Effects of transcranial static magnetic stimulation over the left DLPFC on gait induced fatigue in young and elderly people

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1.Introduction

Gait-induced fatigue increases the risk of falls during human walking[1]. In this process, fatigue seems to increase the variability of gait rhythmicity, which is already higher in the elderly[2]. On the other hand, transcranial static magnetic stimulation (tSMS) over the left-DLPFC reduces fatigability during simple rhythmic hand movements[3].

2. Objectives

- The aim of this study was to evaluate the effects of tSMS on the left-DLPFC on gait-induced fatigue in young and older people.

3. Methods

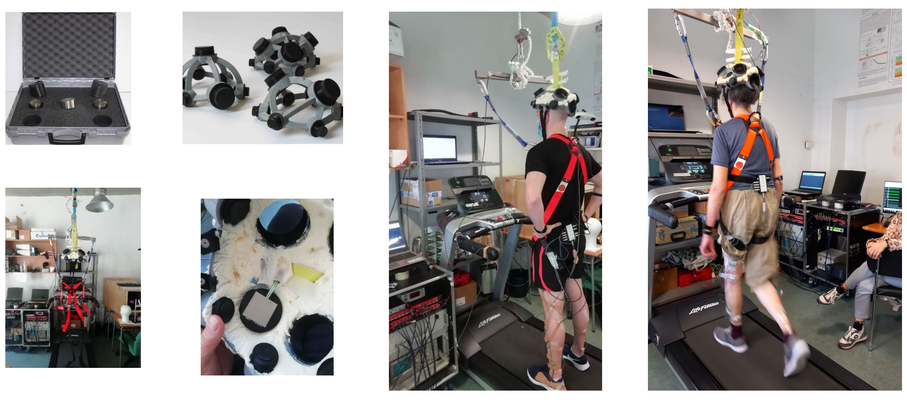
- Double-blind cross-over design. Three sessions: Preliminary Session – Real tSMS – Sham tSMS. At least one-week apart.

- Twelve young (20-28 yrs-old) and 6 older (60-72 yrs-old) healthy subjects participated; all right-handed. Participants walked on a treadmill at their preferred walking speed for a maximum of two hours or until withdrawal. Fatigue was monitored every 5 minutes using a visual analogue scale (VAS). While walking, participant's left-DLPFC was stimulated with tSMS (0.5 Tesla). In one session, tSMS was real, whereas the other session was sham. Sessions order was counterbalanced. Participants were encouraged to walk for the same amount of time in both sessions.

- Left-DLPFC Stimulation

  Real magnet: (MAG60r NEUREK Ltd): A cylindrical nickel-plated NdFeB magnet 60mm diameter/30mm of thickness. Nominal strength ≈120kg.

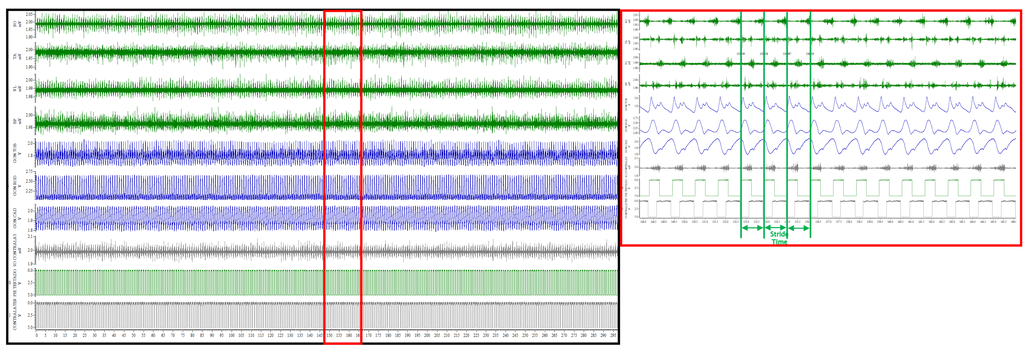
  Sham magnet: identical non-magnetic replica.



