81-5.

National Institute for Health and Clinical Excellence, 2004. *Chronic obstructive pulmonary disease. Management of chronic obstructive pulmonary disease in adults in primary and secondary care*. Clinical guideline 12 [online]. Available: [http://www.nice.org.uk/nicemedia/pdf/CG012\\_niceguideline.pdf](http://www.nice.org.uk/nicemedia/pdf/CG012_niceguideline.pdf)

World Health Organization (WHO), 2006. COPD: Burden. World Health Organization [online]. Available: <http://www.who.int/respiratory/copd/burden/en/index.html>

## How acupuncture can help

Clinical trials to date suggest that acupuncture may be a useful adjunct to standard medical care for COPD (Bausewein 2008, Suzuki 2008, Lau 2008, Lewith 2004), though this requires corroboration with larger studies (see Table overleaf).

Acupuncture may help relieve COPD by:

- reducing bronchial immune-mediated inflammation (Carneiro 2005), and reducing inflammation in general by promoting release of vascular and immunomodulatory factors (Kavoussi 2007, Zijlstra 2003).
- improving both airway mucociliary clearance and the airway surface liquid (Tai 2006).
- regulating cytokine production (Jeong 2002, Joos 2000).

## 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](http://www.acupuncture.org.uk)

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## The evidence

Research	Conclusion
<b>Reviews</b>	
Bausewein C et al. Non-pharmacological interventions for breathlessness in advanced stages of malignant and non-malignant diseases. <i>Cochrane Database of Systematic Reviews</i> 2008, Issue 2. Art. No.: CD005623. DOI: 10.1002/14651858.CD005623.pub2.	A systematic review that looked at the effectiveness of non-pharmacological and non-invasive interventions to relieve breathlessness in participants suffering from the five most common conditions causing breathlessness in advanced disease. It included 47 randomised controlled and controlled clinical trials involving a total of 2,532 participants described as suffering from breathlessness due to advanced stages of cancer, COPD, interstitial lung disease, chronic heart failure or motor neurone disease. Five of the trials were of acupuncture/acupressure, which provided low strength evidence that acupuncture/acupressure is helpful. Most of the studies had been conducted in patients with COPD.
<b>Clinical studies</b>	
Suzuki M et al. The effect of acupuncture in the treatment of chronic obstructive pulmonary disease. <i>J Altern Complement Med</i> 2008; 14:1097-105.	A prospective study to determine whether a combination of traditional acupuncture treatment and conservative treatment for COPD improves dyspnoea on exercise. Thirty patients were divided into the acupuncture group (n = 15) and the control group (n = 15). The control group received conservative treatment with medication only. The acupuncture group received acupuncture treatments once a week for 10 weeks, in addition to conservative treatment with medication. The main outcome measure was the Modified Borg dyspnoea scale after the 6-minute walk test. The acupuncture group had significantly better results on the Borg scale than the control group after 10 weeks (2.2 +/- 2.7 versus 6.4 +/- 3.4, p = 0.0001, 95% CI -5.10 to -2.35, paired t-test). The 6-minute walk distance and oxygen saturation at the minimum rate also improved significantly in the acupuncture group compared with the control group. <u>The researchers concluded that acupuncture contributed to the reduction of COPD-related dyspnoea on exercise.</u>
Lau KS, Jones AY. A single session of Acu-TENS increases FEV1 and reduces dyspnoea in patients with chronic obstructive pulmonary disease: a randomised, placebo-controlled trial. <i>Australian Journal of Physiotherapy</i> 2008; 54: 179-84.	A single-blind randomised placebo-controlled trial that examined the immediate effect of a single 45-minute session of transcutaneous electrical nerve stimulation over acupoints (Acu-TENS) on lung function and dyspnoea in 46 patients with COPD. The experimental group received 45 minutes of Acu-TENS, while the control group received placebo-TENS with identical electrode placement but no electrical output despite a flashing light indicating stimulus delivery. Lung function was measured as FEV1 and FVC while dyspnoea was measured using a shortness of breath 100-mm visual analogue scale. After 45 minutes of Acu-TENS, in the experimental

