NEW TECHNOLOGIES IN REHABILITATION – CHALLENGES AND PERSPECTIVES

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New technologies in rehabilitation comprise biomedical and engineering approaches to optimize a person's capacity, strengthen the resources of the person, provide a facilitating environment, and develop a person's performance in the interaction with the environment.

High technologies in rehabilitation including robotics, telemedicine, virtual reality, etc. have evolved in the last decades. The ultimate objective of new technologies is to improve the functional capacity of persons with disabilities, thus reducing their dependence on others and contributing to their integration in the families and society.

Robotic assisted rehabilitation as part of the new technologies was introduced with the expectation to provide highly repetitive, reproducible, and guided limb movements with intelligent control, continuous sensory feedback, and monitoring of performance. It enhances traditional therapies by providing therapy for long periods, with less fatigue for patients and therapists. This task oriented rehabilitation is usually combined with virtual reality, which allows one to motivate the patients to perform the rehabilitation tasks, guaranteeing repetitive movements and informative feedback.

Still there are a lot of challenges for the integration of new technologies in everyday clinical practice. New technology compliance and use is influenced by a combination of medical, research, social, economic, ethical, and cultural factors. Rehabilitation providers should be aware of this and of the way in which their own values guide and influence patients and caregivers in complex decisions regarding the utility of new technologies.

Still there are controversies about the effectiveness of robotic therapy and other new technology approaches. Studies, meta-analysis, including Cochrane reviews find benefits, especially when they are integrated with conventional rehabilitation interventions. There is a need for well-designed, large-scale, multicentre studies to evaluate benefits (regarding functioning,

activities and participation) and harms of robotic assisted therapy and other new technologies in rehabilitation. The best protocol, regarding the intensity, duration, and amount of training needs to be clarified as well as the indications concerning the stage and severity of the disorder. A specific barrier is the education of the members of the rehabilitation team to use the technologies properly for the benefit of the patients. Another barrier is the lack of effective communication in the planning stage of designing robotic aids between engineers and health professionals. Many devices are incredibly complicated from the usability point of view. There is also a problem with the cost and availability and their relation to the effectiveness of the treatment.

Further research should determine whether daily living-related tasks can be enhanced by new technologies through technical design and new treatment exercises and protocols. Tailoring the new technology approach to user needs (patients, therapists, and PRM specialists) might improve outcomes.