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## Pre-post change in mental health and brain structure in pediatric mild traumatic brain injury

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► **To cite this version:**

Fanny Dégeilh, Tilmann von Soest, Claire Cury, Lia Ferschmann, Christian K Tamnes. Pre-post change in mental health and brain structure in pediatric mild traumatic brain injury. IBIA 2023 - 14th Biennial World Congress on Brain Injury, Mar 2023, Dublin, Ireland. pp.758-1040, 10.1080/02699052.2023.2247822 . hal-04174821

**HAL Id: hal-04174821**

**<https://hal.science/hal-04174821>**

Submitted on 1 Aug 2023

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Participants: 144 people with mobility limitations as a result of TBI.

Intervention: For 12 weeks, the experimental group had three 60-minute sessions of usual physiotherapy care per week replaced by ballistic resistance training. The control group had usual physiotherapy care of equivalent time consisting of balance exercises, lower limb stretching, conventional strengthening exercises and cardiovascular fitness training. Both groups received gait training.

Outcome Measures: The primary outcome measure was mobility quantified using the High-Level Mobility Assessment Tool (HiMAT). Secondary outcomes were walking speed, strength, balance and quality of life. Outcomes were measured at baseline (0 weeks), after completion of the 12-week intervention (12 weeks), and 12 weeks after the cessation of the intervention (24 weeks).

Results: After 12 weeks of ballistic resistance training, the experimental group scored 3 points (95% CI 0 to 6) higher on the 54-point HiMAT than the control group and they remained 3 points (95% CI - 1 to 6) higher at 24 weeks. Although there was a transient decrement in balance at 12 weeks in the experimental group, the interventions had similar effects on all secondary outcomes by 24 weeks. Participants with a baseline HiMAT <27 gained greater benefit from ballistic training: 6 points (1 to 10) on the HiMAT.

Conclusion: This randomized trial shows that ballistic resistance training has a similar or better effect on mobility than usual physiotherapy care in people with TBI. It may be better targeted toward those with more severe mobility limitations.

### 108 Pre-post change in mental health and brain structure in pediatric mild traumatic brain injury

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#### ABSTRACT

Introduction: Studies comparing children with and without a traumatic brain injury (TBI) have shown that pediatric TBI is associated with difficulties in a large range of functional domains, including emotion and behavior (Catroppa et al., 2015), as well as with changes in brain morphometry (King et al., 2019). However, whether these differences already existed before the injury and constitute a risk-factor, or emerge as a consequence of the injury remains an unsolved question. The large population-based Adolescent Brain Cognitive Development (ABCD) Study (Casey et al., 2018) provides a rare opportunity to explore this question.

Objective: This pre-post design study aimed to examine longitudinal changes in mental health, and brain morphometry following pediatric mild TBI (mTBI).

Methods: The following baseline and 2-year follow-up data from the ABCD 4.0 curated data release were used: 1) The Parent Ohio State TBI Screen-Short Modified Report (Bogner et al., 2017) to retrospectively identify children with no-TBI ( $n = 6,780$ ; baseline mean age = 9.91 years; 3,309 [49%] males) and children who sustained a mTBI (i.e., head or neck injury with loss of consciousness  $\leq 30$  min or memory loss) between baseline and a 2-year follow-up ( $n = 145$ ; baseline mean age = 9.97 years; 86 [59%] males), 2) internalizing and externalizing problem t-scores (syndrome scales) and DSM-5-oriented scales from the Child Behavior Checklist (CBCL, Achenbach & Rescorla, 2000), and 3) right and left hemisphere total cortical volume and mean cortical thickness computed on T1-weighted images by the ABCD group. Scanner effects were controlled for using longitudinal-ComBat (Beer et al., 2020). Multigroup latent change score models were constructed with the lavaan 0.6–12 package (Rosseel, 2012) in R (version 4.1.2) to estimate individual change between baseline and follow-up for mental health (CBCL scores), cortical volume and cortical thickness. Group differences in 4 parameters of interest (mean of the baseline score, rate of change over time, and variances of the baseline and of the change) were tested using chi-square difference tests (Kievit et al., 2018). Sex and parental education were included as covariates.

Results: As compared to non-injured peers, children with mTBI show no different trajectories in internalizing and externalizing problems, but different trajectories in ADHD and anxiety disorder scores. While similar at baseline (pre-injury), ADHD and anxiety disorder scores increased in children with mTBI and decrease in their non-injured peers. Children with mTBI showed greater cortical volume and thickness at baseline compared to non-injured peers, but no differences in change.

Conclusion: This pre-post study suggests an increased risk of anxiety disorder and ADHD as a consequence of a mTBI, rather than a preexisting risk factors. Further explorations using additional brain metrics and timepoints (ABCD release 5.0 – fall 2022) will be conducted to fully understand these findings.

### 110 Coping with menopause after traumatic brain injury

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#### ABSTRACT

Menopause is a biological process that all women experience, yet little is known about the menopause transition after TBI. The experience of menopause may differ for women who sustain a TBI, because some of the symptoms associated with the hormonal disruption may have an interactive effect with common sequelae of TBI (e.g., depression, irritability, sleep dysfunction, fatigue). Based on the results, therapeutic interventions or coping strategies could be developed to help deal with these experiences. Participants were 221 women 40–60 years old who were not taking hormones and had intact ovaries. Women with TBI had mild-complicated to severe