

SUGGESTED GUIDELINES FOR MANAGEMENT OF CONCUSSION IN SPORTS

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INTRODUCTION

Concussions are a common problem in sports and have the potential for serious complications if not managed correctly. Even what appears to be a "minor ding or bell ringer" has the real risk of catastrophic results when an athlete is returned to action **prematurely**.

At many athletic contests across the country, trained and knowledgeable individuals are not available to make the decision to return concussed athletes to play. Frequently, there is pressure from various sources (parents, player and coach) to return an athlete to action. In addition, often there is unwillingness by the athlete to report headaches and other **concussive symptoms** because the individual knows it would prevent his or her return to play.

Outlined below are some guidelines that may be helpful for parents, coaches and others dealing with possible concussions. Please bear in mind that these are general guidelines and must not be used in place of the central role that physicians and athletic trainers must play in protecting the health and safety of student-athletes.

PRE-PARTICIPATION RECOMMENDATIONS

It is recommended that a complete concussion history be obtained from each student-athlete during his or her pre-participation physical examination. This history should minimally include the number and (approximate) dates of prior concussions, the presence of loss of consciousness or amnesia with each concussion, and the approximate length of time required for symptom resolution and clearance for return to play. Also, the history should include assessment for learning disabilities/ADHD, migraine or other headache disorders, psychiatric illness, chemical dependency, seizures, or other neurologic conditions.

The use of neurocognitive testing has become increasingly popular in the assessment of sports-related concussion. The idea behind this approach is to obtain a preparticipation, or "baseline" measure of a student-athlete's cognitive functioning, and then to repeat the test after a concussion to determine how close the athlete is to his or her baseline cognitive status. Even without a baseline measure, formal neurocognitive testing can be helpful after a concussion in that an athlete's score can be compared with an appropriate control group of age and gender matched athletes to give an objective measure of cognitive functioning. When possible, we recommend preparticipation baseline testing for all collision and contact sport participants. If formal neurocognitive testing is unavailable, at least some form of standardized cognitive/mental status testing is recommended (at a minimum) in the return to play decision-making process.

SIDELINE MANAGEMENT OF CONCUSSION

1. **Did a concussion take place?** Based on mechanism of injury, observation, history and **signs and symptoms**, even without loss of consciousness, **there should be a high index of suspicion that** a concussion has occurred if the head was hit and even the mildest of symptoms occur. (See **below** for **a list of** signs and symptoms).
2. **Does the athlete need immediate referral for emergency care?** If confusion, **altered** behavior or responsiveness, deteriorating condition, loss of consciousness, or concern about neck and spine injury exists, the athlete should be referred at once for emergency care.
3. **If no emergency is apparent, how should the athlete be monitored?** Every 5-10 minutes **the athlete's** mental status, attention, balance, behavior, speech and memory should be examined until stable over a few hours. If appropriate medical care is not available, an athlete even with mild symptoms should be sent for medical evaluation.
4. **No athlete suspected of having a concussion should return to the same practice or contest, even if symptoms clear in 15 minutes.**

SIGNS AND SYMPTOMS OF CONCUSSION

Concussions can **manifest** in many different ways. Listed below are some of the signs and symptoms frequently associated with concussions. Most signs, symptoms, and abnormalities after a concussion fall into the four categories listed below. A coach, parent, or other person who knows the athlete well can often detect these problems by observing the athlete and/or by asking a few relevant questions of the athlete, official or a teammate who was on the field or court at the time of the concussion. Below are some suggested observations and questions a non-medical individual can use to help determine whether an athlete has suffered a concussion and how urgently he or she should be sent for appropriate medical care.

PROBLEMS IN BRAIN FUNCTION

- a. Confused state – dazed look, vacant stare or confusion about what happened or is happening.
- b. Memory problems – can't remember assignment on play, opponent, score of game, or period of the game, can't remember how or with whom he or she traveled to the game, etc.
- c. Symptoms reported by athlete – Headache, nausea or vomiting, blurred or double vision, sensitivity to sound or light, light, ringing in ears, feeling foggy or groggy, dizziness.
- d. Lack of sustained attention – difficulty sustaining focus adequately to complete a task, a coherent thought or a conversation.

