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COMMENTARY

COMMENTARY ON GAIT TRAINING IN PATIENTS WITH SPINAL CORD INJURY

There are 2 systematic reviews regarding gait training for persons with spinal cord injury in this issue ("Effectiveness of robot-assisted gait training in persons with spinal cord injury: a systematic review" by Swinnen et al. (1) and "Body weight-supported gait training for restoration of walking in people with an incomplete spinal cord injury: a systematic review " by Wessels et al. (2)). The question of training for mobility after a spinal cord injury has been described thoroughly by the National Institute for Neurological Disorders and Stroke, as has the ongoing research in the field (available from: http://www.ninds.nih.gov/disorders/sci/detail_sci.htm). What is obvious when reading this site is the frustration experienced by people with spinal cord injuries, and the hope for a cure, which is manifested through research in different areas.

In the area of training (which refers to the acquisition of skills and competencies), various methods to restore walking capacity are in focus. In people with spinal cord injuries, activation of brain function, as well as the transport of information in the spinal tract past the site of injury are necessary. Below the site of injury the tract continues, with the anterior horn cells, nerves and muscles; therefore, if the nerve impulses were able to by-pass the break, the nerves could function again. This is where the focus on stem cell research lies, but, as stated in the World Congress of Neurorehabilitation in Vienna (March 2010), much work is required before the spinal cord can be restored or the site of injury by-passed (3). The other possible means of regaining walking ability is to utilize the fact that part of the spinal cord is outside the control of the brain, meaning that activation of the spinal gait pattern may be possible. Another factor that may be important for training is the theory that the intensity, frequency and duration of the task have an impact. In addition, task specificity seems to be of importance (3). This implies that in order to be able to walk one has to practice walking a lot. Thus, after a spinal cord injury the patient needs to be supported, not to fall, and for someone to move their legs one at a time. Since this training is extremely tiring and time-consuming, it is not surprising that the focus is on technical solutions. There are 2 alternatives currently available: (*i*) body weight support, where the body is partially hoisted so that the person does not have to take their full weight on their legs. In the case of partial spinal cord injury, this theoretically would make it possible for the subject to move their own legs on a treadmill in order to walk. More steps would mean more training. (*ii*) For patients with a complete injury, someone or something has to move their legs. This may be a robotic device that is programmed to move the legs forward in a certain rhythm. However, to the disappointment of most therapists and many patients the reviews in this issue indicate that there is no evidence to support that gait training should be delivered by either body weight support (for incomplete spinal cord injury) or robot-assisted gait training. On the contrary, it appears that ordinary over-ground walking is more effective than body weight supported training; and for robot-assisted gait training, the studies were small and not all were well designed.

The neurobiological background of the effect of training needs to be investigated. For the future I believe we will understand more of the complexity of the spinal cord injury and its effects on gait pattern, and that this will call for individualized training. Therefore, further well-designed studies are needed in order to determine what type of gait training works best for different patients.

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