Robotics-assisted treadmill exercise for cardiovascular rehabilitation early after stroke

Propositions

Robotics-assisted treadmill exercise for cardiovascular rehabilitation early after stroke

1. Stroke survivors benefit from cardiovascular exercise interventions, however, individuals with severe motor impairments cannot participate in conventional cardiovascular rehabilitation programmes due to unique challenges in motor control (this thesis).
2. Conventional controllers for robotics-assisted training are not sophisticated enough to provoke substantial cardiovascular responses for the assessment of exercise capacity and achievement of recommended intensity levels for cardiovascular exercise (this thesis).
3. Feedback-controlled robotics-assisted treadmill exercise is a promising method for the assessment of cardiovascular fitness and the guidance of exercise intensity in persons with severe motor impairments early after stroke (this thesis).
4. The guidelines on ’cardiopulmonary exercise testing’ postulated so far may not be realistic to determine true exercise capacity in persons with severe motor limitations (this thesis).
5. Early cardiovascular exercise admission facilitates neuroplasticity and thus accelerates overall recovery.
6. The implementation of controlled error amplification during robotics-assisted exercise might have potential to provoke substantial cardiovascular stress while facilitating motor learning/recovery after stroke.
7. High intensity interval training needs to be considered for further implementation of cardiovascular exercise interventions in populations with severe impairments.
8. The promotion of intensive cardiovascular exercise programmes early after stroke will increase social participation and decrease healthcare costs through the improvement of functional capacity and the reduction of care needs.
9. Regular cardiovascular exercise will no longer be of importance, because (volitional) genetic mutations of the human organism to low levels of exercise and customised medical treatment options will shortly reject current guidelines on physical activity.
10. There is no need for a certain level of physical fitness; robots will do the hard work for us.
11. Switzerland lacks ’surf’, one of many reasons that kept me writing this dissertation.

May 2015 Oliver Stoller