

How Common are Concussions?

- Each year more than one million children sustain a traumatic brain injury, 80 percent to 90 percent of which are mild and are due to motor vehicle accidents, falls, and pedestrian accidents.
- The national Centers for Disease Control and Prevention says as many as 3.8 million sports- and recreation-related concussions occur every year. In sports alone, 300,000 concussions in children are estimated to occur each year.
- Concussions can occur in a wide variety of sports, including (but not limited to) **football, hockey, rugby, wrestling, horseback riding, lacrosse, basketball, cheerleading, and soccer.**
- Brain injuries cause more deaths than any other sports injury. In football, brain injury accounts for 65 to 85% of all fatalities.

Did You Know:

- A concussion is the most common type of brain injury sustained in sports.
- Most concussions do NOT involve loss of consciousness.
- You can sustain a concussion even if you do NOT hit your head. An indirect blow elsewhere on the body can transmit an "impulsive" force to the head and cause a concussion to the brain.
- Multiple concussions can have cumulative and long lasting life changes.
- Concussions typically do NOT appear in neuroimaging studies such as MRI or CAT Scans.
- During 2001-2005, children and youth ages 5-18 years accounted for 2.4 million sports-related emergency department (ED) visits annually, of which 6% (135,000) involved a concussion.
- Among children and youth ages 5-18 years, the **five leading sports or recreational activities**, which account for concussions, include **bicycling, football, basketball, playground activities, and soccer.**

Sports Concussion Fact Sheet SB721

A concussion is an injury to the brain caused by a blow or jolt to the head. Other terms used for concussion include mild traumatic brain injury or minor head trauma. Immediately following a concussion, a person may feel several types of symptoms affecting their cognitive, physical or emotional functioning. Symptoms can vary from one person to another, and can last for minutes, hours or weeks after a concussion.

Recovery from Concussion

Recovery from concussion can be different for every person. Symptoms can last from only a few minutes to days or weeks after the concussion. Long-standing symptoms can interfere with a child or adolescent's performance at school, or limit their participation in activities at home or in the community. Therefore, it is important to systematically evaluate and monitor any ongoing symptoms.

Football

- Football injuries associated with the brain occur at a rate of one in every 3.5 games.
- Football is responsible for more than 250,000 head injuries in the United States. In any given season 20% of all high school players sustain brain injuries and at least two will die.
- Football players with brain injuries are six times more likely to sustain new injuries.
- A helmet helps prevent a brain injury from occurring.

Too many kids are returning to the playing field too soon after a concussion.

- **62 % of organized sports-related injuries occur during practices** ¹ (Journal of Athletic Training).
- 41% of concussed athletes returned to play too soon, if an athlete's concussion symptoms, such as dizziness or nausea, last longer than 15 minutes, he should be benched until he's been symptom-free for a week. (American Academy of Neurology guidelines).
- **girls have a higher incidence of concussion than boys** - In some sports played by both sexes, girls actually run a higher risk of getting hurt.
- **High school Soccer:** female athletes suffered almost 40% more concussions than males (female players suffer some 29,000 concussions annually, males have 21,000).
- **High school basketball:** female concussions were nearly 240% higher (girls got 13,000 concussions playing basketball, boys 4,000).
- **In girls' volleyball and boys' basketball and baseball,** more than half of concussed players returned to play too soon (Journal of Athletic Training).

Mandatory Annual Coach Training on Sports Concussion

- Currently youth sports coaches are required to have annual training to spot child abuse, but not for sports concussion
- Provide annual training through online and community resources such as BIAOR, local hospitals and other non-profits

Football is the most dangerous

Boys who play football are still more likely to suffer concussions than any other athletes, 16% of high school football players who lost consciousness during a concussion returned to the field the same day.

The consequences of going back early: In 1999, Max Conradt, 17, suffered a concussion during football game, the coach who examined Max cleared him to play in a game the next week; during the game he was tackled; moments later, he collapsed on the sidelines and slipped into a five month coma from second-impact syndrome. Overcompetitive coaches, who are not required to be trained in concussion management, are pushing players back onto the field. And too often the players themselves aren't reporting head trauma, with team spirit giving them too much of a warrior mentality.

