Case Report

DOI: 10.7860/JCDR/2024/67506.19145

# Immediate Effect of Dry Cupping along side Breathing Exercises on Chest Wall Mobility in a Patient with COPD: A Case Report

Complementary/alternative medicine Section

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## ABSTRACT

Chronic Obstructive Pulmonary Disease (COPD) is one of the most prevalent respiratory disorders, caused by the obstruction of the respiratory pathway. It is a progressive disease that worsens with time, but it is treatable. Physiotherapists are widely acknowledged to have a significant role in the care of patients suffering from respiratory disease. They employ a number of tactics targeted at reducing the labour of breathing, enhancing ventilation, promoting function, and providing dyspnoea alleviation. Chest physical therapy may include postural corrections to promote ventilation, secretory retention control, breathing and whole-body exercises to increase strength and function, and the use of adjuncts to improve lung function. Cupping therapy is one of the ancient healing methods. It is used on the skin by creating a negative pressure inside the cup through various devices. Many studies have shown that cupping therapy has promising preventive and therapeutic effects in a variety of pathological conditions, such as high fever due to upper respiratory tract infection, pulmonary dysfunctions in asthmatic children, type 2 diabetes mellitus, autoimmune diseases such as rheumatoid arthritis, hypertension, myocardial infarction, and cardiac arrhythmias, and chronic fatigue syndrome. Here, the authors reported a case of a 74-year-old male patient demonstrating the positive effect of cupping therapy, particularly dry dynamic cupping, along with physical exercise to improve chest expansion or thoracic expansion and improve well-being in a patient suffering from COPD.

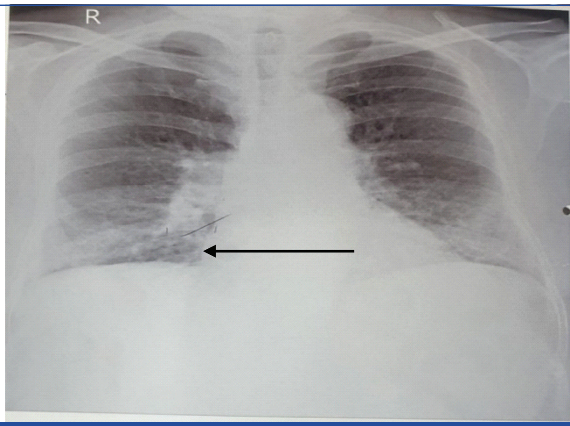
**Keywords:** Chest expansion, Chronic obstruction, Dyspnoea, Physical therapy, Quality of life, Thoracic pain

## CASE REPORT

A 74-year-old male farmer, by occupation, visited the respiratory Outpatient Department (OPD) with chief complaints of difficulty in breathing (more during the night or activity), pain, and cough with sputum (yellow expectoration) for the past 18 days, and intermittent fever for six days. The patient was previously treated in a private hospital six years ago for severe breathlessness episodes while working and has been experiencing dyspnoea since then. The patient had a history of a stroke eight months back with left hemiparalysis, which completely recovered. He had a history of addictions to cigarette smoking, alcohol consumption, and tobacco chewing (kharra) for the past 37 years, and dust allergy with seasonal variation, which was exacerbated during the winter. He had no history of diabetes, hypertension, weight loss, loss of appetite, biomass exposure, or any kind of drug allergy. The patient was observed in sitting position, and was supportive, properly well-versed with time, location, and person. A slightly barrel-shaped chest was observed from the lateral side during the examination, and the accessory muscles were used during breathing. The trachea was not deviated on palpation, and chest excursion and tactile vocal fremitus were decreased on both sides in all the zones. At the axillary, nipple, and xiphisternal levels, the chest expansion was noticed to be reduced by 1 cm, 1.5 cm, and 1cm, respectively [Table/Fig-1]. A hyper-resonant sound was present on percussion. Breath sounds were reduced bilaterally along with rhonchi during auscultation in the upper and lower zones.

