

The Immediate, Intermediate, and Long-Term Effects of Osteopathic Manipulative
Treatment on Pulmonary Function in Adults with Asthma

IRB Approval Date: January 8, 2019

Objective

To examine the immediate, intermediate and long-term effects of OMT on the objective pulmonary function of adults with a diagnosis of asthma, as well as the subjective long-term effects.

Design

The study design for the present study was approved by the institutional review board at Des Moines University in Des Moines, IA. Written informed consent was obtained from all participants. Participants were recruited by email, class announcements, and word of mouth targeting Des Moines University (DMU) students and faculty. Inclusion criteria for participation in the study included being 18 years of age or older and having a diagnosis of asthma, regardless of whether spirometry was used in the diagnosis. Exclusion criteria included being a current smoker, having any other respiratory disease besides asthma, and receiving Osteopathic Manipulative Medicine (OMM) from a licensed physician or chiropractic or massage treatment for 30 days prior to and during the study.

Methods

Timeline

The study was conducted over a period of eight weeks. During week 0, participants completed a form regarding their age, sex, height, ethnicity, exercise habits, and current asthma medications. They completed the initial AQLQ and performed baseline spirometry testing.

During weeks 1, 2, and 3 of the study, a standard OMT protocol, detailed below, was performed on each participant, followed by spirometry testing to measure the immediate effect. Spirometry testing was then performed again three days later to measure the intermediate effect of OMT.

During week 7, participants completed the post-OMT AQLQ and performed spirometry testing once more to measure the long-term effect of OMT.

Asthma Quality of Life Questionnaire

Participants completed the Asthma Quality of Life Questionnaire with Standardized Activities (AQLQ(S)) to subjectively measure asthma severity. The AQLQ is a 32-item survey which asks participants to recall their experiences during the previous two weeks as they relate to four domains (symptoms, activity limitations, emotional function, and environmental stimuli). Each item is rated on a 7-point Likert scale, with 1 being severely impaired and 7 being not impaired at all. This was taken in week 0 to establish a subjective baseline value as perceived by the participant. Participants completed this questionnaire again in week 7 to be used as a subjective measurement of their asthma severity after OMT. We compared the mean scores for each item, each domain, and the overall average.

Pulmonary Function Measurements

Pulmonary function testing was done using a portable spirometer (McKesson LUMEON, Andover, MA, USA). Testing was conducted by one member of the research team, after training with a licensed pulmonologist. Subjects were required to perform three trials deemed acceptable by the spirometry software (Easy on-PC), and the trial with the best overall effort as determined by the highest FVC was used for analysis. The spirometric measures used to assess participants' pulmonary function included forced expiratory volume in one second (FEV1), forced vital capacity (FVC), the FEV1/FVC ratio, and peak expiratory flow (PEF).

OMT Protocol

An OMT protocol was derived from a survey of the DMU OMM Department faculty as well as current and past DMU OMM Fellows. The survey included questions regarding the approach each participant would use when treating an asthmatic patient with OMT. Based on the survey results, the current undergraduate OMM Fellows of DMU developed the standardized OMT protocol used during each of the three OMT sessions. These sessions lasted 21.3 ± 3.6 minutes. The protocol included the following techniques: supine OA joint balanced ligamentous tension (BLT), supine cervical spine Still technique, supine thoracic inlet MFR, stimulatory supine rib raising soft tissue, supine respiratory rib BLT, supine abdominal diaphragm MFR, seated thoracic spine Still technique, and seated posterior rib Still technique.

After the undergraduate OMM Fellows (AJ, ST, EK, AB) completed the treatment protocol, all participants were rechecked for somatic dysfunction resolution by one of 2 board-certified OMM/MMM physicians (JP, KH). If inadequate resolution at a specific body region was found, that region was retreated using the same technique included in the protocol. The retreatment lasted, on average, 6.3 minutes. The final step before spirometry was performed involved one minute of stimulatory tapotement, or rhythmic tapping of the tissues, applied to the paraspinal region at the levels of the first through sixth thoracic vertebrae to target the lung viscerosomatic reflex area and potentially temper parasympathetic cholinergic tone to decrease contraction of airway smooth muscle.

Statistical Analysis Plan

Changes in FEV1, FVC, the FEV1/FVC ratio, and PEF were determined by calculating the arithmetic mean for all participants at each time point. The immediate effect of OMT was determined by comparing the measurements taken immediately after the first treatment to baseline, and the previous week's measurements to those taken immediately after the subsequent treatment. The intermediate effect was determined by comparing the measurements three days after treatment to baseline as well as the previous week's three-days-post-OMT measurements. The long-term effect was determined by comparing the measurements four weeks after the final OMT session to baseline. Each comparison was analyzed using a repeated-measure ANOVA on random subjects. The Westfall method was used to adjust p-values.

Changes in participants' survey results were determined by calculating the arithmetic mean for the overall scores and for each of the four domains, then comparing the post-OMT values to the pre-OMT values. These values were analyzed using paired t-tests.

Statistical analysis was performed using IBM SPSS[®] Software, with the guidance of Chunfa Jie, PhD and Simon Geletta, PhD of the Des Moines University Research and Public Health Department, respectively.