

RISK IN FOCUS



EDUCATION

Concussions in K-12 Sports: Helping Ensure Safe Play

Introduction

Concussions in young athletes participating in sporting activities remain a health concern that demands attention from parents, coaches, administrators, and healthcare professionals. Brain development in adolescents/teenagers is not fully developed, and damage to a still-developing areas of the brain can result in detrimental long-term effects.¹ As research continues to reveal the short and long-term effects of traumatic brain injuries, it is vital to understand and implement effective safety solutions that protect youth and high school athletes.

TABLE OF CONTENTS

01	Understanding the Impact
02	Return-to-Play
03	Risk Solutions
05	Looking Forward



Understanding the Impact

A concussion is a serious traumatic brain injury that disrupts normal brain function.² Athletes usually sustain concussions when they fall or collide with one another, hitting another player’s bones—shoulders, knees, elbows, or an object, such as a goal post, floor, or ball. A concussive injury occurs when sudden movement causes the brain to move rapidly within the skull, stretching and sometimes damaging brain cells. The result of this trauma creates chemical changes that can affect cognitive function, mood, and physical abilities for days, weeks, or even months.

Studies report that 15% of high school student-athletes report experiencing at least one sports-related concussion within 12 months.³ Yet, the risk isn’t uniform across all sports and youth activities. Contact sports, including football, basketball, and soccer, are associated with 45% of all emergency room visits for concussions among children ages 17 and under.⁴

From a different approach, bicycling and playground activities have a high number of emergency department visits for TBIs and concussions among younger children. **However, the risk varies significantly by sport, gender, and level of competition:**

- + **Practice vs. Competition:** Nearly 64% of concussions occur during games rather than practice, except in cheerleading, where practice accounts for more injuries.
- + **Gender Comparisons:** In sports like soccer and basketball, female athletes experience higher concussion rates than their male counterparts.
- + **Progress and Challenges:** While practice-related football concussions have decreased, game-related concussion rates have increased.



Return-to-Play

Concussions can happen to athletes in any sport. While the total number of injuries across high school sports has decreased since 2005, the total number of concussions has increased by 87%.⁵

All 50 states now have legislation requiring immediate removal of athletes with suspected concussions and medical clearance before an athlete can return to play. The National Federation of State High School Associations and the Center for Disease Control teamed up to develop the **“Heads Up” 4-step Action Plan⁶** that provides a framework:

- 1. Remove the athlete from play immediately
- 2. Ensure evaluation by an appropriate healthcare professional
- 3. Inform parents/guardians and provide concussion information
- 4. Keep the athlete out until symptom-free and medically cleared

Concussion symptoms are not always immediately apparent. Coaches, officials, and parents should monitor at-risk athletes or participants for symptoms during and after games, and athletes should only return to play after a medical professional clears them.



CONCUSSION SYMPTOMS⁷

REPORTED BY ATHLETES

- + Headache or “pressure” in the head
- + Nausea or vomiting
- + Balance problems or dizziness
- + Blurry or double-vision
- + Sensitivity to light or noise
- + Feeling sluggish, hazy, foggy, or groggy
- + Difficulty concentrating or remembering
- + Just not “feeling right” or “feeling down”

SIGNS OBSERVED

- + Appears dazed or stunned
- + Is confused about events
- + Answers questions slowly
- + Repeats questions
- + Can’t recall events before the hit, bump, or fall
- + Can’t recall events after the hit, bump, or fall
- + Loses consciousness (even briefly)
- + Shows behavior or personality changes
- + Forgets an instruction or assignment



Risk Solutions

While it’s important to know the symptoms of a concussion, creating an action plan can help safeguard participants by preventing situations for concussions to occur and procedures to take when a concussion happens. Before the season or camp begins, make sure coaches and staff receive updated training about concussions and procedures to take when one occurs. Coaches and staff, including medical personnel, should train athletes and parents about concussion symptoms, reporting, and treatment and encourage athletes to undergo a pre-participation medical evaluation. Schools should establish a Concussion Management Plan, have medical staff help develop this plan, and review it annually for updates. **Protocols for a CMP can include:**

1 EDUCATION AND TRAINING

Concussion awareness programs for coaches, athletes, parents, and staff increase awareness about concussion signs, symptoms, and risks.

Proper technique training for coaches to teach proper techniques that minimize the risk of head injuries.

2 SAFETY POLICIES AND PROTOCOLS

Concussion management policies for managing concussions from injury to return to play.

Baseline cognitive testing for athletes before the season to help assess post-injury conditions.



