



RESEARCH REPORT

Effects of a diaphragm stretching technique on pulmonary function in healthy participants: A randomized-controlled trial



Francisco José González-Álvarez, Marie Carmen Valenza*, Irene Cabrera-Martos, Irene Torres-Sánchez, Gerald Valenza-Demet

Department of Physical Therapy, Faculty of Health Sciences, University of Granada, Spain

Received 25 March 2014; revised 30 July 2014; accepted 1 August 2014

KEYWORDS

Passive stretching;
Respiratory function tests;
Manual therapy;
Diaphragm

Abstract *Background:* Manual therapy has traditionally been included among the therapeutic approaches to respiratory pathologies.

Objective: The aim of this study was to evaluate the effects of a diaphragm stretching on pulmonary function and respiratory pressures in healthy adults.

Design: Randomized placebo-controlled trial using a between-groups design.

Setting: The study was conducted at a university laboratory.

Methods: The outcomes were evaluated at baseline and immediately after treatment. Participants' spirometry was assessed at baseline, immediately after the intervention, and also at 5 and 20 min post-treatment.

Participants: A final sample of eighty healthy adults was included. Participants were randomized into two groups: experimental or placebo group.

Results: The data analysis revealed that all measures significantly ($p < 0.05$) improved from pre- to post-test in the experimental group.

Conclusions: Diaphragm stretching is able to increase maximal respiratory pressures, forced vital capacity and forced expiratory volume in the first second.

© 2014 Elsevier Ltd. All rights reserved.

* Corresponding author. Department of Physiotherapy, Faculty of Health Sciences, University of Granada, Av de Madrid SN, Granada, Spain. Tel./fax: +34 958242360.

E-mail address: cvalenza@ugr.es (M.C. Valenza).

Implications for practice

- Manual therapy focused on the diaphragm can be effective for improving pulmonary function.
- Diaphragm stretching improves the spirometric values of forced vital capacity and forced volume in the first second and the maximal respiratory pressures.
- Significant changes on FVC and FEV₁ have been found 5 and 20 min after the stretching technique. This could be useful for further research or practice with short term effects, such as in sports therapy.

Introduction

Respiratory disturbances are a growing global problem.^{1,2} Physical therapists have traditionally included various forms of manual therapy among the therapeutic approaches to respiratory diseases. Additionally, manual therapy has generally been used to try to relieve various respiratory and breathing symptoms.³

Stretching of respiratory muscles, myofascial release, and soft tissue massage are included in what is known as thoracic manual therapy.⁴ The aim of most of these techniques is to increase movement in the rib cage and the spine in order to improve lung function and circulation.^{5,6} However, two different systematic reviews^{4,7} have examined the role of manual therapy in pulmonary pathologies, concluding that there is a lack of high quality research in this area and showing no evidence for the application in patients with chronic obstructive pulmonary disease or asthma. Additionally, the use of manual therapy in the thorax can be used as a therapeutic approach to dysfunctional breathing, a respiratory disorder involving an overt hyperventilation and hypocapnia and/or more subtle and subjective features.⁸ Musculoskeletal changes, such as scoliosis, postural disturbances, spine pain and altered rib movement, have been described to alter the mechanical mechanisms of breathing.⁹ Equally, prolonged changes in breathing patterns can cause musculoskeletal changes and dysfunction.¹⁰

The diaphragm is recognized as the primary muscle of respiration that plays an important role in breathing and physiological regulation.¹¹ Dysfunction of the diaphragm can cause poor breathing patterns, disrupt physiological balance, and have detrimental effects on the interrelation among body systems.¹² The effects of diaphragm

movement and physiological changes have been explored in the presence of disease such as chronic obstructive pulmonary disease.¹³ However, little research has been conducted on the effects of stretching techniques on the diaphragm.

In recent years, muscle stretching has begun to play an important role in rehabilitation¹⁴ public sports, and especially in high-performance sports.¹⁵ Over the last decades, many studies have been conducted on the effects of stretching, evidencing increased muscle control, flexibility and range of motion.^{16,17}

The biomechanical and structural characteristics of the diaphragm imply an additional difficulty. It was hypothesized that a stretching technique on the diaphragm can improve contractile properties and pulmonary function. To test the validity of this hypothesis we proposed that the application of a direct stretching technique to the diaphragm would result in a better pulmonary function and respiratory pressures. The main purpose of this study was to explore the effects of diaphragm stretching on pulmonary function in healthy subjects.

Materials and methods

A randomized controlled trial with a single-blind design was conducted. It was completed in a laboratory of the Faculty of Health Sciences. Approval for the study was obtained from the University Ethics Committee and written informed consent was obtained from each participant. The study was registered in a clinical trial registry (clinicaltrials.gov NCT01753726).

Participants

Email, and word of mouth were used to recruit a non-probabilistic convenience sample of 90 subjects from the staff and student body of the Faculty of Health Sciences as well as their friends and relatives. The participants were recruited between June and November 2012. Subjects were given all information about inclusion and exclusion criteria at the time of recruitment and then reminded of the relevant criteria at 24–36 h before their arranged time of participation by a research assistant. The inclusion criteria included healthy participants of both genders aged between 20 and 50 years old. They were eligible if they had a body mass index lower than 28. If they were smokers, they were excluded if they smoked more than 20 cigarettes a day. As the study was examining an asymptomatic population, subjects who had

Download English Version:

<https://daneshyari.com/en/article/2618037>

Download Persian Version:

<https://daneshyari.com/article/2618037>

[Daneshyari.com](https://daneshyari.com)