A Short Review of Acupuncture and Bronchial Asthma — Western and Traditional Chinese Medicine Concepts

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Abstract: Bronchial asthma, a chronic inflammatory airway disorder characterized by reversible airway obstruction, is traditionally managed by pharmacological intervention. Despite asthma receiving extensive global attention, the mortality rate remains at unacceptable levels. Over reliance on medication and associated adverse drug effects have led to exploration of alternative management modalities. The effects of acupuncture and moxibustion, a branch of traditional Chinese medicine, in the management of asthma have been extensively reported over the last few decades. This review provides a general overview of the Western and Chinese concepts of management of asthmatic symptoms and, in particular, the use of acupuncture in the management of asthma.

Key words: acupuncture, asthma, traditional Chinese medicine

Introduction

Asthma is an inflammatory disorder of the airway affecting both adults and children [1]. While bronchial asthma is a chronic condition characterized by reversible airway obstruction, an acute asthma attack may be fatal [2]. Despite global efforts to optimize asthma control, as epitomized by the Global Initiative for Asthma (GINA) [3] and Gaining Optimal Asthma Control (GOAL) [4], the prevalence of asthma, its associated hospitalization rate and medical costs are still on the rise. In 2001, the reported prevalence of asthma in children ranged from 1.6% to 35% worldwide, while that in adults ranged from 4.1% to 32% in Europe [5]. In Europe, the annual per patient cost was reported to range from €463 to €789 [6], and in Hong Kong, the recent annual per patient cost has been reported to be as high as US$1,010 [7].

Western Medicine Concepts of Asthma Management

In Western medicine, asthma is classified as an inflammatory disease because airway narrowing is associated with changes in the levels of eosinophils, mast cells, lymphocytes, cytokines and other inflammatory cell products [8–11]. It is well known that patients with asthma have high levels of specific IgE that binds to receptors of mast cells and other inflammatory cells [12]. Interaction between IgE antibody and antigen results in the activation of a series of inflammatory cellular reactions, including the release of preformed mediators (such as histamines, prostaglandins and leukotrienes), which subsequently lead to contraction of airway smooth muscle and bronchoconstriction [11,13].
Patients with exercise-induced asthma are believed to be sensitive to thermal and osmotic changes in the airway [14]. Velocity of airflow is increased during exercise, and this leads to airway cooling that subsequently induces mucosal drying. This increased osmolarity of the epithelial cells in the lining of the airway induces degranulation of mast cells and release of inflammatory mediators leading to airway obstruction [14,15]. Rapid airway re-warming after exercise is believed to induce vascular congestion and increased epithelial cellular permeability, which causes oedema of the airway mucosa leading to airflow obstruction [14,16].

The major aims of management of patients suffering from mild to moderate asthma is to minimize symptoms of wheezing, cough, dyspnoea, and the sensation of chest tightness [1,11,13,17,18]; permit unrestricted exercise and prevent exacerbations. For patients with severe asthma, the aim is to achieve the highest possible stable peak expiratory flow rate (PEFR) and maximize exercise capacity [1,17].

In Western medicine, pharmacological treatment is the mainstay of management. Medications for patients with asthma include bronchodilators (β₂ adrenoceptor agonists) for relief of symptoms (termed “relievers”) and anti-inflammatory drugs for suppression and stabilization of the underlying inflammatory process (termed “preventers”) [18].

The British Thoracic Society recommends a five-step approach to therapy, depending on the severity of the asthma condition [17].

- **Step 1**: Mild intermittent asthma — inhaled short-acting β₂ adrenoceptor agonists.
- **Step 2**: Regular preventer therapy — start at dose of inhaled steroid appropriate to severity of disease.
- **Step 3**: Add-on therapy — add inhaled long-acting β₂ agonist.
- **Step 4**: Persistent poor control — consider increasing the dosage of inhaled steroid and/or addition of a fourth drug.
- **Step 5**: Continuous or frequent use of oral steroid — use daily steroid tablet in lowest dose to provide adequate control, maintain high dose inhaled steroid as in Step 4; consider other treatments to minimize the use of steroid tablets.

The British Thoracic Society also recommended that a treatment regimen likely to achieve rapid symptomatic control should be adopted initially and then the patient can “step down” from the initial regimen [17].

