Functional independence and gait parameters following haemorrhagic stroke combining conventional rehabilitation and Lokomat® therapy – a case study

Siret Põldur[1], Mari-Liis Ööpik[1,2,3], Tiiu Tatar[1], Priit Eelmäe[1,2,3]

1-Haapsalu Neurological Rehabilitation Centre, 2-Centre of Excellence in Health Promotion and Rehabilitation, 3-Tallinn University Haapsalu College

Introduction

Haapsalu Neurological Rehabilitation Centre (HNRC) is a modern, 102-bed rehabilitation hospital in Estonia. There are 3 diagnosis-based specialised teams: 1) spinal cord injury; 2) stroke/traumatic brain injury and 3) children´s neurological pathologies. HNRC is a key partner in Centre of Excellence in Health Promotion and Rehabilitation. In November 2012 several robotic devices, including LokomatPro®, were acquired as a part of above-mentioned project.

Aim

The aim of this paper is to illustrate the effect of Lokomat training combined with conventional rehabilitation on walking ability and functional independence outcomes of a stroke patient.

Subject and methods

A 48-year-old female suffered intracerebral haemorrhagic stroke (I61.0) in March 2014 during a yoga class.

Following a period of acute care from March to July 2014, she was referred to Haapsalu Neurological Rehabilitation Centre for intensive inpatient rehabilitation with severe right hemiparesis and cognitive deficits. The duration of the rehabilitation period at HNRC was 128 days (86, 22 and 20 day periods).

FIM® instrument and LokomatPro® assessment tool were used to assess functional independence and strength of knee and hip flexors and extensors.

The patient's personal medical data was collected from the medical database of HNRC.

Conventional therapy included 238 interventions: 90 physiotherapy, 20 occupational therapy, 47 massage and 81 psycho-social (speech therapy, appointments with psychologist) sessions were performed.

Lokomat therapy consisted of 37 sessions (45 minutes each) with a total duration of direct gait training 844 minutes and distance 21433 meters. Average distance per session was 579 meters.

Results

The result of FIM® was 28 (19 motor/9 cognitive) at admission and 59 (46/13) at discharge (Figures 1 and 2).

The strength of hip and knee flexors and extensors was recorded during the first and last Lokomat session.

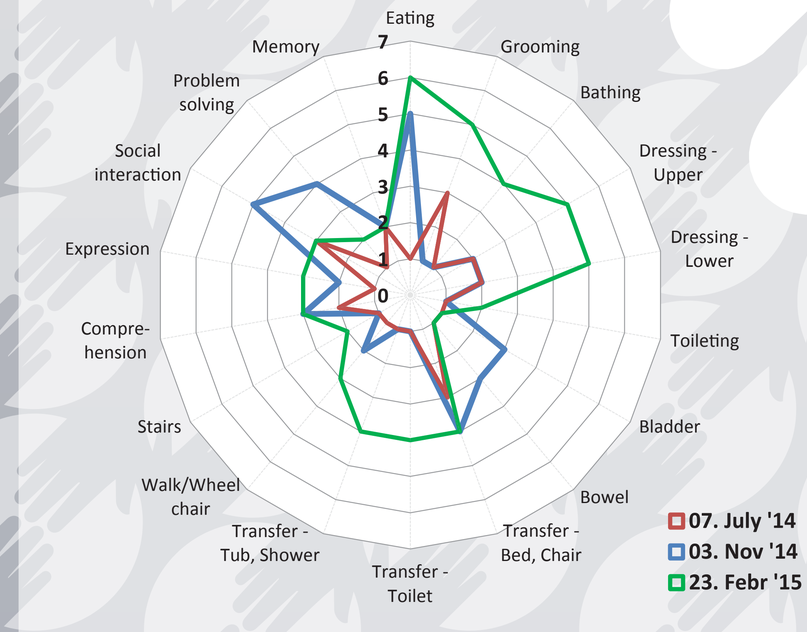

Figure 1. Results of FIM® Instrument: dynamics in 18 specific functions.

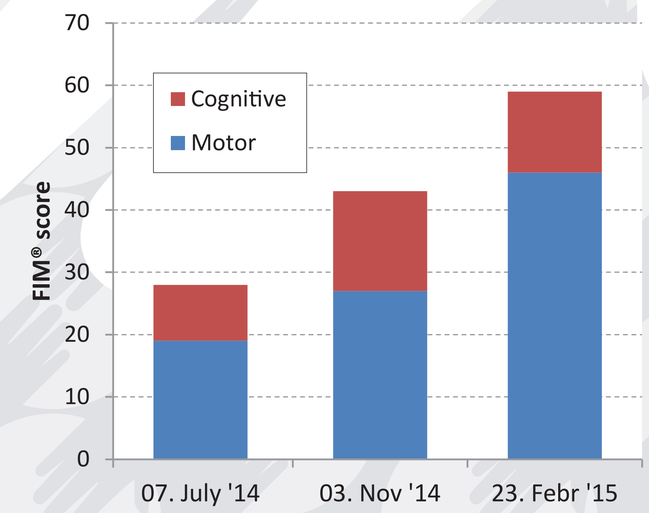

Figure 2. Total score of FIM® Instrument motor and cognitive functions

We observed an increase in torque of both lower limbs and in all assessed muscle groups (Figures 3 and 4).

