

FactSheet

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Concussions in Student Athletes and How to Reduce Risk

In the past decade, the increased attention to concussions has spread from the world of professional sports, particularly football, to that of youth athletics. California fields the second highest number of high school athletes—roughly 800,000—among U.S. states. This fact sheet summarizes some current research on concussions and offers considerations for board members on how school districts can protect student athletes and reduce risk.

Irreparable harm

It is now known that sustained participation in high-impact sports can lead to a brain condition that can cause depression, dementia, and memory loss. This disease is known as chronic traumatic encephalopathy or CTE. At present, the extent of the biological changes that occur in the brain after blows to the head are received are still being determined, and researchers are continuing to make discoveries about the effects of such blows.

Athletes who have experienced concussions liken the sensation to a snow globe being shaken, or the yolk in an egg being tossed around. Depending on the hit, the brain can slam against the skull, and brain cells can be twisted and damaged, leading to structural and chemical changes. This sloshing of the brain, which floats in the skull, occurs in different ways. A linear hit causes the head to snap directly back upon impact. A rotational hit (one not well-protected by most football helmets), causes the head and shoulders to change direction rapidly. Athletes can also simply knock heads, or be hit by the ball or other object such as an elbow.

Concussed athletes can experience both short- and long-term symptoms such as, dizziness, headaches, nausea, difficulty concentrating, sleep loss, moodiness, irritability, memory loss, and depression, as well

as other health problems. In addition, evidence of more sustained effects is emerging. The effects of blows to the head can add up, especially if an initial injury has not had time to heal properly and a subsequent injury is sustained. A seemingly minor hit, for example, can make an athlete's brain more susceptible to concussions over time.

Emerging research is revealing that youth are at particular risk for lasting effects. A recent study reported in the journal, *Neurology*, found that retired professional football players are more likely to have long-term health problems from brain trauma if they started playing football before the age of 12.¹ Researchers report that children and adolescents are especially vulnerable to head injuries because the onset of puberty is a key period for brain development. These findings are of major concern for educators and show a great need to tackle the concussion issue.

Not just a football problem

Athletes of all ages who participate in a range of sports are susceptible to head injuries. For boys, football is the most concussion-prime sport, as well as hockey, lacrosse, soccer and wrestling. Although girls do not generally play football, they are at risk as well. Some studies have shown that girls who play certain high-risk sports, including soccer, lacrosse, volleyball and basketball, more frequently suffer concussions than boys.

Protecting students

The California Interscholastic Federation recommends a multifaceted approach that stresses concussion-awareness education among teachers, parents, coaches, administrators, athletes, and athletic directors. CIF also advocates rethinking current athletic techniques, such as how to tackle in football.

High-quality equipment can reduce risk, but does not remove it completely. For example, helmets, while critical for the safety of student football athletes, are not concussion-proof.

A significant problem school districts face is the lack of athletic trainers. About 80% of California schools do not have athletic trainers who are considered vital to helping with on-site injuries and monitoring symptoms of concussion.² Nearly 30% of athletic coaches in California high schools are not full-time teachers. This may mean that they have less contact with the district than a full-time employee, which can lead to gaps in ensuring coaches are adequately trained and certified.

California is the only state that does not require athletic trainers to be licensed, although they must be certified. And while football is one of the sports that by law must have a qualified physician and emergency services available for games, other sports that bring risk of concussion are unlikely to have similar services available.

In addition to being a safety issue, the access to athletic trainers can be an equity issue. Private schools and more affluent public schools might generate resources for athletic trainers through non-public means such as booster clubs.

A positive trend

California is making progress in addressing this risk. Over the last 10 years, California's schools have taken steps to increase concussion awareness and safety. School districts and educators looking for guidance are encouraged to stay informed via the CIF.

Questions for boards

1. Do we have a policy on health and safety for student athletes? If so, when was it last reviewed?
2. Do students have access to an athletic trainer? If not, can community partnerships be forged to fill this gap?
3. How up-to-date is our athletic equipment such as helmets?
4. What kind of training and professional development is provided for the coaching staff? How is compliance with safety policies monitored and enforced?
5. How are we ensuring that our teachers and coaches are aware of the risks of participating in some sports and how to minimize these risks for both boys and girls?

Resources

Brain Injury Research Institute
<http://www.protectthebrain.org/>

Boston University Center for the Study of Traumatic Encephalopathy
<http://www.bu.edu/cte/>

California Interscholastic Federation
www.cifstate.org/sports-medicine/concussions/index

California Schools: New Playing Field: Schools and Educators Tackle Concussions
<http://mydigitalpublication.com/publication/?i=266433&p=21>

Centers for Disease Control and Prevention
www.cdc.gov/headsup/highschoolsports/

National Federation of State High School Associations: Concussion Task Force Recommendations
www.nfhs.org/articles/concussion-task-force-recommendations-to-be-implemented-in-2015/

Endnotes

- 1 Lehman, E. J., Hein, M. J., Baron, S. L., and Gersic, C. M. (2012). Neurodegenerative causes of death among retired National Football League players. *Neurology*, 79(19).
- 2 Biggar, H. (2015). New playing field: Schools and Educators Tackle Concussions. *California Schools*.