

SIGNS OF CONCUSSION

Concussions can appear in many different ways. Listed below are some of the signs and symptoms frequently associated with minor head trauma (e.g., "ding", "bell rung", dazed or concussion). Most symptoms, signs and abnormalities after a head injury fall into the four categories listed below. A coach or other person who knows the athlete well can usually detect these problems by observing the athlete and/or by asking a few relevant questions to the athlete, referee or a teammate who was on the field or court at the time of the head injury. Below are some suggested observations and questions a non-medical professional like a coach or school administrator can use to help determine whether an athlete has suffered a concussion and how urgently he or she should be sent for medical care following a head injury.

1. PROBLEMS IN BRAIN FUNCTION:

- a. Confused state – dazed look, vacant stare, 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, what he or she was wearing, what was eaten for breakfast, etc.
- c. Symptoms reported by athlete – Headache, nausea or vomiting, blurred or double vision, oversensitivity to sound, light or touch, ringing in ears, feeling foggy or groggy.
- d. Lack of Sustained Attention – Difficulty sustaining focus adequately to complete a task or a coherent thought or conversation.

2. **SPEED OF BRAIN FUNCTION:** Slow response to questions, slow slurred speech, incoherent speech, slow body movements, slow reaction time.

3. **UNUSUAL BEHAVIORS:** Behaving in a combative, aggressive or very silly manner, or just atypical for the individual. Repeatedly asking the same question over and over. Restless and irritable behavior with constant motion and attempts to return to play or leave. Reactions that seem out of proportion and inappropriate. Changing position frequently and having trouble resting or "finding a comfortable position." These can be manifestations of post-head trauma difficulties.

4. **PROBLEMS WITH BALANCE AND COORDINATION:** Dizzy, slow clumsy movements, acting like a "drunk," inability to walk a straight line or balance on one foot with eyes closed.

CHECK FOR CONCUSSION

In addition to observation and direct questioning for symptoms, asking the athlete specifics about the contest or the injury, having the athlete repeat a series of numbers forward and backward, or recite the months of the year in reverse order may help identify problems in brain function. Checking coordination and agility such as touching a finger to the nose and to another object, balancing on one foot, and walking heel-to-toe on a straight line can be helpful in analyzing the athlete's state of coordination.

Any athlete being returned to play because he or she seemed not to have actually had a head injury should be assessed after exercise, such as push-ups, sit-ups, sprints and deep knee bends, before concluding a return to play would be appropriate.

Increasing evidence is suggesting that initial signs and symptoms, including loss of consciousness and amnesia, may not be very predictive of the true severity of the injury and the prognosis or 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.

PREVENTION

Although all concussions cannot be prevented, many can be altered or avoided. Proper coaching techniques, good officiating of the existing rules, and use of properly fitted equipment can minimize the risk of head injury. Although the NFHS advocates the use of mouthguards in nearly all sports, there is no convincing scientific data that their use will prevent concussions.

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SUGGESTED GUIDELINES FOR MANAGEMENT OF HEAD TRAUMA IN SPORTS

EVEN MINOR CONCUSSIONS WITHOUT LOSS OF CONSCIOUSNESS CAN HAVE DEVASTATING RESULTS

INTRODUCTION

Head trauma is a common problem in sports and has the potential for serious complications if not managed correctly. Even what appears to be a "minor ding or bell ringer" without loss of consciousness has the real risk of catastrophic results when an athlete is returned to action too soon. The medical literature and lay press are reporting instances of death from "second impact syndrome" when a second concussion occurs before the brain has recovered from the first one regardless of how mild both injuries seem.

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 undo pressure from various sources (parents, player and coach) to return a valuable athlete to action A.S.A.P. In addition, often there is unwillingness by the athlete who wants to play to report headaches and other findings because the individual knows it would prevent his or her return to play.

Outlined below are some guidelines that may be helpful in establishing a protocol at your institution. Please bear in mind that these are general guidelines and must not be used in place of the central role that physicians and certified athletic trainers must play in protecting the health and safety of student-athletes.