Why are girls hurt more than boys

Of course, many girls suck it up too, but there are anatomical reasons that explain why they are more likely to have a concussion diagnosed. For starters, look to the neck. Bigger, stronger neck muscles can balance the head during impact and lower the chances of the brain's being jolted in a collision. According to a study that will be published in the *Journal of Biomechanics*, the circumference of men's necks is 20% larger than that of women's necks. Further, resistance tests showed that men's necks are 50% stronger than those of women. Another new biomechanical study shows that during adolescence, boys develop significantly stronger necks than girls do. "More-developed necks allow boys to better absorb a blow to the head," says Dr. Joseph Maroon, a neurosurgeon and consultant to the Sports Concussion Program at the University of Pittsburgh Medical Center.

The way girls play may also make a difference. Kevin Guskiewicz, director of the Sports Medicine Research Laboratory at the University of North Carolina, has found that female athletes are more likely than male athletes to land on the floor or field with their knees locked. The less flexible their knees, the worse their balance. The worse their balance, the more likely they'll hit the ground or another player.

CONCUSSION

- 50% of "second impact syndrome" incidents – brain injury caused from a premature return to activity after suffering initial injury (concussion) – result in death.²
- Female high school soccer athletes suffer almost 40% more concussions than males (29,000 annually).³
- Female high school basketball players suffer 240% more concussions than males (13,000).³
- Concussion rates more than doubled among students age 8–19 participating in sports like basketball, soccer and football between 1997 and 2007, even as participation in those sports declined.⁴
- The concussion rate was highest for ice hockey, at 10 per 10,000 participants for 7- to 11-year-olds and 29 per 10,000 participants for 12- to 17-year-olds.⁴
- Football accounted for the second highest concussion rate, at 8 per 10,000 for 7- to 11-year-olds and 27 per 10,000 for 12- to 17-year-olds.⁴
- **Youth sports are getting extremely competitive, and kids, in general, are getting bigger; so you end up with 8-year-olds in 13-year-old bodies but with the maturity still of 8-year-olds.**⁴

¹ Rachel J, Yard E, Comstock R. *An Epidemiologic Comparison of High School Sports Injuries Sustained in Practice and Competition*. *J Athl Train*. 2008;43(2):197–204.

² Cantu RC. Second impact syndrome: immediate management. *Phys Sportsmed*. 1992;20(9):14–17

³ Covassin T, Swank C. Sex Differences and the Incidence of Concussions Among Collegiate Athletes. *J Athl Train*. 2003;38(3):238–244.

⁴ Bakhos L, Lockhart G, Myers R. Emergency Department Visits for Concussion in Young Child Athletes. *Pediatrics*. 2010;126(3):e550–6.

Why is playing sports with concussion symptoms so risky?

During a concussion, arteries constrict, slowing blood flow to the brain. At the same time, calcium floods the energy-producing portions of brain cells. That calcium plays a mean defense, blocking oxygen- and glucose-rich blood from replenishing neurons' energy supply. Brain cells get sluggish, and a concussed athlete who can't focus or suffers from slower reaction times is left more susceptible to a slew of other injuries, including another concussion. A second blow to the head could lead to more arterial constriction and more calcium infusions. "Concussion produces an energy crisis in the brain," says David Hovda, director of the Brain Injury Research Center at UCLA's David Geffen School of Medicine. "A second concussion will cause such an energy demand that it will overwhelm the survival capability of the brain."

That's why caution should be the name of the game. Robert Cantu, a neurosurgeon and concussion expert, insists that even after a mild first-time concussion, athletes must be free of all symptoms for at least a week, both at rest and during exertion, before returning to the field. Cantu's mantra: "When in doubt, sit them out."

Signs and Symptoms

Parents may not be familiar with concussion symptoms. Contrary to popular belief, the child does not have to lose consciousness to sustain a concussion. In fact, the majority of children do not lose consciousness. A child or teenager suspected of having a concussion should be carefully assessed for any of the following symptoms listed below.

Cognitive Symptoms

Poor attention/Concentration
Problems remembering
Difficulty following conversation
Answers questions slowly
Asks same question repeatedly
Mentally foggy

Physical Symptoms

Headaches
Vacant stare
Appears dazed or stunned
Dizziness
Clumsiness/Balance problems
Fuzzy/Blurry vision
Sleeps more or less than usual
Appears fatigued, tired or sleepy
Vomiting/Nausea

Emotional Symptoms

Nervousness/Anxiety
Sad
Irritability
Personality changes
Plays less

Concussion Evaluation

Appropriate evaluation and management are the keys to a safe outcome. The symptoms of a concussion can cause problems when the child returns to school, home or community activities. The concussion evaluation assesses possible cognitive, emotional or physical symptoms to assist in planning during recovery. During an evaluation, a child is given tests of attention, memory and speed. Test results are used to determine any needed interventions, as well as plan for return to school, sports, and other physical activities.