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Benefits of physiotherapist-guided motor activity in patients with Chronic Obstructive Pulmonary Disease (COPD)

Os benefícios da atividade motora conduzida por fisioterapeutas em pacientes com Doença Pulmonar Obstrutiva Crônica (DPOC)

Los beneficios de la actividad motora guiada por fisioterapeutas en pacientes con Enfermedad Pulmonar Obstructiva Crónica (EPOC)

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ABSTRACT

Chronic Obstructive Pulmonary Disease (COPD) is the third leading cause of death worldwide, characterized by the progressive limitation of airflow and having a significant negative impact on public health. COPD treatment is multifactorial, with physical therapy being essential to improve functional capacity, combat sedentary behavior, and reduce hospitalizations. Objectives: The primary objective of this study is to analyze the impact of motor physiotherapy in patients with COPD. The specific objectives include: identifying the most commonly used physiotherapeutic approaches in the treatment of this population and examining whether physiotherapy contributes to the reduction of hospitalizations. Methods: This is an integrative qualitative literature review, with articles published between 2018 and 2025, aimed at analyzing the effects of motor physiotherapy on COPD. The following databases were used: Google Scholar, PubMed, LILACS, and SciELO, with a focus on empirical studies, clinical trials, and systematic reviews.Results: The review showed that different physical exercise modalities, such as strength, endurance, and combined exercises, promote improvements in functional capacity, muscle strength, and quality of life in COPD patients. Pulmonary Rehabilitation (PR) stands out for reducing hospitalizations and positively impacting the inflammatory response. However, there are still limitations in the studies, particularly regarding the standardization of interventions.Conclusion: Motor physiotherapy, especially through Pulmonary Rehabilitation, improves functional capacity and quality of life in patients with COPD, as well as reducing hospitalizations. Combinations of aerobic and strength exercises, particularly in supervised programs, are the most effective. However, results vary depending on the protocol used and the patient's profile, highlighting the importance of individualized planning.

Keywords: Physical Therapy Specialty. Pulmonary Disease. Chronic Obstructive. Physical Exercise. Pulmonary Rehabilitation. Respiratory Function. Quality of Life.

RESUMO

A Doença Pulmonar Obstrutiva Crônica (DPOC) é a terceira maior causa de morte no mundo, caracterizando-se pela limitação progressiva do fluxo aéreo e apresentando um grande impacto negativo na saúde pública. O tratamento da

DPOC é multifatorial, sendo a fisioterapia essencial para melhorar a capacidade funcional, combater o sedentarismo e reduzir as hospitalizações. Objetivos: O objetivo principal deste estudo é analisar o impacto da fisioterapia motora em pacientes com DPOC. Os objetivos específicos incluem: identificar as condutas fisioterapêuticas mais empregadas no tratamento dessa população e analisar se a fisioterapia contribui para a redução das hospitalizações.Métodos: Trata-se de uma revisão de literatura integrativa qualitativa, com artigos publicados entre 2018 e 2025, para analisar os efeitos da fisioterapia motora na DPOC. Foram utilizadas as bases de dados Google Acadêmico, PubMed, LILACS e SciELO, com foco em estudos empíricos, ensaios clínicos e revisões sistemáticas.Resultados: A revisão demonstrou que diferentes modalidades de exercício físico, como força, resistência e exercícios combinados, promovem melhorias na capacidade funcional, força muscular e qualidade de vida de pacientes com DPOC. A Reabilitação Pulmonar (RP) se destaca pela redução das hospitalizações e pelo impacto positivo na resposta inflamatória. No entanto, ainda existem limitações nos estudos, especialmente quanto à padronização das intervenções.Conclusão: A fisioterapia motora, especialmente por meio da Reabilitação Pulmonar, melhora a capacidade funcional e a qualidade de vida de pacientes com DPOC, além de reduzir as hospitalizações. As combinações de exercícios aeróbicos e de força, especialmente em programas supervisionados, são as mais eficazes. No entanto, os resultados variam de acordo com o protocolo utilizado e o perfil do paciente, o que destaca a importância do planejamento individualizado

Palavras-chave: Fisioterapia. Doença Pulmonar Obstrutiva Crônica. Exercício Físico. Reabilitação Pulmonar. Função Respiratória. Qualidade de Vida.