Current medical therapy comprising bronchodilators and anti-inflammatory drugs, though effective, are also known to be associated with adverse side effects [2,19]. β₂ adrenoceptor agonists are known to cause tremors, palpitations and muscle cramps, but the main concern associated with the use of β₂ adrenoceptor agonists is over-reliance on the drug by patients and a masking of the severity of the condition by relief of symptoms, rather than control of the underlying inflammatory process. Long-term reliance on medicines is associated with an increased risk of mortality [2,19]. Low dose steroids do not have any significant side effects, apart from oropharyngeal candidiasis and hoarseness of voice. Suppression of adrenal function and increased osteoporosis have been reported in some patients on high doses of inhaled steroids [2,19]. However, the side effects associated with anti-asthmatic medications have led to increasing attention being paid to alternative methods of asthma management.

**Traditional Chinese Medicine Concepts of Asthma Management**

Based on the concept of traditional Chinese medicine (TCM), health is maintained by a balance between **yin** and **yang** and the free flow of energy, commonly known as **qi** or chi [20]. Any disturbance to the balance of **qi** in the system will lead to illness. Meridians are paths along which **qi** passes, and acupuncture points located on the meridians are believed to be the gateways to restoration of **yin** and **yang** and the free flow of **qi**. There are 12 main meridians and eight “extra” meridians in the body. The 12 main meridians are named after important organs. Organs are categorized under **Zang** and **Fu**. The **Zang** organs include the heart, pericardium (although strictly speaking, pericardium is not regarded as a true **Zang** organ but as an attachment to the heart to protect it from the invasion of external pathologic factors), liver, spleen, lung and kidney [21,22]. The **Fu** organs include the gall-bladder, stomach, small intestine, large intestine, bladder and “triple energizer”.

The triple energizer is believed to control water circulation within the body and can be divided into three parts: Upper Energizer (upper jiao) — which contains the lungs and heart and is known as the “Chamber of Mist”; Middle Energizer (middle jiao) — which contains the spleen and stomach and is known as the “Chamber of Maceration”; and Lower Energizer (lower jiao) — which contains the kidney and bladder and is known as the “Drainage Ditch” [21,22]. Only two of the eight extra meridians are commonly used for manipulation of **qi** balance, these are the “Conceptual Vessel” and “Governor Vessel”, which lie in the midline at the front and back of the body [22,23].

According to TCM, asthma is a condition which results from either excessive or deficient **qi** in the respiratory system. Diagnosis of the condition is made using four diagnostic methods: inspection, auscultation and olfaction, inquiring, and palpation [22,23]. Inspection requires observation of the systemic and regional changes in the patient’s vitality, colour, appearance, five sense organs and tongue. Auscultation and olfaction determine the pathological changes by listening to speech (strength,
loudness, clearness, speed), abnormal sounds (hiccup, wheezing, sighing, coughing), and smelling the patient’s breath, secretion and excretion. Inquiry involves questioning the patient to determine subjective symptoms and progression of the illness. Palpation assesses the pathological condition by feeling the pulse and skin palpation. In TCM, pulses are differentiated by depth (superficial or deep), speed (rapid or slow), strength (forceful or weak), shape (thick or thready) and rhythm (regular or irregular). Different pulse conditions are associated with different syndromes [22,23].

Disease is also affected by seven emotions and six exogenous pathogenic factors — wind, cold, summer heat, dampness, dryness, and fire (warmth and heat) [21–23].

Asthma resulting from excessive respiratory qi might be due to stagnation of the qi caused by an attack of cold temperature and wind (called “wind-cold”), and the patient often has a white coating of the tongue with superficial and tense pulses. Excessive asthma might arise from failure of the spleen leading to disturbance in water metabolism and the production of phlegm (called “phlegm-heat”). The lung qi stagnates because of the phlegm. Patients with phlegm-heat often experience rapid and shallow breathing, strong and coarse voice, cough with thick sputum, chest tightness, fever, restlessness, dry mouth, thick yellow or sticky coating of the tongue, and rolling and rapid pulses [22,24].

