

Leg Cycle Ergometry in Critically Ill Patients



Physical rehabilitation interventions initiated in the ICU represent a proactive approach to reducing post-ICU impairments. While many clinical guidelines recommend starting rehabilitation during ICU care, there is no consensus on the optimal timing or specific type of intervention. The types of rehabilitation studied are diverse, leading to varying results across studies. Some randomised clinical trials (RCTs) comparing ICU-based physical rehabilitation to standard care have shown improvements in ICU mobility, physical function, and cognitive function. However, other trials using different approaches or outcomes found no significant benefits in physical function or ICU length of stay.

For instance, a large multicentre RCT examining early, high-dose, high-intensity rehabilitation found no difference in the number of patients alive and discharged from the hospital at six months and reported more adverse events in the intervention group than in the usual care group. Despite these mixed results, meta-analyses of over 60 RCTs suggest that ICU-based rehabilitation can improve physical function and reduce ICU and hospital stays, with only rare reports of adverse events.

One specific intervention, cycle ergometry, can be used even when patients are bed-bound, mechanically ventilated, or sedated. Since a previous review on this topic, several trials have evaluated cycle ergometry alone or as part of a multicomponent ICU rehabilitation strategy. The largest RCT to date, known as CYCLE (Critical Care Cycling to Improve Lower Extremity Strength), found no significant difference in physical function, as measured by the Physical Function in ICU Test, between patients receiving "Cycling + Usual Physiotherapy" and those receiving "Usual Physiotherapy Alone" three days after ICU discharge.

To provide an updated understanding of the evidence, a systematic review and meta-analysis addressed the question: "In adults admitted to the ICU, does ICU-based cycling improve physical function compared to other interventions?" This review builds on previous research to offer a more comprehensive look at the role of cycling in ICU-based rehabilitation.

The research, published in NEJM Evidence, analysed 33 clinical trials involving nearly 3,300 patients across 13 countries. The analysis demonstrates that incorporating cycling into ICU rehabilitation reduces ICU and hospital stays, is safe, and enhances physical function after ICU discharge.

On average, patients who participated in cycling therapy spent one day less in the ICU than those who did not and 1.5 days less in the hospital overall, freeing up ICU beds sooner. In Canada, the average daily cost per ICU patient is approximately \$7,300, with hospital stays costing an additional \$1,500 per day.

While previous studies on ICU rehabilitation have yielded mixed results, this systematic review offers clearer evidence of the safety and benefits of in-bed cycling as a rehabilitation tool for ICU patients. The study also found that adverse events during cycling therapy were rare, occurring in less than 1% of patients. Cycling in the ICU did not increase mortality compared to those who did not receive the therapy.

Researchers believe these findings pave the way for future research, as the rehabilitation model using in-bed cycling is easily reproducible, standardised, and based on clear-cut equipment and protocols.

Source: [NEJM Evidence](#)

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