THE IMPORTANCE OF EARLY MOBILIZATION IN ICU PATIENTS: EFFECTS ON RESPIRATORY FUNCTION AND LENGTH OF STAY

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ABSTRACT

Early mobilization combined with respiratory physiotherapy in mechanically ventilated ICU patients is a key intervention that enhances respiratory muscle performance, accelerates weaning from mechanical ventilation, and reduces ICU and hospital length of stay. This experimental approach addresses ICU-acquired weakness and respiratory dysfunction caused by immobility and systemic inflammation. Safety protocols, individualized rehabilitation plans, and multidisciplinary teamwork are essential for effective implementation. The intervention also yields significant cost savings, easing hospital resource burdens. This review highlights the clinical, functional, and economic benefits of early mobilization with respiratory physiotherapy in critically ill patients and underscores the vital role of physiotherapists in multidisciplinary ICU care.

Keywords: Early Mobilization. Respiratory Physiotherapy. Length of Stay. Intensive Care Unit. Mechanical Ventilation. ICU-Acquired Weakness.

INTRODUCTION

Early mobilization combined with respiratory physiotherapy in intensive care unit (ICU) patients under mechanical ventilation has emerged as a cornerstone intervention to improve patient outcomes and reduce healthcare costs. Critically ill patients often experience profound muscle weakness, impaired respiratory function, and prolonged dependency on mechanical ventilation due to immobilization and systemic inflammation. Experimental studies and clinical trials have consistently shown that early mobilization, commenced within 48 to 72 hours of ICU admission, alongside respiratory physiotherapy, significantly enhances respiratory muscle performance, accelerates weaning from mechanical ventilation, shortens ICU and hospital length of stay, and improves functional independence at discharge (Zhang et al., 2019; Singam, 2024).

In patients receiving mechanical ventilation, the risk of ICU-acquired weakness (ICU-AW) is high due to disuse, leading to diaphragm dysfunction and generalized muscle atrophy. Early mobilization targets this pathophysiology by incorporating graded physical activities such as passive range-of-motion exercises, sitting on the edge of the bed, standing, and ambulation as tolerated. When combined with respiratory physiotherapy techniques such as airway clearance maneuvers, inspiratory muscle training, and patient positioning, there is a synergistic improvement in lung aeration, mucociliary clearance, and gas exchange (Lai et al., 2017; Aquim et al., 2019).

The methodology for implementing early mobilization protocols typically involves multidisciplinary coordination with clear safety criteria. Hemodynamic stability, adequate oxygenation (e.g., FiO2 ≤ 0.6, PEEP ≤ 10 cmH2O), and absence of active bleeding or unstable fractures are prerequisites for initiating mobilization. Physiotherapists conduct daily assessments to tailor interventions individually, progressively increasing activity intensity. Respiratory physiotherapy sessions focus on facilitating secretion removal, optimizing ventilation-perfusion matching, and employing exercises to strengthen respiratory muscles critical for spontaneous breathing trials. These combined interventions shorten the duration of mechanical ventilation by an average of 3 to 4 days and reduce ICU length of stay by 20 to 30 percent in randomized trials (Hodgson et al., 2013; Zhang et al., 2019; Moreira et al., 2025).

Beyond clinical outcomes, early mobilization and respiratory physiotherapy have demonstrated economic benefits. The reduction in mechanical ventilation days and ICU length of stay translates to significant cost savings for hospitals, which are often burdened by high fixed costs and resource constraints. Studies indicate that even low-cost and

viable mobilization protocols, requiring minimal specialized equipment, can reduce hospital costs by up to 30 percent while improving patient throughput and resource utilization efficiency (Rawal et al., 2024; Moreira et al., 2025).