Deficient asthma may be due to qi deficiency in either the lungs or kidneys. Lung deficiency type asthma is caused by a weakening of qi in the lungs, associated with short and rapid breathing, prolonged and weak coughing, and feeble voice. Patients often experience excessive sweating on mild exertion, with pale tongues and weak pulses [22,24]. Kidney deficiency type asthma is caused by overwork or sexual indulgence which injures the kidneys [22,24]. The main symptoms are dyspnoea on exertion, severe wheezing and shortness of breath. Cold extremities, pale tongue, deep and thready pulses are the common signs of weakened kidney qi.

Use of Acupuncture in Asthma Management

Acupuncture has been used for thousands of years for management of organ dysfunction [22,25,26]. Stimulation of acupuncture points is believed to restore normal body function by replenishing and allowing free flow of qi, and maintaining the balance of yin and yang [21–24,26].

The basic principle of acupuncture is to select points on the meridians that are responsible for the specific organ with dysfunction. Manipulative technique can be divided into “tonifying” (reinforcing) and “reducing” (sedating). The tonifying method is designed to invigorate body resistance and strengthen weakened physiological function and is often used for deficient asthma syndrome. The reducing method is used to eliminate pathogenic factors and harmonize hyperactive physiological functions and is therefore for excessive asthma syndrome [23]. In the management of asthma, maintenance of a smooth flow of qi along the Lung and Large Intestine meridians are aimed at [22,24]. Stimulation of acupoints on the Conceptual Vessel and Governor Vessel (extra meridians) is believed to have a qi-tonifying effect for deficiency type asthma.

Since the signs and symptoms of asthma vary between individuals, the selection of acupuncture points depends on the findings of the four methods of assessment. Acupuncture points chosen for the same disease in different patients may vary [22–24], and the number of acupuncture points used for each treatment, number of treatment sessions, and duration of the treatment programme depend on the acupuncturist’s assessment preference [22–24].

The aim of management of wind-cold asthma is to eliminate (sedate) the wind and cold, as well as to clear the lung. Common points reported in the Chinese literature are BL 13 (Feishu) and BL 12 (Fengmen) on the Bladder meridian, GV 14 (Dazhui) on the Governor Vessel, LU 7 (Lieque) on the Lung meridian and LI 4 (Hegu) on the Large Intestine meridian [20,22,25]. Employment of the reducing technique has been frequently reported in the literature, but the number of treatment sessions in each course was not mentioned.

The aim of management of phlegm heat asthma is to resolve phlegm, reduce heat, clear lung, and to regulate the flow of qi. Acupoints commonly used for the reducing technique are LU 5 (Chize) on the Lung meridian, ST 40 (Fenglong) on the Stomach meridian, BL 13 (Feishu) on the Bladder meridian, CV 22 (Tianti) on the Conceptual Vessel, and EX 14 (Dingchuan, an extra point not located on any of the meridians) [22,24].

For management of lung deficient type of asthma, the aim is to strengthen lung qi. A tonifying technique using the reinforcing method is often employed. Acupoints commonly reported are LU 9 (Taiyuan) on the Lung meridian, BL 13 (Feishu) on the Bladder meridian, SP 3 (Taibai) on the Spleen meridian, and ST 36 (Zusanli) on the Stomach meridian.

The relationship between the five elements (metal, wood, water, fire, earth) can be inter-promoted. For example, earth can promote metal. Lung pertains to metal and spleen pertains to earth; therefore, points along the Spleen meridian such as the Taibai (SP 3), and Zusanli (ST 36), are often reinforced to strengthen lung qi [22,24,25].

The aim of management of kidney deficiency type of asthma is obviously to strengthen kidney function using a reinforcing technique. Acupoints commonly used for this technique are KI 3 (Taixi) on the Kidney meridian,
BL 23 (Shenshu) on the Bladder meridian, CV 17 (Tanzhong) and CV 6 (Qihai) on the Conceptual Vessel [22,24].

**Possible Mechanisms of Effect of Acupuncture in Asthma Management**

Stimulation of a combination of acupuncture points in patients with acute bronchospasm was shown to lead to a reduction of airway conductance and an increase in peak flow and forced expiratory volume in 1 second (FEV₁) [29]. Application of acupuncture to patients with acute asthma has been shown to lower respiratory resistance measured by a pneumotachograph [30]. How acupuncture actually lowers airway resistance is unknown. The autonomic control of airways is presumably partly related to the segmental innervation of thoracic respiratory muscles. It was hypothesized that stimulation of the somatic afferents of certain thoracic segments may influence output to the sympathetic chain and cause further changes to airway resistance [21].

