

## **THE EFFECTS OF TRANSCRANIAL DIRECT CURRENT STIMULATION IN PATIENTS WITH NEUROPATHIC PAIN FROM SPINAL CORD INJURY: A PILOT STUDY**

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**Background and objectives:** One of the neuropathic pain hypotheses is the occurring of cortical reorganization resulted in decrement of pain modulatory system modulated by thalamus and reduction of peak frequency of alpha activity. There were few studies about the effect of transcranial direct current stimulation (tDCS) in neuropathic pain. However, these studies were not involved in the mechanism of action. Therefore, we aimed to study the effects of anodal tDCS on neuropathic pain relief and the alteration of peak frequency of power spectrum density (PSD).

**Methods:** Ten patients with neuropathic pain from spinal cord injury were treated by a single stimulation of tDCS 2 mA over the left primary motor area (M1) for 20 minutes. Pain score and peak frequency of electroencephalogram spectral analysis were compared between before and after tDCS.

**Results:** Immediate post-treatment, mean difference of pain score was 1.00 (95%CI 0.24 to 1.75,  $p=0.01$ ) while theta-alpha frequency (TAF) under the left M1 was 0.99 (95% CI -2.83 to 0.84,  $p = 0.84$ ). In addition, we found a significant linear regression between the difference of pain score and TAF ( $r=0.73$ ,  $p = 0.03$ )

**Conclusion:** Our study suggests that a single stimulation of anodal tDCS over the left M1 may be a useful clinical tool in neuropathic pain from spinal cord injury. We found the tendency of correlation between the decreased pain score and the increased peak frequency in the TAF, therefore we proposed that increased cortical excitability and modulated pain perception through corticothalamic loop may underlie these effects.