TRANSCRANIAL DIRECT CURRENT STIMULATION COMBINED WITH TREADMILL TRAINING IN THE SUBACUTE PHASE FOLLOWING STROKE

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Background

Regaining walking ability after stroke is a major target in stroke rehabilitation.
Imbalance of interhemispheric interactions is believed to interfere with the recovery process.
This imbalance can be ameliorated by upregulation of the excitability in the lesioned hemisphere using non-invasive brain stimulation technique - transcranial Direct Current Stimulation (tDCS)

Aim

to evaluate the feasibility of anodal tDCS over lower limb primary motor cortex combined with body weight support treadmill training (BWSTT) in the subacute stroke patients.

Methods

4 ischemic stroke patients included within 14 days from onset (Tab. 1)

Intervention:

1. BWSTT thrice per week for 4 weeks
2. Anodal tDCS:
   - to the cortical lower limb motor area in affected hemisphere
   - 2 mA current for 20 minutes during BWSTT using 35 cm2 saline soaked electrodes

Evaluations:

- 10-meters walking test (10 MWT)
- isokinetic muscle strength of knee extensors using BIODEX System 3 Pro Dynamometer
- gait analysis (step length, swing time and stance time ratio) conducted with Vicon 612 8-camera system

Results

- All subjects demonstrated improved gait velocity determined by the 10MWT (Fig. 1)
- Changes in peak torque of paretic knee extensors were non-significant (Fig. 2)
- Gait analysis performed in 3 subjects revealed better temporal and spatial symmetry (Fig.3).
- No major side effects were reported

