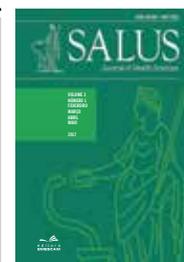




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REVIEW ARTICLE / UPDATE

## Influence of early mobilization in adult critical patients

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### Abstract

Severe patient is considered to be an imminent risk of loss of life or organ function of the human body, as well as those in fragile clinical condition that require care in the Intensive Care Units (ICU), requiring the assistance of an interdisciplinary team, in which Physiotherapy is able to promote the preservation and functional recovery of human movement, minimizing complications of hospitalization. The main objective of this study is to know the influence of early mobilization through physical therapy in critical adult patients. Regarding material and methods, an integrative review of the literature of the last 5 years found in the PubMed, Lilacs and Scielo database was done. There were 10 studies related to early mobilization in critical adult patients hospitalized in ICU. The results indicated that early mobilization is a safe and viable technique, which reduces hospitalization time, mechanical ventilation, muscle weakness due to immobilization and, despite the benefits, presents limitations, insecurity related to the patient's tubes and catheters. Many studies argue that early mobilization reduces the deleterious effects of prolonged bed rest. The study concluded that early mobilization is a safe, affordable method that provides benefits to the patient. However, it has limitations in practice, such as the lack of professionals and the fear of disconnecting tubes and catheters.

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A critical patient is an individual who has impairment of one or more of the major physiological systems with loss of self-regulation, thus requiring continuous care, as occurs in Intensive Care Units (ICUs)<sup>1</sup>. A common complication in patients admitted to ICUs is the generalized weakness, for bed restriction causes immobility cooperating for the weakness of the skeletal muscles, especially in the respiratory muscles. This immobility may contribute to an increase in the length of hospital stay<sup>2</sup>; to a greater dependence on activities of daily living; to the need for family support; as well as to a greater disability after hospital discharge, which may have a significant impact on the patient's functions and quality of life<sup>3</sup>.

The critical patient demands care from a multidisciplinary team, in which physical therapy is crucial, because as a result of human movement, it promotes the preservation of functional recovery, minimizing complications arising from hospital admission, more precisely in the ICU<sup>4</sup>. In this respect, early mobilization is a physiotherapeutic resource which maximizes functional recovery, and is performed through progressive activities, such as kinesiotherapy, bedside sedestation, transfer to a chair, orthostatism and ambulation that, when possible, should be initiated from The first days of hospitalization<sup>3</sup>.

It is common to believe that early mobilization of critically restricted bed patients can result in important effects for these patients, such as maintaining skeletal muscle strength and joint mobility, optimizing tissue oxygen transport, improving lung function and Performance of the cardiorespiratory system. According to some authors, early mobilization seems therefore to be favorable to patient recovery, considering that it may be useful in the prevention of both physical problems and psychic problems. Added to that, it can prevent prolonged hospitalization and

thus the risks associated with the longer immobilization period. All these factors added can even affect the improvement of the quality of life after hospital discharge<sup>5</sup>.

Aforementioned in the literature, early mobilization should be started as soon as possible<sup>7</sup>, as it seems to be a safe and viable physiotherapeutic approach capable of producing important physiological effects<sup>6</sup>. Even though there are studies about the early mobilization, it is necessary to know better its influence in the critical adult patient, as a way to deepen the knowledge of the interdisciplinary team, being able, then, to improve the care provided by the professionals involved, especially in physiotherapy.

Thus, the purpose of this study is to understand the influence of early mobilization on critical adult patients, especially in relation to muscle strength, respiratory complications and length of hospital stay.

