MULTIMODAL PHYSICAL TRAINING COMBINED WITH TDCS IMPROVES PHYSICAL FITNESS COMPONENTS IN PEOPLE AFTER STROKE: A DOUBLE-BLIND RANDOMIZED CONTROLLED TRIAL

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ABSTRACT

Background: Transcranial direct current stimulation (tDCS) seems to be a potential tool to optimize the long-term effects of multimodal physical training (MPT) on fitness components in post-stroke patients. **Objective**: We investigated the effects of cortical tDCS combined with MPT on motor function reflected by strength, motor performance, and cardiorespiratory capacity in chronic stroke patients. **Methods**: This double-blind randomized controlled trial included 18 volunteers (55±10 y, 72±13 kg), who underwent MPT preceded by either sham stimulation (SHAM) or 2 mA bi-hemispheric tDCS. MPT consisted of24 sessions of 60-70 min performed 2 d/wk within 12-16 weeks, with individualized intensity. Outcomes were Fugl-Meyer scores for lower limbs (FM-LL), and total (FM-Total); speed in the 10-m walk test (10MWT); oxygen uptake and work output at maximal effort (VO 2max and W max), and gas exchange threshold (VO 2 -GET and W-GET);peak torque of isokinetic knee extension (PT-EXT) and flexion (PT-FLEX) of paretic and non-paretic limbs; bilateral strength deficit during knee extension (DS-EXT) and flexion (DS-FLEX). **Results**: Pre- vs. post-intervention improvements were detected in tDCS vs. SHAM (p<0.05) for FM-total (29.6% vs. 15.9%; effect size [ES]=0.78), FM-LL (35.9% vs. 9.0%; ES=1.23), 10MWT (10.6% vs. 3.8%; ES=0.67), W max (75.0% vs. 4.3%; ES=1.68), W-GET (91.6% vs. 12.4%; ES=1.62), PT-EXT (25.6% vs. -6.5%; ES=1.94) and PT-FLEX (26.3% vs. 9.8%; ES=0.65) of the paretic limb, and DS-EXT (-13.7% vs. 2.5; ES=1.43). **Conclusion**: Bi-hemispheric cortical tDCS optimized the effects of MPT performed with moderate volume and intensity upon muscle strength, motor function, and cardiorespiratory performance in stroke hemiparetic survivors. (Registration number RBR-22rh3p).

Keywords: cerebrovascular accident; neuromodulation; functional capacity; brain stimulation; exercise; health