

THE EFFECT OF THORACIC MUSCLE ENERGY TECHNIQUE ON PULMONARY FUNCTION IN PATIENTS WITH COPD

EFFECTUL TEHNICII ENERGIEI MUSCULATURII TORARCICE ASUPRA FUNCȚIEI PULONARE LA PACIENȚII CU BPOC

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Key words: Thoracic muscle energy technique, FVC, FEV₁, COPD.

Cuvinte cheie: tehnica energiei musculaturii toracice, FVC, FEV₁, BPOC.

Abstract. Objective: The objective of this study is to find out the effect of thoracic muscle energy technique on pulmonary function (FVC and FEV₁) measures in patients with chronic obstructive pulmonary disease (COPD).

Study design: Pretest- posttest experimental study design.

Study setting: Department of Cardiorespiratory Physiotherapy, Pravara Rural Hospital, Loni-413736, District- Ahmednagar, Tal-Rahata, Maharashtra State, India.

Participants. Thirty participants with clinically diagnosed COPD between 30 to 60 years age group.

Intervention. Thoracic muscle energy technique given for two weeks of duration and the values for pulmonary function FVC and FEV₁ measures were assessed pre and post intervention using clinical Spirometry.

Outcome measures. Forced Vital Capacity (FVC) and Forced Expiratory Volume in one second (FEV₁).

Results. The data were analyzed using the statistical method of Student Paired 't' test. The result of the present study showed significant increase in the pulmonary function measures after two weeks of treatment when compared to the baseline data.

Conclusion. The present study shows significant improvement in the FVC and FEV₁ measures after two weeks when treated with thoracic muscle energy techniques.

Rezumat. Obiectivul acestui studiu este de a studia efectul tehnicii energiei musculaturii toracice asupra funcției pulmonare (FVC and FEV₁), la pacienții cu bronhopneumopatie cronică obstructivă (BPOC).

Design-ul studiului. Studiu experimental pretest-posttest.

Locație. Departamentul de Kinetoterapie cardiorespiratorie, Pravara Rural Hospital, Loni-413736, District- Ahmednagar, Tal-Rahata, Maharashtra State, India.

Participanți. Treizeci de participanți diagnosticați cu BPOC, cu vârste între 30 și 60 de ani.

Intervenții. Tehnica energiei musculaturii toracice efectuată timp de două săptămâni și valorile funcției pulmonare FVC și FEV₁ au fost evaluate pre și posttest cu ajutorul spirometriei clinice.

Teste de evaluare. Capacitatea vitală de rezervă (FVC) și Volumul expirator de rezervă într-o secundă (FEV₁).

Results. Datele au fost analizate cu ajutorul testului statistic Student Paired 't' test. Rezultatele acestui studiu au demonstrat creșteri semnificative ale funcției pulmonare după două săptămâni de tratament, la compararea cu rezultatele finale.

Conclusion. Studiul de față demonstrează îmbunătățiri semnificative ale valorilor FVC și FEV₁ după două săptămâni de tratament prin tehnica energiei musculaturii toracice.

