The Effect of Multi-Session Transcranial Direct Current Stimulation on Cognitive Performance in Youth with Concussion: A Pilot and Feasibility Study

Rationale

- Concussion/mild traumatic brain injury (mTBI) is a global public health concern
- Children and youth are disproportionately impacted by these injuries
- 30% of youth experience persistent post-concussion/mTBI symptoms (PPCS)2, including challenges with working memory (WM)3 and dual tasking4

Research Questions

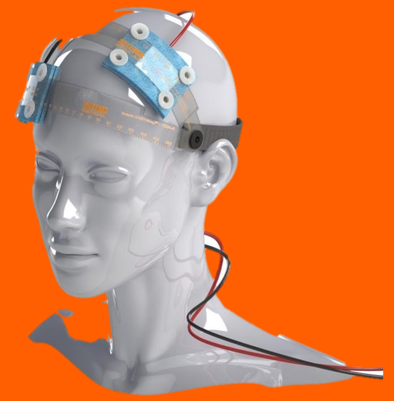
- Does tDCS to the left DLPFC influence cognitive performance on a WM dual task in youth post-concussion?
- How do youth with PPCS rate the subjective experience of receiving tDCS? Were any feasibility barriers identified?

Project Team

- Keelia Quinn de Launay
- Stephanie Cheung
- Lily Riggs
- Nick Reed
- Deryk Beal

Programs

Bloorview Research Institute, University of Toronto Rehabilitation Sciences Institute, Institute of Biomaterials and Biomechanical Engineering, Department of Occupational Science and Occupational Therapy, Department of Speech-Language Pathology



More investigation is needed to understand if Transcranial Direct Current Stimulation to the brain with therapy could help cognitive recovery after concussion

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Methods

- Pilot quasi-randomized double-blinded control design
- Convenience sample of 12 youth (10 F, 2 M) with persisting cognitive symptoms
- 3 sessions of real or sham tDCS over left DLPFC during a WM dual task7
- Tolerability and Feasibility:
- tDCS adverse effects and tolerability survey
- Concussion symptoms (PCSI)

- Recruitment and attrition rates

Results

Both groups improved on WM dual task (increased accuracy, decreased reaction time)
No adverse events or participant attrition
Significant reduction in concussion symptoms across sessions in both groups
Substantial recruitment barriers (Scheduling constraints and apprehensiveness about tDCS)
Acceptable tolerability (Comparable to a long road trip)

Conclusions

- Youth with concussion can improve on a complex WM dual task with practice
- tDCS shows potential to improve task accuracy, but not reaction time
- tDCS is safe and tolerable for youth with concussion
- Barriers to recruitment were identified
- tDCS has potential as an intervention for persisting cognitive symptoms post-paediatric concussion

Implications

- There is a pressing need to develop feasible, cost-effective, and clinically meaningful interventions to address the cognitive challenges post-concussion
- Clinical efficacy of tDCS merits exploration in a larger clinical trial, after addressing barriers to recruitment