

Non-invasive brain stimulation paired with robot-assisted gait training after spinal cord injury

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BACKGROUND: Locomotor training with a robot-assisted gait orthosis (LT-RGO) and transcranial direct current stimulation (tDCS; a form of non-invasive brain stimulation) are interventions that can significantly enhance outcomes of rehabilitation after spinal cord injury (SCI). No studies have investigated whether combining these interventions significantly enhances lower extremity movement function more than training alone in spinal cord injury.

OBJECTIVE: Determine whether active tDCS paired with LT-RGO improves lower extremity movement function more than sham tDCS paired with LT-RGO, for subjects with motor incomplete SCI.

METHODS: Fifteen adults with SCI received 36 sessions of either active or sham tDCS (20 minutes) preceding LT-RGO. Outcome

measures included manual muscle testing (MMT; primary outcome measure); 6-Minute Walk Test (6MinWT); 10-Meter Walk Test (10MWT); Timed Up and Go Test (TUG); Berg Balance Scale (BBS); and Spinal Cord Independence Measure-III (SCIM-III).

RESULTS: MMT showed significant improvements after active tDCS paired with LT-RGO, with the most pronounced improvement in the right lower extremity. 10MWT, 6MinWT, and BBS showed improvement for both groups. TUG and SCIM-III showed improvement only for the sham tDCS group.

CONCLUSION: Pairing tDCS with LT-RGO can improve lower extremity movement function more than LT-RGO alone. Future research with a larger sample size is recommended to determine longer-term effects on movement function, including activities of daily living.