



CONCUSSION RESOURCE CENTER

Content Source: [National Center for Injury Prevention and Control, Division of Injury Response Heads Up! Concussion Information for Physicians Centers for Disease Control and Prevention](#)

What is a Concussion?

- A concussion is a disturbance in brain function that occurs following either a blow to the head or as a result of the violent shaking of the head
- In the United States, the annual incidence of sports-related concussion is estimated at 300,000. Estimates regarding the likelihood of an athlete in a contact sport experiencing a concussion may be as high as 19% per season. Although the majority of athletes who experience a concussion are likely to recover, an as yet unknown number of these individuals may experience chronic cognitive and neurobehavioral difficulties related to recurrent injury.

Common Signs and Symptoms:

<ul style="list-style-type: none"> • Signs observed <ul style="list-style-type: none"> ○ Appears to be dazed or stunned ○ Is confused about assignment ○ Forgets plays ○ Is unsure of game, score, or opponent ○ Moves clumsily ○ Answers questions slowly ○ Loses consciousness (even temporarily) ○ Shows behavior or personality change ○ Forgets events prior to hit (retrograde amnesia) ○ Forgets events after hit (anterograde amnesia) 	<ul style="list-style-type: none"> • Signs reported by athlete <ul style="list-style-type: none"> ○ Headache ○ Nausea ○ Balance problems or dizziness ○ Double or fuzzy vision ○ Sensitivity to light or noise ○ Feeling sluggish ○ Feeling "foggy" ○ Change in sleep pattern ○ Concentration or memory problems
--	---

Loss of Consciousness

- In a University of Pittsburgh Medical Center (UPMC) study of high school and college athletes with concussion, on-the-field amnesia, not loss of consciousness, as long thought, was predictive of post-injury symptom severity and neurocognitive deficits.

- Upon ruling out more severe injury, acute evaluation continues with assessment of the concussion. First, the clinician should establish the presence of any loss or other alteration of consciousness (LOC). LOC is relatively rare and occurs in less than 10% of concussive injuries. The identification of LOC can be very tricky as the athlete may lose consciousness very briefly, and this event may not be directly observed by others. By definition, LOC represents a state of brief coma in which the eyes are typically closed and the athlete is unresponsive to external stimuli. LOC is most obvious when an athlete makes no attempt to brace his or her fall following a blow to the head. Any athlete with documented LOC should be managed conservatively, and return to play is contraindicated.

Post-Concussion Syndrome

- Although the majority of athletes who experience a concussion are likely to recover, an as yet unknown number of these individuals may experience chronic cognitive and neurobehavioral difficulties related to recurrent injury. Such symptoms may include chronic headaches, fatigue, sleep difficulties, personality change (e.g. increased irritability, emotionality), sensitivity to light/noise, dizziness when standing quickly, and deficits in short-term memory, problem solving and general academic functioning. This constellation of symptoms is referred to "Post-Concussion Syndrome" and can be quite disabling for an athlete. In some cases, such difficulties can be permanent and disabling. In addition to Post-Concussion Syndrome, suffering a second blow to the head while recovering from an initial concussion can have catastrophic consequences as in the case of "Second Impact Syndrome," which has led to approximately 30-40 deaths over the past decade.

Consulting w/ a Doctor

Recovery

- Athletes that are not fully recovered from an initial concussion are significantly vulnerable for recurrent, cumulative, and even catastrophic consequences of a second concussive injury. Such difficulties are prevented if the athlete is allowed time to recover from concussion and return to play decisions are carefully made. No athlete should return to sport or other at-risk participation when symptoms of concussion are present and recovery is ongoing. In summary, the best way to prevent difficulties with concussion is to manage the injury properly when it does occur.

Treatment

- At the forefront of proper concussion management is the implementation of baseline and/or post-injury neurocognitive testing. Such evaluation can help to objectively evaluate the concussed athlete's post-injury condition and track recovery for safe return to play, thus preventing the cumulative effects of concussion. In fact, neurocognitive testing has recently been called the "cornerstone" of proper concussion management by an international panel of sports medicine experts.
- Current management guidelines (i.e. Grade 1, 2, 3 of concussion) are not evidenced-based and little to no scientific data support the arbitrary systems that are in place to manage concussion. As a result, there are currently 19 different management criteria available for concussion management. As a result, they are often misused and misinterpreted.
- Traditional neurological and radiologic procedures, such as CT, MRI, and EEG, although helpful in identifying more serious concerns (e.g. skull fracture, hematoma, contusion), are not useful in

identifying the effects of concussion. Such tests are typically unremarkable or normal, even in athletes sustaining a severe concussion. The reason for this issue is that concussion is a metabolic rather than structural injury. Thus, structural neuroimaging techniques are insensitive to the effects of concussion.

- Vienna Concussion Conference Recommendations: Athletes should complete the following step-wise process prior to return to play following concussion.
 - Removal from contest following an signs / symptoms of concussion
 - No return to play in current game
 - Medical evaluation following injury
 - Rule out more serious intracranial pathology
 - Step-wise return to play
 - No activity - rest until asymptomatic
 - Light aerobic exercise
 - Sport-specific training
 - Non-contact drills
 - Full-contact drills
 - Game play
- The goal of treatment is to allow the brain injury to heal. Concussions are treated differently depending on their level of severity. Treatment may include:
 - Rest - provide adequate time for recovery. Do not rush back into daily activities for work or school.
 - Preventing re-injury - avoid activities that might jolt or jar your heard. Never return to a sports activity until your doctor has given you clearance. Ask when it's safe to drive a car, ride a bike, work or play at heights, or use heavy equipment.
 - Observation by a responsible adult - ask someone to awaken you every few hours as advised by your doctor. The doctor will explain how to watch for complications such as bleeding in the brain.
 - Limiting exposure to drugs - do not take medicines without your doctor's permission. This is especially true to aspirin, blood thinners, and drugs that cause drowsiness. Avoid use of alcohol or illicit drugs.
 - Consult with a Credentialed ImpACT Consultant for a full recovery