
ROLE OF INCENTIVE SPIROMETRY AND POSTURAL DRAINAGE IN COPD PATIENT'S: A REVIEW

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ABSTRACT

Background: A group of illnesses known as chronic obstructive pulmonary disease (COPD) results in irreversible lung damage. Worldwide, it is a prevalent cause of both mortality and morbidity. An instrument called the Incentive Spirometer is used to maximally expand the lungs. It's a typical respiratory treatment.

Aims and Objectives: The goals of this research are to evaluate the impact of incentive spirometry and postural drainage in COPD patients.

Material and Methods: Data was retrieved by using PubMed, Google Scholar, and the physiotherapy evidence database, for research done between 2013 and 2023 using the article titles and abstracts. A total of 12 studies were chosen to assess function of incentive spirometry and postural drainage in COPD patients.

Results: All data searched between January 2013 and March 2023 in April 2023 demonstrate the advantages of both postural drainage and incentive spirometry for COPD patients.

Conclusion: According to the study's outcomes, COPD patients undergoing incentive spirometry and postural drainage are doing well.

Keywords: Incentive Spirometry, Postural Drainage, Chronic obstructive pulmonary disease.

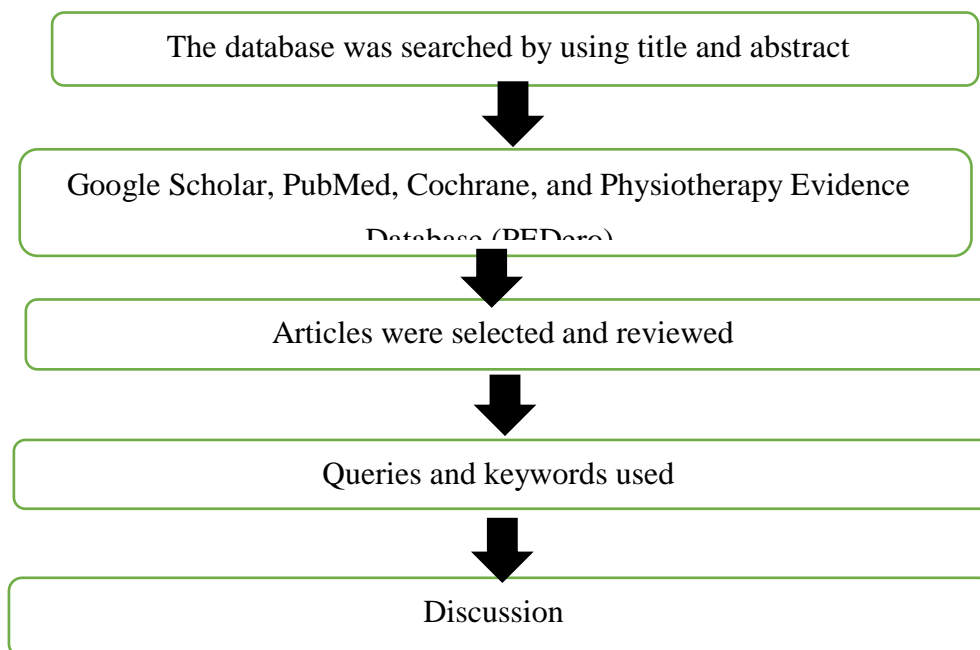
Introduction: COPD is a common, curable illness characterized by growing tissue damage and limited airflow. It is associated with structural changes in the lungs caused by chronic inflammation caused by exposure to dangerous particles or gases, most commonly cigarette smoke. Chronic inflammation leads airway constriction and reduced lung recoil¹.

