

CURRENT TECHNOLOGY IN MOTOR AND SENSORY RECOVERY OF THE UPPER LIMB

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Abstract

Introduction. Objectives. Stroke is the leading cause of disability in industrialized countries. It has a significant impact on the individual, on their family and on the healthcare services in society. Any form of treatment that improves the functional recovery of patients after a stroke can significantly reduce the physical, emotional and financial burden that this condition bestows on those who are affected by it, their families and society in general.

Materials and methods. In recent years, rehabilitation medicine has encouraged research in an attempt to identify appropriate ways, time intervals and motivations for the rehabilitation intervention. Evidence of stroke rehabilitation technologies composes the fastest growing area of therapeutic research. As examples of studied technologies that can help in the rehabilitation process, we mention telerehabilitation, transcranial direct current stimulation (tDCS) and robotic systems developed for sensory-motor rehabilitation of the upper limb in hemiplegic patients. These robotic devices offer different types of movement assistance and target specific joints of the upper limb. Patients who participated in studies using such robotic devices were evaluated before and after the end of the rehabilitation program by various tests such as the Fugl-Meyer (FM) assessment for the upper extremity, muscle strength assessment, modified Ashworth scale for spasticity, visual analogue scale (VAS) for pain, Box and Block test (B&B), functional independence measure (FIM) and range of motion (ROM) testing of the affected limb.

Results. Studies have shown significant improvements in upper limb function after the end of the robotic treatment period for the majority of patients, as evidenced by improvements in self-care capacity, upper limb motor capacity, visual-constructive skills and decreases in anxiety levels.

Conclusion. The use of robotic devices for upper limb rehabilitation is considered a new and effective approach of performing therapy with impact on movement and function of the deficit affected upper limb following a stroke. Current research literature on robotic upper limb rehabilitation devices indicates that task-specific practice and task-intensive practice could significantly improve motor recovery and neuroplasticity following a neurologic injury.