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Webinar

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In the era of digital medicine: using technologies to restore functional movement in neurological patients.

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The recovery of patients affected by CNS lesion is like a learning process exploiting preserved sensorimotor circuits. The best recovery is related by providing appropriate proprioceptive input to the spinal cord with the goal of maximally engaging preserved neural circuits. The extent of recovery depends on the severity of CNS damage and the individual capacity of a patient to regain a function. Cognition and motivation are important contributors to this learning and must therefore be considered during rehabilitation. But first of all we need to understand that the goal of rehabilitation is not exclusively to re-establish 'normal' movement patterns, but to enable well-organized movements to achieve optimal outcome in mobility and independence during activities of daily living (ADL) for the individual patient.

Robotic rehabilitation is a young science that is rapidly infiltrating the clinical environment. In 1994 with development of MIT-MaNUS5, robotic device for the upper limb rehabilitation, started the robotic era of neurorehabilitation. In the same year the introduction of Lokomat, a Body Weight Supported Treadmill Training (BWSTT) assisted by a gait orthosis, represented the first pioneering grounded exoskeleton.

Exoskeleton is an outer wearable skeleton that allows people with paralysis of the lower limbs to walk. Neurological diseases such as traumatic brain injury, stroke and spinal cord injury cause serious consequences both at physiological and motor levels. Our recent studies have underlined the positive effects of using exoskeletons both in spinal cord injuries and stroke patients, affecting in terms of positive results the two main domains of our brain: psychological and sensory-motor.