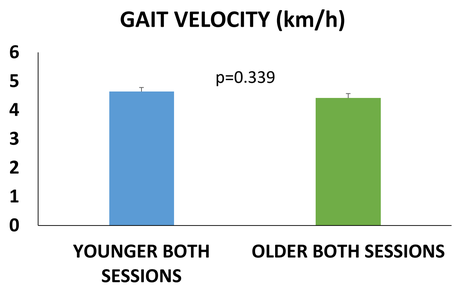
Analysed Variables:

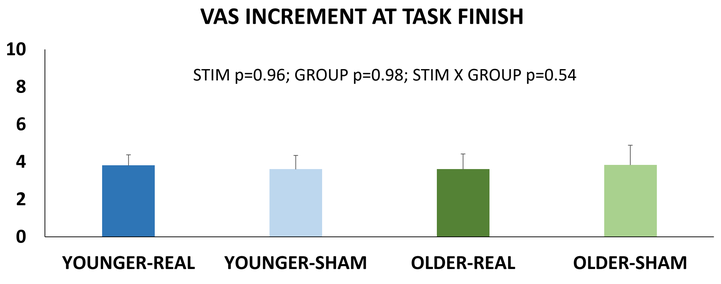
Fatigue Perception (VAS Score), Gait Velocity, Time to withdrawal

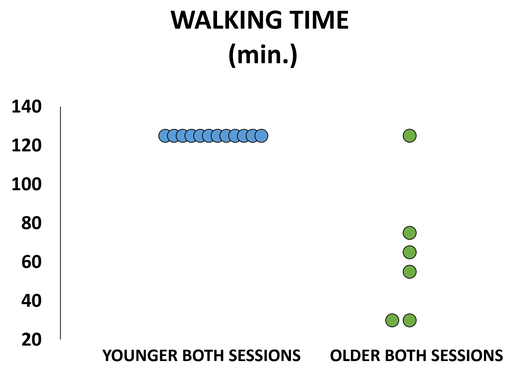
Stride Time (s); Stride Time CV (%)