Worldwide, it is a prevalent causative factor of both mortality and morbidity. The incentive spirometer (IS) is a device that is used to maximum expansion and sustain inflation of lungs. Patients feel inspired greater according to the visual input. It is a common respiratory therapy post-surgery because it prevents and cures atelectasis by increasing lung inflation, which tries to open the collapsed lung alveoli. It is advised to take IS post-operatively for COPD patients. However, its benefits on COPD patients remain unclear and aren't related to surgery². Known alternatively as sustained maximum inspiration (SMI), incentive spirometry is a type of bronchial hygiene therapy. Its primary purpose is to mimic a natural yawning reflex, which involves deep, leisurely breaths. With incentive spirometry, a patient uses a device that gives them when they

inhale at a set volume and hold that inflation for at least three seconds, they receive both visual and positive feedback³. Because of the force of gravity, postural drainage promotes the movement of secretions inside the bronchial tree. In order to accomplish this, the patient must be placed in various positions and the bronchial segment that needs to be drained must be inclined as vertically as feasible. When it comes to getting rid of secretions, postural drainage works well and safely without interfering with oxygen saturation.⁴

The cough reflex and mucociliary escalator protect the respiratory system by clearing secretions and keeping airways free. Every day, healthy people produce between 10 and 100 mL of airway secretions, which are removed by the mucociliary escalator's centripetal action. It is challenging to mobilize and evacuate secretions for a variety of reasons. Conditions including bronchiectasis, age, tobacco use, and environmental exposures all reduce the effectiveness of the mucociliary escalator. Respiratory therapists and other healthcare professionals administer airway clearance treatment (ACT) with the goal of facilitating secretion mobilization and expectoration as well as reducing issues related to secretion retention. In order to control airflow, mobilize secretions cephalad, and aid in evacuation by coughing, ACT employs mechanical or physical methods. To help with secretion mobilization, breathing exercises, mechanical devices, manual approaches, and gravity-assisted drainage can be employed⁵.

Methods:



This review is a comprehensive search in international databases of Google Scholar, PubMed, Cochrane, and Physiotherapy Evidence database was conducted to find results matching the keywords ‘Incentive spirometry’, ‘Postural drainage’, ‘COPD’ and other related terms in the international databases of Google Scholar, PubMed, Cochrane, and Physiotherapy Evidence database. Data pertaining to conditions other than lung illness were not included in the analysis. 12 peer-reviewed studies were qualified in the end. Published between 2013 and 2023, they discussed the aetiology of COPD as well as the different pulmonary rehabilitation strategies. The research included cross-sectional, case-control, cohort, prospective, retrospective, descriptive, correlational, and review

investigations. Research released prior to 2013 was one of the exclusion criteria. This review's primary goal is to provide an overview of the research on the efficacy of postural drainage and incentive spirometry in COPD patients.

Author & year	Type of study	Technique used	Outcome measure
M. Kurzaj et al. (2013)	Experimental group=20 Control group= 10	Massage treatments comprised kneading, vibrating, grinding, and stroking.	The effect of intensive exercise therapy on BODE Index's improvement BMI improved, Improve exercise capacity.
V. Kiran, Dr. Bhimasen. S et al. (2014)	Comparative study design Group A = 30 Group B= 30	Autogenic drainage, Postural drainage	Oxygen saturation and removal of secretion
Jaya Negi, Niraj Kumar et al. (2019)	Comparative study design experimental Group A=15 control Group B =15	Inspiratory muscles trainer and Incentive spirometer	Improving Inspiratory Capacity and reducing dyspnoea
Taniya Singh, Niraj Kumar, Nishu Sharma, et al. (2019)	Comparative study design experimental group A= 15 and control group B= 15 subjects	Active cycle of breathing technique combined with postural drainage and autogenic drainage	Clearing secretions and improving SaO ₂ .
Westerdahl et al. (2019)	Cross-sectional descriptive study	Survey based on airway clearance techniques	Airway clearance techniques to be an important aspect of patients' overall management.
Apurva Girish Mehta, Smita Chandrakant Patil et al. (2020)	Pre-post intervention study 28 Group A=14 Group B=14	Segmental relaxation from Laura Mitchell Relaxation Technique along with postural drainage and forced expiratory technique	Speedy recovery of mucus clearance and airway clearance
Selma Arik, Kivan Çevik (2021)	quasi-experimental study consisting of 100 patients	Triflow volume and Pulmonary Function Test.	Increasing oxygen saturation, triflo volume, and pulmonary function tests
Amal A. El-Koa, Hanaa A. Eid et al. (2023)	Group1=20 control group = 20	Incentive spirometry	Improve ABG, and spirometry functions