	<p>group FEV1 had increased by 0.12 litres (95% CI 0.07 to 0.15) and dyspnoea had decreased by 10.7 mm (95% CI -13.9 to -7.6) more than the control group. <u>The researchers concluded that Acu-TENS may be a useful non-invasive adjunctive intervention in the management of dyspnoea in patients with COPD.</u></p>
<p>Lewith GT et al. Can a standardized acupuncture technique palliate disabling breathlessness: A single-blind, placebo-controlled crossover study. <i>Chest</i> 2004; 125:1783-90.</p>	<p>A single-blind randomised crossover study that compared the efficacy of acupuncture with an appropriately validated placebo/control (mock transcutaneous electrical nerve stimulation [TENS]) for disabling nonmalignant breathlessness (largely COPD) in 36 patients. Each patient received six treatments in each phase of the study, with an intervening 2-week washout period. The primary outcome was worst breathlessness (visual analogue scale, 0 to 100 mm). Secondary outcomes included the St George's respiratory questionnaire score and treatment credibility. The primary outcome improved significantly during the course of the study, but there were no significant treatment differences between acupuncture and the placebo/control of mock TENS for either primary or secondary outcomes. <u>The researchers concluded that the acupuncture technique used did not show specific efficacy in disabling nonmalignant breathlessness, but that patients entered into the study did experience clinically significant benefit from both treatments.</u></p>
<p><b>Physiology studies (human and animal)</b></p>	
<p>Tai S et al. Effect of needle puncture and electro-acupuncture on mucociliary clearance in anesthetized quails. <i>BMC Complement Altern Med</i> 2006; 6: 4.</p>	<p>Impaired mucociliary clearance is an important feature of airway inflammation in most obstructive respiratory diseases. This study looked at the effect of electro-acupuncture on tracheal mucociliary clearance in anaesthetised quails. It found that electro-acupuncture significantly increased tracheal mucociliary transport velocity and decreased the content of protein in the tracheal lavage. The researchers concluded that acupuncture significantly improves both airway mucociliary clearance and the airway surface liquid.</p>
<p>Carneiro ER et al. Effect of electroacupuncture on bronchial asthma induced by ovalbumin in rats. <i>Journal of Alternative and Complementary Medicine</i> 2005; 11(1): 127-34.</p>	<p>A study using a rat pulmonary hypersensitivity experimental model that mimics human asthma to investigate whether electroacupuncture treatment can reduce the inflammatory process. Histopathologic analyses showed that peribronchial and perivascular inflammatory cell infiltrates were significantly lower with electroacupuncture compared to sham acupuncture and control groups. Furthermore, bronchoalveolar lavage total cell count and percentage of polymorphonuclears (as well as the differential counts of neutrophils and eosinophils) were significantly reduced with electroacupuncture. Taken together, these results show that electroacupuncture diminishes the bronchial immune-mediated inflammation induced in rats.</p>
<p>Jeong HJ et al. Regulatory effect of cytokine production in asthma patients by SOOJI CHIM (Koryo Hand Acupuncture Therapy). <i>Immunopharmacology and Immunotoxicology</i> 2002; 24(2): 265-4.</p>	<p>A study that investigated the regulatory effects of hand acupuncture on cytokine production in peripheral blood of patients with asthma. Plasma interferon-gamma and interleukin-2 levels derived from T helper 1 cells and interleukin-4 and -6 levels derived from T helper 2 cells were elevated with hand acupuncture. These results suggest that the effects of hand acupuncture as an asthma treatment may be due to</p>

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the regulation of cytokine production.

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Joos S et al. Immunomodulatory effects of acupuncture in the treatment of allergic asthma: a randomized controlled study. *J Altern Complement Med* 2000; 6(6): 519-25.

A randomised, controlled study that compared the immunological effects of Chinese acupuncture with sham acupuncture in 38 patients with allergic asthma. All patients were treated 12 times for 30 minutes over a time period of 4 weeks. Patients' general well-being and several peripheral blood parameters (eosinophils, lymphocyte subpopulations, cytokines, in vitro lymphocyte proliferation) were determined before and after treatment. In the Chinese acupuncture group, significantly more patients indicated an improvement in general well-being (79% vs. 47% in the control group,  $p = 0.049$ ). The following changes were found in the Chinese acupuncture group: within the lymphocyte subpopulations the CD3+ cells ( $p = 0.005$ ) and CD4+ cells ( $p = 0.014$ ) increased significantly. There were also significant changes in cytokine concentrations: interleukin (IL)-6 ( $p = 0.026$ ) and IL-10 ( $p = 0.001$ ) decreased whereas IL-8 ( $p = 0.050$ ) rose. Additionally, the in vitro lymphocyte proliferation rate increased significantly ( $p = 0.035$ ), while the number of eosinophils decreased from 4.4% to 3.3% ( $p > 0.05$ ). The control group, however, showed no significant changes apart from an increase in the CD4+ cells ( $p = 0.012$ ). The researchers concluded that their results imply that asthma patients benefit from acupuncture treatment given in addition to conventional therapy, and that Chinese acupuncture showed significant immune-modulating effects.

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### **General review articles of acupuncture**

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Kavoussi B, Ross BE. The neuroimmune basis of anti-inflammatory acupuncture. *Integr Cancer Ther* 2007; 6(3): 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.

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Zijlstra FJ et al. Anti-inflammatory actions of acupuncture. *Mediators Inflamm* 2003; 12(2):59-69.

An article that suggests a hypothesis for the anti-inflammatory action of acupuncture: Insertion of acupuncture needles initially stimulates production of beta-endorphins, calcitonin gene-related peptide (CGRP) and substance P, leading to further stimulation of cytokines and (nitric oxide) 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.

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