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Efficacy of diaphragmatic exercise on COPD patients: A experimental Study

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Introduction:

Airway obstruction is a primary symptom of COPD, which is characterised by decreased airflow. Peripheral airway obstruction can result in air volume being trapped in the lungs (i.e. hyperinflation). Inspiration, which occurs before the lungs are emptied of air, can cause an increase in respiratory rate. Respiratory muscle fatigue may occur as a result of rapid shallow breathing. If hyperinflation occurs, the diaphragm's dome is reduced, the respiratory muscle fibres are shortened, and the ability to contract is impaired. As a result, the transfer of gas may be inefficient. Shortness of breath or dyspnea are common signs and symptoms in people with COPD.

Treatments for COPD include endurance training, which improves physical fitness, as well as breathing techniques and ideas for coping with the disease.

Abdominal breathing, also referred to as DB, is a breathing technique in which the diaphragm, a dome-shaped muscle sheet situated horizontally between the thoracic and abdominal cavities, is contracted.

Physiological studies on the effects of each component of pulmonary rehabilitation are lacking, but it has been suggested that diaphragmatic breathing can correct abnormal chest wall motion, reduce work of breathing (WOB), alleviate dyspnea and shortness-of-breath (SOB), and improve ventilation.

Diaphragmatic breathing has been shown to increase tidal volume, decrease respiratory rate, and improve breathing pattern and efficiency in patients with COPD, according to a number of studies. In the words of a COPD patient, "Diaphragmatic breathing has proved highly beneficial to my ability to operate in daily life as well as the quality of my personal, recreational, and professional life."

Although diaphragmatic breathing may exacerbate dyspnea and decrease mechanical breathing efficiency in patients with severe COPD, there is some concern. Consequently, it is essential to determine whether diaphragmatic breathing has a different effect on participants with different levels of disease.

Diaphragmatic breathing is still debated, but it is still used in physiotherapy practise for patients with COPD. The effect of abdominal expansion on diaphragmatic function has been studied in some diaphragmatic breathing technique studies, but it is not clear whether abdominal movement is specific to diaphragmatic muscle activity – it is entirely possible to expand the abdomen with little or no diaphragmatic involvement. Therefore, a more accurate outcome metric may be a direct assessment of diaphragmatic muscle activity. Diaphragmatic breathing and positioning have unknown effects on nutritional status, but it is hypothesised that a higher body mass index (BMI), which is associated with increased abdominal adipose tissue deposition, may have a detrimental affect upon the diaphragm activity and the ability to recruit diaphragmatic activity during diaphragmatic breathing.

COPD patients who underwent diaphragmatic and pursed-lip breathing showed an improvement in maximal exercise tolerance compared to matched control patients, but not in patients with mild COPD. While pulmonary function and exercise capacity were unaffected, a decrease in rib cage motion and an increase in abdominal motion were found in uncontrolled studies.

It has been reported recently that in patients with moderate to severe COPD, DB negatively affected coordination of chest wall motion as well as mechanical efficiency, while dyspnoea sensation did not improve during both loaded and unloaded breathing.

Researchers questioned the method's effect on people with more severe COPD, such as those recovering from an episode of acute respiratory failure who have chronic respiratory insufficiency. It was decided that this study would investigate the effects of deep DB on blood gases, breathing pattern, and dyspnea in severe hypercapnic COPD sufferers who were recovering from a recent exacerbation of their condition. We also examined the effect of DB on pulmonary mechanics in a smaller group of patients.

BCEs and RMT are used for shortness of breath treatment. Body posture exercises and relaxation techniques like diaphragmatic breathing and pursed-lip breathing are all forms of BCE (BPEs). Additionally, deep breathing is a key component of BCEs because it helps relax the body while also reducing respiratory rate and dyspnea (the feeling of being short of breath).

An investigation into how deep diaphragmatic breathing affects respiratory muscle activity (the diaphragm and intercostal muscles) in COPD patients was the goal of this research.

METHODOLOGY:

As With 30 male participants, 15 from each group will be selected to participate in the study, which will be a randomised control trial. Between the ages of 40 and 60 years old Because they had a documented medical history of COPD and were receiving medical treatment with pulmonary medications, the participants were selected to participate. The participants were all smokers or ex-smokers, and none of them had any signs of bronchial asthma. 3)

The criterion by which someone is excluded 1) older than or equal to 80 years of age Obesity 3) A history of recent exacerbations Pulmonary hypertension that is not under control (4) If you need oxygen therapy at home, this may be an issue.