## METHODS

This study is an integrative review of the literature, in which descriptive research was carried out in the database of PubMed, Lilacs (Latin American and Caribbean Literature in Health Sciences) and Scielo (Scientific Electronic Library Online). The search was limited to the English and Portuguese languages and articles with great pertinence to the theme were selected. The types of study selected in this review were: systematic review, observational studies, cohort studies, experimental and clinical trials. The search was based on the combination of the terms: ICU, critical patient, early mobilization. After the bibliographical survey, the inclusion criterion used was that of material which data referred to aspects related to the key words previously mentioned as well as relevance on the subject in question. Direct approach to the topic in articles with languages in English or Portuguese,

published between 2010 and 2016 was used as criterion of inclusion of the studies. Articles that referred to the mobilization of patients who were not hospitalized in ICU were not used.

**RESULTS**

The harmful effects of bed rest and the benefits of early mobilization have been recognized in hospitalized patients since the 1940s. “Early”

is understood to mean mobilization activities that begin immediately after the stabilization of important physiological changes, and not exclusively after the release of mechanical ventilation or discharge from the Intensive Care Unit<sup>8</sup>. With the study of the literature, it was possible to obtain 10 results focusing on Early Mobilization in critical adult patients. The studies included in this review and a summary of some characteristics of each study are presented in Table 1.

Table 1: Summary of results of the studies which met the inclusion criteria.

Study	Type of Study	Participants	Intervention	Evaluated Issues
TEAM Study Investigatorset al. 2015.	Prospective cohort study	192 intubated patients, ventilated for more than 48 hours	Daily data collection during the first 14 days of mechanical ventilation or until discharge from the ICU or death	Physiological information, Richmond Agitation and scoring sedation scale maximum level of mobilization using the ICU mobility scale
JolleySE et al. 2014.	Cross-sectional Study	Physicians, Nurses and Physiotherapists of the team	Questionnaires on early mobilization and meetings	Potential benefits on early ICU mobilization, attitudes toward ICU therapy provision and perceived barriers
MeyerMJ et al. 2013.	Multicenter randomized trial	All adult ICU patients ventilated for less than 48 hours and were expected to continue ventilation for at least 24 hours	Daily goals for early patient mobilization. With the intervention protocol	Evaluated through questionnaires and early mobilization exercises
ZomorodiM et al. 2012.	Pilot Study	3 patients in VM since the date of admission	The protocol consists of 6 events of early mobilization activities	Safety and viability of early mobility protocol for ICU patients due to surgical trauma. Influence in time of MV or hospitalization and perceived vital effects

Study	Type of Study	Participants	Intervention	Evaluated Issues
LeditschkeAI et al. 2012.	Quality Audit	Patients with postoperative surgical hospitalization and trauma	Active Mobilization, Active Transfer, Passive Transfer	Frequency of early mobilization in the ICU and obstacles to early mobilization
ChawlaR et al. 2014.	Questionnaire	Physicians of the Indian Society of Medicine Questionnaire sent by email	Questionnaire	The physician's vision regarding the practices of analgesia, delirium, early mobilization among others
HarrisCL et al. 2014.	Questionnaire	Physicians, area managers and nurses. Patient records	3 orientation meetings and questionnaire	Barriers to early mobilization, early mobilization protocol and team vision
PermeC et al. 2014.	Observational Study	Patients of the Cardiovascular ICU, aged >18, who met the criteria to start physical therapy	Patients Observation for 8 weeks	Concordance, feasibility and clinical use of the Perme Mobilization Scale in ICUs
HodgsonCL et al. 2013.	Clinical Evaluation	Techniques applied on the patient in mechanical ventilation	–	The early mobilization with the reduction time of mechanical ventilation
MorrisPE et al. 2012.	Prospective Cohort Study	280 survivors due to acute respiratory failure during hospitalization	–	Index medical variables and early mobility with admissions or death in survivors of acute respiratory failure

VM: Mechanical Ventilation. UTI: Intensive Care Unit.

