Clinical Integration of Osteopathic Manipulative Medicine

Pediatrics: Asthma

Author: Sarah Raza OMS III, Dr. Sheldon C. Yao DO

Introduction: Asthma is the most common chronic disease of children and adolescents. Approximately 75 percent of cases are diagnosed before the age of seven (4). Although the precise etiology of asthma is unknown, there’s evidence that it involves a complex interplay of both genetic and environmental factors that influence its pathogenesis (1). The strongest identifiable risk factor for the development of asthma is Atopy—the genetic predisposition to develop specific IgE antibodies directed against common environmental allergens (2). Thus, it has been long established that asthma is a chronic inflammatory disorder that involves hypersensitivity of the bronchi and lower airways to numerous irritants. These irritants include allergens (pollen, mites, animal fur, food), cold, pollution, exertion, and other non-specific irritants. The resulting insult from these causes inflammation, bronchospasm via vasovagal reflexes, and mucous plugging via increased bronchial secretions; all of which result in intermittent, reversible airway obstruction and dyspnea (3).

Patient Presentation:

- Diffuse expiratory wheezing
- Intermittent dyspnea
- Coughing
- Use of accessory muscles of respiration
- Flaring of nostrils
- Tachycardia
- Tachypnea
- Posturing to enhance respiratory muscle mechanics
  - “Tripod” position: seated position with use of extended arms to support the upper chest
- Prolonged exhalation phase of breathing

Differential Diagnosis: This can be subdivided based on the symptom under consideration:

Wheezing:
Luminal narrowing anywhere along the respiratory tract (i.e. nares, pharynx, glottis, trachea and bronchi)
• Vocal cord dysfunction syndrome
• Stridor
• Aspiration of objects

Coughing
• Bronchiectasis
• Bronchiolitis
• Bronchitis
• Rhinitis
• Pneumonia
• Cystic Fibrosis
• Gastro-esophageal reflux
• Bronchial Obstruction due to other causatives (i.e. lymphnodes, vascular)
• Post-viral tussive syndrome
• Eosinophilic bronchitis
• “Whooping cough” (Bordetella Pertussis)

Dyspnea:
• Panic Disorder
• Obesity
• Heart Failure
• COPD
• Pulmonary Embolus
• Sarcoidosis

Clinical Pearls and Diagnostic tools:
• Clinical diagnosis: Obtain a thorough history, should demonstrate recurrence of intermittent symptoms typical of asthma: wheezing, coughing, dyspnea. Support diagnosis with Physical exam findings characteristic of Asthma (i.e. expiratory wheezing), and confirm diagnosis based on 2 key elements:
  o Spirometry showing variable expiratory airflow limitation (obstructive pattern)
  o Exclusion of alternative diagnoses
• History indicating airway hyper-responsiveness upon exposure to certain environmental triggers
• Musical wheeze on auscultation
• Prompt response to anti-asthma medications
Osteopathic Manipulative Medicine (OMM) Integration: Osteopathic Manipulative Treatment (OMT) has been studied as a non-invasive, cost-effective, adjunctive therapy for children with asthma. A single-blind, randomized, controlled trial conducted at Peninsula Hospital assessed the efficacy of OMT versus control (‘sham’) on peak expiratory flow rate’s (PEF) pre- and post-treatment. PEF’s are considered an object measurement of asthma severity and response to treatment. This trial was conducted over a span of two years, from 1997-1999, the participants were selected from the hospital’s Pediatric Asthma Clinic, and were randomly assigned to the OMT group or the control group. All the patients had an established diagnosis of asthma based on guidelines by the National Institute of Health (NIH), and ranged in age from 5-17 year old.

A total of 140 pediatric cases were enrolled in the study, 90 were assigned to the OMT group, and 50 to the control group. The OMT group was diagnosed with somatic dysfunctions and treated using any of the following techniques: rib raising, muscle energy for the ribs, and myofascial release. In the control group, the patients were assigned to an Allopathic physician who just placed their hands on different parts of the body where OMT was performed for patients in the OMT group. This was done in an effort to control for a ‘therapeutic touch’ variable.

Patients PEF’s were taken pre- and post-treatment in both groups. Analysis of the two groups PEF’s demonstrated that the OMT group has a statistically significant improvement of 7L per minute to 9L per minute, while the control group had no such improvement. The results of this study demonstrated that OMT does improve the pulmonary function of pediatric patients with asthma to a significant degree. This supports the use of OMT as an adjunctive therapy in patients with asthma in order to maximize their drug responses and therapeutic yield (4).

Another research study which assessed the impact on OMT on asthmatic patients also provided evidence for the beneficial effects it has in an immediate manner on the patients pulmonary functioning. In this study, 10 patients who had chronic asthma were selected and treated with Balanced ligamentous tension applied to their occipito-atloid and cervico-thoracic region. The method used in this study was a pretest-posttest crossover design in which each patient was treated with OMT procedures and sham procedures scheduled at least 1 weeks apart; thus, subjects served as their own controls. The patient’s pulmonary function was assessed by specifically measuring their respiratory excursion, peak expiratory flow rates, and subjective indicators of their asthma symptoms. The results of this study indicated that thoracic cage excursion with forced respiration increase significantly after a single, brief intervention using osteopathic manipulative techniques (6).

Furthermore, a study conducted on the effectiveness of OMT on severe chronic obstructive pulmonary disease (COPD) demonstrated that the OMT group showed a significant decrease in residual volume and forced expiratory volume in one second. The results of this study concluded that the group which received OMT, along with pulmonary rehabilitation, showed improvements in exercise capacity and residual volume compared to the group that only received pulmonary rehabilitation. The implications of this study can be used to support the use of OMT in Asthma because it too is an Obstructive type of pulmonary disease (7).
**Osteopathic Structural Examination:** Potential areas of somatic dysfunctions in patients with asthma:

- Upper thoracic vertebrae, ribs, sternum
- T1-6 due to sympathetic innervations from these regions to the lungs
- Occipito-atlantal junction and the course of the vagus nerve that supplies parasympathetic input to the pulmonary tree
- Accessory muscles of respiration
- Anterior cervical fascia
- Thoracic diaphragm (innervated by the phrenic nerve: C3-5, and it’s mobility is influenced by the lower six ribs, L1-2 and the sternum
- Chapman’s reflexes for the lungs, sinuses, and adrenal glands
- Cranial-sacral mechanism
- T10-L2 and the lower ribs

Dysfunctions in these areas may contribute to or exacerbate a patient's breathing difficulty. Thus, treatment with OMT focuses on the strong dependence of the respiratory system on the musculoskeletal system and aims to reduce any dysfunctions in that relationship. OMT achieves this by maximizing the physiologic motion of the musculoskeletal system, thereby reducing the work of respiration in asthmatic patients and improving pulmonary functioning.

**Treatment Options:**

- Rib raising to mobilize the thoracic cage and stimulate the sympathetic chain ganglion and alter sympathetic outflow to visceral organs, including the lungs
- Muscle energy for the ribs
- Myofascial release of thorax
- Counterstrain of any of the listed ‘OMM Structural exam’ anatomical regions
- Balanced ligamentous tension to address thoracic cage and diaphragm
- Soft tissue techniques i.e. Paraspinal inhibition of the cervical region
- Suboccipital release (apply with caution in acute attacks)

The aim of these OMM techniques in asthmatic patients is to restore the balance between a hyperactive parasympathetic and the sympathetic nervous system, especially in relation to the pulmonary system. This effort is aided by treating any mechanical restrictions or dysfunctions adversely affecting respiratory functioning i.e. the workload of breathing.

**References:**