Acupuncture stimulation for ten 20-minute sessions at the points CV 17, LI 4, BL 13 and EX 14 was associated with a reduction in IgE levels in patients with asthma [8]. More recently, acupuncture stimulation over standard acupoints (BL 13, BL 17, LI 4, LU 7) and additional individualized points (LU 5, LU 6, ST 36, LI 3, KI 7, SP 6, SP 9, CV 6, CV 12, HT 7) for 12 sessions was reported to lead to increased levels of CD3+, CD4+ and IL-8, and reduced levels of IL-6, IL-10 and eosinophils [9]. The authors propose a modulation of the immune system by acupuncture but the exact mechanism remains unclear.

In patients with exercise-induced asthma, it is proposed that stimulation of acupuncture points triggers neurochemical changes in the central nervous system through the release of opioids, which subsequently leads to a reduction of hyperventilation [20,21,28].

**What Acupuncture Points to Use for Management of Asthma**

While acupuncture points are often selected based on the four diagnostic methods in TCM, the use of acupuncture in Western medicine often adopts a “standard point protocol” [8,25,27,28,30–39]. This refers to the use of a fixed number of standardized acupuncture points during a clinical trial for all subjects regardless of the type of asthmatic disorder (as interpreted in TCM). These standard points were either suggested by individual TCM acupuncturists or based on the common points reported in research findings and/or clinical trials.

A wide variation in the standard point protocols are reported in the literature. The common points adopted in Western research include LU 7, LI 4, BL 13, EX 14, GV 14, ST 36 and CV 17 (Table). Of these points, EX 14 and BL 13 [8,9,25,27,28,31–33,35,37,38] appear to be used in the majority of clinical trials. These standard points are, however, often used in TCM for management of the excessive type of asthma (with the exception of ST 36 and CV 17). Stimulation of these points is believed to effectively reduce both subjective symptoms and objective signs of asthma.

There are numerous reports of the use of acupuncture in the management of patients with asthma. Most studies used a combination of two to six acupuncture points [8,25,27,28,31–35,37,39], but the use of a single point has also been reported [30,39]. The maximum number of points reportedly used was 14 [9,38]. Inclusion of too many acupuncture points makes it difficult to draw any conclusions on the effect of acupuncture on disease management [20,41]. The recent trend favours using one single point or the combination of only a few points [25,39].

The number of sessions employed in the treatment of patients with asthma varies from one session [28,31,33–35,37,39] to 20 sessions [25,42], with the majority reporting one session to investigate the short-term effects of acupuncture on asthma [28,31,33–35,37,39]. Treatment duration varied from 10 minutes [30,31,34] to 60 minutes [36], with the majority applying acupuncture for 20–30 minutes [8,9,25,27,28,35,38–40,42,43] (Table).

Many studies reported the use of placebo or sham points as control. These were either points with no defined energetic effect (either not an acupuncture point or pseudo-intervention) [8,27,31–33,39,42,43] or points located in remote meridians that are not relevant to the disease being studied [9,28,30,34,35,40]. However, the question of whether or not the insertion of a needle near any acupuncture point may induce physiological changes in the body remains unanswered.

**Effectiveness of Acupuncture in the Management of Patients with Asthma**

The variety of acupuncture points used, different treatment duration and sample size make comparison of the reports difficult. Kleijien and colleagues evaluated 13 studies based on 18 predefined methodological criteria, and applied a score out of 100 as a rating of the quality of the study [41]. The criteria included the adequacy of study population, intervention and measurement of effects. Of the 13 studies, eight scored more than 50 but none scored more than 72. However, the results of the studies with higher scores were contradictory, making it difficult to draw a conclusion as to the effectiveness of acupuncture in the management of asthma.