TEAM Study Investigators, et al.<sup>9</sup> and Morris et al.<sup>10</sup> performed a cohort study. The first one performed a prospective cohort study, in which the population studied was composed of 192 intubated patients, for more than 48 hours. Data collection was performed daily at 12 o'clock, during the first 14 days of mechanical ventilation or until discharge from the ICU or death. The physiotherapist assessed the physiological issues, the Richmond Agitation and Sedation (RASS) scale, according to table 2,<sup>11</sup> and the maximum level of mobilization

in the ICU. The study presented a positive result, since during the mobilization there were no serious adverse events, and among the 1,288 physiotherapy visits performed, only six (0.4%) presented cardiovascular or respiratory instability, demonstrating that mobilization is a safe method. On the other hand, Morris et al.<sup>10</sup>, in their cohort study of 280 ICU survivors who required mechanical ventilation for acute respiratory failure during hospitalization, aimed to assess whether medical variables and early mobilization Are ultimately associated

with readmission or death in survivors of acute respiratory failure. Of the total of 280 survivors, 132 (47%) required at least one hospital rehospitalization or died during the first year of post-admission, 126 (45%) did not require hospital readmission and remained alive after one year and 22 (8 %) Did not respond, being considered as loss of follow-up. The results showed that the precise mechanism by which early ICU mobility can lead to reduced rehospitalization is unclear, since survivors of respiratory insufficiency requiring mechanical ventilation are vulnerable to hospital readmission and have a high mortality rate within one year. For this, prospective longitudinal studies are needed to assess the effects of long-term early mobility.

The cross-sectional study by Jolley et al.<sup>12</sup> participants were 91 physicians, 17 nurses and 12 team physiotherapists who completed a questionnaire on early mobilization. The questionnaires consisted in evaluating the knowledge of the potential benefits of early mobilization in the ICU, the attitudes regarding the provision of ICU therapy and the perceived barriers to the practice of early mobilization. There were multiple choice questions with answer choices: I agree, I totally agree, I am neutral, I disagree, and I totally disagree. The results of this study concluded that most doctors favor the practice of early mobilization. Nurses, however, feel that mobilization puts the team at risk of musculoskeletal injuries, causing stress at work. Physiotherapists argued that reduced care time and concern about invasive device management are the barriers to early mobilization practice, demonstrating, this way, the need for a cohesive and trained multidisciplinary team for the widespread implementation of early mobilization in ICUs.

Meyer et al.<sup>13</sup> presented a randomized, multicenter study with all patients in the

adult surgical ICU, totaling 200 patients from three university hospitals in the United States of America, who were ventilated for less than 48 hours, expecting to continue ventilation at the next 24 hours at the time of screening. Daily goals for early mobilization were drawn with an intervention protocol, and then assessed through questionnaires and early mobilization exercises. The results of the study concluded that early mobilization based on previously established algorithms tends to optimize the efficiency of existing professional and technological resources, with no need for new hiring and acquisitions, safely improving the clinical results of patients hospitalized in the ICU, with no Increase hospital expenses.

Zomorodi et al.<sup>14</sup> analyzed, in a pilot study, 3 patients on mechanical ventilation hospitalized in an intensive care unit, from the date of admission, through a protocol composed of six mobilization activities. The evaluated items investigated whether it is safe and feasible for patients in the surgical ICU to develop and implement an early mobility protocol, whether there is a decrease in time in MV or hospitalization and whether the vital effects are perceived. The results of the study allowed concluding the importance of the multidisciplinary role in the development of an early mobilization protocol. In conclusion, more comprehensive studies are needed to determine if an early mobility protocol for patients admitted to such units is effective, considering that there is no gold standard for patient mobilization in intensive care units.

Leditschke et al.<sup>15</sup> performed a quality audit, which monitored 176 patients with postoperative surgical hospitalizations in the ICU for four weeks, evaluating the frequency of early mobilization in the intensive units and likewise assessed the obstacles encountered in performing the mobilization. The capacity of active mobilization, active transference, passive transference was

evaluated and the patients who were not mobilized were also evaluated. Among the mobilization records, there were two adverse events - both episodes of hypotension. The results of this study revealed that 54% of the patients analyzed received some type of mobilization, demonstrating the high frequency and safety of the method, contrary to the reluctance of the teams of some ICUs to mobilize the patients, despite the low risk and potential benefits. It is essential to emphasize that the mobilization in the patients who did not receive it could have been possible with small changes, such as, for example, selection of place for devices of vascular access, time of accomplishment of procedures and improvement of the degree of sedation.

