Clinical Integration of the robotic equipment: Haapsalu Neurological Rehabilitation Centre, Estonia

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In our clinic we use different robotic devices to accomplish the therapeutic goals as a part of active therapy program. Our patient groups include spinal cord injury, brain injury (stroke and traumatic), cerebral palsy and other neurologic impairments. In our clinic, robotics contribute to reduce the number of therapists needed for the same amount of therapy and to promote early and motivating rehabilitation.

Here we describe our clinical setting and hope that it serves as an example to support other clinics that also work with robotic equipment.

Patient Group

We use robotics as part of the therapy in patients with stroke, cerebral palsy, spinal cord injury and traumatic brain injury.

Different robotic devices are used according to the therapy goals of the patient. In general terms we could say that we use Erigo® mainly in acute patients with spinal cord injury or traumatic brain injury; Lokomat in all patients who require intensive gait training with BWS and ArmeoSpring in patients with stroke, cerebral palsy and monoplegias (e.g. brachial plexus).

In some cases, we also use robotic devices for patients with different needs, such as chronic spinal cord injury patients who require extra verticalization therapy (Enigo) or who require motivating therapy for the upper extremity (Armeo®Spring).

Prescription: Inclusion Criteria

We follow Hocoma User Manual indications and contraindications to prescribe the therapy to our patients. The therapy parameters are set and the decision of including robotics to the therapy plan is made by a multidisciplinary team according to the goals of the patient.

Duration and frequency of robotic sessions

We schedule robotic sessions in 45 min slots including set-up time. This allows the patient to perform around 30 minutes of active robotic therapy. Sessions are scheduled 2-3 times per week.

For ArmeoSpring the procedure is slightly different. We use it as an additional tool within the physical therapy session. The duration ranges between 15 and 45 minutes according to the therapy goals.

About us

Haapsalu Neurological Rehabilitation Centre, Haapsalu, Estonia

The Haapsalu Neurological Rehabilitation Centre is a modern rehabilitation hospital with over 50 years of experience. It provides services for adults and children with neurological conditions, serving more than 2500 cases per year in a facility with over 1000m² for active therapies.

Our staff is composed by 138 professionals divided in three teams: spinal cord injury, brain injury and pediatric rehabilitation, some of whom are also involved in developmental units: clinical motion and gait analysis, centre of adaptive aids and rehabilitation laboratory of Centre of Excellence for Health Promotion and Rehabilitation (funded by European Regional Fund) in cooperation with the University of Tallinn.

The Centre of Excellence in Health Promotion and Rehabilitation was opened in 2012 and includes several neuro-robotic devices as well as other technologies for neurorehabilitation: LokomatPro, ArmeoSpring, Enigo, E-Link, Biodex isokinetic dynamometer and VO₂ max assessment device.

Other technologies and devices used in our hospital are: HUR gym with pneumatic resistance equipment, Ho-logic Horizon for bone densitometry and Monark upper body ergometer for paraplegic patients.
Patient evaluation

We administer the Functional Independence Measurement (FIM®) at admission and discharge. Moreover, we use L-Force assessment tool of the Lokomat in the first and last session.

Other assessment tools are used in our clinic according to the therapy goals and the physical therapist needs: Berg Balance Test, Tinetti Gait and Balance Assessment, Tar-dieu, Timed Up and Go, Wheelchair Skills Program etc.

Reasons to include robotics as part of the therapy program

We include robotics as a part of our therapy program since it reduces the amount of therapist needed per session as well as the amount of physical demand with the same results. Moreover, robotics allows us to start the intensive rehabilitation earlier in our patients. They are also a motivating tool for rehabilitation, which help the patient to focus longer on the therapy and thus, perform more repetitions per session.

For us, Lokomat’s biggest benefit is the reduction of therapist per session and the possibility to train the patients longer and with higher intensities without being physically too demanding for the therapist.

In our experience ArmeoSpring offers an opportunity to motivate patients, especially for patients with brachial plexus injuries or other monoplegias, where reducing the weight of the arm allows the patient to actively use the limb and engage in fun “exergames” on the device.

We use Erigo in our clinic since it allows us to verticalize the patients much earlier and more safely than with regular tilt tables. The research also shows that this type of verticalization is more effective in terms of osteoporosis and chronic SCI as compared to conventional tilt table, where the lower limbs are static. Moreover, we observed great benefit of verticalization on Erigo in patients with pusher syndrome, even in severe cases.

Other therapies provided in addition to robotics

In our clinic, patients perform 3-4 hours of active therapies (physiotherapy – usually individual sessions, including pool classes (individual and group), occupational therapy, psychotherapy, speech therapy) and in addition to that some passive treatments like massage, electrotherapy, vibroacoustics. Robotics are part of the active therapy time.

We also have a fully accessible gym with pneumatic resistance fitness equipment (HUR), where the patients can attend group therapies, but each patient is working out according to an individual program designed by their physiotherapist. The gym equipment is using a chip card system so that each patients’ progress can be monitored at any time.

Organization: Responsible therapy team

In our center we have 8 people certified in the use of the Lokomat (6 trainers and 2 users) and all our physical therapists are able to operate the Erigo and ArmeoSpring.

From an operative point of view, Lokomat slots (9 per day) are divided through three treatment teams: spinal cord injury, brain injury and children. One therapist is responsible of the device at each time slot.

If a physiotherapist believes their patient would benefit from Lokomat therapy, a referral is sent to the Lokomat therapist. Before the therapy can start, the physician must give his/her approval. The physiotherapist is asked to attend the first Lokomat session with their patient in order to provide a safe and comfortable environment.

There is one therapist working on the Erigo on a permanent basis. Other physical therapists can refer their patients to Erigo therapy as part of their individual therapy sessions in acute patients or as an extra verticalization therapy for chronic patients.

ArmeoSpring can be operated by all our physical therapists. They use it as part of the individual therapy session. We always work on a 1:1 basis with the robotic devices.

Billing and financial compensation of robotics therapy

We have no specific billing for the robotics. They are part of the clinical routine in our center and billed according to it as physical therapy.
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<td>2-3 times per week</td>
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<td>Patient evaluation</td>
<td>Functional Independence Measure (FIM®)</td>
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<td>Reduce the need of physical effort</td>
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<td>Reduce the number of therapist needed</td>
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<td>1 responsible therapist for Erigo</td>
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<td>ArmeoSpring used during conventional therapy slots for all therapists</td>
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<td>Remuneration of robotics Therapy</td>
<td>Not specific billing. Part of the physical therapy program.</td>
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*Note: This clinical experience report is meant to serve as an example of how the Lokomat is integrated into the clinical setting in one individual hospital. It is not necessarily a standard recommendation from Hocoma*