Jobst and coworkers evaluated 16 reports, comparing the methodology, outcome measures and choice of protocols. In 10 studies, acupuncture was reported to be superior to placebo or sham acupuncture, whereas six studies...
<table>
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<tr>
<th>Study Type</th>
<th>Study Design</th>
<th>Subjects</th>
<th>Acupoints chosen and manipulative method</th>
<th>Duration</th>
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<th>Outcome measures</th>
<th>Results</th>
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<tbody>
<tr>
<td>Acute bronchial asthma (20 patients)</td>
<td>SB (15–65 yr)</td>
<td>Site 1: ST 36 Site 2a: EX 14</td>
<td>Rx: Site 1+2a Placebo: Site 1+2b Stimulated by continuous clockwise and anti-clockwise at 1 cycle/s</td>
<td>10 min each</td>
<td>1</td>
<td>1) Subjective feeling of breathlessness and expiratory wheeze 2) Lung function: FVC, FEV₁ 3) Arterial BP 4) ECG and blood sample for PaO₂, pH, PaCO₂</td>
<td>POS 1) Subjective feeling a) After site 1: Rx, Sham: no Δ b) After site 2: Rx and Sham: improvement of breathlessness and expiratory wheeze Rx &gt; Sham 2) Lung function: Sg. ↑ in FEV₁ and FVC (0.025 &lt; p &lt; 0.05) Isoprenaline &gt; Rx(Site2a) &gt; Sham(Site 1, Site 2b) 3) BP (p &lt; 0.05) Site 1 4) HR (p &lt; 0.05) Site 2a and isoprenaline 5) PaCO₂ (p &lt; 0.05) Site 2a and isoprenaline</td>
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<td>Methacholine-induced asthma (mild to moderate)</td>
<td>DB (16–64 yr)</td>
<td>Rx: LI 4, GV 14, Ex 14, Waitingchuan ST 36, LU 7</td>
<td>Sham: localized region over scapulae, anterior tibia and dorsum of hand Manipulate every 3–4 min</td>
<td>15 min</td>
<td>1</td>
<td>1) Lung function: FVC, FEV₁, FEV₂5–75% 2) Raw, Vtg. SGaw by body plethysmography 3) Single breath diffusing capacity for CO₂ and HR, RR, BP</td>
<td>POS 1) Lung function: FEV₁, MMFR ↑ 2) Raw, SGaw, Vtg ↑ (p &lt; 0.05125) 3) BP, HR, RR: no Δ Isoproteoranol &gt; Rx &gt; Sham</td>
</tr>
<tr>
<td>Chronic asthma</td>
<td>DB (18–73 yr)</td>
<td>Rx: RN 22, LU 7, EX-BW 1</td>
<td>Sham: GB 5, GB 6</td>
<td>30 min</td>
<td>1</td>
<td>1) Lung function 2) Drug use 3) Subjective assessment</td>
<td>NEG No sig. diff. in the 3 parameters in both groups</td>
</tr>
<tr>
<td>Study</td>
<td>Type of Asthma</td>
<td>Age (yr)</td>
<td>History</td>
<td>Rx</td>
<td>Placebo</td>
<td>EFV1</td>
<td>FEV1</td>
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<tr>
<td>Takishima</td>
<td>Acute asthma</td>
<td>1982</td>
<td>10</td>
<td>ST 10 with EA 2 Hz</td>
<td>Placebo stimulation: C4 transverse process + EA</td>
<td>5 min placebo stimulation, rest</td>
<td>2–3</td>
</tr>
<tr>
<td>Chow</td>
<td>Exercise-induced asthma</td>
<td>1983</td>
<td>16</td>
<td>2 points on external ear:</td>
<td></td>
<td>Remove when patient has recovered from bronchoconstriction × 2</td>
<td>1</td>
</tr>
<tr>
<td>Christensen</td>
