



## Review article

# Effect of massage therapy on pulmonary functions of pediatric asthma: A systematic review and meta-analysis of randomized controlled trials<sup>☆</sup>



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## ABSTRACT

**Introduction:** Massage therapy (MT), as one of the most popular forms of CAM therapies, has been widely accepted by families with children. This systematic review and meta-analysis included randomized controlled trials (RCTs) which evaluated the effects of MT on pulmonary functions of pediatric asthma. **Methods:** Eight English and Chinese databases were searched for relevant RCTs published from their inception to May, 2015. We included eligible RCTs in which MT was employed either alone or as an adjuvant treatment for standard asthma medical therapy in children with asthma. Forced Vital Capacity (FVC), Forced Expiratory Flow in first second (FEV1) and FEV1/FVC were used as important outcomes in this research. The selection of studies, data extraction, and validation was performed independently by two reviewers. Cochrane risk of bias criteria was used for evaluating the quality of the included studies. **Results:** Three RCTs were included in the final meta-analysis. The meta-analysis showed that, compared with standard asthma medical therapy alone, MT plus standard asthma medical therapy had favorable effects in improving the FEV1 [MD = 0.07, 95% CI (0.01, 0.13),  $p = 0.02$ ; heterogeneity:  $\text{Chi}^2 = 1.02$ ,  $p = 0.60$ ,  $I^2 = 0\%$ ] and FEV1/FVC [MD = 0.06, 95% CI (0.01, 0.12),  $p = 0.03$ ; heterogeneity:  $\text{Chi}^2 = 1.52$ ,  $p = 0.47$ ,  $I^2 = 0\%$ ]; however, it failed to do so on FVC. In addition, we conducted a qualitative review of two styles of massage therapies here. Changes in FVC were measured in two styles of massage therapies, with inconsistent effects. However, there were consistent increases in FEV1, though one study which used classical manual massage reported improvements were not statistically significant. In addition, the similar results were also found in the FEV1/FVC measurement.

**Conclusion:** Only weak evidence supports the notion that MT has a beneficial effect on pulmonary functions of pediatric asthma.

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## 1. Introduction

Asthma is a chronic inflammatory disease affecting over 6 million American children, and remains the most common chronic illness in children all around the world [1,2]. It can be the consequence of a pathological process characterized by airway edema, bronchoconstriction and airway hyperresponsiveness [3]. Asthma most frequently presents with clinical symptoms which include wheezing, shortness of breath, chest tightness, and cough [4]. To date, pediatric asthma has become a frequent reason for emergency department (ED) visits and hospitalization in the United States [5]. In addition, with the disease progression, pediatric asthma impaired caregivers' normal quality of life, increased parent's heavy economic burden, and resulted in the absence of children from school [6,7].

Currently, the conventional medical therapy showed satisfied results over the past decades [1]. However, it has been reported that approximately 5–10% of children showed the persistent asthma, and the ongoing loss of lung still existed in these populations [8]. Therefore, several other treatment adjuncts, including anti-Immunoglobulin E (IgE)-directed therapy, low dose theophylline, and the use of macrolide antibiotics, have been emerged. However, their exact role in pediatric asthma treatment remains unclear [9]. Moreover, these most impressive agents may be too expensive for families in the rural district [10]. Therefore, it is urgent for us to seek new therapeutic modalities for treating pediatric asthma [11].

Because of these and other limitations, complementary and alternative medicine (CAM) is on the rise as the most prevalent treatment in the management of pediatric illness [12]. Massage therapy (MT), as one of the most popular forms of CAM therapies, has been widely accepted by families with children in the United States [13]. It is defined as a 'method of manipulating the soft tissue of whole body areas using pressure and traction' [14]. Until now, MT is generally divided into two different massage styles: classical manual massage in the West and Tui na in China. Classical manual massage is described as a technique that applies deep friction directly to the lesion and transverse to reduce the fibrous adhesions [15]. Therefore, this type of massage especially focused on reducing the pain and inflammation in the musculoskeletal diseases. Tui na, as an important segment of Traditional Chinese Medicine (TCM), is defined as a method that utilize hands via meridians for treating illness [16]. Compared with the previous classical manual massage, Tui na shows great similarities in terms of techniques and indications. However, in addition to the musculoskeletal diseases, Tui na may have great advantages in dilating capillaries, increasing elasticity of blood vessels, promoting insulin secretion and regulating immune system [16]. Hence,

Tui na is considered to be a utilized technique in the prevention of diverse chronic diseases in China.

A narrative review published in 2012 summarized and critically evaluated the effects of MT on pediatric illness [17]. However, there have been no systematic reviews specifically focusing on the effect of MT on pulmonary functions of pediatric asthma. Additionally, Tui na is one of the essential massage styles in the world, and it was likely that more studies would be carried out in China. Unfortunately, previous research has lacked searching for the relevant Chinese studies.

Therefore, our research included RCTs which used classical manual massage or Tui na intervention to examine their effects on pulmonary functions of pediatric asthma, and these studies included some recent RCTs with results published after June, 2012.

## 2. Materials and methods

This study was carried out according to guidelines described in the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) [18]. In addition, the protocol of this systematic review has been registered in PROSPERO funded by the UK National Institute for Health Research (Registration Number: CRD42015024028).

### 2.1. Search strategies

The following databases were searched to May 2015 from their inception: PubMed/Medline, Embase, CINAHL, the Cochrane Central Register of Controlled Trials and four Chinese databases [WanFang Med Database, Chinese BioMedical Database, Chinese WeiPu Database, China National Knowledge Infrastructure (CNKI)]. The languages were restricted in English and Chinese. Search strategies were presented in Appendix A, and these search terms were slightly modified for other databases. In order to identify the grey literature/unpublished studies, we also identified relevant studies via a review of Chinese Clinical Trial and Registry ClinicalTrials.gov. The relevant English-language articles published in Neonatal Network Journal, the Journal of Obstetrics, the Gynecologic and Obstetric Investigation, and Journal of Obstetric were also hand-searched from 1990 to May 2015. Finally, we searched the reference lists of review articles and identified RCTs for any possible titles matching the inclusion criteria.

### 2.2. Selection criteria

Only the peer-reviewed randomized controlled trials (RCTs) related to examining the effects of MT on pulmonary functions of pediatric asthma were deemed eligible for inclusion in our

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