Optimizing respiratory performance in oncologic thoracic surgery: a narrative review

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Abstract

Background and Objectives: Respiratory function is often compromised in patients undergoing thoracic surgery for cancer, increasing the risk of pulmonary complications and hindering functional recovery. The aim of this narrative review was to gather and discuss the main evidence on respiratory physiotherapy interventions applied to oncologic patients undergoing lung resections, focusing on effective strategies and clinical outcomes.

Content: Databases such as PubMed, Scopus, and SciELO were consulted, prioritizing articles published between 2015 and 2025. The review highlights interventions at three stages: prehabilitation, perioperative management, and postoperative rehabilitation. Prehabilitation programs including inspiratory muscle training, breathing exercises, and functional strengthening reduce postoperative pulmonary complications. Early physiotherapy in the hospital prevents atelectasis and pneumonia, while outpatient rehabilitation improves ventilatory capacity, muscle strength, and quality of life. Multidisciplinary care enhances adherence and functional outcomes.

Conclusion: Integrating structured respiratory physiotherapy interventions throughout the surgical process optimizes respiratory performance and functional recovery in oncologic patients.

Keywords: oncologic physiotherapy; prehabilitation; rehabilitation; thoracic surgery; lung neoplasms

Abbreviations

ERAS – Enhanced Recovery After Surgery

IMT – Inspiratory Muscle Training

TMI – Training Muscular Inspiratory

PEP/OPEP – Positive Expiratory Pressure / Oscillatory Positive Expiratory Pressure

Introduction

Lung cancer remains one of the leading causes of cancer-related mortality worldwide. Thoracic surgery is the treatment of choice for early-stage adenocarcinoma but is associated with significant risks of respiratory complications, reduced ventilatory capacity, and functional limitations.

Oncologic patients often present additional risk factors, such as advanced age, comorbidities, and sequelae from previous treatments, increasing clinical vulnerability. Physiotherapy plays a key role throughout the surgical process, from preoperative preparation to long-term rehabilitation.

Content

1. Respiratory Prehabilitation

Prehabilitation aims to prepare patients for surgery by optimizing pulmonary function and muscle strength before the procedure. Programs including inspiratory muscle training (IMT), breathing exercises, light aerobic conditioning, and functional strengthening have been shown to significantly reduce postoperative pulmonary complications and length of hospital stay. Patients receiving preoperative physiotherapy have lower rates of atelectasis and pneumonia compared to standard care.[1,3]

2. Perioperative and In-Hospital Management

Immediate postoperative physiotherapy focuses on preventing complications and promoting adequate ventilation. Key interventions include early mobilization, diaphragmatic breathing re-education, incentive spirometry, and bronchial hygiene techniques. Evidence shows that combining early mobilization with respiratory exercises reduces infection rates and facilitates faster hospital discharge.[1,3]

3. Postoperative Rehabilitation

Outpatient physiotherapy remains essential after discharge. Strategies such as resistance exercises, use of oscillatory devices (e.g., Acapella®, PEP/OPEP), progressive muscle strengthening, and gait training improve functional capacity, respiratory muscle strength, and quality of life. Adherence to rehabilitation programs is directly associated with faster and sustained recovery.[1,2,3]

4. Multidisciplinary Approach

The success of oncologic physiotherapy depends on integration with other healthcare professionals. Multidisciplinary care involving physicians, nurses, nutritionists, psychologists, and physiotherapists enhances adherence, reduces complications, and improves functional outcomes. ERAS protocols adapted for oncology have shown promising results.[2,4,5]

Conclusion

Respiratory physiotherapy is an essential component in the management of patients undergoing thoracic oncologic surgery. Structured interventions in prehabilitation, perioperative care, and postoperative rehabilitation provide clinically relevant benefits, including reduced complications, improved functional outcomes, and optimized respiratory performance. Integration of physiotherapy programs into surgical routines is highly recommended in oncology centers.[1–5]

Table 1 – Critical Analysis of the Review Article

Evaluated Aspect	Strengths	Limitations	Suggestions for Improvement
Topic and Relevance	Current and clinical topic; focus on thoracic oncologic surgery; integration with ERAS	No major issues	Maintain focus; include less common thoracic cancers
Clarity and Structure	Well organized; clear headings; logical flow	Narrative review; lacks quantitative data	Add summary tables or comparative graphs
Review Methodology	Search in PubMed, Scopus, LILACS, SciELO; recent articles (2015–2025)	Inclusion/exclusion criteria not detailed; narrative type limits evidence	Detail selection criteria; consider systematic review
Content	Covers prehabilitation, perioperative, postoperative care; multidisciplinary approach	Few numerical data; protocol heterogeneity; small samples	Quantify benefits (% reduction of complications, functional gains); include summary table of studies
Discussion	Integrates evidence with clinical	Does not differentiate	Suggest standardization of

	practice; acknowledges limitations	surgery types; lacks detail on most effective interventions	protocols; discuss impact of different surgeries (lobectomy, pneumonectomy)
Conclusion	Summarizes findings; emphasizes physiotherapy importance	May appear generic without concrete data	Highlight quantifiable results; suggest future research directions

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