Chawla et al.<sup>16</sup> applied a 6-month e-mail questionnaire to 659 physicians of the Indiana Society of Medicine in their study, evaluating the physician's view of analgesia, delirium, and early mobilization among others. In analyzing the data presented on mobilization practices, 92% believed that early mobilization plays an important role in patient recovery, that 85% of doctors asked for some form of mobilization on a regular basis and that only 20% believed that inpatients in ICUs can be mobilized safely, while on mechanical ventilators and with invasive monitoring. The main limiting factor for the non-mobilization of ICU patients was the seizure with the displacement of tubes and lines, corresponding to 22% of the responses. As regards 'reason for non-mobilization', only 569 doctors answered the question. 33.7% reported that ICU mobilization is not applicable and is not feasible due to personnel issues (the lack of availability of trained personnel), 13.7% believe that they could not mobilize critical patients with suspensory equipment (ventilators, , Etc.) and 7.8% are afraid of complications that may occur as a result of mobilization.

The study by Harris et al.<sup>17</sup> was attended by professionals from a multidisciplinary team. The intervention was performed through orientation meetings and questionnaire responses on the difficulties of early patient mobilization. In addition, an analysis of the medical records of 21 patients who remained in the intensive medical-surgical or cardiac care unit for more than three days between April 2011 to April 2012 and May 2012 to May 2013 was performed, totaling 364 and 542 physiotherapeutic evaluations, respectively. The barriers of early mobilization, the protocol used for mobilization, and the team's view on the subject were evaluated. The analysis of the data from this study allowed us to conclude that the practice of early mobilization in ICU is feasible. However, for this practice to take place safely, it is imperative that physiotherapists plan the sessions, taking into account the constraints of each patient, such as the use of mechanical ventilation and continuous dialysis. It was also concluded that most patients were able to participate in at least a few sessions, with postural changes, wandering small distances, transferring from bed to chair, causing them to progress and to tolerate the proposed activities.

Perme et al.<sup>18</sup> performed an observational study for eight weeks in 35 patients of the Cardiovascular ICU, older than eighteen years, who met the criteria to start physical therapy, verifying the agreement, feasibility and clinical use of the Perme de Mobilization Scale in ICU. The authors concluded that the presented scale is a tool developed to measure the mobility situation of the patient beginning with the ability to follow commands and terminating with the distance covered in two minutes. Presuming the preliminary data, they suggest that the scale may be considered a valid, reliable tool with acceptable clinical use, considering that it is used as an algorithm for progression of

the patient's activities in place of measuring their state of mobility.

Hodgson et al.<sup>19</sup> conducted a clinical evaluation study which observed the influence of early mobilization on reducing the time the patient received mechanical ventilation through the techniques applied to the patient during intensive care unit admission. After the analysis of three randomized trials, it was possible to establish the incidence of new technologies in the early mobilization of patients. A cycloergometer, transcutaneous electrical muscle stimulation, video therapies and technological aids made especially for the patient were used. Even with so many technologies allied to the practice of early mobilization, it is possible to perceive some barriers to its implementation. Examples of these are: inadequate staff to administer physical therapy, lack of equipment, concern with patient safety and physiological stability, sedation and mechanical ventilation, presence of catheters and probes, and scarcity of data on clinical and economic efficacy assessment in order to Convince doctors to apply the method.

## DISCUSSION

Severely ill patients who remain in bed for days or weeks have a great chance of suffering complications such as atrophy and muscular and skeletal weakness, as well as other organic consequences associated with immobility. Muscle weakness is recognized in ICU patients who are able to survive the acute phase of critical illness. According to literature, this weakness occurs in 25% to 60% of patients who recover their consciousness after a week of mechanical ventilation, and may have repercussions for months or years after hospital discharge, with impairment of daily activities, quality Life and reintegration of the patient into society<sup>8</sup>.