			together. Improving diaphragmatic functions.
Dr. Pritam Singha, Dr. Mahesh Kumar Shou Dr. Kamalika Bhattacharjee (2023)	Pre-test and post-test experimental study Experimental group A= 20 Experimental group B= 20	Active cycle breathing technique along with Spirometry and Active Cycle breathing technique along with Acapella device.	Improvement of Perceived exertion rate, and improvement of Peak expiratory flow rate.
Gil Sokol, Daphna Vilozni et al. (2015)	Retrospective study. resistive-breathing incentive spirometer (n = 40) or autogenic drainage (n = 32)	Resistive-Breathing incentive spirometry or autogenic drainage technique	Lower thoracic pressures and assist in the prevention of central airway collapse.
Hesham A. Abdel Halim, Heba H. AboEl Naga et al. (2016)	Comparative study group (1) = 15 (10 males and 5 females), group (2) = 15 (10 males and 5 females)	Active cycle breathing technique with postural drainage. Conventional chest physiotherapy.	Improvement in MMRC dyspnoea score. Clear and mobilize excessive pulmonary secretions.
Toor H, Kashyap S, Yau A et al. (2021)	Prospective cohort study 48 patients including 21 females and 27 males	Incentive Spirometry, walking or light jogging Postural drainage exercises.	Encourage deep inspiratory and expiratory breathing, Emphasizes lung inflation Increasing tidal volume, and maintaining patency of the smaller airway.

Discussion: Globally, COPD is one of the main causes of chronic morbidity and mortality. It is an illness that many people live with for years, and its complications can cause premature death, which is something that can be anticipated in the next ten years¹⁷. In all nations, acute exacerbations of COPD lead to significant economic and societal losses due to variables including rising medical costs and hospital stays, workforce attrition, etc. For COPD patients to receive the best care possible, both pharmaceutical and nonpharmacological interventions are typically needed¹². Mucus migrates toward central airways as a direct result of respiratory physiotherapy. This could result in a temporary blockage that impairs lung function. Determining the peak-effect time is crucial in order to assess lung function following treatment¹⁸.

Despite the fact that recent advances in medicine and surgery have produced notable advancements, these operations are frequently non-therapeutic. As a result, pulmonary rehabilitation programs have gained prominence, with the goal of enhancing the quality of life for all patients suffering from

respiratory issues, including COPD¹⁹. This review evaluated the available data about the benefits of postural drainage exercises and incentive spirometry for COPD subjects. The purpose of this research is to assess the efficacy of postural drainage and incentive spirometry in COPD patients. The review's findings demonstrated the advantages of postural drainage and incentive spirometry for COPD patients. For instance, a study by V. Kiran, Dr. Bhimasen, S., et al. demonstrates that autogenic drainage can be more tolerable by COPD patients and is more successful in raising SpO₂. It also produces fewer benefits in terms of sputum clearance but does not result in sharp decline in SpO₂ as does postural drainage just after therapy. Postural drainage is proven to be greater successful in terms of the average amount of secretion elimination⁷.

According to Apurva Girish Mehta, Smita Chandrakant Patil, et al., segmental relaxation from the Laura Mitchell Relaxation Technique combined with postural drainage and forced expiratory technique has a greater effect on COPD patients than do these techniques alone¹¹. According to Toor H, Kashyap S, Yau A, et al., During the study period, participants saw a 16% increase in maximal inspiratory volume over a 30-day period when prescribed daily breathing exercises using an Incentive spirometry, and they did not need to contact their primary care physician¹⁶. All things considered, the bulk of the included studies showed that incentive spirometry and postural drainage are highly beneficial for COPD patients.

Conclusion: Research to date indicates that airway clearing techniques, such as incentive spirometry and postural drainage, are safe, feasible, and advantageous for people with chronic obstructive pulmonary disease. Specific protocols for chest physical therapy, including autogenic drainage, vibration, percussion, and chest shaking, can enhance pulmonary functions, improve arterial blood gases, and aid in the drainage of secretions.

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Conflict of interest: None

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