SUMMARY

The effect of physiotherapy with Lokomat Pro on the change of selected functional parameters and well-being of patients with chronic, motor incomplete spinal cord injury

BACKGROUND: Although the potential therapeutic effects of gait therapy using robotic systems in patients with spinal cord injury are well-known, the choice between robotics and conventional therapy in gait reeducation is often a big issue. There is no unequivocal evidence supporting the greater effectiveness of one of the above treatment concepts, and all research trials include high-frequency gait therapy, mainly in acute or subacute patients. There is no evidence to support the effectiveness of therapy with the use of the Lokomat system less than 3 times a week in chronic patients, and the lack of specific optimal therapy parameters makes it impossible to adjust the appropriate physiotherapy to the patient's needs.

OBJECTIVE OF THE WORK: The aim of the study was to analyze the impact of two 6-week therapeutic programs from the robotic system: (1) therapy with the use of Lokomat once a week with standard physiotherapy and (2) therapy with the use of Lokomat twice a week with standard physiotherapy on changes in gait function, motor function of the lower limbs, changes in the perceived level of spasticity and pain in patients with chronic, motor incomplete spinal cord injury and whether there are differences in selected parameters distinguished by the study groups and the control group (standard physiotherapy without the use of a robotic system).

MATERIAL AND METHODS OF STUDY: 30 patients with traumatic, chronic, motor incomplete spinal cord injury were included in a randomized clinical trial. Two study groups received 6 weeks of lokomat gait therapy, once (L1) and twice (L2) per week. The control group was left without the use of robotic gait therapy. All groups received conventional physiotherapy 3 times a week. Speed, endurance and gait support, motor function of the lower limbs, spasticity and pain were assessed. The main outcome measures were: 10-meter walk test (10MWT), 6-minute walk test (6MWT), Walking Index for Spinal Cord Injuries II (WISCI II), lower extremity motor score (LEMS), assessment of spasticity level (SCI-SET questionnaire) and assessment of pain (VAS scale). The assessment was carried out before the start of the therapy procedure, after 3 and after 6 weeks of therapy. In order to solve the research problem, there were empirical and exploratory analyzes of a comparative and model used.

RESULTS: In the L1 and L2 groups, a statistically significant improvement of the 10MWT, 6MWT and SCI-SET variables was demonstrated. There was no statistically significant improvement in the WISCI II, LEMS and VAS variables. There were significant differences between the L1 group and the control group in the improvement of 10MWT nad 6MWT, in

favor of robot-assisted rehabilitation. There were significant differences between the L2 group and the control group in improving 10MWT and reducing the perceived level of spasticity, in favor of robot-assisted rehabilitation.There were no statistically significant differences between the L1 and L2 groups.

CONCLUSIONS: Gait therapy with the use of the Lokomat system, carried out 1 and 2 times a week, improves the speed, endurance of gait and reduces the level of spasticity, but does not improve the type of gait support, motor function of the lower limbs and pain in patients with chronic, motor incomplete spinal cord injury. Significant differences were found between the once-a-week Lokomat Pro rehabilitation group in combination with standard physiotherapy and conventional physiotherapy methods in improving gait speed and stamina in favor of robot-assisted rehabilitation. Significant differences were found between the twice-a-week Lokomat Pro rehabilitation group in combination with standard physiotherapy and conventional physiotherapy methods in improving speed and reducing the perceived level of spasticity, in favor of robot-assited rehabilitation. The frequency of this therapy does not affect the amount of improvement.

CLINICAL REHABILITATION IMPACT: The use of gait therapy with the use of the Lokomat 1 and 2 times a week in patients with chronic, motor incomplete spinal cord injury is justified in order to improve the functional status of the patient, e.g. by improving speed, gait endurance and reducing the level of perceived spasticity. Both robotic therapy programs with standard physiotherapy in patients with chronic, motor incomplete spinal cord injury may be a better form of therapy improving the speed, endurance of gait and reducing the level of spasticity than conventional physiotherapy. The cyclicality of the assistive gait therapy may not affect different therapeutic effects in the group of patients.

Keywords: spinal cord injury, robot assisted gait therapy, walking ability, spasticity, pain