

Can a Single Session of 2ma Active Transcranial Direct Current Stimulation (TDCS) Over the Primary Motor Cortex Enhance Exercise Induced Hypoalgesia (EIH) Compared to Sham TDCS in Individuals with Knee Osteoarthritis (OA)?

David Toomey (PhD) Faculty of Health & Environmental Sciences

Osteoarthritis (OA) is the most common cause of chronic pain and disability in older adults and is associated with muscle weakness, functional limitations, psychological distress, fear of movement and reduced quality of life. Knee OA accounts for the majority of the burden of OA worldwide. Exercise can effectively reduce pain in knee OA and is universally recommended as a first-line treatment by international evidence-based treatment guidelines. Exercise also produces immediate, short-term reductions in pain sensitivity after a single bout of exercise, called exercise induced hypoalgesia (EIH). However, higher levels of EIH variability can be seen in chronic pain conditions such as OA, with some people experiencing no change or even an increase in pain after exercise. At this stage, the factors that influence the magnitude of EIH in knee OA are poorly understood. This presentation will discuss research carried out to investigate whether active transcranial direct current stimulation (tDCS) can enhance the EIH response in individuals with knee OA. A double-blind randomised controlled cross over trial was undertaken, with 27 participants. Each participant took part in 2 sessions (active tDCS, sham tDCS), in a randomised order, a minimum of 7 days apart. Following tDCS, a standardised isometric resistance exercise was performed, and pre-post exercise change in pressure pain thresholds, resting knee pain and knee pain during stepping were measured in each session. Linear mixed regression analysis was utilised to assess between session differences in outcomes (anodal vs sham tDCS). The findings of the current study suggest a single session of 2mA active tDCS over the primary motor cortex does not enhance EIH compared to sham tDCS in individuals with knee OA. This research provides insight into the potential factors that impair and facilitate EIH in individuals with knee OA and will offer guidance for the design of future exercise-based interventions for people with OA.

Keywords

Knee osteoarthritis; exercise induced hypoalgesia; transcranial direct current stimulation