

# Practice resource network.

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Q | have been hearing about early mobilization for critically ill patients. Are there any studies that support this practice?

A As every critical care nurse is aware, critically ill patients have limited mobility due to life support, an array of monitoring equipment and multiple medical problems, and they suffer from de-conditioning and muscle weakness. Often the most activity a critically ill patient receives is rolling side to side for a bed bath or repositioning, being pulled up to the head of the bed or being transferred to the CT table for a scan. For caregivers in the ICU, it is apparent that physical de-conditioning from illness, heavy sedation and prolonged bed rest can occur even after only a few days. And for patients who are unconscious or sedated much of the muscle weakness may go unnoticed early on. The concept of early mobilization therapy for critically ill patients, especially patients undergoing mechanical ventilation, is somewhat new to ICU caregivers and not much information has been readily available. However, recently, several studies and related articles have been published that support and encourage getting critically ill patients up and moving early in their ICU stay.

To understand the need for early mobilization, we must first understand what happens as the body experiences de-conditioning from inactivity and illness. Multiple changes occur within a few days to a few weeks in organ system physiology that are induced by a sudden decrease in activity. Patients have demonstrated weakness and neuromuscular abnormalities within seven days of ICU stay (1). This can be potentially worse in a sedated patient. Skeletal muscle strength may decline by 1 to 1.5 percent per day of strict bed rest and up to 50 percent of the total muscle mass in two weeks' time (2). In most types of muscle atrophy, overall rates of protein synthesis are suppressed, and rates of protein degradation are elevated. This response accounts for most of the rapid loss of muscle protein. In critically ill patients, the muscle groups that may lose strength most quickly as a result of immobilization are those involved with maintaining posture, transferring position and ambulation (3).

Critically ill patients are also likely to have decreases in their cardiovascular and respiratory reserves as well as neuropathies. Myocardial dysfunction can develop in critically ill patients who did not have primary heart disease and is associated with systolic dysfunction, contractility disturbances and electrocardiographic changes (3). Most nurses are familiar with the "foot drop" that occurs with prolonged immobility; this can also occur in the hands. These compression neuropathies that can develop in ICU patients may not be apparent for some time because many ICU patients are sedated or have decreased levels of consciousness (3).

Recent studies are bringing to light the benefits of early mobilization for critically ill patients, and although it goes against what has traditionally been accepted, patients on mechanical ventilation can be safely mobilized when appropriate measures are taken. Benefits of mobility are well documented in traditional rehabilitation settings. The heart works 30 percent more efficiently when not in a supine position as oxygen consumption is decreased. Mobility of patients has also been found to help prevent venous stasis, thereby decreasing thrombophlebitis, deep vein thrombosis and pulmonary emboli. The kidneys are able to function more effectively and cell debris does not collect in the dependent area of the kidneys. The urine is then able to empty from the bladder. With the kidney and bladder functioning most effectively, the risk of kidney stones and urinary tract infections decreases (1).

The following studies may shed some light on benefits, risks and barriers to early mobilization for this complex group of patients:

Bailey and colleagues concluded in their study that early activity is feasible and safe in mechanically ventilated patients. The study also proposes that early activity is a candidate therapy to prevent or treat the neuromuscular complications of critical illness (4).

Perme and colleagues reported a case of a patient with an LVAD (left ventricular assist device) who required prolonged postoperative mechanical ventilation. Early and aggressive physical therapy was provided including ambulation on a portable ventilator. This case suggests that improving mobility of these patients has the potential to facilitate ventilator weaning as well as to improve the outcomes of transplantation (5).

Hopkins, Spuhler and Thomsen describe the development and implementation of a respiratory care process model focusing on best practices and improvement in care, including early mobility. To implement the care process model in their unit, the authors had to make significant changes in the respiratory ICU (RICU) at LDS Hospital in Salt Lake City, Utah, which included changes in how the RICU staff worked together. ICU culture was transformed in a way that resulted in improved and consistent care, including early mobility, while stabilizing or even decreasing cost. Involvement of frontline staff in early mobility and other components of the care process model resulted in the development of a culture of safety and teamwork (6).

Kathy Stiller, a physiotherapist based out of Adelaide Royal Hospital in Australia, describes her experiences with early mobilization for critically ill patients with the aim of treatment to include improving respiratory function, level of consciousness, functional ability and psychological well-being, and reducing the adverse effects of immobility. She believes mobilization may decrease the duration of mechanical ventilation and length of ICU or hospital stay. Her article provides critical care practitioners with guidelines that can be used to assess the safety of mobilizing critically ill patients. The main safety factors she addresses include intrinsic factors related to the patient such as medical background, cardiovascular and respiratory reserve, and hematological considerations as well as factors extrinsic to the patient, for example, patient attachments, environment and staffing (7).

A study conducted by Peter Morris, MD, from Wake Forest University Baptist Medical Center was presented Oct. 23, 2007 at a meeting of the American College of Chest Physicians in Chicago. This study describes phase I of a planned two-phase study to address a lack of early mobilization data by conducting a structured project, or protocol, over 24 consecutive months from 2004 to 2006, in which respiratory-failure patients admitted to the Medical Center's ICUs were assigned to one of two groups: 165 to a protocol group, which received early therapy from a mobility team (a critical care nurse, a nursing assistant and a physical therapist), and 165 to a control group, which received usual care. Some of those patients who received usual care also received physical therapy, although not as early or as frequently as those in the protocol group. The length of stay for the group of respiratory-failure patients who received early mobilization and physical therapy within 48 hours of the insertion of a breathing tube was reduced by an average of three days compared with the stay for patients who did not receive the therapy. This reduced length of stay included a reduction of time in the ICU of more than a day. Once patients were transferred to a regular nursing unit, both groups received usual care. In addition to shorter hospital stays, the protocol patients also progressed more quickly to active physical therapy, were out of bed earlier and experienced no adverse events during an ICU therapy session (8).

Historically, there has been a lack of evidence and/or data supporting activity as an essential part of care in the ICU. Morris' study is the first of its kind on the topic of early mobilization that confirms and supports the notion that it is safe to get patients up and moving early in their ICU stay, even while on mechanical ventilation. Most theories for mobilizing ICU patients up to this point have been gleaned or translated from data based on pulmonary, cardiac, stroke and

traditional rehabilitation programs.

The idea of walking a patient on mechanical ventilation around the ICU may seem appealing to some or present daunting challenges to others and, without a doubt, more studies are needed to demonstrate the ultimate benefit for the patient as well as the best practice for accomplishing early mobilization.

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