

## **Geven Silles Balears** Effects of transcranial direct current stimulation (tDCS) on pain modulation in older people with chronic pain.

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## Introduction

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Chronic pain is one of the main obstacles for healthy aging, reaching over 50% of the elderly (Leadley et al., 2012). Transcranial direct current stimulation (tDCS) over the primary motor cortex (M1) and/or dorsolateral prefrontal cortex (DLPFC) has been postulated as innovative intervention to relieve pain (Pinto et al., 2018). However, little is known about the underlying neurophysiological correlates of tDCS and its efficacy in aging (Pacheco-Barrios et al., 2020).

This study aimed to explore tDCS effects on pain processing and perception in older participants with chronic pain, as well as compare two anodal stimulation sites: M1 versus DLPFC.

**Materials and Methods** 

**Participants.** 24 older adults with chronic pain ( $68.59 \pm 5.64$  years (60-79 years), 12 female).

**Experimental design**. Participants were randomly assigned to receive a single anodal tDCS session (20 minutes of duration, 1.5 mA of intensity) at M1 (n=12) or DLPFC (n=12). Painrelated evoked potentials (PREPs) elicited by electrical stimulation, pressure and electrical pain thresholds as well as subjective pain perception (spontaneous and evoked pain ratings) in a 0-10 visual analogue scale (VAS)) were registered before and after the tDCS (Figure 1).



**Results** 

- **1.** PREPs amplitudes (Figure 2). For N1, we found a significant main effect in TIME (F(1,65)=5.576, p=.036,  $\eta_p^2=.296$ ), as the amplitudes were significantly reduced in POST compared to PRE in all locations and for all participants. No differences were found in P1 or P3.
- Electrical pain (Figure 3). A significant main effect in TIME (F(1,22)=21.530, p=.000,  $\eta_p^2=.606$ ) was found, as the threshold was significantly augmented in POST compared to PRE for all participants. No differences were found in pain intensity or unpleasantness.
- **Pressure pain** (Figure 4). We found a significant main effect in TIME (F(1,22)=8.573, p=.007,  $\eta_p^2=.385$ ), as the pressure evoked pain ratings were significantly reduced in POST compared to PRE for all participants. No differences were found in pressure pain thresholds.
- **Spontaneous pain** (Figure 5). A significant main effect in TIME (F(1,22)=8.573, p=.007,  $\eta_p^2=.385$ ) was found, as the 4. spontaneous perceived pain was significantly reduced in POST compared to PRE for all participants.



Fig. 3. Electrical pain threshold in M1 and DLFPC groups, and in all participants. \*\*\*= p<.001





## **Conclusions**

These results suggest that a single 20-min tDCS session elicited a modulatory effect on attentional aspects of pain processing in older people with chronic pain, in addition to decreasing pain perception during threshold acquisition and reducing spontaneous pain felt by participants. However, no advantage could be observed regarding the site of stimulation, as all improvements in pain processing and perception were equally obtained by anodal stimulation in both M1 and DLPFC.

## References

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