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Structural Neuroplastic Change nd Behavioral Motor Recovery after transcranial Direct Current Stimulation (tDCS) in Patient with Stroke: A Case Study

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Fine motor and manual dexterity deficits are the main cause of functional disability that leave stroke survivors with significant impairment physically and psychosocially. transcranial direct current stimulation (tDCS) is one of the non-invasive brain stimulation (NIBS) novel techniques that can be used in modulating brain activity and improving functional and clinical outcomes. To investigate the therapeutic utility of applying tDCS in behavioral functions in patients with stroke, a 48-year-old, left-handed male who had a right-hemisphere-fronto- parietal ischemic stroke suffering from cortical sensation deficits; asterognosis and agraphesthesia was participated in 30 sessions of sham tDCS before crossover to 30 sessions of dual- hemispheric tDCS in a double-blind, sham-controlled single-case study. Six weeks of daily sessions (5 days per week) with (2 mA, 20 min). Direct current was delivered from a battery-driven, constant current stimulator (Magstim HDCStim stimulator, The Magstim Co., Whitland, UK) using saline-soaked surface sponge electrodes (5 × 5 cm) with anodal tDCS placed over ipsilesional primary motor area (M1), and cathodal over contralesional M1. Functional outcome measures were assessed with grooved pegboard, box and block test (BBT), action research arm test (ARAT), functional dexterity test (FDT) and nine-hole peg test (NHPT), in several times; prior stimulation (T0), immediately post (T1), as well as 1 month (T3) and 3 months after the end of procedure (T4). Structural and tensor diffusion imaging (DTI) data were also acquired prior (T0) and after stimulation (T1). Slight improvement in grooved pegboard, (BBT), (ARAT), (FDT) and (NHPT) in sham was noticed in (T1). However, with real dual-hemispheric stimulation all findings were clinically significant across all times (T1, T3 and T4). Higher fractional anisotropy (FA) and lower diffusivity of the corticospinal tract (CST) positively correlated with better recovery of fine motor and manual dexterity. tDCS intervention induces not only behavioral but also and structural changes in stroke.

Biography

Turki Abualait is a clinical researcher in neuroscience and Neurorehabilitation interested in investigating the neurological disorders at Imam Abdulrahman bin Faisal University (university of Dammam formerly).

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