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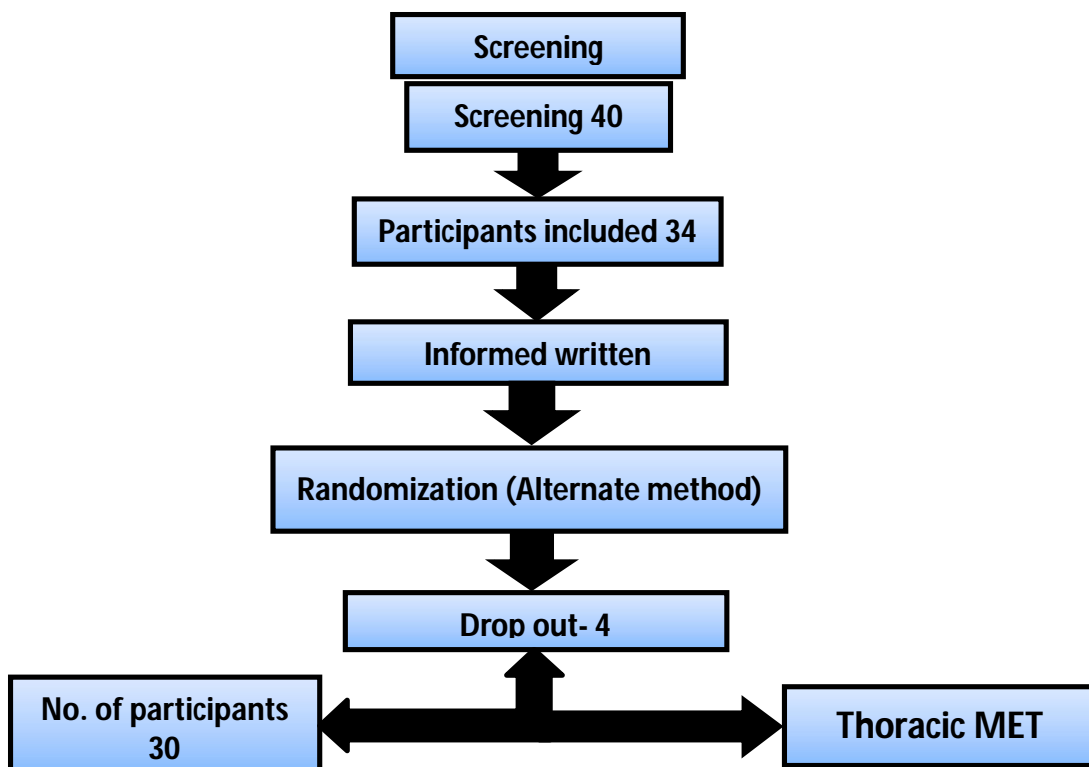
Introduction

Chronic obstructive pulmonary disease (COPD) occurs worldwide, but it is a major health problem principally in societies where cigarette smoking is common. COPD has a prevalence of 4 to 10 percent in adults in populations in whom lung function has been measured.[1] COPD is the name of a group of slowly progressing respiratory disorders characterized by chronic obstruction of lung airflow that interferes with normal breathing and is not fully reversible. The more familiar terms 'chronic bronchitis' and 'emphysema' are no longer used, but are now included within the COPD diagnosis. COPD is a common medical problem in which males are more frequently affected than females.[2] A variety of factors (cigarette smoking, air pollution, infection, occupation, genetic) appear to increase the risk of COPD but cigarette smoking remains the most important factor.[3] In the year 1958, Fred Mitchell Sr., D.O., published the first details of MET. MET has been described as manual medicine treatment procedure that involves the voluntary contraction of patients muscle in a precisely controlled direction, at varying levels of intensity, against a distinctly executed counterforce applied by the operator. Previous studies have demonstrated that MET to the cervical, thoracic & lumbar region can produce significant mechanical changes to spinal range of movement.[4] Serial spirometry is important in assessing the rate of decline of FEV1. The American thoracic society recommends staging COPD by FEV1. Stage 1.mild disease, is defined as FEV1,>-50% predicted, stage 2.moderate disease, 3. 49% predicted, & stage 3, severe disease,<35% predicted.[6-8]

Methods

Participants

A total of 30 participants with clinically diagnosed cases of COPD referred from the Medicine Department of Pravara Rural Hospital, Loni-413736, Dist- Ahmednagar, Taluka Rahata were screened for the study and thirty participants fulfilling the inclusion criteria, were included in the study. Prior to the study written informed consent was taken from all the participants. Participants included were both males and females with age group 30 to 60 years with clinically diagnosed cases of COPD. Participants excluded were: 1) Diseases of cardiac origin.2) History of recent thoracic surgery or abdominal surgery. 3) Fibrotic lung disease. 4) Musculoskeletal injuries to the chest wall.



Flow Diagram showing the procedure of participant allocation

Outcome Measures

1. Forced vital capacity (FVC)
2. Forced expiratory volume in one second (FEV₁).

Procedures

The study received approval from Ethical Committee of Pravara Institute of Medical Sciences, Loni. After the screening and as the written informed consent were obtained from all the participants, randomization was done as per the alternate method. Pulmonary function test measurements were performed pre and post intervention. A standard instruction protocol on how to use the spirometer was provided for each of the participants, along with a demonstration and familiarization trial.