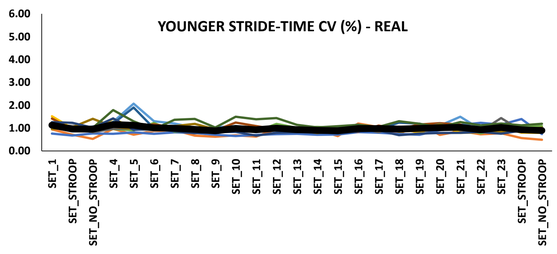


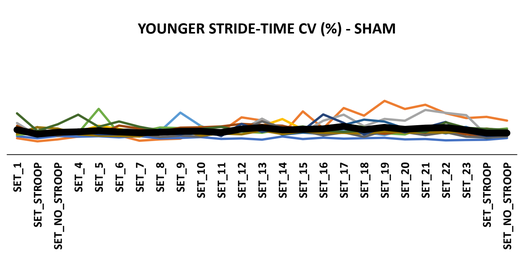
4. Results

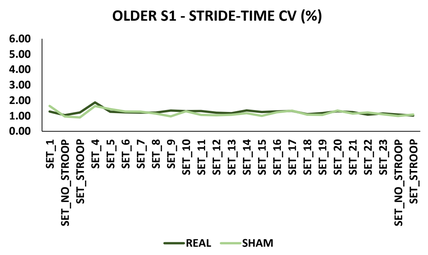


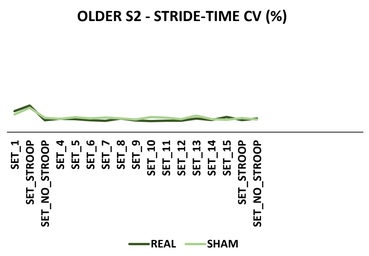


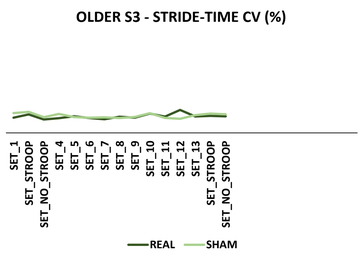


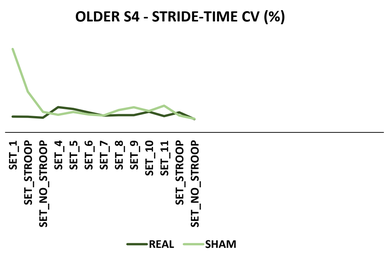


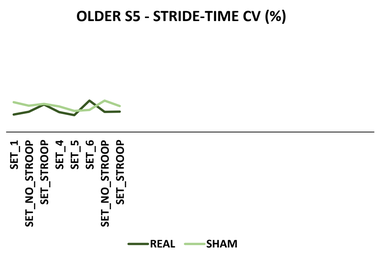


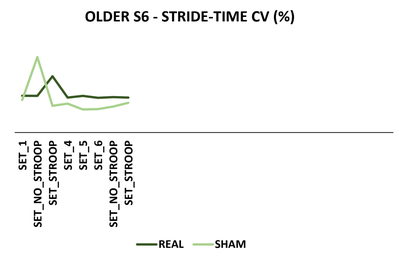


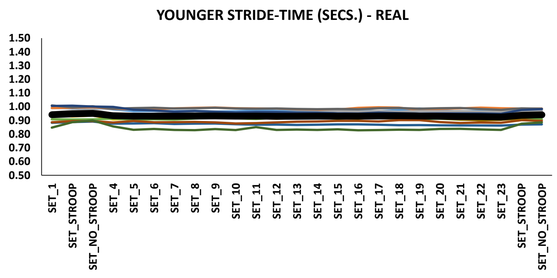


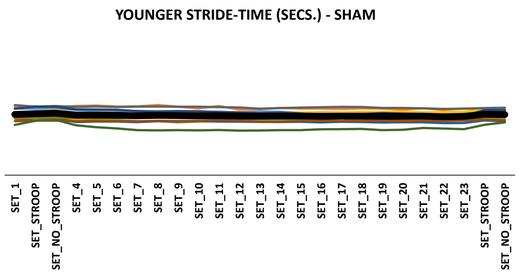


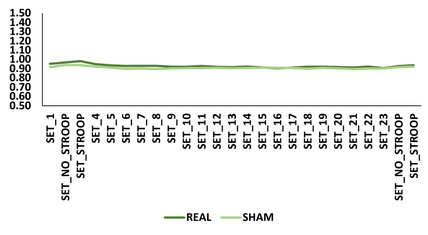


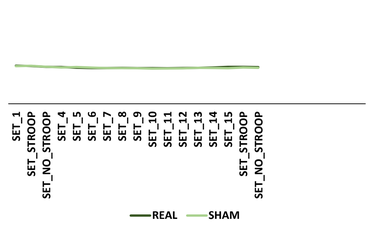


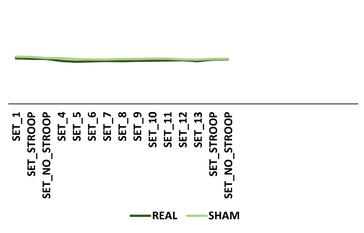


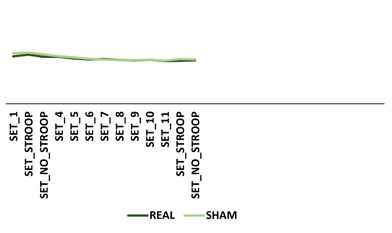


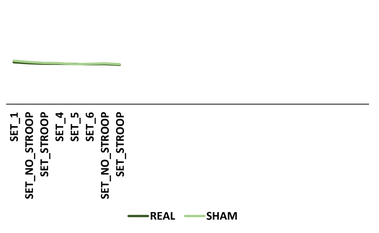


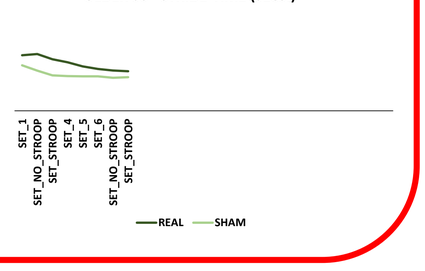












5. Conclusions

tSMS over the left-DLPFC does not change fatigue induced by human gait. Gait-induced fatigue does not change gait variability.

6. References

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