Individualization of tDCS intensity over the motor cortex according to corticospinal excitability responsiveness

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INTRODUCTION

- Applying tDCS at the same intensity for a whole population results in a wide interindividual variability in the neurophysiological response limiting the stimulation efficacy (Horvath et al., 2015; Tremblay et al., 2016)
- Efficacy of tDCS might be linked to individual corticospinal excitability responsiveness measured by TMS (Jamil et al., 2017; Labruna et al., 2016)
- However, no study attempted to individualize stimulation parameters
- We aimed to investigate whether the individualization of tDCS intensity based on corticospinal excitability improves stimulation efficiency

METHODS

- Baseline
  - RMT
  - I-O curve
  - SI1mV
- tDCS - (14 min)
  - RMT
  - I-O curve
  - SI1mV
  - Sham
- tDCS - (10 min)
  - RMT
  - I-O curve
  - SI1mV
- Anode individualized condition: tDCS intensity set according to TMS value (%) obtained for RMT (see Table)

RESULTS

- No change in MEP amplitude between stimulation conditions
- Increase in RMT in anodal condition at t-30 / t-15
- Positive correlations in individualized anodal condition almost reached statistical significance (p=0.06)
  - Averaged normalized MEPs in RMT / TMS sensitivity
  - Averaged normalized MEPs in RMT / tDCS intensity

CONCLUSION

- Individualized tDCS intensity according to cortical excitability responsiveness did not result in neuromodulation
- We hypothesize that i) tDCS dose-response relationship is not linear, ii) TMS sensitivity does not reflect tDCS responsiveness given the difficulty to set stimulation parameters according to cortical excitability level
- The tDCS-response relationship needs to be further explored to individualize stimulation parameters and reduce variability in the outcomes