

# Researchers find that pre-existing mental health diagnoses may prolong time to recovery from concussion

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Researchers from the Minds Matter Concussion Program at Children's Hospital of Philadelphia (CHOP) have found that youth with pre-

existing mental health diagnoses experienced a greater burden from emotional symptoms after concussion, as well as a prolonged time to recovery.

Importantly, the study was the first of its kind to find a "dose-response" effect—that a greater number of mental health diagnoses was associated with increased emotional symptoms after concussion and a longer [recovery](#). This finding suggests that addressing pre-existing mental health diagnoses is critical to the management of concussion and supporting children through recovery.

The study was recently [published](#) by the journal *Sports Health: A Multidisciplinary Approach*.

Concussions are a common childhood injury, with approximately 2 million sports- and recreation-related concussions occurring annually in the United States. As a form of mild traumatic brain injury, concussions can impact a youth's ability to participate in school and sports in a way that negatively affects their quality of life. Concussions can also cause a variety of cognitive, emotional, sleep and visual issues.

A child's health prior to injury can exacerbate these symptoms and impact recovery, and researchers suspect this may be the case with [mental health conditions](#). However, prior studies examining mental health diagnoses on concussion prognosis and recovery have yielded conflicting data, and their impact on the emotional burden of a concussion is poorly understood.

"While research has emphasized the negative mental health effects that persist after a concussion and how they can impact development and recovery, it's also very important to consider the burden these children and adolescents face prior to their injuries, and how their pre-existing mental health status can impact recovery," said senior study author

Matthew F. Grady, MD, a pediatric sports medicine specialist at CHOP.

"We suspected that pre-existing mental health diagnoses would increase the emotional burden youth faced after a concussion and wanted to assess how these diagnoses impacted other aspects of concussion recovery."

The researchers utilized a prospective registry of youth concussion to study differences in emotional symptom burden—irritability, sadness, nervousness and feeling more emotional—and developed a predictive risk model for how this might affect prolonged recovery. The total number of pre-existing mental health diagnoses, ranging from 0, 1, 2, and 3 or more, was taken into consideration. A cohort of 3,105 youth with concussions were assessed in this study.

The study found that those with a history of mental health diagnoses had a greater emotional symptom burden after their injury, with an average of 7 emotional symptoms, compared with 4 among patients who did not have prior mental health diagnoses. Additionally, the greater the number of mental health diagnoses a patient had prior to the injury, the more emotional symptoms they experienced during the period following their injury.

This "dose-response" effect is a novel finding not previously described. Patients with mental health diagnoses were also more likely to have issues with vision and balance and took longer to return to exercise and recover fully from their concussions.

Interestingly, the study also found that boys with prolonged recovery after a concussion experienced greater emotional burden than girls, a finding that has important implications for clinical practice. In general, girls have a higher prevalence of mental health conditions, such as depression and anxiety, and experience a greater overall concussion

symptom burden compared to boys.

As a result, there may be implicit bias where boys may not be expected by clinicians to have as high emotional burden after concussion compared to girls, and thus, may not be as actively screened and treated for mental health concerns to the same degree as girls are.

The study's findings indicate that in the setting of prolonged recovery, boys have a greater emotional burden than girls, highlighting the importance of universal screening for emotional symptoms and mental health conditions after concussion.

"This study demonstrated how important it is for those treating [young patients](#) with concussions to understand their mental health challenges and take them into consideration when guiding their recovery," said study first author Christina L. Master, MD, a pediatrician and sports medicine specialist and co-leader of the Minds Matter Concussion program at CHOP.

"Our Minds Matter team includes mental health clinicians, nurse navigators and a social worker who can help a young person navigate this range of health concerns. A visio-vestibular home exercise program and [symptom](#)-guided [aerobic exercise](#) might also help reduce the burden of emotional symptoms after [concussion](#) and help these patients recover more quickly."

**More information:** Christina L. Master et al, Dose-Response Effect of Mental Health Diagnoses on Concussion Recovery in Children and Adolescents, *Sports Health: A Multidisciplinary Approach* (2024). [DOI: 10.1177/19417381241228870](https://doi.org/10.1177/19417381241228870)

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