



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 normal 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.

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 little more than a “ding” on 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 or, rarely, death.

What is a concussion?

You’ve probably heard the terms “ding” and “bell-ringer.” These terms were previously used to refer to “minor” head injuries and thought to be a normal part of collision sports. Research has shown that a concussion is a brain injury and by no means minor. Any suspected concussion must be taken seriously. The athlete does not have to be hit directly in the head to injure the brain. Any force that is transmitted to the head may cause the brain to bounce or twist within the skull, resulting in a concussion.

It was once believed that a person had to lose consciousness or be “knocked-out” to have a concussion. This is not true, as the vast majority of concussions do not involve a loss of consciousness. In fact, less than 5% of athletes actually lose consciousness with a concussion.

What happens to the brain during a concussion is not completely understood. It is a very 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 increased stress until it fully recovers.

Common sports injuries such as torn ligaments and broken bones are structural injuries that can be detected during an examination and seen on x-rays or MRI. A concussion, however, is an

injury that interferes with how the brain works and cannot be diagnosed by MRI or CT scans. Therefore, the brain looks normal on these tests, even though it has been injured.

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 closely observed. Sustaining another head injury after a concussion can lead to worsening concussion symptoms, increased risk for further injury and, rarely, death.

Parents/guardians and coaches are not expected to “diagnose” a concussion. That is the role of an appropriate health-care professional. 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

- *Loss of consciousness (even if brief)
- *Seizure
- *Increasing sleepiness
- *Worsening headache
- *Persistent vomiting
- Dazed or stunned appearance
- Confusion about assignment or position
- Forgetful, for example, doesn't follow instructions
- Uncertainty of game, score or opponent
- Clumsy movements
- Slow response to questions
- Mood, behavior or personality changes
- Inability to recall events *prior* to hit or fall
- Inability to recall events *after* hit or fall

*RED FLAGS

Symptoms Reported by Athlete

- Headaches or “pressure” in head
- Nausea or vomiting
- Balance problems or dizziness
- Double or blurry vision
- Sensitivity to light
- Sensitivity to 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!

When 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. (RED FLAGS: If any red flag present, the athlete should go to the emergency department)
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 says the athlete is symptom-free and gives the okay to return to activity.

The signs, symptoms and behaviors 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. An athlete should be closely watched following a suspected concussion and should never 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, the athlete is at greater risk for a repeat concussion. A repeat concussion that occurs before the brain has a chance to recover from the first can slow recovery or increase the chance for long-term problems. In rare cases, a repeat concussion can result in severe swelling and bleeding in the brain that can be fatal.

What to do in an Emergency

Although rare, there are some situations where you will need to call 911 and activate the Emergency Medical System (EMS). The following circumstances are medical emergencies:

1. Any time an athlete has a loss of consciousness of any duration. While loss of consciousness is not required for a concussion to occur, it may indicate more serious brain injury.
2. If an athlete exhibits any of the following:
 - Seizure
 - Increasing sleepiness
 - Worsening headache
 - Persistent vomiting

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 longer.

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, followed by a lightened 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 in collaboration 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**, he/she 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 Physical Activity Program (ideally under supervision)

- Step 1:* Light aerobic exercise- 5 to 10 minutes on an exercise bike or light jog; no weight lifting, resistance training or any other exercises.
- Step 2:* Moderate aerobic exercise- 15 to 20 minutes of running at moderate intensity in the gym or on the field without equipment.
- Step 3:* Non-contact training drills in full uniform. May begin weightlifting, resistance training and other exercises.
- Step 4:* Full contact practice or training.
- Step 5:* Full game play.

If symptoms of a concussion recur, or if concussion signs and/or behaviors are observed at any time during the return-to-activity program, the athlete must discontinue all activity immediately. Depending on previous instructions, the athlete may need to be re-evaluated by the health-care provider, or may have to return to the previous step of the return-to-activity program.

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 with a concussion should be medically cleared by 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 with provisions for delayed RTP based upon return of any signs or symptoms.

References:

American Medical Society for Sports Medicine position statement: concussion in sport. Harmon KG, Drezner J, Gammons M, Guskiewicz K, Halstead M, Herring S, Kutcher J, Pana A, Putukian M, Roberts W; American Medical Society for Sports Medicine. *Clin J Sport Med.* 2013 Jan;23(1):1-18.

McCrory P, Meeuwisse WH, Aubry M, et al. Consensus statement on concussion in sport: the 4th International Conference on Concussion in Sport held in Zurich, November 2012 *J Athl Train.* 2013 Jul-Aug;48(4):554-75.

Returning to Learning Following a Concussion. Halstead M, McAvoy K, Devore C, Carl R, Lee M, Logan K and Council on Sports Medicine and Fitness, and Council on School Health. *Pediatrics,* October 2013. American Academy of Pediatrics.

Additional Resources:

Brain 101 – The Concussion Playbook.

<http://brain101.orcasinc.com/5000/>

Concussion in Sports- What you need to know.

<http://www.nfhslearn.com/electiveDetail.aspx?courseID=15000>

Heads Up: Concussion in High School Sports

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

NFHS Sports Medicine Handbook, 4th Ed, 2011.

REAP Concussion Management Program.

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

Sport Concussion Library

<http://www.sportconcussionlibrary.com/content/concussions-101-primer-kids-and-parents>

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