SPEED OF BRAIN FUNCTION

Slow response to questions, slurred or incoherent speech, slow body movements and reaction time.

UNUSUAL BEHAVIORS

Behaving in a combative, aggressive or very silly manner; atypical behavior for the individual; repeatedly asking the same question over and over; restless and irritable behavior with constant motion and attempts to return to play; reactions that seem out of proportion and inappropriate; having trouble resting or "finding a comfortable position; **unusual emotionality (crying, euphoria, giddiness)..**

PROBLEMS WITH BALANCE AND COORDINATION

Dizziness, slow clumsy movements, inability to walk a straight line or balance on one foot with eyes closed.

IF NO MEDICAL PERSONNEL ARE ON HAND AND AN INJURED ATHLETE HAS ANY OF THE ABOVE SYMPTOMS, HE OR SHE SHOULD BE SENT FOR APPROPRIATE MEDICAL CARE.

CHECKING FOR CONCUSSION

The presence of any of the signs or symptoms that are listed suggest a concussion has most likely occurred. In addition to observation and direct questioning for symptoms, medical professionals have a number of other instruments to evaluate attention, processing speed, memory, balance, reaction time, and ability to think and analyze information. These are the brain functions that are most likely to be adversely affected by a concussion and most likely to persist during the post concussion period.

If an athlete **is suspected of having a sustained a concussion yet has no signs or symptoms upon examination (and thus seems “clear”)**, he or she should be exercised enough to increase the heart rate and then evaluated **to determine if any symptoms are manifest** before allowing that athlete to practice or play.

MANAGEMENT OF CONCUSSIONS AND RETURN TO PLAY

Increasing evidence is suggesting that initial signs and symptoms, including loss of consciousness and amnesia, may not be very predictive of the **ultimate** severity of the injury and the outcome. More importance is being assigned to the duration of such symptoms and this, along with data showing symptoms may worsen some time after the head injury, has shifted focus to continued monitoring of the athlete. This is one reason why these guidelines no longer include an option to return an athlete to play even if clear in 15 minutes and why there is no discussion about the “Grade” of the concussion.

Any athlete who is removed from play because of a concussion should have medical clearance from an appropriate health care professional before being allowed to return to play or practice. The **Third International Conference on Concussion in Sport held in Zurich (2008)** recommends an athlete should not return to practice or competition in sport until he or she is asymptomatic **at rest and after exertion**.

Recent information suggests that mental exertion, as well as physical exertion, should be avoided until concussion symptoms have cleared. Premature mental or physical exertion may lead to more severe and more prolonged post concussion period. Therefore, **many** athletes should not study, play video games, do computer work or phone texting until his or her symptoms are resolving. **Some athletes may find their concussion symptoms are worsened by watching TV or movies. It cannot be predicted which specific symptoms will occur with any particular concussion. It is recommended, however, that athletes attend to any symptoms experienced after a concussion and respect those symptoms if they are worsened by any particular exertional activity.**

The student-athlete who suffers a concussion may likely need academic accommodations during his or her recovery. **Accommodations refer to both attendance and work load. Some concussed student-athletes may not be able to attend school and participate meaningfully in cognitive activities until many of the concussive symptoms have resolved. Gradually working one’s way back into a regular academic routine and full cognitive exertion (without symptom provocation) is recommended. Specific academic accommodations should be requested by the**

student-athlete's health care provider. The student-athlete may require excuse from physical education classes until he or she has recovered from the concussion.

Once the athlete is able to complete a full day of school work, without physical education classes or other exertion, the athlete can begin the gradual return to play protocol as outlined below. Each step increases the intensity and duration of the physical exertion until all skills required by the specific sport can be accomplished without **recurrence of post-concussive** symptoms. These recommendations have been based on the awareness of the increased vulnerability of the brain to concussions occurring close together and of the **potentially** cumulative effects of multiple concussions on long-term brain function.

Clinical research studies have revealed objective **neuroradiological, neuropsychological, and neurophysiological** tests which can identify subtle residual deficits that may not be obvious from the traditional **clinical or mental status** evaluations. These identifiable abnormalities can persist after the obvious signs of concussion are gone and **may be relevant for safe return to play determinations**.