<td>Stable chronic bronchial asthma</td>
<td>1984</td>
<td>17</td>
<td>CV 17, LI 4, BL 13, Ex 14</td>
<td>Placebo: loci outside segmental dermatome associated with loci used in Rx group where no skin resistance</td>
<td>EA without impulses</td>
<td>1) Lung function: MPEFR, EPEFR</td>
</tr>
<tr>
<td>Study</td>
<td>Type</td>
<td>Study design</td>
<td>Subjects ((n))</td>
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<tr>
<td>Tashkin 1985 (LTE)</td>
<td>Stable chronic asthma (moderate to severe)</td>
<td>DB Age (8–73 yr) Asthma history (3–59 yr) Pre-Rx: 4 wk Real/Placebo: 4 wk FU, no Rx: 3 wk Placebo/Real: 4 wk FU, no Rx: 3 wk</td>
<td>26</td>
<td>Rx: LI 4, GV 14, EX 14, ST 36, LU 7, Waitingchuan Placebo: in the vicinity of real acupuncture loci but at precisely localized region over scapulae, anterior tibia and dorsum of hand where no acupuncture loci exist</td>
<td>15 min</td>
<td>8 over 4 wk</td>
<td>1) Patient diary for S/S 2) Medication 3) No. of attack 4) Lung function: FEV&lt;sub&gt;1&lt;/sub&gt;, FVC&lt;sub&gt;1&lt;/sub&gt;, FEV&lt;sub&gt;25-75&lt;/sub&gt;% Raw, Vtg SGaw (3 hr after Rx/Pl) 5) HR, BP</td>
</tr>
<tr>
<td>Fung 1986 (STE)</td>
<td>Exercise-induced asthma (moderately severe)</td>
<td>DB Age (9–13.5 yr) Asthma history (not mentioned)</td>
<td>19</td>
<td>Rx: EX 14, LU 6, KI 3 Sham: Neighbouring dermatome SI 14, PC 4, GB 39 Rotate clockwise, anti-clockwise every 5 min</td>
<td>20 min (before exercise)</td>
<td>1</td>
<td>Lung function: FEV&lt;sub&gt;1&lt;/sub&gt;, FVC, PEFR before and after exercise every 2 min for 15 min, and every 5 min during exercise</td>
</tr>
<tr>
<td>Tandon 1989 (STE)</td>
<td>Histamine-induced asthma (moderately severe) on regular medication</td>
<td>DB Age (11–60 yr) Asthma history (3–55 yr)</td>
<td>16 non-smoker</td>
<td>Rx: Ex 14, CV 17, LU 6, LU 7 Sham: TE 5, ST 25, GB 34 Rotate clockwise and anti-clockwise every 5 min</td>
<td>20 min</td>
<td>1</td>
<td>Lung function: FEV&lt;sub&gt;1&lt;/sub&gt;, FVC</td>
</tr>
<tr>
<td>Sternfield 1989 (LTE)</td>
<td>Extrinsic bronchial asthma Unblinded (age &amp; asthma history not mentioned)</td>
<td>Unblinded (age &amp; asthma history not mentioned)</td>
<td>9</td>
<td>2 prescriptions: A: GB 20, GV 14, LI 11, ST 36, SP 6, KI 7, EX 14 B: LU 1, CV 17, CV2 2, LU 9</td>
<td>30–60 min</td>
<td>10 (3 every 2nd day, rests are twice weekly)</td>
<td>1) Skin test 2) Complete blood count 3) Total IgE 4) Lung function 5) LTC4-induced LAI 6) Self measured peak flow rate</td>
</tr>
<tr>
<td>Zang 1990 (STE)</td>
<td>Bronchial asthma (outcome study) Unblinded</td>
<td>Unblinded Age not mentioned Asthma history (4 mo–45 yr)</td>
<td>192</td>
<td>LU 6, LU 10 Manipulate with reducing method + EA 160 Hz</td>
<td>40 min</td>
<td>1</td>
<td>Clinical observation of S/S such as dyspnoea, wheezing</td>
</tr>
</tbody>
</table>
### Zwolfer (1993)
**Bronchial asthma (outcome study)**

