



SUGGESTED GUIDELINES FOR MANAGEMENT OF CONCUSSION IN SPORTS

National Federation of State High School Associations (NFHS)
Sports Medicine Advisory Committee (SMAC)

Introduction

A concussion is a type of traumatic brain injury that impairs the function of the brain. It occurs when the brain moves within the skull as a result of a blow to the head or body. What may appear to be only a mild jolt or blow to the head or body can result in a concussion or other serious brain injury.

The understanding of sports-related concussion continues to evolve. We now know that young athletes are particularly vulnerable to the effects of a concussion. Once considered a “ding” to the head, it is now understood that a concussion has the potential to result in a variety of short- or long-term changes in brain function and, rarely, death.

What is a concussion?

A concussion is a traumatic brain injury that interferes with the normal function of the brain. Simply stated – a concussion results from an injury to the brain, and there is no such thing as a minor brain injury! Concussions should never be referred to as a “ding” or a “bell-ringer.” Any suspected concussion must be taken very seriously.

An athlete does not need to lose consciousness (be “knocked-out”) to suffer a concussion. In fact, less than 5% of concussed athletes suffer a loss of consciousness.

What happens to the brain during a concussion is not completely understood. It is a complex process, primarily affecting the function of the brain. The sudden movement of the brain causes stretching and tearing of brain cells, damaging the cells and creating chemical changes in the brain. Once this injury occurs, the brain is vulnerable to further injury and very sensitive to any increase in stress, such as another head injury, until it fully recovers.

Common sports injuries such as torn ligaments and broken bones are structural injuries that can be seen on x-rays or MRI. A concussion, however, is an injury that interferes with how the brain works and cannot be seen on MRI or CT scans. Therefore, even though the brain is injured, the brain looks normal on these tests.

Recognition and Management

If an athlete exhibits any signs, symptoms, or behaviors that make you suspicious of a concussion, the athlete **must** be removed from play and not be allowed to return to play until they are evaluated and cleared by a health-care professional. Failure to remove the athlete from activity puts them at risk for sustaining another

head injury while concussed, which can lead to worsening concussion symptoms, increased risk for further injury, and, sometimes even death.

Parents/guardians and coaches are not expected to “diagnose” a concussion. However, everyone involved in athletics must be aware of the signs, symptoms and behaviors associated with a concussion. If you suspect that an athlete may have a concussion, then the athlete must be **immediately removed** from all physical activity.

Signs Observed by Coaching Staff

- Dazed or stunned appearance.
- Confusion about assignment or position.
- Forgetfulness.
- Uncertainty of game, score, or opponent.
- Clumsy movements.
- Slow response to questions.
- Mood, behavior or personality changes.
- Can’t recall events prior to or after hit or fall.

Symptoms Reported by Athlete

- Headache or “pressure” in head.
- Nausea.
- Balance problems or dizziness.
- Double or blurry vision.
- Sensitivity to light or noise.
- Feeling sluggish, hazy, foggy or groggy.
- Concentration or memory problems.
- Confusion.
- Emotions of “not feeling right” or “feeling down”.

When in doubt, sit them out!

If you suspect that a player has a concussion, follow the “Heads Up” 4-step Action Plan.

1. Remove the athlete from play.
2. Ensure the athlete is evaluated by an appropriate health-care professional.
3. Inform the athlete’s parents/guardians about the possible concussion and give them information on concussion.
4. Keep the athlete out of play the day of the injury, and until an appropriate health-care professional **has given written clearance** that the athlete is symptom-free and may return to activity.

The signs and symptoms associated with a concussion are not always apparent immediately after a bump, blow, or jolt to the head or body and may develop over a few hours or longer. However, until an athlete is evaluated by an appropriate health-care professional, they should be closely watched following a suspected concussion and should not be left alone.

Athletes should never try to “tough out” a concussion. Teammates, parents/guardians, and coaches should never encourage an athlete to “play through” the symptoms of a concussion. In addition, there should never be an attribution of bravery or courage to athletes who play despite having concussion signs and/or symptoms. The risks of such behavior must be emphasized to all members of the team, as well as coaches and parents.

If an athlete returns to activity before being fully healed from an initial concussion, their reaction time and reflexes may be compromised, placing the athlete at greater risk for sustaining another head injury. A second injury that occurs before the brain has a chance to recover from the initial concussion will delay recovery and increase the chance for long-term problems. In rare cases, a repeat head injury can result in severe swelling and bleeding in the brain that can be fatal.

What Are Some Danger Signs to Look Out For?

In rare cases, a dangerous collection of blood (hematoma) may form between the brain and skull after a bump, blow, or jolt to the head or body. The pressure from this blood can squeeze the brain within the skull. Call 9-1-1 for any athlete that demonstrates any of the following signs or symptoms after a bump, blow, or jolt to the head or body for transport to the emergency department:

- One pupil larger than the other.
- Drowsiness or inability to wake up.
- A headache that gets worse and does not go away.
- Slurred speech, weakness, numbness, or decreased coordination.
- Repeated vomiting or nausea
- Convulsions or seizures (shaking or twitching).
- Unusual behavior, increased confusion, restlessness, or agitation.
- Loss of consciousness (passed out/knocked out). Even a brief loss of consciousness should be taken seriously.

