

# After concussion, biomarkers in the blood may help predict recovery time

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A study of high school and college football players suggests that biomarkers in the blood may have potential use in identifying which players are more likely to need a longer recovery time after concussion,

according to a study published in the July 3, 2019, online issue of *Neurology*, the medical journal of the American Academy of Neurology.

"With so many people sustaining concussions and a sizeable number of them having prolonged symptoms and recovery, any tools we can develop to help determine who would be at greater risk of problems would be very beneficial, so these results are a crucial first step," said study author Timothy B. Meier, Ph.D., of the Medical College of Wisconsin in Milwaukee and a member of the American Academy of Neurology.

The study involved 41 [high school](#) and [college football players](#) who experienced a concussion during the season. None of the players lost consciousness with their concussions. The players were matched with 43 [football players](#) of the same level, age and position who did not have a concussion during that season.

All of the participants had blood tests at the beginning of the season. Those who had concussions had blood tests within six hours after the injury, then again 24 to 48 hours later and also eight, 15 and 45 days later. Those who did not have concussions had tests at similar times for comparison.

The tests looked at levels of seven biomarkers for inflammation that have been related to more severe brain injury. Of the seven biomarkers, two were elevated for those with concussion at six hours after the injury compared to the athletes with no concussion. The biomarkers interleukin 6 and interleukin 1 [receptor antagonist](#) were both elevated at six hours after concussion.

For interleukin 6, levels at the beginning of the study were 0.44 picograms per milliliter (pg/mL) for those who later had concussions and 0.40 pg/mL for those who did not have concussions. At six hours after

the injury, those with concussions had levels of 1.01 pg/mL, compared to levels of 0.39 at a similar time for those without concussions.

"These results demonstrate a meaningful increase in the levels of interleukin 6 for athletes who sustained a concussion compared to athletes who did not," said Meier.

Athletes with higher levels of interleukin 6 six hours after the injury were also more likely to take longer to recover from their symptoms. Overall, the athletes with concussions had symptoms for an average of 8.9 days. Eight of the 17 athletes with concussion and high [interleukin 6](#) levels at six hours after injury, compared to their levels at the beginning of the season, still had [concussion](#) symptoms eight days after the injury.

"Eventually, these results may help us better understand the relationship between [injury](#) and inflammation and potentially lead to new treatments," Meier said.

Provided by American Academy of Neurology

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