In the affected side the greatest increase was noted in knee extensors - from 5.40 Nm to 13.57 Nm (151%) and hip flexors – from 30.52 Nm to 49.80 Nm (63%). There was also an increase in the strength of knee flexors – from 10.25 Nm to 12.59 Nm (23%) and hip extensors – from 32.48 Nm to 38.77 Nm (19%). These changes are illustrated in the figures 3 and 4 along with the data of the non-affected lower limb strength parameters.

In the beginning of the rehabilitation the patient was unable to walk. At discharge the patient was able to walk 50m needing an elbow crutch, moderate contact and verbal cueing from PT and 4 steps on stairs with alternative steps with moderate help.

Conclusion

The intervention was successful. The patient is able to walk with assistance, functional independence and affected lower limb strength increased remarkably.

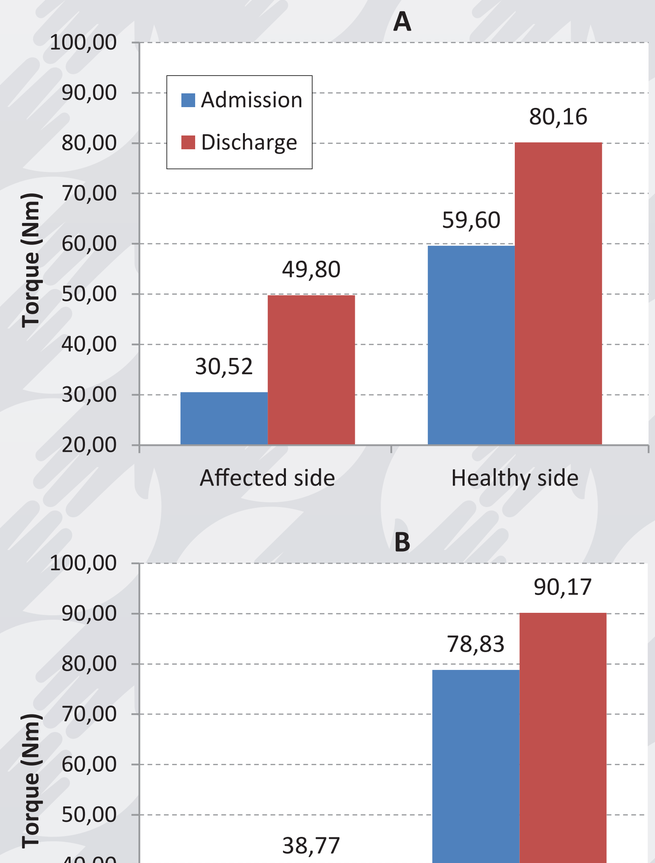

Figure 3. Hip flexors (A) and extensors (B) force paremeters in admission and discharge.

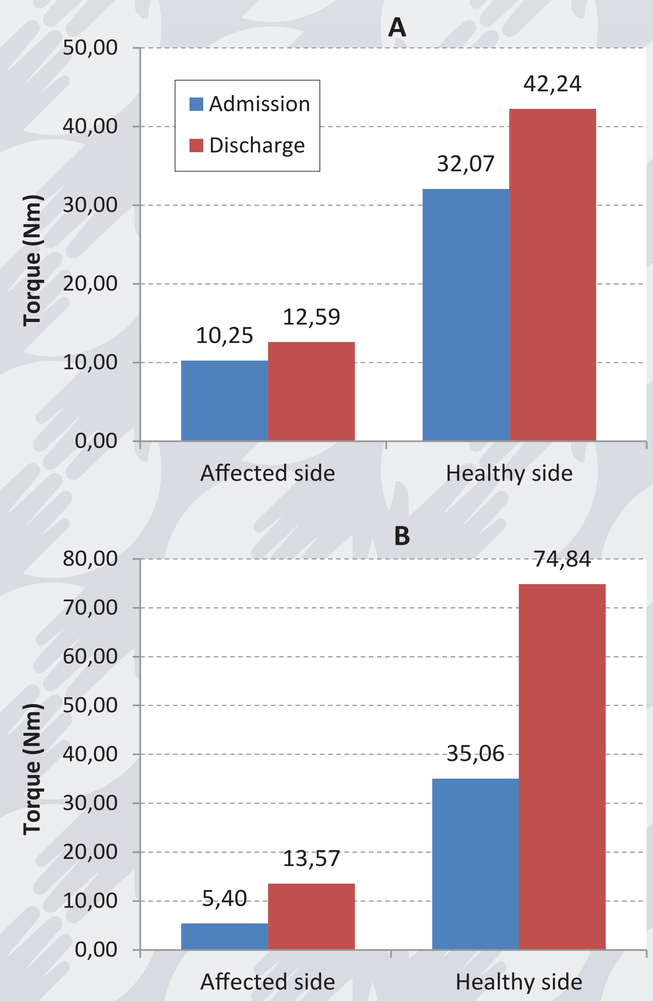

Figure 4. Knee flexors (A) and extensors (B) force paremeters in admission and discharge.

This QR code leads to a video that illustrates the patient´s improvement over the course of her therapy period in actual therapy sessions and Lokomat training. If you cannot scan the code, please use the following link: **http://youtu.be/WqUXX-mBjK4**
The video will be available for viewing until August 31st, 2015

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Contact:
Author to contact: Siret Põldur
Institution: Haapsalu Neurological Rehabilitation Centre
Mailing address: Sadama 16, Haapsalu 90502, Estonia
e-mail address: siret.poldur@hnrk.ee
tel: +372 4725 400

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