Effect of Early Mobilization Programs in the Intensive Care Unit (ICU). A Review of Systematic Reviews

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INTRODUCTION
The Intensive Care Unit (ICU), a department within the hospital reserved for only the most critically ill or injured patients, is where patients are frequently mechanically ventilated, intubated, or sedated. Extended stays in the ICU often result in post-hospitalization syndrome, lower quality of life, disuse atrophy, osteopenia, increased risk of deep vein thrombosis, pulmonary embolism, hypovolemia, hypoxemia, pressure ulcers and skin breakdown, lymphedema, constipation, atelectasis, pneumonia, insulin resistance and systemic changes that mimic accelerated aging. Early mobilization of critically ill patients in the ICU was introduced in 1944 to improve morale, general health and muscle strength. Originally, it was considered that patients in the ICU were “too ill” to participate in early rehabilitation. However, current research suggests that early mobilization is feasible through sedation interruption for the purpose of performing early physical medicine and rehabilitation with little to no adverse or life threatening effects.

RESULTS
Initial search yielded 187 articles with seven fitting inclusion/exclusion criteria, published from 2009 to 2013. These reviews were rated using the validated AMSTAR checklist and were organized according to outcome measure. The AMSTAR scores ranged from 6 to 9 with a mean score of 6.86. Outcome measures reported in the systematic reviews varied but included the following objective measures: length of stay in the ICU, length of stay in the hospital, hand grip strength, mortality, functional independence measure, 6 minute walk distance, duration of intubation and duration of mechanical ventilation, and subjective measures, SF-36 and health related QOL. Results from systematic reviews that included duplicate RCTs were reported, but not statistically adjusted for in the synthesis of the results.

CONCLUSIONS
Early mobilization was successful in improving functional mobility, in three out of seven systematic reviews demonstrating improved patient’s muscle strength. Length of stay in the ICU and the duration of required mechanical ventilation decreased in four out of seven systematic reviews; while mortality decreased in two of the seven studies. Standardization of outcome measures are needed to reduce variability and heterogeneity in the reporting of results. Further research surrounding the standardization of early mobilization protocols are warranted.

RELEVANCE
An increasing number of severely ill patients are surviving extended hospitalization and are susceptible to the effects of prolonged bed rest that cause moderate to severe functional impairments. Early mobilization has been shown to improve outcomes associated with functional mobility and strength but limited quantity and inconsistent methodological quality of the studies reduces the statistical power. This review summarizes and compiles current available research to provide a stronger evidence-based conclusion on which further research may follow.

Table 1. Summary of systematic reviews

<table>
<thead>
<tr>
<th>Author (Year)</th>
<th>AMSTAR Score</th>
<th>Aim of the Review</th>
<th>Search Strategies</th>
<th># of Studies</th>
<th># of Patients</th>
<th>Primary Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calvin-Ayakai et al. (2013)</td>
<td>7</td>
<td>To identify effective interventions that improve long-term physical functioning of ICU survivors.</td>
<td>MEDLINE, EMBASE, CINAHL, PEDro</td>
<td>14</td>
<td>7,417</td>
<td>Physical therapy with exercise is the only effective intervention to improve long-term physical functioning.</td>
</tr>
<tr>
<td>Engleb et al. (2013)</td>
<td>6</td>
<td>To evaluate the literature related to mobilization of the critically ill patient with an emphasis on functional outcomes and patient safety.</td>
<td>MEDLINE, EMBASE, CINAHL, PEDro</td>
<td>105</td>
<td>11,823</td>
<td>Increased functional range of motion and strength, improved balance.</td>
</tr>
<tr>
<td>Gayen et al. (2013)</td>
<td>9</td>
<td>To review the evidence for exercise in critically ill patients.</td>
<td>MEDLINE, CINAHL, Cochrane Library</td>
<td>10</td>
<td>250</td>
<td>Increased ICU length of stay, days on ventilation, no impact on mortality</td>
</tr>
<tr>
<td>Li et al. (2013)</td>
<td>7</td>
<td>To investigate the effectiveness and safety of active mobilization on improving physical mobility and hospital outcomes in patients undergoing mechanical ventilation for more than 24 hours.</td>
<td>PubMed, EMBASE, CINAHL, PEDro, Scopus, Web of Knowledge</td>
<td>17</td>
<td>1,614</td>
<td>Increased respiratory muscle and skeletal muscle function production, increased days on ventilation, length of stay, decreased mortality at one year.</td>
</tr>
<tr>
<td>O’Connor, E. Wanham, J. (2008)</td>
<td>8</td>
<td>To review the literature to evaluate the worldwide availability of mobilization therapy in the intensive care unit and the mobilization therapy for patients requiring medical and surgical high dependency or intensive care.</td>
<td>PubMed</td>
<td>35</td>
<td>12,996</td>
<td>Increased LOS, days on ventilation, postoperative complications, mortality, time to return to normal bowel functioning.</td>
</tr>
</tbody>
</table>

METHODS
CINAHL, The Cochrane Library, PEDro and PubMed were searched between April 2015 to August 2015 to identify systematic reviews published from 2000 to 2015 with the keywords “ambulation”, “critical care”, “mobilization”, “systematic review”, “ICU”, “physical therapy” resulting in the retrieval of eight potential articles. All studies were systematic reviews containing early mobilization. Three reviewers independently rated study quality and extracted data.

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