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INTRODUCTION

- Transcranial-direct-current-stimulation (tDCS) is a non-invasive form of neurostimulation with potential for self-administered intervention.
- tDCS has shown promise as a safe and potentially effective treatment for obsessive compulsive disorder (OCD)¹.
- Alongside clinical symptoms, patients with OCD show impairment in specific aspects of executive function of great relevance to wellbeing, including motor disinhibition and inflexible thinking.
- Our aim is to investigate whether tDCS changes cognitive markers of inhibition and flexibility, as a potential mechanism of clinical effect

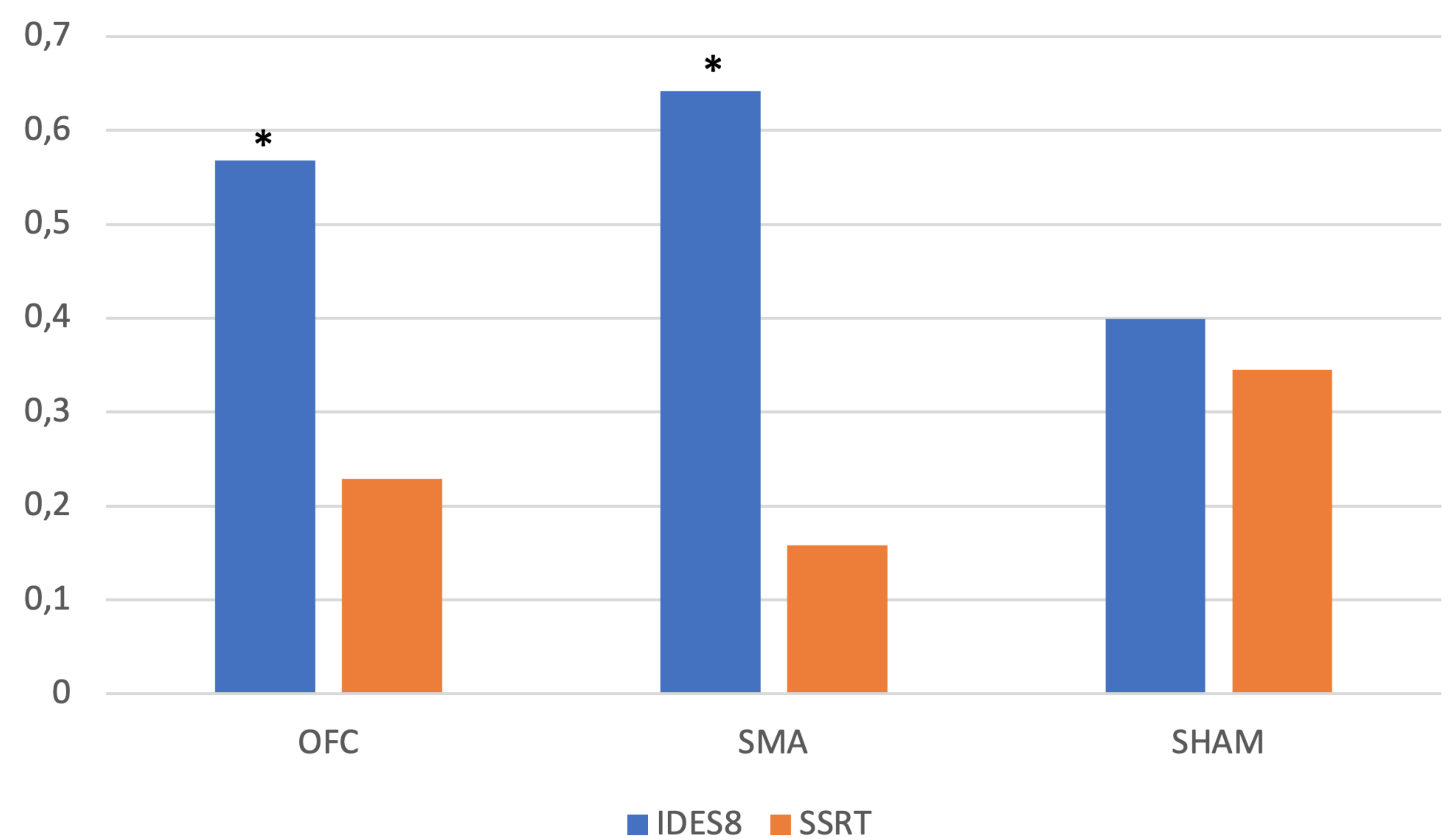
METHODS

- FEATSOCS¹ is a randomised, double-blind, sham-controlled, cross-over, multicentre feasibility study.
- Nineteen adults with DSM-5 OCD (at least moderate severity – Yale-Brown Obsessive Compulsive Scale (Y-BOCS) > 20) received three courses of clinic-based tDCS (SMA-supplementary motor area, L-OFC-left orbitofrontal cortex and Sham), randomly allocated and delivered in counterbalanced order.
- Each course of tDCS comprised four 20-minute 2 mA stimulations, delivered over two consecutive days, separated by a ‘washout’ period of at least four weeks.
- tDCs of the LOFC produced the most convincing clinical effect on OCD symptoms (Y-BOCS).
- This supplementary analysis focuses on cognitive data.
- We used the CANTAB-Battery² to collect measures of motor-impulsivity (stop signal reaction time: SSRT) and cognitive inflexibility in terms of extra dimensional set shifting (Intra/Extra-Dimensional-Set-Shifting-Task: ID/ED).
- Cognitive assessment was conducted before and after stimulation.
- We used a paired samples T-test to compare the baseline and post-stimulation scores for each treatment group.

RESULTS

- 18 patients completed all of the neurocognitive assessment, 1 participant completed only the neurocognitive assessment after sham.
- tDCS of the OFC and SMA significantly improved cognitive inflexibility (total errors on stage 8 of the ID/ED), while sham did not (pre-post effect size, baseline vs. 2h after stimulation).
- Effect sizes were: 0.57 (CI:0.03-1.09), $p=0.038$ for OFC and 0.64 (CI:0.184-0.871), $p=0.030$ for SMA.
- No significant effect was found for motor inhibition (SSRT) in any of the three arms.

Figure 1. Effect sizes of OFC, SMA and SHAM on performance on the Stop Signal Task and the Intradimensional-Extradimensional Set-Shift Task.



Y-axis: Effect sizes, corrected for non-normality when needed.

Improvement: positive effect size. Worsening: negative effect size.

* = significant within-group improvement compared to baseline, $p<0.05$

CONCLUSIONS

- Notwithstanding the small sample size, stimulating the OFC and SMA with a short course of tDCS significantly improved attentional flexibility but not motor impulsivity in patients with OCD.
- The effect of tDCS on attentional inflexibility is remarkable because this cognitive phenotype is not known to improve with standard evidence-based treatments of OCD, such as SSRIs and CBT.
- tDCS of both the OFC and SMA may act to improve aspects of OCD via cognitive mechanisms.
- A definitive randomised, controlled trial of tDCS targeting both the OFC and SMA, including cognitive markers, is now needed.

REFERENCES

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