Management Until Recovery

Rest

The first step in recovering from a concussion is rest. Rest is essential to help the brain heal. Athletes with a concussion need rest from physical and mental activities that require concentration and attention as these activities may worsen symptoms and delay recovery. Exposure to loud noises, bright lights, computers, video games, television and phones (including texting) all may worsen the symptoms of concussion. Athletes typically require 24-48 hours of rest, though some may require a longer period of time.

Return to Learn

Following a concussion, many athletes will have difficulty in school. These problems may last from days to weeks and often involve difficulties with short- and long-term memory, concentration, and organization. In many cases, it is best to lessen the student’s class load early on after the injury. This may include staying home from school during the short period of rest (typically no more than 1-2 days) followed by a lighter school schedule for a few days, or longer, if necessary. Decreasing the stress to the brain in the early phase after a concussion may lessen symptoms and shorten the recovery time. Additional academic adjustments may include decreasing homework, allowing extra time for assignments/tests, and taking breaks during class. Such academic adjustments are best made using a team approach collaborating with teachers, counselors, and school nurses.

Return to Play

After suffering a concussion, **no athlete should return to play or practice on that same day.**

An athlete should never be allowed to resume play following a concussion until symptom free and given the approval to resume physical activity by an appropriate health-care professional.

Once an athlete no longer has signs or symptoms of a concussion **and is cleared to return to activity by an appropriate health-care professional**, they should proceed in a step-wise fashion to allow the brain to re-adjust to exercise. In most cases, the athlete should progress no more than one step each day, and at times each step may take more than one day. **Below is an example of a return to physical activity program:**

Progressive Return to Play Protocol

Step 1: Back to Regular Activities (such as school)

To enter into the stepwise return to play protocol the athlete should first be back to regular activities (such as school) and has been cleared by their appropriate health-care professional to begin the return to play process. In most all cases, the athlete should have all concussion-related academic adjustments removed prior to beginning the Return to Sports Activity Program

Step 2: Light Aerobic Activity

Begin with light aerobic exercise only to increase heart rate. This means about 5 to 10 minutes on an exercise bike, brisk walking, or light jogging. No anaerobic activity such as weight lifting should be done at this stage.

Step 3: Moderate Activity

Continue with activities that increase an athlete's heart rate while adding movement. This includes running and skating drills.

Step 4: Non-Contact Training Activity

Add sports specific, more intense, non-contact physical activity, such as such as passing in hockey, dribbling in basketball or soccer, high-intensity stationary biking, regular weightlifting routine.

Step 5: Practice and Full Contact

The athlete may return to practice and full contact (if appropriate for the sport) in a controlled practice setting where the skills can be assessed by the coaches.

Step 6: Competition

The athlete may return to competition.

If symptoms of a concussion recur, or if concussion signs and/or behaviors are observed at any time during the return-to-play program, the athlete must discontinue all activity immediately. The athlete may need to be re-evaluated by the appropriate health-care professional or may have to return to the previous step of the return-to-activity program, as pre-determined by the appropriate health-care professional.

Summary of Suggested Concussion Management

- 1. No athlete should return to play (RTP) or practice on the same day of a concussion.**
- 2. Any athlete suspected of having a concussion should be evaluated by an appropriate health-care professional.**

3. Any athlete diagnosed with a concussion should have written clearance from an appropriate health-care professional prior to resuming participation in any practice or competition.
4. After medical clearance, RTP should follow a step-wise protocol as outlined above with provisions for delayed RTP based upon return of any signs or symptoms.

References:

Halstead ME, Walter KD, Moffatt K; COUNCIL ON SPORTS MEDICINE AND FITNESS.

[Sport-Related Concussion in Children and Adolescents. Pediatrics. 2018 Dec;142\(6\). pii: e20183074. doi: 10.1542/peds.2018-3074. Epub 2018 Nov 12.](#)

McCrary P, Meeuwisse W, Dvořák J, Aubry M, Bailes J, Broglio S, Cantu RC, Cassidy D, Echemendia RJ, Castellani RJ, Davis GA, Ellenbogen R, Emery C, Engebretsen L, Feddermann-Demont N, Giza CC, Guskiewicz KM, Herring S, Iverson GL, Johnston KM, Kissick J, Kutcher J, Leddy JJ, Maddocks D, Makdissi M, Manley GT, McCrea M, Meehan WP, Nagahiro S, Patricios J, Putukian M, Schneider KJ, Sills A, Tator CH, Turner M, Vos PE. Consensus statement on concussion in sport-the 5th international conference on concussion in sport held in Berlin, October 2016. Br J Sports Med. 2017 Jun;51(11):838-847. doi: 10.1136/bjsports-2017-097699. Epub 2017 Apr 26.

Additional Resources:

Brain 101 – The Concussion Playbook.

Concussion in Sports- What you need to know.

<https://nfhslearn.com/courses/61151/concussion-in-sports>

Heads Up: Concussion in High School Sports

http://www.cdc.gov/concussion/headsup/high_school.html

REAP Concussion Management Program.

<http://www.rockymountainhospitalforchildren.com/sports-medicine/concussion-management/reap-guidelines.htm>

Revised and Approved April 2019

April 2017

October 2013

January 2011

April 2009

October 2008

October 2005

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