RESUMEN

La Enfermedad Pulmonar Obstructiva Crónica (EPOC) es la tercera causa de muerte a nivel mundial, caracterizándose por la limitación progresiva del flujo aéreo y teniendo un gran impacto negativo en la salud pública. El tratamiento de la EPOC es multifactorial, siendo la fisioterapia esencial para mejorar la capacidad funcional, combatir el sedentarismo y reducir las hospitalizaciones. Objetivos: El objetivo principal de este estudio es analizar el impacto de la fisioterapia motora en pacientes con EPOC. Los objetivos específicos incluyen: identificar las conductas fisioterapéuticas más empleadas en el tratamiento de esta población y analizar si la fisioterapia contribuye a la reducción de las hospitalizaciones.Métodos: Se trata de una revisión de literatura integrativa cualitativa, con artículos publicados entre 2018 y 2025, para analizar los efectos de la fisioterapia motora en la EPOC. Se utilizaron las bases de datos Google Académico, PubMed, LILACS y SciELO, enfocándose en estudios empíricos, ensayos clínicos y revisiones sistemáticas.Resultados: La revisión demostró que diferentes modalidades de ejercicio físico, como fuerza, resistencia y ejercicios combinados, promueven mejoras en la capacidad funcional, fuerza muscular y calidad de vida en pacientes con EPOC. La Rehabilitación Pulmonar (RP) se destaca por la reducción de hospitalizaciones y el impacto positivo en la respuesta inflamatoria. Sin embargo, aún existen limitaciones en los estudios, especialmente en cuanto a la estandarización de las intervenciones.Conclusión:

La fisioterapia motora, especialmente a través de la Rehabilitación Pulmonar, mejora la capacidad funcional y la calidad de vida de los pacientes con EPOC, además de reducir las hospitalizaciones. Las combinaciones de ejercicios aeróbicos y de fuerza, especialmente en programas supervisados, son las más eficaces. Sin embargo, los resultados varían según el protocolo utilizado y el perfil del paciente, lo que resalta la importancia de la planificación individualizada.

Palabras clave: Fisioterapia. Enfermedad Pulmonar Obstructiva Crónica. Ejercicio Físico. Rehabilitación Pulmonar. Función Respiratoria. Calidad de Vida.

1 INTRODUCTION

Chronic Obstructive Pulmonary Disease (COPD) is recognized as one of the leading causes of global morbidity and mortality. Classified by the World Health Organization (WHO), under the United Nations (UN), as the third leading cause of death worldwide, COPD accounts for more than 3 million deaths annually (WHO, 2023). This condition is characterized by chronic and progressive airflow limitation, typically irreversible, resulting from an abnormal inflammatory response in the lungs due to prolonged inhalation of harmful particles or gases, particularly tobacco smoke (Gold, 2023).

With the aim of raising awareness and encouraging public health policies focused on the prevention and management of COPD, World COPD Day was established. It is celebrated annually on the third Wednesday of November. The campaign is promoted by the Global Initiative for Chronic Obstructive Lung Disease (GOLD), which provides international evidence-based guidelines for the diagnosis, treatment, and rehabilitation of COPD. This initiative aligns with global sustainable development goals, particularly the promotion of health and well-being (SDG 3 of the UN 2030 Agenda) (Gold, 2023; UN, 2023).

In Brazil, COPD represents a significant public health challenge due to its high prevalence and socioeconomic impact. According to the Ministry of Health, 433,729 new cases were reported in the country, highlighting the urgent need for integrated strategies for its prevention and control (Brasil, 2022). The disease has systemic repercussions, affecting not only the lungs but also the cardiovascular,

musculoskeletal, and psychosocial systems. It is commonly associated with symptoms such as dyspnea, chronic cough, fatigue, reduced exercise tolerance, and diminished quality of life (Girão *et al*., 2023; Jiménez *et al*., 2022).