Only the members of the study group will engage in diaphragmatic breathing exercises. Only medical attention was provided to the control group. Measurement (PaO_2, $PaCO_2$, and PaO_2/FiO_2 of oxygen saturation in the blood)

OUTCOMES

During the screening process, 94 patients were screened for eligibility, and 30 were randomised to groups at random. Three protocol deviations were made by the CG, two of which were related to an exacerbation of his COPD and the third was unrelated. In order to comply with the intention-to-treat analysis, these patients were kept. Baseline illness severity, functional capacity, anthropometric data and other baseline parameters were not significantly different between groups. n

The Thoracoabdominal and Diaphragmatic Organs: Their Mobilities A decrease in RC/ABD ratio was observed in the TG compared to the CG following the four-week DBTP, as measured by NB (F8.66; P .001). During voluntary DB after surgery, the TG had more abdominal mobility than the CG (F4.11; P .05). DB proficiency was demonstrated by all of the TG patients. It was also found that the diaphragms of both groups improved after four weeks of DBTP (F15.08; P .001). During voluntary DB (d –.69) and NB (d –96), the TG had a medium-to-large effect on diaphragmatic mobility (d.46) and the RC/ABD ratio. Diaphragmatic mobility and the RC/ABD ratio were not altered in CG patients.

Performance Capacity Following the four-week DBTP, dyspnoea was lower in the TG than in the CG (F5.1; P .05). The TG's HRQOL improved by 10 points, as evidenced by a decrease in the total SGRQ score (F9.7; P .001). TG had statistically significant and clinically relevant advantages over CG in various SGRQ domains (symptom and impact). However, the TG for the activity domain remained unchanged. In the end, the TG outperformed the CG in the six-minute walk test after a 4-week follow-up period (F4.9; P .05). Disturbances in HRQOL, dyspnea, and the 6MWT all showed small to medium effects in favour of the TG. No differences were found between groups in terms of spirometry and lung volume measurements

Enhanced Motion and Characteristics of the Abdomen Maintain a Relationship that Follows a Linear Path There was a negative correlation between the improvement in abdominal motion (RC/ABD ratio) and the baseline RC/ABD ratio and diaphragmatic mobility (r –0.8; P.001) (r .58; P .02). At an RC/ABD ratio of 0.5, most people who improved their abdominal motion had a predominance in costal breathing. After DBTP, patients with lower diaphragmatic mobility improved more in abdominal motion than those with greater diaphragmatic mobility. Other baseline outcomes were not linked to changes in TG abdominal mobility. The RC/ABD ratio was not related to the baseline RC/ABD ratio or diaphragmatic mobility in the CG after a 4-week follow-up period (P .05).

DISCUSSION

This RCT was designed to investigate the effects of a short-term DBTP on COPD patients. During NB and voluntary DB, it showed an improvement in diaphragmatic mobility as well as an increase in abdominal motion. Dyspnea symptoms, HRQOL, and exercise tolerance all improve with DBTP. Research shows that DBTP can alter breathing patterns and increase diaphragmatic movement, thus reducing symptoms and increasing functional capacity in COPD sufferers. During voluntary DB, patients were able to increase their abdominal motion, according to the data.

To begin with, our workouts were longer (12 sessions vs. 9). A second difference between our programme and theirs is that they only used the supine and sitting positions for DB, whereas we used the lateral decubitus and standing positions. Third, our patients had less airflow obstruction than those studied by Gosselink (43 percent vs 34 percent FEV1). All of our patients were judged to be DB competent after the intervention, whereas the other study made no mention of such a qualification. As a result of these discrepancies, our patients appear to have an advantage.

COPD-related respiratory changes can cause diaphragmatic dysfunction. According to previous studies, patients with a restricted range of diaphragmatic motion (33.99mm) have a lower tolerance for exercise and more severe dyspnea after exertion. A smaller diaphragmatic excursion than the critical criterion for diaphragmatic dysfunction (33.99mm) was found in both groups of patients in the current study, but only those who participated in the DBTP improved diaphragmatic mobility beyond the limit of impairment. These findings support the hypothesis that improving diaphragmatic mobility will alleviate dyspnea symptoms and increase functional capacity.

Increased dyspnea symptoms have been linked to both increased chest wall respiratory muscle activity and decreased diaphragm activity, according to research. Patients with COPD and dyspnea may benefit from treatments that aim to reduce the overuse of respiratory muscles in the chest wall and to enhance diaphragmatic function. Patients who took part in DBTP showed improved NB abdominal motion and diaphragmatic mobility as well as a decrease in dyspnea symptoms following the training. A possible explanation based on these findings would be an increased diaphragm involvement and lowered respiratory muscle activity along the chest wall.

Conclusion

DBTP improves abdominal mobility and functional capacity in patients with COPD, according to the researchers. In addition, patients with poor diaphragmatic mobility and high prevalence of costal breathing showed greater improvements in abdominal motion. This group of patients is probably a better fit for DB training than others. We conclude that DB is an important supplement to standard treatment for COPD patients.