- **Unblinded Mean age**: 52.2 yr
- **Asthma history**: (> 5 yr)
- **Rx**: HT 3, SI 3, BL 13, BL 17, Kl 27, TE 5, TE 15, LR 13, LU 1, LU 2, LU 7, LI 4, ST 13, CV 17 (12-14 needles)
- **Questionnaire**: (1st Rx, 10th Rx and half a year)
- **10 weekly**
- **POS**: 70% S/S ↓

### Biernacki (1998)
**Stable chronic asthma (mild to moderate)**

- **DB Age**: (43 ± 15 yr)
- **Asthma history (not mentioned)**
- **Rx**: CV 17
- **Sham:** nonspecific single point of unrecognized value on the chest wall
- **20 min**
- **1**
- **1) AQLQ**
- **2) Usage of bronchodilator**
- **3) MPEFR, EPEFR (daily)**
- **4) Lung function**: FEV1, FVC, PEFR (measure before, after 30 min, 45 min, 60 min)
- **BOTH**
- **1) Stat. sig. ↑ AQLQ scores in all domains in both Rx and Sham (Sham > Rx)**
- **2) Sig. ↓ bronchodilator in both (Sham > Rx)**
- **3) Home measured PEFR: no sig. ↓**
- **4) No sig. Δ in spirometric values acutely or 60 min later for both groups**

### Joos (2000)
**Mild to moderate bronchial asthma**

- **SB Age**: (16–65 yr)
- **Asthma history**: (1–20 yr)
- **Rx**: Max 16 needles
- **Control**: 18
- **Based on TCM Dx method**
- **Max 16 needles**
- **Basic**: BL 13, BL 17, LI 4, LU 7
- **Add on**: LU 5, LU 6, ST 36, LI 3, KL 7, SP 6, SP 9, CV 6, CV 12, HT 7
- **Depth**: 0.3–3 cm
- **Control**: TE 3, TE 9, GB 8, GB 34
- **Add on**: BL 38, BL 55, ST 4, ST 6, ST 32, TE 14, TE 23, ST 5
- **Depth**: < 1 cm
- **30 min**
- **12 times over 4 wk**
- **1) Subjective: general wellbeing**
- **2) Blood samples: eosinophils, lymphocyte sub-population, cytokines, lymphocyte proliferation before and after Rx**
- **POSS**
- **1) General wellbeing: sig. ↑ (Real > Sham)**
- **2) Blood parameters: Real: CD3+, CD4+ sig. ↑; IL6, IL10 sig. ↓; IL8 sig. ↓; eosinophils sig. ↓; (p < 0.05)**
- **Sham: no change except CD4+ (p < 0.05)**

### Shapira (2002)
**Chronic asthma (moderate) Methacholine challenge**

- **SB Age**: (18–58 yr)
- **Asthma history**: (not mentioned)
- **Rx**: 1st, 4th: points designed for acute attack of asthma
- **2nd, 3rd: points designed for treating root of asthma (diagnosed by TCM)**
- **Sham**: Places other than acupuncture points on the back, shoulder, the extremities at angle of 10° to 30° and directed subcutaneously
- **Manipulated 1–2 times during session**
- **20–30 min**
- **4 sessions in 2 wk**
- **1) Lung function**: FEV1
- **2) Daily peak flow variability**
- **3) Asthma diary**
- **NEG**
- **1) Lung function: no sig. Δ in FEV1 before and after treatment and methacholine challenge in both groups**
- **2) PF variability: no sig. Δ (both groups)**
- **3) No sig. Δ in both medication and S/S**

(contd.)
<table>
<thead>
<tr>
<th>Study</th>
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<tbody>
<tr>
<td>Medici 2002 (LTE)</td>
<td>Allergic bronchial asthma (mild to moderate)</td>
<td>DB Age (16–70 yr)</td>
<td>66 Real: 23 S: 23 No: 20</td>
<td>Real Rx: GV 14, EX 14, BL 13, KI 3, SP 6, LI 4, LI 11, ST 36, LR 13, LU 10, PC 6</td>
<td>20 min</td>
<td>8 over 4 wk (twice 1 wk and 2 mo apart, start another 4 wk (total 16 sessions)</td>
<td>1) Lung function: PEF variability, FEV₁ 2) Airway responsiveness 3) Asthma responsiveness 4) Use of asthma drugs 5) Patient’s wellbeing 6) Eosinophils and ECP in blood and sputum</td>
<td>BOTH 1) PEF ↓ in all groups: but no diff. btw sham and real 2) Most of the other functional and clinical variables did not differ from those obtained in controls 3) Eosinophils and ECP in blood and sputum ↓ saw 4m btw sham and control and 10m btw sham and real</td>
</tr>
<tr>
<td>Malmstrom 2002 (LTE)</td>
<td>Mild asthma</td>
<td>SB Age (33–48 yr)</td>
<td>27</td>
<td>Rx: LU 5, LU 6, LU 7, PC 6, CV 17, BL 13, GV 20, ST 36, ST 40, KI 3 (↑ from 5 to 16) Control: mock TENS</td>
<td>30 min</td>
<td>20</td>
<td>Lung function</td>
<td>NEG No sig. diff. before and after BICA (p &gt; 0.05) in both groups</td>
</tr>
<tr>
<td>Maa 2003 (STE)</td>
<td>Stable chronic asthma</td>
<td>Unblinded Mean age 64 yr Asthma history &gt; 3 yr</td>
<td>41</td>
<td>Gp 1: control (standard care) Gp 2: acupuncture + standard care Rx: LU 1, DU 14, EX 14, ST 36, PC 6 Gp 3: acupressure + standard care</td>
<td>Gp 2: 30 min (10 s manual manipulation) Gp 3: 30 s to 2 min each</td>
<td>Gp 2: 20 Gp 3: daily</td>
<td>1) 6MWD 2) DVAS 3) Modified Borg Scale, SGRQ 4) BESC</td>
<td>BOTH SGRQ score sig. ↑ in Gp 2 and Gp 3; no sig. diff. in other parameters</td>
</tr>
</tbody>
</table>

