ABSTRACT

OBJECTIVES: 1) To investigate the feasibility of combining transcranial direct current stimulation (tDCS) to the lower extremity (LE) motor cortex with novel locomotor training to facilitate gait in subjects with chronic stroke and low ambulatory status, and 2) to obtain insight from study subjects and their caregivers to inform future trial design.

METHODS: Double-blind, randomized controlled study with additional qualitative exploratory descriptive design. One-month follow-up. 10 subjects with stroke were recruited and randomized to active tDCS or sham tDCS for 12 sessions. Both groups participated in identical locomotor training with a robotic gait orthosis (RGO) following each tDCS session. RGO training protocol was designed to harness cortical neuroplasticity. Data analysis included assessment of functional and participation outcome measures and qualitative thematic analysis.

RESULTS: Eight subjects completed the study. Both groups demonstrated trends toward improvement, but the active tDCS group showed greater improvement than the sham group. Qualitative analyses indicated beneficial effects of this combined intervention.

CONCLUSIONS: It is feasible to combine tDCS targeting the LE motor cortex with our novel locomotor training. It appears that tDCS has the potential to enhance the effectiveness of gait training in chronic stroke. Insights from participants provide additional guidance in designing future trials.

KEYWORDS: Lokomat, LokomatPro, Neuronal plasticity, electric stimulation, robotics, lower extremity, stroke

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