
MODIFICATIONS OF HUMAN BRAIN ACTIVITY DUE TO TRANSCRANIAL DIRECT CURRENT STIMULATION (TDCS) IN PATIENTS WITH NICOTINE DEPENDENCE

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Transcranial direct current stimulation (tDCS) is a non-invasive technique to modulate human brain responses and has been used successfully in the treatment of depression. In this study tDCS was used as an add-on to psychotherapeutic interventions for the treatment of nicotine dependence. The goal of this study is to investigate modifications of brain activity before and after tDCS therapy.

The study is based on a sample of 32 smokers, 22 to 65 years; participants were divided into a placebo group and a verum group. Each participated in fMRI measurements before and after treatment (tDCS plus psychotherapy). During the fMRI sessions, pictures with or without a connection to smoking were presented in a pseudo-randomised order, in order to assess craving-related responses.

The results indicate cue-related brain activations, mainly within the basal ganglia, in the thalamus, the occipital cortex and the cuneus. The verum group showed an increased activation of the frontal cortex which is possibly related to a reinforcement of the brain's control function. The placebo group demonstrated reduced responses in the thalamus, the parahippocampal gyrus and the occipital cerebral cortex after tDCS, which may be related to changes of general attention and alertness.