SIDELINE MANAGEMENT OF ACUTE HEAD INJURY

1. **Did a head injury take place?** Based on mechanism of injury, observation, history and unusual behavior and reactions of the athlete, even without loss of consciousness, assume a concussion has occurred if the head was hit.
2. **Does the athlete need immediate referral for emergency care?** If confusion, unusual behavior or responsiveness, deteriorating condition, LOC, or concern about neck and spine injury exist, 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 mental status, attention, balance, behavior, speech and memory should be examined until stable over a few hours.
4. **No athlete suspected of a head injury should return to the same practice or contest, even if clear in 15 minutes, without clearance by an appropriate medical physician.**

EXAMPLE OF SPECIFIC INSTRUMENTS BEING USED TO DO SIDELINE ASSESSMENT OF ATHLETES WITH CONCUSSION

Outlined below is a fairly comprehensive list of signs, symptoms and observations that can be utilized to determine if an athlete is "clear" of any abnormalities that should prevent return to play. Abnormalities of attention, processing speed, memory, balance, reaction time, and ability to think and analyze information appear to be those areas most likely to be involved and persist after a head injury. Several instruments such as the Sideline Concussion Checklist (SCC) and the Sideline Assessment of Concussion (SAC) have been developed as reasonably user-friendly methods of monitoring an athlete on the sideline to determine whether he or she is stable or needs immediate referral for emergency care. The CDC has also developed a tool kit (Heads UP: Concussion in High School Sports[®]), which has been made available to all high schools, and has information on head injuries for coaches, athletes and parents. The NFHS is proud to be a co-sponsor of this initiative. Computerized tests that evaluate similar domains (IMPACT, Sentinel, CRI, or ANAM) are being used by some schools, professionals and others. Cost and availability vary. Balance studies such as Balance Error Scoring System (BESS) may also be a helpful sideline tool for monitoring athletes.

The NFHS will continue to monitor developments in this research as investigators seek ways of making these instruments more practical.

MANAGEMENT OF HEAD INJURIES THAT INTERRUPT RETURN TO PLAY

(SEE "SIDELINE MANAGEMENT")

Any athlete who is removed from play because of a head injury will require medical clearance before being allowed to return to play or practice. The second international conference on concussion held in Prague suggests an athlete should not return to practice or competition in sport until he or she is asymptomatic and appears normal for a minimum of one week. The athlete must be able to progress through a return to play (RTP) protocol as outlined below without any return of signs or symptoms before actually competing. These recommendations have been based on the awareness of the increased vulnerability of the brain to concussions occurring close together and of the cumulative effects of multiple concussions on long-term brain function. Research is now revealing some fairly objective and relatively easy-to-use tests which appear to identify subtle residual deficits that may not be obvious from the traditional evaluation. These identifiable abnormalities frequently persist after the obvious signs of concussion are gone and appear to have relevance to whether an athlete can return to play in relative safety. The significance of these deficits is still under study and the evaluation instruments represent a work in progress. They may be helpful to the professional determining return to play in conjunction with consideration of the severity and nature of the injury; the interval since the last head injury; the duration of symptoms for clearing; and the level of play.

SIDELINE DECISION-MAKING

1. **No athlete should return to play (RTP) after head injury even if clear in 15 minutes without medical clearance.**
2. Any athlete removed from play for a head injury must have appropriate medical clearance before practice or competition may resume.
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 the athlete appears clear, begin low-impact activity such as walking, stationary bike, etc.
3. Initiate aerobic activity fundamental to specific sport such as skating, running, etc.
4. Begin non-contact skill drills specific to sport such as dribbling, ground balls, batting, etc.
5. Then full contact in practice setting.
6. If athlete remains without symptoms, he or she may return to play.

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

B. IF SYMPTOMS RECUR, ATHLETE MUST RETURN TO PREVIOUS LEVEL.

C. MEDICAL CHECK SHOULD OCCUR BEFORE CONTACT.