

# Longitudinal Trajectories of Postconcussive Symptoms in Children with Mild Traumatic Brain Injuries and Their Relationships to Acute Clinical Status

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## Introduction

Mild traumatic brain injuries (MTBIs), also commonly referred to as concussions, are a very common medical problem for children and adolescents. MTBIs often result in postconcussive symptoms. Postconcussive symptoms include somatic, emotional, and cognitive complaints, such as headaches, fatigue, irritability, and difficulties with memory and attention.

This is the first prospective, longitudinal study of postconcussive symptoms in children that defined MTBIs across a range of injury severity, including “complicated” MTBIs (i.e., those with acute indications of more severe brain injury). The study examined trajectories of postconcussive symptoms across the first year following injury in 8-15 year-old children with MTBIs and children with orthopedic injuries. Results indicate that acute increases in postconcussive symptoms and persistent postconcussive symptoms are more likely to occur after MTBIs than orthopedic injuries, and especially so after complicated MTBIs.

Children with MTBI were more likely than children with orthopedic injury to belong to trajectories involving high acute/persistent symptoms and high acute/resolved symptoms. Children whose MTBIs were associated with indicators of more severe brain injury were especially likely to demonstrate high acute levels of postconcussive symptoms, as well as persistent symptoms over time.

The study's findings help to address the ongoing debate on whether and why postconcussive symptoms continue over time following MTBIs in children and adolescents.

## Key Findings from Study

- Children with MTBI and those with orthopedic injury demonstrated different distributions of symptom trajectories.
- Children with MTBI were more likely to demonstrate high acute/resolved and high acute/persistent trajectories compared to children with orthopedic injury.
- The two trajectories with high acute levels of postconcussive symptoms were likely among children with MTBIs whose acute clinical presentation reflected more severe injury.
- Physicians should monitor children with MTBIs, to identify those who display acute and persistent increases in postconcussive symptoms. Appropriate interventions may alleviate postconcussive symptoms when they do occur.

## Research Method

- Sample consisted of 8- to 15-year-old children (186 with MTBIs, 99 with mild orthopedic injuries). Children were recruited from consecutive admissions to emergency departments at two large children's hospitals.
- Parents rated current postconcussive symptoms within 3 weeks of injury and at 1, 3 and 12 months after injury. Parents also reported retrospective ratings of pre-injury symptoms.
- Children with MTBIs completed an MRI of the brain.
- Predictors of postconcussive symptoms included:
  - Loss of consciousness
  - Glasgow Coma Scale score below 15
  - Associated injuries
  - Acute signs and symptoms of concussion (e.g., persistent post-traumatic amnesia)
  - Intracranial abnormalities on MRI

**For more information, please contact the Center for Biobehavioral Health in The Research Institute at Nationwide Children's Hospital at 614-722-3182**  
[www.NationwideChildrens.org/Research](http://www.NationwideChildrens.org/Research)