

# New research shows symptom improvement after concussion in children varies

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Age and sex must be taken into consideration when looking at children's recovery after a concussion, say researchers at the CHEO Research Institute. In a new article published in the *Journal of the American Medical Association Pediatrics*, authors describe how the common symptoms following concussion improve by both age and sex over time. In "Natural Progression of Symptom Change and Recovery From Concussion in a Pediatric Population", they found that the length of time for symptom improvement after concussion in children and adolescents varied across age groups and sex.

"Although the international guidelines for concussion [recovery](#) were updated in 2017 to differentiate between adults and children, there was still a major research gap," says Dr. Andrée-Anne Ledoux, Investigator at the CHEO Research Institute and lead author of the paper. "The natural progression of recovery processes remains poorly characterized, throughout childhood. Childrens' brains go through many phases of growth during development and sex differences exist. It was important to explore the natural progression of recovery from concussion while considering these two key demographic factors. "

The study examined data from 2,716 children and adolescents who had presented at nine emergency departments across Canada and were diagnosed with concussion. Researchers examined the natural progression of self-reported [symptom](#) recovery following pediatric concussion over the initial three months after injury. Participants in the study were aged 5 to 18 years old with acute concussion, enrolled from

August 1, 2013, to May 31, 2015. Authors looked at different age cohorts—5 to 7 years of age, 8 to 12 years of age, and 13 to 18 years of age, and examined how sex is associated with recovery.

"The greatest gains in recovery occurred primary in the first week, with some gains in the second week. Beyond two weeks, the rate of recovery significantly slowed. The duration of symptoms was longer the older the concussed child," says Dr. Ledoux

What stands out in the study is the recovery rates between adolescent girls and boys. Researchers found that girls recovered more slowly than boys. In fact, more than 50 percent of [adolescent girls](#) still exhibited post-concussion symptoms twelve weeks after the injury. There are thought to be many potential explanations for the [sex differences](#). Physiological differences exist between boys and girls such as neck strength, pubertal stage and hormonal differences. Psychosocial differences between the sexes may contribute to differential perception, influencing symptom reporting, given that female athletes have a higher injury rate and report more symptoms with greater severity.

"The expected duration for recovery after pediatric concussions is broad, ranging from days to months and even years, and recovery progression remains poorly described," says Dr. Roger Zemek, Senior Scientist at the CHEO Research Institute and Associate Professor in the Departments of Pediatrics and Emergency Medicine at the University of Ottawa Faculty of Medicine and senior author on the study. "With this study, we hope to provide primary care providers and clinicians with more tools to make effective healthcare decisions for children based on what we've found as the [natural progression](#) of symptom change and recovery from [concussion](#). Health providers now have a guide to track whether a child is within expected normal range of recovery."

Provided by Children's Hospital of Eastern Ontario Research Institute

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