
CLINICAL ASPECTS OF ROBOTIC TECHNOLOGY IN REHABILITATION

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Demographic and socio-economic changes in society, as well the new opportunities provided by today's medicine and technology, will soon lead to completely new challenges in rehabilitation medicine due to demands of the patients. In fact, as modern technologies are already available, they are evolving rapidly and despite their high cost are also a factor in financial savings. The use of modern technologies enables more intensive therapy, and thus more effective achievement of rehabilitation goals and greater patient independence.

Rehabilitation with the help of robotic exercise is one of the pillars of the rehabilitation of the future, which also includes neuromodulation, virtual reality and telerehabilitation. It allows to start intensive treatment early in the acute period and further a continuous process with the patient-adjusted intensity of exercise through the post-acute and chronic period of rehabilitation. An important factor in robotic exercise is also the promotion of neuroplasticity through the feedback system or patient feedback. During different periods of rehabilitation, robotic exercise allows you to achieve customized goals. In the period of rehabilitation in intensive acute phase it enables safe early mobilization and verticalization of the patient. In the period of acute and post-acute rehabilitation it enables improvement of upper and lower limb function and in the later period of long-term rehabilitation additional adjustment and use of acquired upper and lower limb function. The last mentioned process can be shown in the case of robotic exercise for the upper limb, where in the period when the strength of the muscles of the upper limb is rated 0/5 we can use a robotic device that offers full support for movement and allows passive movement and consequently improves range of motion. ArmeoPower®), even with the improvement of muscle strength to 1/5, we can use a robotic device that improves the range of motion and coordination of upper limb movement (eg ArmeoSpring®) with the help of regulated unloading, and previously achieved muscle strength during long rehabilitation. Range of motion and accuracy of movements are targeted in self-guided and self-directed and patient-specific training (eg ArmeoSenso®).

Robotic exercise in the acute period of rehabilitation enables controlled and gradual verticalization, which has been proven to help achieve short and long-term goals of rehabilitation faster, and above all prevents complications associated with immobilisation and thus reduces treatment costs. In the post-acute period, robotic exercise in achieving functional movement reduces the effort of physiotherapists and allows for intense, repeatable and measurable therapy. Additionally, robotic exercise allows for neuroplasticity and prevents interference with pathological compensatory movement patterns.

Keywords: rehabilitation, robotics, assistive technology

References

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