**[Table/Fig-1]:** Measurement of chest expansion.

Various investigations were performed, including Electrocardiogram (ECG), blood investigations, and sputum collection, all of which were within normal limits. An X-ray investigation revealed bronchopulmonary findings and flattening of the diaphragm, along with hyperinflated lungs [Table/Fig-2]. The patient's Contrast-Enhanced Computed Tomography (CECT) thorax with CT pulmonary angiogram revealed diffuse centrilobular and paraseptal emphysematous changes noted in bilateral lung fields. Also, a few patchy ground opacities were noted in the superior lingular segment in the left upper lobe. The Arterial Blood Gas (ABG) analysis findings revealed respiratory acidosis, with pH, $pCO_2$, and $HCO_3$ as 7.34, 50 mmHg, 26 mEq/Litre.




**[Table/Fig-2]:** According to chest X-ray, the lungs were hyper-inflated, with prominent broncho-pulmonary markings and a flat diaphragm.

Based on the findings of clinical, laboratory, and radiological investigations, the patient was diagnosed with COPD. The patient was prescribed paracetamol, azithromycin, and bronchodilators to provide symptomatic relief, and after four days, was referred to the department of cardiorespiratory physiotherapy for the management of excessive secretions, improvement of chest expansion, and exercise capacity.

The physiotherapeutic exercise protocol was goal-oriented and was followed with cupping techniques. Dynamic cupping therapy was used to stimulate relaxation in the intercostal muscles, and silicon cups were used for treatment. Firstly, the patient was assessed for chest expansion using tape in the sitting position. And then in the supine position, arnica oil was applied completely over the thoracic/chest region to reduce friction with the skin [Table/Fig-1]. Then, intercostal spaces were palpated by considering the space below the clavicle as the second intercostal, and then progressively working on each intercostal muscle of the thorax. The silicon cup was pressed and placed on the muscles, generating a vacuum effect and creating negative pressure under the cup, and then synchronising the movement of cupping with the rhythm of breathing. On inhalation, when the thorax rises, the cup was kept on standby, and when the patient exhales, the cup glides very slowly from the central to the peripheral direction. With every single exhalation of the breath, the silicon cup was given a dynamic motion. This process was repeated five times in each intercostal space for three days [Table/Fig-3]. This improves circulation in the muscles and also focuses on the extensibility of muscles, along with promoting the mobility of the chest muscles.

**[Table/Fig-3]:** Cupping therapy to the chest muscles.

After the cupping intervention, a re-evaluation of chest expansion was done after three days, and a positive result was noted [Table/Fig-4], following which he was asked to perform deep breathing exercises, thoracic expansion exercises, and pursed lip breathing exercises to maintain good ventilation.

| | Axillary level | Nipple level | Xiphisternum level |
|---|---|---|---|
| Pre-cupping phase | 1.6 cm | 2.3 cm | 3.0 cm |
| Post-cupping phase | 2.1 cm | 3.1 cm | 3.8 cm |

**[Table/Fig-4]:** Chest expansion at various levels before and after intervention.

The outcome measures used to assess the patient's progress in the pre-intervention and post-intervention phase are shown in the table below [Table/Fig-5]. The patient was given cupping therapy along with the breathing exercises in the hospital. He was also advised to exercise breathing retraining and hygiene activity every day and was additionally taught to use relaxation and dyspnoea-relieving techniques when required. The patient was asked to rate his pain on a Numeric Pain Rating Scale (NPRS) [1] from 0 (no pain) to 10 (extreme pain) (worst pain), and the modified Borg Dyspnoea Scale [2] was also used as mentioned in [Table/Fig-5]. The patient was satisfied with the productive rehabilitation and outcomes of the intervention. Due to a lack of patient adherence, follow-up was not possible.

| | Pre-intervention phase | Post-intervention phase |
|---|---|---|
| Numerical pain rating scale | 5/10 | 2/10 |
| Modified borg dyspnoea scale | 3 | 0.5 |

