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Transcranial direct current stimulation and mechanical punctate pain in older adults with knee osteoarthritis pain: A double-blind, randomized, sham-controlled pilot clinical study

Hyochol Ahn
University of Texas Health Science Center at Houston, USA

Osteoarthritis is the most common arthritic condition, a leading cause of pain and disability in people 45 years and older. There is a growing interest in non-pharmacologic interventions targeting central nervous system pain processing, such as transcranial Direct Current Stimulation (tDCS), for this population owing to its neuromodulatory effects. A panel of experts at the European chapter of the International Federation of Clinical Neurophysiology recently recommended that stimulation with anode over the primary motor cortex (M1) and cathode over contralateral Supraorbital Region (SO) for possible efficacy among populations with chronic pain. However, few studies have examined the efficacy of tDCS on experimental pain sensitivity. Thus, we sought to assess the preliminary efficacy of M1-SO tDCS on punctate pain in adults with knee OA pain. We conducted a double-blind, randomized, sham-controlled pilot clinical study in 40 community-dwelling participants with knee OA. The participants were randomly assigned to receive either five daily sessions of 2mA tDCS for 20 minutes or sham tDCS. A calibrated nylon monofilament delivering a target force of 300 grams was applied and verbal ratings of the pain intensity on a scale of 0 to 100 following 10 contacts were obtained to assess their sensitivity to punctate mechanical stimuli on the index knee. The mean age was 59 years (SD=8 years) and 53% were female. After five daily sessions, the active tDCS group had a marginally greater decrease in mechanical punctate pain (-3.62±4.72) than the sham group (4.12±6.48). The mean difference between groups was 7.75±8.02 (t=0.96, df=38, p=0.34, Cohen's d=0.30). Although our primary results were non-significant, there is a preliminary suggestion that tDCS targeting primary motor cortex may reduce mechanical punctate pain sensitivity in adults with knee OA. Further studies with stronger dose of tDCS and larger samples are needed.

Hyochol.Ahn@uth.tmc.edu