The diagnosis of COPD is based on clinical data and confirmed through spirometry, which measures the Forced Expiratory Volume in one second (FEV_1) and Forced Vital Capacity (FVC) — essential parameters for determining the degree of respiratory obstruction. Imaging exams such as chest X-rays or computed tomography scans are often used to assess the extent of pulmonary impairment and rule out differential diagnoses (Almeida *et al*., 2019).

The treatment of COPD follows a multifactorial approach. Pharmacological therapy plays a central role, aiming to control symptoms, reduce the frequency of exacerbations, and improve exercise tolerance. The main medications used include short- and long-acting bronchodilators (such as beta-agonists and anticholinergics), inhaled corticosteroids, and in some cases, antibiotics and mucolytics during respiratory infections. In more severe cases of chronic hypoxemia, long-term home oxygen therapy is indicated (Gold, 2023; AlmeidA *et al*., 2019).

In addition, non-pharmacological treatments play a crucial role in the management of COPD, with particular emphasis on respiratory physiotherapy and pulmonary rehabilitation. Physiotherapy involves strategies aimed at bronchial clearance, ventilatory retraining, strengthening of respiratory and peripheral muscles, as well as the prescription and monitoring of physical exercises tailored to the patient's functional capacity. The implementation of pulmonary rehabilitation programs, supervised by physiotherapists, has shown significant benefits in improving dyspnea, quality of life, and reducing hospital admissions (Nascimento *et al*., 2022; Xiang *et al*., 2022).

It is well established that dyspnea and exercise intolerance often lead many patients to a sedentary lifestyle, which increases the risk of comorbidities and mortality. In this context, physiotherapy plays both a preventive and therapeutic role, contributing to the restoration of the patient’s functionality and autonomy. The literature shows that when physiotherapy is provided in a structured and continuous manner, it also contributes to a reduction in the need

for oxygen therapy and the frequency of hospitalizations (Jiménez *et al*., 2022; Nascimento *et al*., 2022).

The main objective of the present study is to analyze the impact of motor physiotherapy in patients with Chronic Obstructive Pulmonary Disease (COPD). The specific objectives are:

a) to identify the most frequently used physiotherapeutic interventions in the treatment of this population; and
b) to assess whether physiotherapy contributes to a reduction in hospitalizations.

The relevance of this study lies in its contribution to the strengthening of evidence-based public health policies, as well as in the recognition of physiotherapeutic practices as an essential part of the integrated care of patients with COPD.

2 METHODOLOGY

This study is an integrative literature review of a qualitative nature, aimed at analyzing the effects of motor activities in patients diagnosed with Chronic Obstructive Pulmonary Disease (COPD), with an emphasis on physiotherapeutic interventions and clinical outcomes related to functional capacity and quality of life. The choice of this methodological design is grounded in the need to gather, systematize, and critically interpret the most recent scientific findings on the topic.

The literature search was conducted between March and May 2025 using the following databases: Google Scholar, PubMed, LILACS (Latin American and Caribbean Health Sciences Literature), and SciELO (Scientific Electronic Library Online). The searches were performed in Portuguese and English, aiming to ensure a comprehensive and up-to-date scope of relevant scientific production.

The following descriptors were used: in Portuguese – atividade motora, fisioterapia, and DPOC (Doença Pulmonar Obstrutiva Crônica); and in English – motor activity, physiotherapy, and COPD (Chronic Obstructive Pulmonary Disease). These terms were combined using Boolean operators (AND/OR) to refine the search results.

The time frame was limited to studies published between 2018 and 2025, prioritizing empirical studies, systematic reviews, controlled clinical trials, and observational studies that discuss the effects of physiotherapeutic interventions and physical exercise in the COPD population.

