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## **Effects of Anodal Stimulation of Left Dorsolateral Prefrontal Cortex in Treatment-Resistance Depression Evaluated with Low-Resolution Brain Electromagnetic Tomography**

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**Background and Aim :** Treatment-resistant depression has a significant impact on the quality of life of patients. This situation will have severe individual, social, and economic consequences.

**Methods :** The method of the current study was quasi-experimental with a pretest-posttest design. Thirty patients with a primary diagnosis of treatment-resistance depression were recruited from outpatient psychiatric clinics in Tehran province, Iran, and selected through the Structured Clinical Interview for DSM-IV Axis I disorders (SCID-I). All patients had been under treatment with citalopram 20 mg/day for at least 6 weeks before transcranial direct current stimulation (tDCS). tDCS was administered with the anodal and cathodal stimulation over F3 and F4 respectively. The patients were assessed with beck depression inventory-II (BDI-II) before starting tDCS sessions, and at the end of week 2 (after 14 sessions of tDCS). Moreover, the EEG was recorded for all patients at the baseline and the end of week 2 of tDCS treatment.

**Results :** The comparison between after and before treatment with tDCS in treatment-resistance depression revealed that patients in post-treatment have statistically significant lower power spectrum density in theta, upper alpha, low beta, and high beta frequencies ( $T=3.1$ ,  $p=0.0098$ ). Moreover, the decrease in theta, upper alpha, low beta, and high beta power spectrum density



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(Corr.  $p < 0.05$  for  $|r| > 0.21$ ) in several brain areas (especially the left hemisphere) has a statistically significant negative correlation with changes in BDI-II scores.

**Conclusion :** Adding new treatments based on neuromodulation to traditional drug treatments can changes in pattern of brain functional activity and improve these patients.

**Keywords :** EEG, Low-Resolution Brain Electromagnetic Tomography, Power Spectrum Density, Transcranial Direct Current Stimulation, Treatment-resistant Depression