Subjects were treated with general rotational thoracic MET in an attempt to increase thoracic rotation in both directions, while also increasing movements between individual ribs. A second technique, a general side-bending thoracic cage release was also applied. These techniques were chosen as both rotation and side-bending in the thoracic spine facilitates most movements between the individual rib and also the thoracic vertebrae. The intervention was given for two weeks for each participant and post intervention Spirometry measurements were recorded.

Results

Statistic analysis was carried out using the GraphPad InStat software trial version. The data was analyzed using the student paired 't' test.

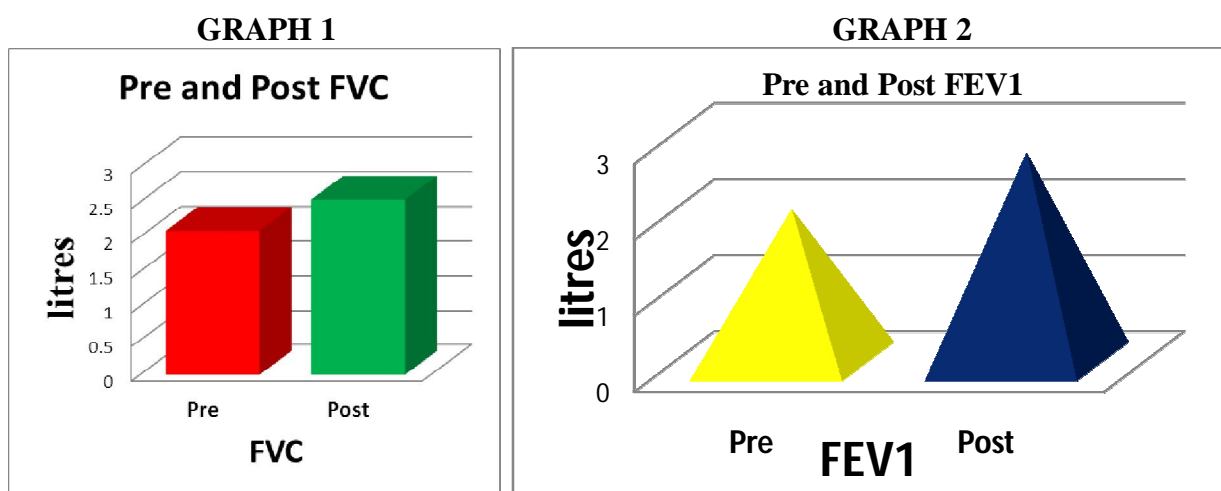
TABLE 1: Showing pre and post FVC

FVC	Pre	Post	T value	P value
Mean	2.086± 0.541	2.535± 0.490	7.613	<0.01 Significant

TABLE 2: Showing pre and post FEV₁

FEV ₁	Pre	Post	T value	P value
Mean	2.001± 0.574	2.747± 0.307	9.605	<0.01 Significant

Graphs 1 and 2 shows changes in pulmonary function measures FVC and FEV₁



No adverse effect was noted during the study period. Thus, the result suggests clinical benefits over the period of two weeks.

Discussion

Ventilator function in symptomatic patients is altered with the application of thoracic MET. This study provides evidence to suggest that ventilator function, measured by FVC & FEV₁, is significantly altered in patients treated with thoracic MET [9]. The patients in this

study, treated using the same protocol, did have significant increases in lung function. Although the symptomatic individuals in this study showed significant changes in ventilator function, all participants felt as though they had benefited from the treatment [10]. This study indicated that despite there being no changes in respiratory function, there was a improvement in the biomechanics of the thoracic region. The use of proprioceptive neuromuscular facilitation (PNF) as a treatment technique is similar to that of MET, with the aims of the therapy being to stretch and also facilitate specific muscles or joints with both active and passive components [11]. From these results it may be suggested that in the absence of any diagnosed pathology or symptoms relating to decrease respiratory function, manual therapy may improve the lung function in asymptomatic people. [12]

Conclusion

The present study shows significant improvement in the pulmonary function measures after two weeks in patients with COPD when treated with thoracic muscle energy techniques.

Acknowledgement: NIL.

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