Included studies comprised full-text scientific articles, field studies, quantitative and qualitative data, as well as clinical research directly addressing the benefits of motor activity and physiotherapy on the respiratory, functional, and psychosocial aspects of patients with COPD. Inclusion criteria considered methodological rigor, thematic relevance to the scope of the research, and clarity in the presentation of results.

Exclusion criteria included publications in the form of abstracts, conference proceedings, dissertations, theses, and articles published prior to 2018, as well as studies not directly related to the research theme or those employing methods deemed inadequate to support the proposed conclusions. The study selection process was carried out manually, involving the review of titles, abstracts, and subsequently full texts, in accordance with the previously established criteria.

This methodological strategy enabled the selection of scientific publications that support and update the discussion on the importance of guided motor activity and physiotherapy in the rehabilitation of patients with COPD, contributing to a critical and integrated overview of the evidence available in recent literature.

3 RESULTS AND DISCUSSIONS

The results obtained from the review of the studies highlight the central role of physiotherapist-led physical activities in the management of COPD, as evidenced and discussed based on the analysis presented in Table 1.

Table 1. List of Reviewed and Selected Articles

Author	Objectives	Conclusion
	To present the results of various physical activity interventions in COPD	SUCRA analyses indicated that Pulmonary Rehabilitation (PR) programs associated with Urban Training are the most effective

Jiménez, S. P. *et al*.	patients, analyzed through the 6-Minute Walk Test (6MWT).	interventions, with Pilates showing similar effects. Both promote improved exercise capacity in COPD patients, although more studies are needed to evaluate the impact according to disease severity.
Tian, X. *et al*.	To compare the effects of aerobic exercise, resistance training, endurance training, and high-intensity interval training (HIIT) in COPD patients.	Effectiveness varies according to patient goals. HIIT enhances exercise capacity, resistance training improves quality of life, and endurance training benefits pulmonary function. Effectiveness depends on individual characteristics.
Redwood, J. Q. *et al*.	To analyze the combined effects of resistance and strength training on exercise tolerance and quality of life in COPD patients	Combined endurance and strength training provides superior benefits, enhancing tolerance, muscle strength, and overall quality of life.
Adolfo, J. R. *et al*.	To analyze the effects of HIIT compared to continuous exercise on functional and cardiovascular capacity in COPD patients.	HIIT may lead to greater improvements in daily activity performance and reduced dyspnea, but studies have bias risks that require cautious interpretation.
Jian, C. *et al*.	To compare the effectiveness of aerobic, strength, endurance, and HIIT training in stable COPD patients.	HIIT is most effective for improving walking capacity, lung function, and quality of life, while resistance training better improves forced vital capacity. Further high-quality studies are required to confirm results.
Ravenna, E. *et al*.	To evaluate the effects of physical activity on the quality of life of COPD patients.	Physical activity provides significant health benefits, improving respiratory and muscular function. Gentle practices like Tai Chi and Qigong also enhance functionality. Home-based programs with behavioral support are viable alternatives to supervised rehabilitation.
Santos, D. S. *et al*.	To evaluate the effects of physical exercise on body composition and functional capacity in patients with Chronic Obstructive Pulmonary Disease (COPD).	The various exercise protocols, including strength training, cycle ergometer exercises, combined modalities, and electrostimulation, have demonstrated effectiveness in patients with stable Chronic Obstructive Pulmonary Disease (COPD), leading to significant improvements in quality of life, the ability to perform daily activities, and muscular functionality (strength and endurance).
Ito, J. T. *et al*.	To analyze the effects of physical exercise on the Th17/Treg cell response and the differentiation of	The practice of physical exercise has been shown to reduce the inflammatory response (Th17 cells) and enhance the immunosuppressive action (Treg cells).