SIDELINE DECISION-MAKING

1. No athlete should return to play (RTP) on the same day of concussion.
2. Any athlete removed from play because of a concussion must have medical clearance from a **licensed** health care professional **trained in the evaluation and management of concussion** before he or she can resume practice or competition.
3. Close observation of athlete should continue for a few hours.
4. After medical clearance, RTP should follow a step-wise protocol with provisions for delayed RTP based on return of any signs or symptoms.

MEDICAL CLEARANCE RTP PROTOCOL

1. No exertional activity until asymptomatic.
2. When **all symptoms have resolved at rest**, begin low-impact activity such as walking, stationary bike, etc.
3. Initiate aerobic activity fundamental to specific sport such as skating or running, and may also begin progressive strength training activities.
4. Begin non-contact skill drills specific to sport such as dribbling, fielding, batting, etc.
5. Full contact in practice setting.
6. If athlete remains asymptomatic, he or she may return to game/play.

A. ATHLETE MUST REMAIN ASYMPTOMATIC TO PROGRESS TO THE NEXT LEVEL.

B. IF SYMPTOMS RECUR, THE ATHLETE MUST RETURN TO THE PREVIOUS LEVEL AFTER THE SYMPTOMS HAVE AGAIN RESOLVED.

C. MEDICAL CLEARANCE SHOULD OCCUR BEFORE CONTACT.

In sports-related concussion, return to play clearance is typically granted when a student-athlete has had a normal neurological examination, has no symptoms at rest or after exertion, has completed a graduated physical rehabilitation program of exertional activity (preferably under the supervision of a certified athletic trainer), and when the neurocognitive test results (if done) have returned to baseline or are otherwise considered to be within normal limits. In the absence of neurocognitive testing, then a formal cognitive/mental status exam should be administered, with results being normal. If CT or MRI scans of the brain have been done, it is expected that their results also are normal.

COMPLICATED CONCUSSIONS

In the vast majority of sport-related concussions among high school student-athletes, recovery is a gradual and straightforward process. Generally speaking, most athletes in this age group recover within a month of the injury. However, there is a small percentage of concussed athletes whose recovery is more protracted. Recent studies (summarized by the Concussion in Sport Group's 2009 Position Statement) have identified several "modifiers" or risk factors potentially associated with protracted recovery from concussion.

The modifiers include demographic factors of age (being less than 18 years old) and possibly gender, as females may have a more difficult post-concussive recovery course than males. Concussion-related factors include loss of consciousness or amnesia of more than one minute duration, and post-concussive convulsions. The number and duration of prior concussions also may be relevant, along with the temporal relationship (timing, or spacing) of the concussions. Co-occurring medical conditions such as migraine headache and sleep disorders may be complicating factors, along with psychiatric illness (depression and anxiety disorders), ADHD spectrum disorders, and learning disabilities. The use of prescribed psychotropic medications and anti-coagulants (blood thinners) also may be relevant, as are the abuse of alcohol or illicit substances. Finally, behavioral factors such as dangerous or reckless style of play are likely contributory.

Consideration should be given to a referral to a concussion specialist when the duration of post-concussive symptoms exceeds one month or when multiple modifiers are present.

PREVENTION

Although most concussions cannot be prevented, many can be minimized or avoided. Proper coaching techniques, good **rules enforcement by officials**, and **the** use of properly fitted equipment can minimize the risk of head injury. Although **several organizations** advocate the use of mouthguards in nearly all sports and mandates them in some, there is no convincing scientific data that their use will prevent concussions. **Education and counseling regarding the signs and symptoms of concussion for students, parents, and coaches is crucial. Encouraging the honest reporting of symptoms by players and of concussion signs noted by coaches, parents, and teammates is equally critical.**

This information was adapted from: NFHS Sports Medicine Advisory Committee. 2009

REFERENCES

McCrory P, Meeuwse W, Johnston K, Dvorak J, Aubry M, Molloy M, & Cantu R. Consensus statement on concussion in sport: 3rd international conference on concussion in sport held in Zurich, November 2008. Clinical Journal of Sport Medicine, 2009, 19, 185-200.

National Federation of High Schools. Concussions. 2008 NFHS Sports Medicine Handbook (Third Edition). 2008: 77-82.