

Is transcutaneous spinal direct current stimulation efficient in symptomatic treatment of patients with idiopathic restless legs syndrome?

Heide AC*, Nitsche MA, Winkler T, Heide W, Trenkwalder C, Paulus W, Bachmann CG

*Department of Clinical Neurophysiology, Georg August University

Objective

Transcutaneous spinal direct current stimulation (tsDCS) is a new, non-invasive and painless technique for modulation of spinal cord excitability. The current conception of restless legs syndrome (RLS) proposes increased spinal excitability in RLS patients. In this pilot study, we aimed to reduce pathologically enhanced excitability in RLS patients by tsDCS to diminish clinical symptoms.

Methods

Twenty (20) patients with primary RLS and 14 healthy subjects participated in this double-blind randomized study. All participants received one session of cathodal, anodal and sham stimulation of the thoracic spinal cord for 15 min (2.5mA, 0.056mA/cm²). To assess spinal cord excitability, we determined the Hmax/Mmax ratio of the soleus Hoffmann reflex and 7 different H2/H1-ratios of two successive stimulations with 7 different interstimulus intervals in 14 patients and 14 healthy controls. These parameters were measured before stimulation, at current offset and 30 minutes after stimulation. The severity of RLS symptoms was assessed in all subjects at all these time points by a visual analogue scale (VAS).

Results

Primary RLS patients showed significantly increased H2/H1-ratios during their highly symptomatic phase in the evening compared to healthy controls. Application of anodal tsDCS led to a distinct, but significantly decreased H2/H1-ratio in primary RLS patients for the interstimulus intervals of 0.2 and 0.3 sec, correlating with a significant moderate alleviation of symptoms on the VAS. Application of cathodal tsDCS also led to a significant, but less effective reduction of RLS symptoms on the VAS, whereas H2/H1-ratios were not affected by this intervention. Application of sham tsDCS had no significant effects on VAS scores or on H2/H1-ratio in patients.

Conclusion

Our data indicate that tsDCS is efficient in alleviating RLS symptoms and might become a completely new, non-pharmacological therapeutic tool for primary RLS patients.