	Treg phenotypes in patients with Chronic Obstructive Pulmonary Disease (COPD).	These changes are associated with improved physical functional capacity and increased muscle strength. The observed physiological responses were correlated with the results of the 6-Minute Walk Test (6MWT), upper (UL) and lower limb (LL) muscle strength, as well as improved performance in daily living activities.
Frei, A. *et al*.	To determine whether a one-year, minimal-equipment, home-based strength training program has an effect on dyspnea, exercise capacity, and patient-reported outcomes in individuals with Chronic Obstructive Pulmonary Disease (COPD).	Over a 12-month period, the home-based exercise program for patients with COPD did not produce a significant improvement in dyspnea. However, it showed high acceptance among participants, demonstrating improvements in key aspects of physical function, such as functional capacity and leg muscle strength. These improvements were confirmed by the one-minute sit-to-stand test (1MSTST), with 79% of participants reporting positive effects.
Valeiro, B. *et al*.	To evaluate the effects of physical activity following hospitalization due to exacerbations in patients with Chronic Obstructive Pulmonary Disease (COPD).	The 12-week program increased physical activity levels in these COPD patients, particularly in the number of daily steps, through the use of pedometers and progressively individualized goals. No other significant differences were observed between the groups in the remaining outcomes.
Özmen, I. *et al*.	To evaluate the effectiveness of a pulmonary rehabilitation (PR) program in reducing the frequency of hospital admissions and emergency department visits in patients with chronic respiratory conditions.	Pulmonary rehabilitation (PR) has proven to be highly effective, leading to significant improvements in exercise capacity and quality of life in patients with chronic respiratory diseases. The most notable benefit was a significant reduction in emergency department visits and hospitalization rates ($p = 0.001$), validating PR as a cost-effective and essential intervention in the management of these patients, alongside pharmacological therapy.
Navarro, M. E. T. *et al*.	To determine whether pulmonary rehabilitation (PR) reduces the number of exacerbations in patients with chronic obstructive pulmonary disease (COPD), delays clinical deterioration, improves quality of life, and to assess whether PR is a cost-effective intervention.	Pulmonary rehabilitation yielded positive clinical outcomes, reducing hospital admissions by 48.2% and emergency visits by 42.5%, in addition to significantly improving quality of life. Financially, the program proved to be cost-effective, resulting in a net saving of €1,826 per patient per year for the healthcare system, demonstrating an excellent cost-benefit ratio.

Lu, H. *et al*.	To analyze, based on the literature, the outcomes of patients with acute exacerbation of COPD who underwent or did not undergo early rehabilitation, comparing the effects of rehabilitation initiated during hospitalization with those of rehabilitation initiated after hospital discharge.	Pulmonary rehabilitation (PR) has demonstrated statistically significant improvements in exercise capacity and quality of life in patients with chronic obstructive pulmonary disease (COPD). The study also confirmed a substantial reduction in emergency admissions and hospitalizations, as well as an increase in forced expiratory volume in one second (FEV1) following PR. These findings underscore the importance of PR as an essential intervention not only for optimizing COPD management, but also for promoting cost savings in healthcare by reducing the need for hospitalizations and emergency treatments.

Source: Prepared by the authors, 2025.

Studies such as Jiménez (2022) highlight the high efficacy of urban circuit training and Pilates, particularly when supervised by physiotherapists, in improving exercise capacity, as assessed by the Six-Minute Walk Test (6MWT). These findings suggest that the combination of structured exercise programs and professional supervision enhances the benefits of Pulmonary Rehabilitation (PR).

According to a meta-analysis by Tian (2024) and a clinical trial by Redwood (2024), the combination of exercise modalities (resistance + strength) is the most effective approach for optimizing multiple clinical outcomes. For instance, Redwood (2024) reported the greatest improvement in 6MWT performance (+72.4 meters) and quality of life, as measured by the St. George's Respiratory Questionnaire (SGRQ), indicating that integrated exercise modalities should be the preferred strategy in PR protocols.

