

Cyclic movement training of the lower limb in stroke rehabilitation

A. Kamps, K. Schüle

Institute for Rehabilitation, German Sports University Cologne

(Institut für Rehabilitation und Behindertensport, Deutsche Sporthochschule Köln)

Abstract

Besides neurological impairments, stroke causes above all immobility that may lead to secondary diseases. In addition to conventional physio- and ergotherapeutic intervention which is normally experienced by stroke victims, this study examined the effects and benefits of a home-based training with a MOTomed Movement Trainer.

Study design: Out of 31 patients, an experimental group consisting of 16 patients (age: $63,1 \pm 8,1$ years) was supplied with a MOTomed viva2 Movement Trainer (RECK-Medizintechnik, 88422 Betzenweiler, Germany). They were advised to train twice a day for 4 months in addition to their conventional therapy. The intensity of each training session corresponded to stage 13 on the BORG-Scale ("a little strenuous"). Primarily, the influence on gait was proved measuring gait velocity and the distance walked in the 2- and 6-Minutes-Walking Test. In addition, motoric assessments were used (Tinetti-Test, Berg-Balance-Scale, Timed "Up&Go"-Test). MOTomed Data was collected by a chip-card placed in the cockpit of the apparatus. The patients of the control group ($n=15$, age: $65,8 \pm 10,7$ years) received conventional physio- and ergotherapeutic interventions.

Results: The results of this study showed an improvement in walking distance (2- and 6-Minute-Walking test; $p=0,015$, $p=0,003$), comfortable gait speed ($p=0,024$) and better results concerning timed "Up&Go" Test ($p=0,016$). Furthermore, patients were able to steer their training by using the Borg-Scale so that they achieved an average power increase of 6,3W of ($p=0,009$).

Conclusion: Using the MOTomed Movement Trainer is a helpful addition to conventional therapy and supports an active participation in the rehabilitation process of stroke patients.

Keywords: Stroke rehabilitation, movement Trainer, Gait

Conclusion

The supply of ongoing therapy after outpatient rehabilitation, e.g. the possibility to participate in a rehabilitation-sports group is often restricted by structural and local circumstances. On the other hand, a strong reduced mobility of the patients as well as long distances and times of journey represent a limiting factor. A possibility to increase the frequency of therapeutic interventions is, besides one-on-one treatment as it is usually done in physio- and ergotherapeutic interventions, to offer facilities, which engage patients' own initiative and can be practiced without supervision. [11]. These thoughts lead us to the conclusion, that MOTomed movement systems are to be viewed as an alternative and supplementation of conventional therapy. The placement of the system into home environment and little expenditure were reasons that can explain the amount of exercising sessions during the period of intervention. Because of an easy handling and fixation of the feet and the lower legs to the apparatus, the patient can do physical exercise training independent from other persons. The documentation of the training sessions, as it was done in this study with the help of chip cards gives all treating persons involved in the rehabilitation process (e.g. doctors and therapists) a possibility to control the patient's amount, frequency and intensity of training.

In this way, these persons are given an opportunity to motivate the patient in carrying on physical exercise. The present study showed a high impact of the MOTomed system on the improvement of 2/6MWT results, as well as comfortable gait speed and timed "Up&Go"-test. Due to the fact that the rate of stroke survivors is very high [49, 60] and cardiac complications are one of the most common causes of death in stroke survivors [54, 55] the strong need for prevention of immobility is evident to avoid secondary diseases. At this point, the MOTomed movement system offers a solution. All participants of the study received two physiotherapeutic and two ergotherapeutic therapy sessions per week on average. Every session takes approximately half an hour. Especially for the physiotherapeutic sessions that work with Bobath's concept, the basic idea of these interventions is to inhibit nonphysiologic movements and spasticity [7]. No question, these forms of therapy can only be done in an one-on-one treatment. They concentrate on the use of neuroplasticity to treat primary neurological impairments. Besides this compensation of neurological problems, the MOTomed movement system aims at the prevention of immobility-related secondary diseases. Patients ability to daily and independently exercise ("task-related" training) with this

apparatus reduces the risk of cardiovascular and musculoskeletal complications on the one hand, and on the other it improves walking ability. Both, MOTomed system and physiotherapeutic intervention, should make it possible to reach an optimal therapy result. The intensity of rehabilitation after stroke significantly contributes to a positive outcome, which again is pointed out in our and also in other studies [33, 46]. In contrast to other investigations [31], the improvement of patients test results (for example a longer distance walked in 6 minutes after having trained with the MOTomed system) shows that even after six months post-stroke it is possible to expand patients capacity of mobility when offering adequate and motivating physical activity tasks.

If you are interested in the detailed version of the study do not hesitate to request it free of charge.

Contact:

RECK-Technik GmbH & Co. KG
Reckstrasse 1-4
88422 Betzenweiler
Germany

Phone +49 -73 74-18 85

Fax +49 -7374-18 480

contact@motomed.com

www.motomed.com