**[Table/Fig-5]:** Outcome measures.

## DISCUSSION

Respiratory diseases have a negative impact on a person's breathing and ventilation capacity. COPD is a serious condition that causes functional impairments and secondary problems such as pneumothorax, pulmonary hypertension, pneumonia, and chronic atelectasis after emphysema, the most frequent form of COPD [3]. The study described a case of a patient suffering from COPD, and upon examination, it was found that the patient's chest expansion and excursion were reduced. Therefore, to improve the mobility of the muscles of the chest wall, it was important to gain extensibility of the muscles. After the intervention was performed, the patient reported a significant improvement, and the severity of his symptoms decreased. Even the outcome measures used in this study, i.e., NPRS and the modified Borg dyspnoea scale, provided positive feedback on the patient's condition. A study proposed that thoracic pain and dyspnoea could be linked. This is supported by the fact that primary and secondary breathing muscles are frequently used to manage breathlessness in COPD patients [4]. Thus, cupping therapy was used as an intervention for it. Although cupping therapy is an ancient therapy, it has recently gained a lot of popularity as a positive therapeutic intervention.

Aboushanab TS et al., concluded that cupping therapy, when administered, can significantly improve pulmonary functioning in asthmatic children, particularly those with mild asthma [5]. Hekmatpou D et al., in their study, evaluated the effect of wet cupping on 110 male smokers with positive results on a pulmonary function test and COPD. They reported that wet cupping (approximately 15-20 minutes), compared with venesection, caused a continued O2 saturation in the intervention group for up to 12 hours [6]. Cao H et al., reported that cupping therapy may have an effect on pain conditions, herpes zoster, symptoms of cough and asthma, acne, the common cold, or other common diseases. The current evidence is not sufficient to allow a recommendation for the clinical use of cupping therapy for the treatment of the above diseases of any aetiology in people of any age group. The long-term effect of cupping therapy is not known, but the use of cupping is generally safe based on long-term clinical use and reports from the reviewed clinical studies [7].

Physiotherapy is essential to improve the lungs' oxygenation and ventilation capacity. Diaphragmatic breathing and segmental expansion, as well as pursed lip breathing, create back pressure on the alveoli, allowing for extended perfusion and the development of collateral routes for ventilation. Physiotherapists must administer breathing exercises to COPD patients during pulmonary rehabilitation to enhance chest wall expansion. There is evidence that maximal inspiratory exercises can promote chest wall expansion by demonstrating mechanical changes and increasing chest wall mobility [8]. Dimitrova A et al., studied and created a pulmonary rehabilitation regimen that included markers such as the six-Minute Walk Test and the Modified Medical Research Council (MMRC) scale to measure the severity of COPD symptoms before and after intervention [9]. In his study, Lauche R stated that cupping is used to improve local blood and lymphatic circulation as well as to relieve painful muscle tension [10].

The innovative group singing therapy has also been demonstrated to increase holistic health by addressing a variety of biopsychosocial components. Effective respiratory muscle recruitment and improvements in oxygenation can be obtained by adopting targeted vocal strategies to engage the diaphragmatic muscle. Singing has also been shown to increase the overall quality of life [11]. There are few articles in the literature regarding cupping therapy for respiratory disorders; hence, there is scope for future research.

## CONCLUSION(S)

The purpose of the present paper was to establish the management a strategy to increase chest expansion in a COPD patient in terms of pulmonary rehabilitation. Before the treatment, the patient exhibited decreased chest wall expansion, poor mucus clearance, and breathing issues. Thus, an approach with an integrated and thorough rehabilitation regimen has resulted in positive changes in the severity of dyspnoea, cough, chest wall mobility, weakness, and general quality of life.

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**PLAGIARISM CHECKING METHODS:** [Jain H et al.]
- Plagiarism X-checker: Sep 21, 2023
- Manual Googling: Dec 08, 2023
- iThenticate Software: Dec 27, 2023 (13%)

**ETYMOLOGY:** Author Origin

**EMENDATIONS:** 6

**AUTHOR DECLARATION:**
- Financial or Other Competing Interests: None
- Was informed consent obtained from the subjects involved in the study? Yes
- For any images presented appropriate consent has been obtained from the subjects. Yes

Date of Submission: **Sep 20, 2023**
Date of Peer Review: **Dec 01, 2023**
Date of Acceptance: **Dec 29, 2023**
Date of Publishing: **Feb 01, 2024**