Body weight-supported bedside treadmill training facilitates ambulation in ICU patients: An interventional proof of concept study

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Background
- Intensive Care Unit-acquired weakness (ICU-AW) is associated with short- and long-term physical impairments and impaired functional status.
- Early mobilisation and ambulation of patients admitted to the ICU improve functional recovery.
- Severe weakness in combination with tubes, lines and machinery are practical barriers for the implementation of ambulation of critically ill patients.

Objective
- To explore the feasibility of Body Weight-Supported Treadmill Training (BWSTT) at the bedside in the ICU.

Methods
- Single centre interventional study
- Tertiary 34-bed mixed medical-surgical ICU of the Academic Medical Center, University of Amsterdam, the Netherlands

Inclusion criteria:
- Adult ICU-patients, mechanically ventilated for ≥ 48 hours
- No contra-indication for mobilisation or activation
- Able to follow instructions
- Muscle strength m. quadriceps MRC ≥ 2
- Independent sitting balance

Intervention
- The BWST enables ambulation at the bedside within the range of ventilator tubes, lines and monitoring equipment.
- In patients with insufficient motor control or muscle strength for ambulation, a harness is used in combination with a weight bearing construction.

Measurements
- Feasibility was evaluated according to:
  - Eligibility
  - Successful number of BWSTT
  - Number of staff needed
  - Adverse events
  - Number of patients that could not have walked without BWSTT
  - Patient satisfaction and anxiety

Results

- BWSTT was performed in:
- 20 patients and 54 sessions
- 53 sessions were successfully performed
- Two numbers off staff needed
- BWSTT is feasible and safe:
  - Median treatment time 25 minutes
  - No adverse events
  - Patients are not anxious
  - Patients are very satisfied
  - All patients were able to walk or would have walked shorter distance without the BWSTT

Characteristics of ICU treatment devices during BWSTT

<table>
<thead>
<tr>
<th>Patients characteristics at the first time of BWSTT</th>
<th>median (IQR) or n</th>
<th>n=20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, years</td>
<td>69.5 (52.8 – 77.5)</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>12 (60%)</td>
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<tr>
<td>Medical category</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Medical</td>
<td>9 (45%)</td>
<td></td>
</tr>
<tr>
<td>• Non-elective surgery</td>
<td>4 (20%)</td>
<td></td>
</tr>
<tr>
<td>• Elective surgery</td>
<td>7 (35%)</td>
<td></td>
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<tr>
<td>APACHE II</td>
<td>18 (15 – 20)</td>
<td></td>
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<tr>
<td>Time in ICU to first BWSTT, days</td>
<td>23.0 (10.0 – 56.3)</td>
<td></td>
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<tr>
<td>Mechanical ventilation, days</td>
<td>10.0 (7.1 – 31.5)</td>
<td></td>
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<tr>
<td>MRC sum score</td>
<td>40 (32.5 – 47.5)</td>
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<tr>
<td>ICU-AW (MRC &lt; 48)</td>
<td>15 (75%)</td>
<td></td>
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<tr>
<td>Functional Ambulation Categories (FAC range 0-5)</td>
<td>0.0 (0.0 – 1.0)</td>
<td></td>
</tr>
<tr>
<td>Functional Ambulation Categories 0</td>
<td>13 (65%)</td>
<td></td>
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</tbody>
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References
- Sommers J, Clinical Rehabilitation. 2015; DOI: 10.1177/0269215514567156

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