STE = short-term effect; LTE = long-term effect; POS = positive findings; NEG = negative findings; BOTH = both positive and negative findings; BP = blood pressure; HR = heart rate; RR = respiratory rate; sig. = significant; diff. = difference; btw = between; ECP = eosinophil cationic protein; TENS = transcutaneous electrical nerve stimulation; 6MWD = 6-minute walking distance; DVAS = Dyspnoea Visual Analogue Scale; SGRQ = St George’s Respiratory Questionnaire; BESC = Bronchitis Emphysema Symptom Checklist.
showed that there was no difference between acupuncture and sham acupuncture or the results were equivocal [44]. The authors concluded that acupuncture may be effective in alleviating the signs and symptoms of asthma and could be used as an adjunct to conventional medical management of asthma, but would not recommend it to be the sole treatment of asthma [44].

Another review reported the effectiveness of acupuncture on the management of asthma based on 10 randomized controlled clinical trials. Nine of the 10 trials investigated showed positive short-term improvement of lung function and a subsequent decrease in the use of medication [45]. The authors suggested that acupuncture may be effective in relieving asthma symptoms on a short-term basis. A recent Cochrane review [46] of 11 randomized controlled trials evaluated the long-term effect of acupuncture treatment of duration longer than 1 week. Assessment criteria included type of study, number of participants and outcome measures (e.g. lung function test and/or medication use and quality of life). With the inconsistencies in methodology and results obtained among the studies, there was inconclusive evidence to make recommendations about the value of acupuncture in the treatment of asthma. Future research with clear reporting of the severity of the asthma condition, and details of acupuncture intervention including treatment duration, number of sessions and standard acupoints chosen were suggested.

**Possible Side Effects of Acupuncture**

There were no reported side effects associated with the application of acupuncture stimulation. However, there were reported complications associated with the acupuncture technique. The most common complications included pneumothorax, stab injuries of internal organs (especially the lungs), infection, vasovagal reaction, recurrent asthma attack with hypertension, angina and other neurovascular injuries [47–50]. Although only a few cases were reported, the consequences were severe. Minor complications such as bleeding, haematoma, needleling pain, faintness and drowsiness were more frequently reported and may be related to inexperience of the acupuncturist and inaccurate techniques being used [50,51].

**Summary**

Acupuncture has been used for the management of asthma for thousands of years in China. The effectiveness of acupuncture has been investigated by many Western researchers. The majority of reports suggest positive outcomes with acupuncture, in terms of either symptom alleviation or improvement in objective measures such as lung function, airway resistance, exercise capacity and immunological status. Most trials, however, focused on the short-term and immediate effects of acupuncture. Small sample size, involvement of too many acupuncture points, non-standardized treatment frequency and variable duration of treatment have resulted in many negative and inconclusive findings. Furthermore, it is possible that sham acupuncture points may unintentionally induce similar changes as actual acupuncture point stimulation. The direction for future research regarding the use of acupuncture in patients with asthma should focus on adopting consistent treatment protocols, using fewer acupuncture points, maximizing sample size and investigating the long-term effects of acupuncture on asthma.

**References**

43. Shapira MY, Berkman N. Short term acupuncture therapy is of no benefit in patients with moderate persistent asthma. Chest 2002;121:1396–400.