

Research Assessment #8

Date: November 13th, 2020

Subject: “The effects of locomotor training in children with spinal cord injury: a systematic review”

MLA citation(s): Donenberg, Jennifer Glenna, et al. “The Effects of Locomotor Training in Children with Spinal Cord Injury: a Systematic Review.” *Developmental*

Neurorehabilitation, Taylor & Francis Ltd, May 2019. EBSCOhost,

<http://search.ebscohost.com/login.aspx?direct=true&db=a9h&AN=135826762>. Accessed 14 Nov. 2020.

Although the majority of spinal cord injuries patients are often senior citizens, teens have a greater potential for rehabilitation because of their developing bodies. However, if they remain ignorant of their potential they may remain quadriplegic for a longer period of time.

Furthermore, the article “The effects of locomotor training in children with spinal cord injury: a systematic review” has conducted an intense research study of various experiments and clinical studies to arrive at the conclusion that locomotor training can have a great impact on the child’s ability to walk. Locomotor training includes functional electrical stimulation (FES), virtual reality therapy, treadmill training, and robotics as well. It was impressive to learn that almost every time, a child could see development after treatment, regardless of the type of training conducted.

The ideology behind locomotor training was to stimulate the central pattern generator (CPG) located between the spinal cord injury and brain, that controls basic movement such as upright mobility. To continue, when the body receives a signal from a sensory input that requires walking, the message travels through the CPG pathway to the supraspinal centers which modulate movement. After a traumatic spinal injury, the movement of the lower limbs may be obstructed but the reason behind the lack of movement is not a damaged CPG. In general, the

CPG may remain intact while the sensory parts of the spinal cord are injured which would cause messages to not be sent. Therefore, the goal of the training is to trigger the CPG by creating simulations within the neuromuscular regions. By using these trigger points the movement of the body will be controllable and can help patients move.

During this gait training, the patient's experience can be similar to an infant's experience while learning to walk. Although, they have learned how to walk before, the perspective is completely different as a patient because they have to relearn everything from scratch. They have to learn how to support their body weight independently as a baby does in its initial stage. Moreover, the journey to upright mobility is different for everyone but the experiences can be generalized by categorizing the patients into two different groups, those with tetraplegia and those with paraplegia. Tetraplegia refers to people without sensation in both upper and lower limbs but paraplegia refers to those with no sensation mainly in the lower limbs. According to the data, people diagnosed with paraplegia have a higher chance of recovery than those with tetraplegia but there many other factors that could also make a difference in each person's experience, such as the origin of the injury, age or type of injury (complete or incomplete).

This article was very helpful as in the previous assessments, the articles focused on the reviews of specific types of training such as electrical stimulation or virtual reality and this systematic review helps bring it all together. Most of the time, the patients focused at least 30 minutes and they were able to see results within 6 days. The effect lasted for about 2 days before the patient had to go into training again. Even though the effect does not last permanently, the movement of muscles temporarily can prevent spasticity of the muscles and improve the body's overall functionality. In addition, to physiological improvements, the article also suggested that the training has psychological implications because walking and standing can give the patients a chance to walk around and have eye contact with whom they are talking, it is a very empowering act for them. After learning about all the different types of treatment, my next focus will be on the psychological effects specifically related to non-compliance of treatment to see what types of

treatments are most preferable for adolescents. Also I will research the psychological effects of at-home school for spinal cord injury patients and how it may affect their social life.

Annotations: <https://kami.app/PbazMs6Hd4QS>