3 PROTECTIVE EQUIPMENT

Appropriate gear that meets sports-specific safety standards.

Regular equipment checks to ensure that equipment is in good condition.

4 RULE CHANGES AND ENFORCEMENT

Rule modifications that reduce risky behaviors.

Strict enforcement of rules by officials to prevent dangerous play.

5 MEDICAL SUPPORT

On-site medical personnel, such as athletic trainers or sports medicine professionals, are available during practices and games.

Immediate response for suspected concussions.

6 MONITORING AND REPORTING

Appropriate gear that meets sports-specific safety standards.

Regular equipment checks to ensure that equipment is in good condition.

7 ENVIRONMENT AND SCHEDULING

Safe conditions of playing and practice fields that are well-maintained and hazards-free.

Adequate rest after participation is necessary for adequate recovery time and reduced injury risk.

HIGH SCHOOL SPORTS CONCUSSION RATES⁸

1. BOYS' TACKLE FOOTBALL

Tackling is responsible for almost **2 out of 3 concussions** in high school football

2. GIRLS' SOCCER

About **1 out of 3 concussions** among girls happen during heading

3. BOYS LACROSSE

3 out of 4 concussions in boys' lacrosse occur from collisions

4. BOYS' ICE HOCKEY

Half of concussions in high school ice hockey are from players in the wing position

5. BOYS' WRESTLING

Takedowns are the most common cause of concussion in wrestling

6. GIRLS' LACROSSE

Concussions most often occur while defending an opponent

7. GIRLS' FIELD HOCKEY

6 out of 10 concussions in field hockey occur during a collision with a piece of equipment

8. GIRLS BASKETBALL

Half of the concussions in girls' high school basketball result from collisions among athletes

9. BOYS' SOCCER

Concussions are most common from collisions among athletes when heading the ball

10. GIRLS' SOFTBALL

About **1 out of 4 concussions** happen when an athlete is fielding a batted ball

Looking Forward

Understanding the impact of concussions on participants in youth and high school sports continues to evolve. While public awareness and education have increased protocols and practices that have helped reduce recurrent concussions, managing this challenge requires a multi-faceted approach. Every concussion must be taken seriously—not as a “ding” or “bell-ringer,” but as a brain injury requiring appropriate care and recovery time.





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SOURCES

¹ Queensland Brain Institute. (n.d.). *Concussion in children*. The University of Queensland. <https://qbi.uq.edu.au/concussion/concussion-in-children#:~:text=Concussion:%20effects%20on%20the%20developing,problems%20and%20poorer%20academic%20performance.>

² CDC Heads Up. (2019 August). *A FACE SHEET FOR Youth Sports Coaches*. Center for Disease Control and Prevention. https://www.cdc.gov/heads-up/media/pdfs/youthsports/coaches_engl.pdf

³ DePadilla, Lara, PhD., Miller, Gabrielle F, PhD., Jones, Sherry Everett PhD., Peterson, Alexis B. PhD., and Breiding, Matthew J. PhD. (2108, June 22). *Self-Reported Concussions from Playing a Sport or Being Physically Active Among High School Students — United States, 2017*. Centers for Disease Control and Prevention. [https://www.cdc.gov/mmwr/volumes/67/wr/mm6724a3.htm#:~:text=Overall%2C%209.1%25%20of%20high%20school,%2C%20respectively%20\(Table%202\).](https://www.cdc.gov/mmwr/volumes/67/wr/mm6724a3.htm#:~:text=Overall%2C%209.1%25%20of%20high%20school,%2C%20respectively%20(Table%202).)

⁴ CDC Heads Up (2024, August 26). *Data on Sports and Recreation Activities*. Center for Disease Control and Prevention. <https://www.cdc.gov/heads-up/data/index.html>

⁵ Neural Effects. (2021, August 13). *High School Sports That Cause the Most Concussions*. Neural Effects. <https://neuraleffects.com/blog/high-school-sports-cause-most-concussions/#:~:text=Symptoms%20reported%20by%20athletes%20who,of%20spring%20sports%20in%202020.>

⁶ NFHS. (2019, April). *SUGGESTED GUIDELINES FOR MANAGEMENT OF CONCUSSION IN SPORTS*. National Federation of State High School Associations and Sports Medicine Advisory Committee. <https://www.nfhs.org/media/1020401/suggested-guidelines-for-management-of-concussion-in-sports-april-2019-final.pdf>

⁷ NFHS. (2019).

⁸ CDC Heads Up (2024).

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