References:

List all the material used from various sources for making this project proposal

Research Papers:

1. Lacasse Y, Wong E, Guyatt GH, Cook DJ, Goldstein RS. Meta-analysis of respiratory rehabilitation in chronic obstructive pulmonary disease. Lancet 1996; 348: 1115–1119.
2. Lacasse Y, Guyatt GH, Goldstein RS. The components of a respiratory rehabilitation program. A systematic overview. Chest 1997; 111: 1077–1088.
3. Faling LJ. Controlled breathing techniques and chest physical therapy in chronic obstructive pulmonary disease and allied conditions. In: Casaburi R, Petty TL, eds. The Principles and Practice of Pulmonary Rehabilitation. Philadelphia, Saunders WB, 1993; pp. 167–182.
4. Ambrosino N, Paggiaro PL Macchi M, et al. A study of short-term effect of rehabilitative therapy in chronic obstructive pulmonary disease. Respiration 1981; 41: 40–44.
5. Sackner MA, Gonzales HF, Jenouri G, Rodriguez M. Effects of abdominal and thoracic breathing on breathing pattern components in normal subjects and in patients with COPD. Am Rev Respir Dis 1984; 130: 584–587.
6. Grimby G, Oxhoj H, Bake B. Effects of abdominal breathing on distribution of ventilation in obstructive lung disease. J Rehab Sci 1993; 6: 66–87.
7. Williams IP, Smith CM, McGavin CR. Diaphragmatic breathing training and walking performance in chronic airways obstruction. Br J Dis Chest 1982; 76: 164–166
8. Gosselink RAM, Wagenaar RC, Rijswijk H, Sargeant AJ, Decramer MLA. Diaphragmatic breathing reduces efficiency of breathing in patients with chronic obstructive pulmonary disease. Am J Respir Crit Care Med 1995; 151: 1136–1142.
9. ATS statement. Standards for the diagnosis and care of patients with chronic obstructive pulmonary disease. Am J Respir Crit Care Med 1995; 152: S77–S120.
10. Siafakas NM, Vermeire P, Pride NB, et al. ERS Consensus Statement. Optimal assessment and management of chronic obstructive pulmonary disease (COPD). Eur Respir J 1995; 8: 1398–1420.
11. Breslin EH, Garoutte BC, Kohlman-Carrieri V, Celli BR. Correlations between dyspnea, diaphragm and sternomastoid recruitment during inspiratory resistance breathing in normal subjects. Chest 1990; 98: 298-302.
12. Paulin E, Yamaguti WP, Chammas MC, et al. Influence of diaphragmatic mobility on exercise tolerance and dyspnea in patients with COPD. Respir Med 2007; 101: 2113-8.
13. Nici L, Donner C, Wouters E, et al. American Thoracic Society/European Respiratory Society statement on pulmonary rehabilitation. Am J Respir Crit Care Med 2006; 173: 1390-413.
14. Dechman G, Wilson CR. Evidence underlying breathing retraining in people with stable chronic obstructive pulmonary disease. Phys Ther 2004; 84: 1189-97.
15. Cahalin LP, Braga M, Matsuo Y, Hernandez ED. Efficacy of diaphragmatic breathing in persons with chronic obstructive pulmonary disease: a review of the literature. J Cardiopulm Rehabil 2002; 22: 7-21.
16. McNeill RS, McKenzie JM. An assessment of the value of breathing exercises in chronic bronchitis and asthma. Thorax 1955; 10: 250-2.
17. Tandon MK. Adjunct treatment with yoga in chronic severe airways obstruction. Thorax 1978; 33: 514-7.
18. Ambrosino N, Paggiaro PL, Macchi M, et al. A study of short-term effect of rehabilitative therapy in chronic obstructive pulmonary disease. Respiration 1981; 41: 40-4.
19. Vitacca M, Clini E, Bianchi L, Ambrosino N. Acute effects of deep diaphragmatic breathing in COPD patients with chronic respiratory insufficiency. Eur Respir J 1998; 11: 408-15.
20. Ito M, Kakizaki F, Tsuzura Y, Yamada M. Immediate effect of respiratory muscle stretch gymnastics and diaphragmatic breathing on respiratory pattern. Respiratory Muscle Conditioning Group. Intern Med 1999; 38: 126-32.
21. Brach BB, Chao RP, Sgroi VL, Minh VD, Ashburn WL, Moser KM. 133Xenon washout patterns during diaphragmatic breathing. Studies in normal subjects and patients with chronic obstructive pulmonary disease. Chest 1977; 71: 735-9.