

Teenage girls at double football-related concussion risk of boys

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New findings published today in the journal *JAMA Network Open* show that teenage girls playing football are at almost double the risk of concussion compared to teenage boys. Teenage girls are also less likely

to be removed from play and take longer to recover from the injury than their male counterparts.

Working in collaboration with researchers at the University of Pennsylvania and Michigan State University, Prof Willie Stewart, Honorary Professor at the University of Glasgow, reviewed three years of injury data for a population of around 40,000 female high school footballers in the Michigan High School Athletic Association and compared these to data for a similar number of male footballers.

The study confirmed findings from previous research that, overall, risk of sports related concussion among female footballers was almost double—1.88 times higher—that of males. Importantly, the researchers also identified several sex-associated differences in sports concussion mechanism and management providing new insights into the injury in this age group.

Male footballers were most often injured colliding with another player and were 1.5 times more likely to be removed from play on the day of injury, compared with females, who were most often injured from contact with equipment, such as the ball or a goalpost. Adolescent female footballers also took on average two days longer to recover from injury and return to play.

These results highlight sex-associated differences among teenage athletes in mechanism of injury and in concussion management and outcomes that raise the question of whether sports should consider sex specific approaches to both participation and concussion management.

Dr. Abigail Bretzin, lead author of the study and postdoctoral fellow and certified athletic trainer at the University of Pennsylvania, said: "This is the first study to look in this detail at sex-associated differences in concussion management and outcomes in teenage footballers. Our

findings add to research showing that female athletes are at increased concussion risk compared to male athletes, and highlight the importance of sex-specific research in this field."

Prof Stewart, senior author of the study, said: "Given we know the importance of immediate removal from play for any athlete with suspected concussion, it is notable that "if in doubt, sit them out" appears more likely to happen for boys than girls. This, together with the finding that mechanism of [injury](#) appears different between boys and girls, suggests that there might be value in sex-specific approaches to concussion education and management in this age group."

The paper, "Sex-associated differences in adolescent soccer [concussion](#) incidence and characteristics," is published in *JAMA Network Open*.

More information: Abigail C. Bretzin et al. Association of Sex With Adolescent Soccer Concussion Incidence and Characteristics, *JAMA Network Open* (2021). [DOI: 10.1001/jamanetworkopen.2021.8191](https://doi.org/10.1001/jamanetworkopen.2021.8191)

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