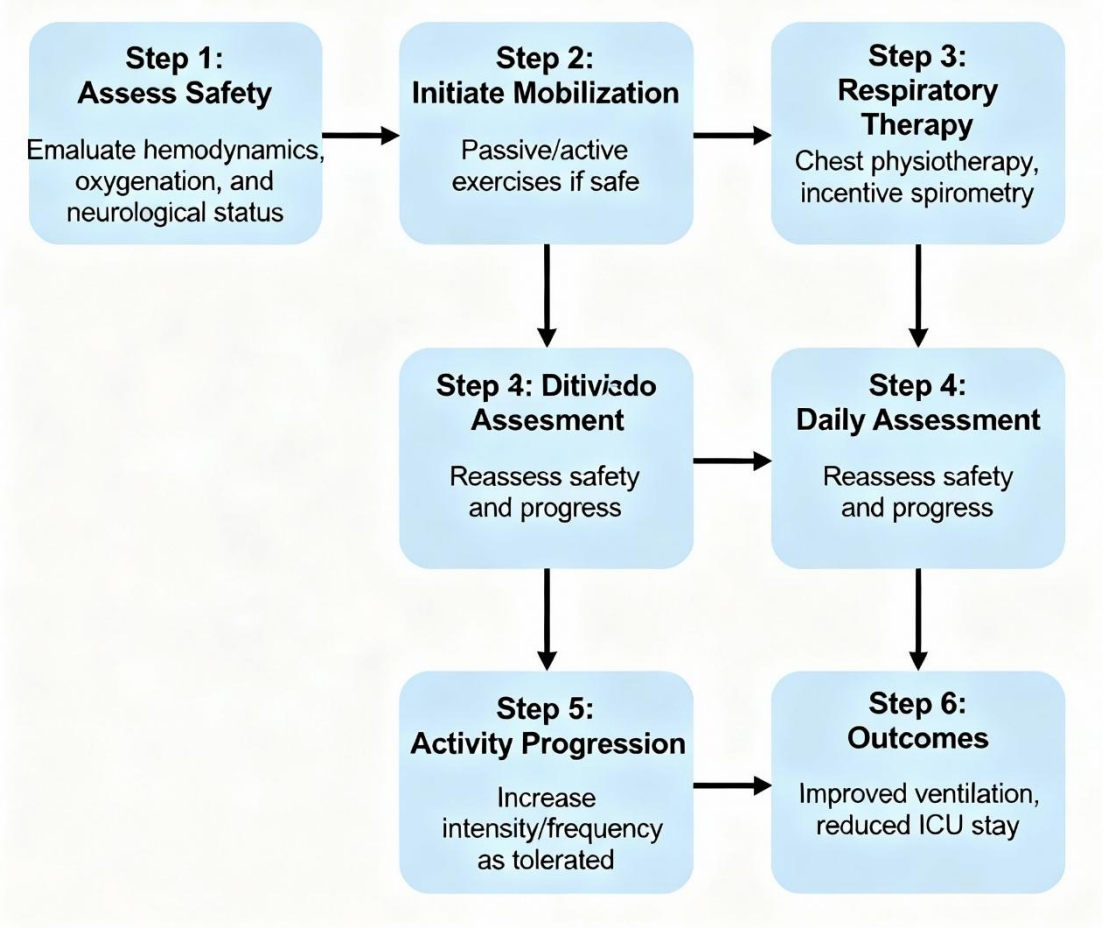
Despite its benefits, the widespread adoption of early mobilization remains challenging. Common barriers include inadequate staffing ratios, sedation practices that limit patient interaction, lack of standardized protocols, and cultural resistance within clinical teams. Strategies to address these challenges encompass staff education, protocol-driven approaches, stakeholder engagement, and integration of physiotherapists as key members of critical care teams responsible for initiating and supervising mobilization and respiratory therapy (Alaparthi et al., 2020; Conceição et al., 2017).

The active role of physiotherapists extends beyond direct patient care to include advocacy for early mobility as a quality-of-care indicator, outcome monitoring, and continuous process improvement. Their expertise in both musculoskeletal and respiratory domains uniquely positions them to optimize patient recovery trajectories, reduce complications, and improve post-ICU quality of life (Hodgson et al., 2013; Aquim et al., 2019).

The flowchart illustrates the process of early mobilization combined with respiratory physiotherapy for ICU patients on mechanical ventilation. It begins with patient admission and a safety assessment that includes hemodynamic stability, sufficient oxygenation, and absence of contraindications like active bleeding. If safety criteria are met, the protocol initiates early mobilization activities such as passive range-of-motion exercises and progressive ambulation, alongside respiratory physiotherapy techniques including airway clearance and inspiratory muscle training. Daily assessments by physiotherapists guide gradual intensity increases in activity and monitor progress in weaning from mechanical ventilation. The overall goal is to enhance respiratory muscle function, reduce the length of ICU and hospital stay, and improve patient outcomes, with adjustments made if safety criteria are not maintained during the process. This multidisciplinary, patient-tailored approach is essential for safe and effective recovery in critically ill patients.

Figure 1

The Importance of Early Mobilization in ICU Patients Effects on Respiratory Function and Length of Stay



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In conclusion, early mobilization coupled with respiratory physiotherapy is a vital intervention within ICU care protocols for mechanically ventilated patients. This approach improves respiratory and functional outcomes, reduces ICU and hospital lengths of stay, and provides significant economic advantages. Its success depends on multidisciplinary collaboration, patient-specific protocols, and overcoming systemic barriers. Future research should focus on standardizing interventions, elucidating long-term outcomes, and exploring technological aids such as robotic-assisted mobilization to further enhance care quality.

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