

## **Neuromodulation paired with locomotor training improves muscle strength after motor complete spinal cord injury: A case report**

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***Abstracts will be considered for both poster and platform presentations***

### ***Neurotrauma (TBI, spinal cord injury, etc.)***

According to the National Spinal Cord Injury Statistical Center, as many as 300,000 people in the United States are living with spinal cord injury (SCI). Approximately 12,500 new cases of SCI occur annually in the United States; and less than 1% of SCI survivors have complete recovery of function. This statistic highlights the need for effective therapeutic interventions during long-term stages of SCI recovery, including interventions to help restore locomotor function.

The central nervous system has the ability for degrees of reorganization formerly thought to occur only during the early post-natal period. It is now believed that this capacity for plastic change plays a crucial role in recovery of function after neurological injury. Persistent responsiveness to external sensorimotor stimuli and resultant plastic change in cortical motor areas can occur after incomplete SCI, a condition in which the spinal cord remains partially preserved and interconnected with the intact brain by unlesioned fibers. Interventions that capitalize on this mechanism may include neuromodulation paired with therapy. Specifically, a non-invasive form of brain stimulation called transcranial direct current stimulation (tDCS) has been shown to facilitate plastic change supporting enhanced outcomes of motor therapy after stroke. However, there is no available data about tDCS to enhance recovery of lower extremity motor function for people with SCI.

To address this evidence gap, the present case study reports on the effects of tDCS paired with robot-assisted treadmill training for a study participant with motor complete SCI in the chronic stage of recovery. This case study was part of a larger randomized, double-blind, sham-controlled trial of tDCS paired with peripheral nerve stimulation and robot-assisted treadmill training.