Changes in emotional and behavior problems, and brain morphometry following mild traumatic brain injury in early adolescence: A pre-post study design

Fanny Dégeilh, Tilmann von Soest, Lia Ferschmann, Christian K Tamnes

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**INTRODUCTION**

**Mild traumatic brain injury (mTBI)**
- highly prevalent in children
- emotional & behavioral difficulties [1]

**Interaction** btw injury physiopathology & brain maturation may underpin long-term difficulties following mTBI [2]

**Very few neuroimaging studies** - conflicting results [2]
- ↓ gray matter volumes and cortical thickness following pediatric mTBI
- no changes

**Unsolved question:** differences already existed before the injury?
- Adolescent Brain Cognitive Development (ABCD) [3] - rare opportunity to explore it

**OBJECTIVE**
To examine longitudinal changes in emotional and behavior problems, and brain morphometry in young adolescents with and without mTBI using a pre-post study design

**CONCLUSION**
As compared to non-injured peers, children with mTBI show no different profiles in emotional and behavior problems, but greater global brain volume and cortical thickness at baseline. Further exploration is needed to fully understand these findings.

**REFERENCES**


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**METHODS**

**MEASURES**
- ABCD dataset
  - Release 4.0
  - Baseline & 2-year follow-up

**Parent’s retrospective report of mTBI**
- Parent Ohio State Traumatic Brain Injury Screen-Short Modified [4, 5]

**Emotional and behavioral problems**
- Child Behavior Checklist-Parent (CBCL) [6]
  - internalizing & externalizing problem t-scores

**Volume and Cortical thickness**
- Pre-processed and quality checked T1-w MRI data (FreeSurfer 5.3) [7]
- Right & left hemisphere total volumes and mean cortical thickness in Desikan atlas [8]
- Scanner effects (n = 24) corrected before statistical analyses - longitudinal ComBat [9]

**STATISTICAL ANALYSES**

**Longitudinal changes modeling**
- Two-group Latent Change Score Model [10]

**RESULTS**

**Emotional and behavioral problems**

<table>
<thead>
<tr>
<th>Controls (N = 6,780)</th>
<th>mTBI* (N = 145)</th>
</tr>
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<tbody>
<tr>
<td>μE, 10 ± 0.6 years</td>
<td>μE, 10 ± 0.6 years *</td>
</tr>
</tbody>
</table>

* mTBI with loss of consciousness ≤30 min or memory loss

**Total volumes**

<table>
<thead>
<tr>
<th>Volume (mL)</th>
<th>Left</th>
<th>Right</th>
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<tbody>
<tr>
<td>Baseline 2-year</td>
<td>*</td>
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**Mean cortical thickness**

<table>
<thead>
<tr>
<th>Cortical thickness (mm)</th>
<th>Left</th>
<th>Right</th>
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</thead>
<tbody>
<tr>
<td>Baseline 2-year</td>
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