

Letter to the Editor

The importance of quantifying training loads and applying exercise principles in respiratory muscle training studies

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Keywords: Respiratory muscle training, exercise principles, COPD

<https://doi.org/10.29390/001c.147869>

Canadian Journal of Respiratory Therapy

Vol. 61, 2025

DEAR EDITOR,

We carefully read the recent article by Russian et al. entitled “Impact of respiratory muscle training on muscle strength, pulmonary function, symptoms, and quality of life in COPD”.¹ The authors address a clinically relevant question and include both inspiratory and expiratory components of respiratory muscle training (RMT), which is pertinent to optimizing rehabilitation strategies. However, we wish to highlight a methodological concern regarding the specification and monitoring of training loads, as well as an interpretative issue related to the reported changes in pulmonary function.

Russian et al. report that participants used a PowerLung device (PowerLung, Inc.) with spring-loaded threshold valves for inspiratory and expiratory training, adjusting the load by one-eighth of a turn when the exercise became “easy”.¹ While the device operates as a threshold system, the authors acknowledge that the pressure corresponding to each adjustment was not quantified (in cmH₂O or a similar unit). Consequently, the actual training stimulus—the key determinant of adaptation—remains undefined in measurable physiological terms and cannot be related to individual capacity.

This point is critical because the principles of exercise training—including specificity, overload, progression, and individualization—apply equally to respiratory and peripheral muscles.² Without a clear quantification of the imposed pressure load or its relationship to the individual’s maximal inspiratory (MIP) and expiratory (MEP) pressures, it is not possible to determine whether these principles were met. Moreover, the inability to express load as a proportion of baseline strength (e.g., %MIP or %MEP) hinders replication and comparison with existing literature.³ In most RMT trials, intensity is prescribed at 30–60% of MIP and progressively increased as tolerance improves, providing a standardized and physiologically meaningful reference.⁴ In the present study, a “one-eighth turn” adjustment could map to variable pressure increments across individu-

als (depending on device mechanics and valve characteristics), which may yield inconsistent training stimuli.

Although the authors report significant improvements in MIP and MEP, the absence of quantifiable load data limits the capacity to establish a defined dose–response relationship for these gains. This methodological limitation, which the authors acknowledge, warrants deeper reflection: without precise control of training intensity, it is difficult to determine whether the observed improvements are the result of accurate physiological adaptation or a combination of motivation, learning effects, or natural variability in repeated maneuvers.

A related consideration concerns the interpretation of changes in pulmonary function. The study notes a modest mean increase in forced expiratory volume in the first second (FEV₁) (approximately 37 mL), which did not reach statistical significance.¹ In routine spirometry, changes of that magnitude fall within expected test–retest variation. The American Thoracic Society (ATS) and European Respiratory Society (ERS) standards consider shifts of about ≥100 mL or 5–10% as the threshold for clinical relevance.⁵ Therefore, in the absence of objective evidence of meaningful change, these results should be interpreted cautiously. If not explicitly discussed by the authors, it would be prudent to recognize that the apparent FEV₁ improvement may reflect measurement variability rather than a real physiological effect of RMT.

RMT is best treated as a structured exercise intervention. This implies explicit prescription of intensity, planned progression, and scheduled reassessment. Practically, reporting valve pressures in cmH₂O and anchoring targets to baseline MIP/MEP—for example, ~30–60% of MIP with predefined rules for step-ups—provides a reproducible dosing scheme. Using a digital manometer or a calibrated threshold device also allows device-independent verification and facilitates comparison across studies.

Despite these methodological limitations, the article usefully illustrates the feasibility of combined inspiratory and expiratory training in COPD.¹ The improvements observed in respiratory muscle strength and patient-reported

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outcomes are encouraging, particularly for individuals with advanced stages of disease. However, as the field moves toward precision rehabilitation, quantitative prescription of RMT intensity will be crucial to transform these promising findings into standardized, evidence-based clinical protocols.

In summary, the study by Russian et al. underscores the role of RMT in COPD care.¹ Future work should report training loads explicitly, express them in pressure units, and individualize targets to baseline capacity. Small changes in spirometric indices such as FEV₁ ought to be interpreted against known measurement variability. Addressing these points will strengthen methodological rigour and sharpen the physiological signal attributable to RMT.

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COMPETING INTERESTS

All authors have completed the ICMJE uniform disclosure form and declare no conflict of interest.

FUNDING

This letter did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

AI STATEMENT

We used an AI-assisted tool (ChatGPT 5, OpenAI) solely to improve English grammar and wording. No scientific content was generated, and all text was reviewed and approved by the authors, who take full responsibility for the manuscript.

Submitted: November 20, 2025 EST. Accepted: November 20, 2025 EST. Published: November 25, 2025 EST.



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