



## Study Protocol: Cycling

### **Experimental Group: Cycling and Routine Physiotherapy**

Patients will be randomized to receive 30 minutes/day of in-bed cycling in addition to routine physiotherapy (PT) interventions, 5 days per week, during their ICU stay. Cycling will occur for a maximum of 28 days or until the patient is able to march on the spot for 2 consecutive days, whichever occurs first.

To ensure we start the intervention early, we will screen patients for temporary exemptions before enrolment. Because of the dynamic nature of critical illness, we will also review participants daily for temporary exclusions precluding cycling. For example, we will not cycle on a day where a patient has cardiac or respiratory instability, active major bleeding, severe agitation, or a new condition interfering with cycling. During every cycling session, patients will be carefully monitored for safety and we will document any indications for termination of cycling, including signs of cardiac or respiratory instability, and catheter or tube dislodgement.

We aim for participants to start the cycling intervention as early as possible, even if they are receiving MV and/or sedative infusions. We also aim for patients to complete as much active cycling as possible during each 30-minute session. We will use a specialized in-bed cycle ergometer (e.g. RT300 supine), which provides passive, active-assisted, and active cycling (see above). Patients will be positioned semi-recumbently per ventilator-associated pneumonia prevention guidelines. The physiotherapist will place the patient's legs in the cycle ergometer, starting with passive cycling at a rate of 5 revolutions per minute (RPM) with 0.6 Newton-meters of resistance. If patients initiate active cycling, the physiotherapist will use standardized verbal encouragement for patients to continue active cycling. Since level of consciousness may vary throughout the ICU stay, we will allow patients to cycle at a self-selected RPM. If the patients stop cycling actively, the ergometer will revert to passive cycling. If patients re-start active cycling, we will provide standardized verbal encouragement.

### **Control Group: Routine Physiotherapy Only**

Patients will receive routine PT interventions per current institutional practice. Routine PT includes, based on the patient's alertness and medical stability, activities to maintain or increase limb range of motion and strength, in- and out- of bed mobility, ambulation, and assistance with optimizing airway clearance and respiratory function. We will use similar criteria to terminate routine PT sessions.