Early mobilization, though intuitively useful and physiologically logical, can be a complex therapy with a great deal of effort. This therapy becomes even more challenging considering that there are barriers that prevent its use in a more constant way<sup>19</sup>. Despite these barriers, studies have argued that early mobilization may reduce the harmful effects of prolonged bed rest<sup>8</sup>.

Considering the above, this study intended to verify the influence of early mobilization on critical adult patients. The results revealed that many studies have pointed to the importance of mobilization.

The cohort study conducted by Hodgson C et al.<sup>2</sup>, found that 84% of patients on mechanical ventilation received early mobilization. The practice of mobilization was associated with an increase in muscle strength at ICU discharge, positively influencing patient discharge and survival 90 days post-discharge. These results confirm the studies of Jolley SE et al.<sup>12</sup> and Chawla et al.<sup>16</sup>, who verified that the team is well informed about the potential benefits of mobilization, including reducing the time spent on mechanical ventilation and maintaining muscle strength. According to these studies, mobilization is a safe and viable technique for patient recovery.

This research pointed out that early mobilization offers benefits, but, on the other hand, it still faces certain difficulties such as seizures related to lack of personnel, displacement of tubes and catheters, patient safety, degree of sedation, time available.

The study by Harris CL et al.<sup>17</sup> encountered difficulties similar to those of this research. However, a relevant result of this study showed the ability of the critically ill patient to participate in some sessions, sitting at the bedside or standing beside the bed. In addition, it also showed that the patient was able to transfer to a bed Chair or wander through some sessions, surprisingly. This

demonstrates that if the patient has enough time to adapt to the changes, he will become more tolerant of activities, thus speeding up his recovery process.

Perme C et al.<sup>18</sup> claim that the patient mobility situation can be evaluated by the Score Perme UTI Mobility assessment tool, which describes the patient's mobilization capacity, selects the ideal activity level and provides a reliable evaluation of the patient's mobility in the ICU. Nevertheless, according to Meyer MJ et al.<sup>13</sup>, the condition for the patient to reach maximum levels of mobility, is to establish goals for the evolution of this patient with the human and material resources already available in the institution. In addition, it is necessary to guarantee safety and functionality to the patient, based on three fundamental characteristics: (1) simplicity, (2) focus of clinical staff and (3) use of resources already available.

Zomorodi M et al.<sup>14</sup> conducted a pilot study with three patients and discovered that these patients were able to walk satisfactorily using the tracheostomy or portable mechanical ventilator maintaining stable vital signs immediately after 15 minutes of activity. This fact indicated the safety of early mobilization and pointed out - in the final analysis of the patients - the reduction of mechanical ventilation time as well as of ICU stay.

The study by Leditschke AI et al.<sup>15</sup> demonstrated that mobilization is a safe practice, contemplating that only two adverse events occurred during early mobilization, requiring that the patient returned to bed. Considering that both episodes involved hypotension, it was pointed out that the limitation for the mobilization was the fact that the patient presented great respiratory instability.

Morris PE et al.<sup>10</sup> observed that patients receiving early mobilization had fewer hospital readmissions or death. This fact - although not entirely clear - reduces potential exposure to damage and debilitation, as it is associated with a decrease in the length of hospital stay.

## CONCLUSION

Considering the literature, early mobilization is a safe and viable technique capable of reducing hospitalization time, mechanical ventilation, as well as of muscle weakness in the ICU. Even knowing the benefits of early mobilization, the professionals involved in the research pointed out the lack of professionals and the fear of disconnecting tubes and catheters as the main limiting factors of the technique.

In view of the above, it is suggested the need to seek new studies on the subject. It is also necessary that the ICU team be trained in order to mobilize the critical patient in a safe and effective way, allowing the patient to benefit from this technique developed by the physiotherapist.

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