The studies by Adolfo (2019) and Tian (2024) indicate that although high-intensity interval training (HIIT) shows significant benefits compared to no intervention, it may not be the most suitable option for all therapeutic goals when compared to moderate-intensity continuous exercise. These findings reinforce the need for individualized exercise prescriptions. Nevertheless, Jian's (2024) meta-analysis confirms that HIIT is effective for outcomes such as 6MWT and Forced Expiratory Volume in one second (FEV_1), supporting its use in patients who are physically capable of performing high-intensity protocols.

Supporting the call for individualized care, Ravenna (2024) reinforces that physical exercise is the cornerstone of Pulmonary Rehabilitation, essential for improving both quality of life and functional capacity. While high-intensity aerobic exercises are generally favored, other modalities—such as resistance training and low-intensity activities—have also shown efficacy. Moreover, the author emphasizes that home-based programs, combined with daily physical activity monitoring, offer a viable alternative for increasing access to and adherence to treatment.

Santos (2024) demonstrated gains in muscle strength and functional performance through varied exercise protocols, including combined strength training, aerobic activities, and neuromuscular electrical stimulation, although without significant impact on body composition. These results suggest that functional benefits do not necessarily depend on morphological changes but rather on physiological adaptations to exercise. Supporting these conclusions, the study by Ito (2025) makes a significant contribution by demonstrating a reduction in inflammatory markers, such as Th17 cells, following Pulmonary Rehabilitation, consolidating exercise as a clinical intervention with broad systemic impact, beyond functional improvement alone.

On the other hand, home-based or low-cost interventions, as examined in the HOMEX program by Frei (2022), proved feasible for maintaining muscle function after hospital discharge. Although these programs showed limited effects on dyspnea or quality of life, they suggest that home interventions may serve as adjuncts or maintenance strategies for patients with limited access to supervised rehabilitation. The importance of structured daily physical activity is also underscored in the study by Valeiro (2022), which showed that simple strategies, such as the use of pedometers and motivational support, can effectively disrupt the cycle of inactivity following exacerbations.

Finally, Özmen (2018) and Navarro (2023) demonstrated significant improvements in functional capacity, quality of life, and reduction in hospitalizations, particularly in lowering emergency admissions and exacerbation rates. A meta-analysis by Lu (2023) further reinforced these findings by showing that early pulmonary rehabilitation following exacerbations improves exercise

capacity and reduces hospital readmissions, although with no clear effect on mortality. Taken together, these studies indicate that pulmonary rehabilitation is effective at various stages of care, and its implementation should be tailored to the clinical condition of each patient.

4 CONCLUSION

Based on the findings of this study, it is concluded that motor physiotherapy, particularly through pulmonary rehabilitation, exerts significant beneficial effects in patients with Chronic Obstructive Pulmonary Disease (COPD). The implementation of motor activities leads to substantial improvements, especially in functional capacity and quality of life, and, in some cases, contributes to the reduction of dyspnea. The most frequently discussed and effective interventions involve the combination of aerobic and resistance exercises, with particular emphasis on supervised approaches, which have demonstrated greater clinical efficacy.

The reviewed studies also indicate that physiotherapy plays a key role in reducing hospitalizations and readmissions among patients with COPD, highlighting the importance of this therapeutic approach in the clinical management and control of the disease. However, it is essential to underscore the heterogeneity of the protocols used across the different studies, suggesting that not all interventions are equally applicable to all patients. In particular, home-based programs may produce variable effects on outcomes such as dyspnea and quality of life, emphasizing the need for individualized treatment planning in COPD care.

Therefore, the personalization of physiotherapeutic interventions, taking into account each patient's specific clinical profile, is a crucial aspect for optimizing clinical outcomes and ensuring more effective management of COPD. Ongoing research focused on protocol standardization and the identification of more precise and individualized approaches is of paramount importance for advancing treatment strategies for this condition.

In summary, motor physiotherapy, especially when integrated with pulmonary rehabilitation, constitutes an essential tool in the management of COPD, promoting significant improvements in quality of life and functional performance, while also contributing to the reduction of complications associated with the disease.

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