To increase and to maintain health of persons with spinal cord injury upper body physical activity is very important. However, increased physical activity can also have negative consequences related to overload of the upper extremities, which could lead to overuse injuries and pain. Appropriate and regular exercise might be a solution to avoid these injuries. The handrim wheelchair is inefficient and strenuous to use and thus seen as a risk factor for overuse injuries. Therefore, alternative devices such as the handbike should be considered for training or daily outdoor mobility.

In this thesis the physical strain and efficiency of handcycling and its accompanying mechanical load on the shoulder complex is studied. The thesis compares handcycling to manual handrim wheelchair propulsion and reports on different setups of the handbike, all in the light of preventing overuse injuries while allowing for an increased upper body activity.

Handcycling: a biophysical analysis

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