Fig. 1 Changes in 10 MWT

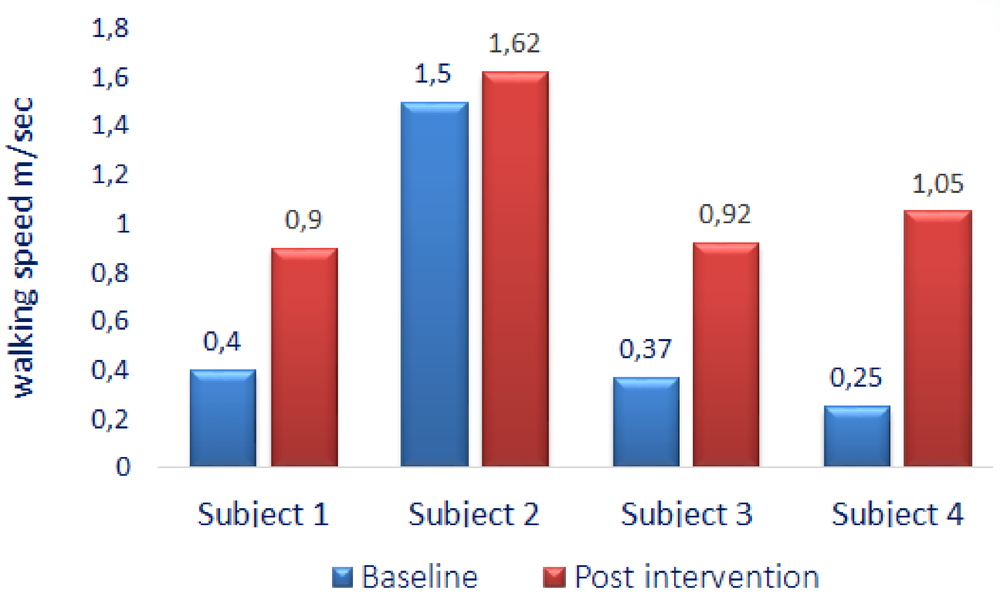


Fig. 2. Isokinetic muscle strength of paretic knee extensor

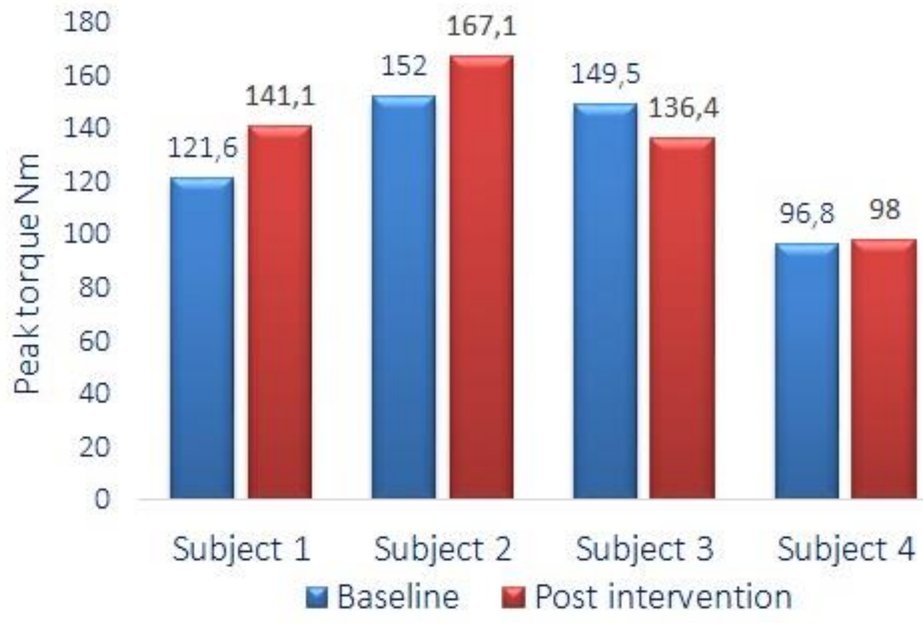
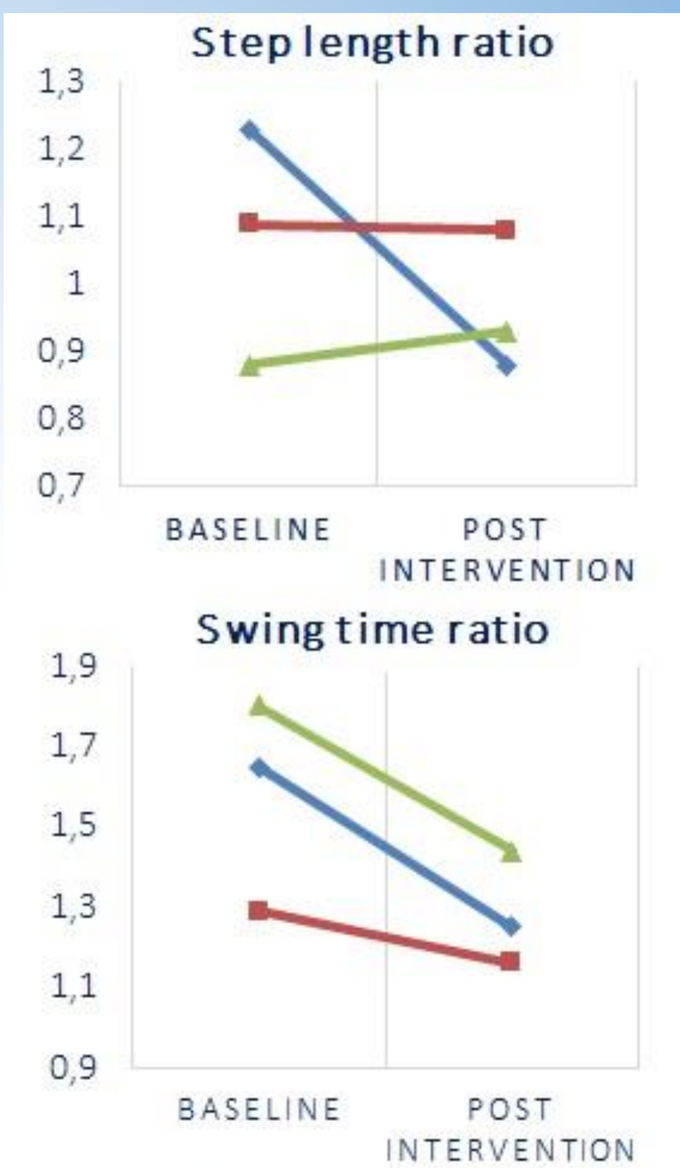


Fig. 3. Gait symmetry



Tab. 1. Patients characteristics

Subject	Sex	Age	Stroke localisation
1	M	58	Right side of pons
2	M	52	Left basal ganglia
3	M	56	Left thalamus
4	M	70	Left corona radiata

Conclusion

Anodal tDCS combined with body weight support treadmill training is feasible and carries potential as a strategy to improve gait recovery in the early phase of stroke rehabilitation.
Data represents preliminary results of an ongoing study which will include additional subjects in order to establish factors correlated with favorable outcome.

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