midwest orthopedic
SPECIALTY HOSPITAL

Sports Medicine

*Affiliated with Wheaton Franciscan Healthcare*

# Concussion Protocol:

**Definition of Concussion**

According to the 2009 Consensus Statement regarding Concussions in Sports and the WIAA Health Recommendations, a concussion is defined as "a complex pathophysiological process affecting the brain, induced by traumatic biomechanical forces. Several common features that incorporate clinical, pathological and biomechanical injury constructs that may be utilized in defining the nature of a concussive head injury include:

1. Concussion may be caused either by a direct blow to the head, face, neck or elsewhere on the body with an "impulsive" force transmitted to the head.
2. Concussion typically results in the rapid onset of short-lived impairment of neurological function that resolves spontaneously.
3. Concussion may result in neuropathological changes, but the acute clinical symptoms largely reflect a functional disturbance rather than a structural injury.
4. Concussion results in a graded set of clinical symptoms that may or may not involve a loss of consciousness. Resolution of the clinical and cognitive symptoms typically follows a sequential course; however, it is important to note that, in a small percentage of cases, post concussive symptoms may be prolonged.
5. No abnormality on standard structural neuroimaging studies is seen in concussion."[1,3]

**Concussion Evaluation**

The assessment of a concussion includes signs and symptoms from a range of domains. A specific diagnosis of concussion can include one or more of the following[1]:

A. Symptoms: somatic (eg, headache), cognitive (eg, feeling like in a fog) and/or unusual or altered emotional symptoms
B. Physical signs (eg, loss of consciousness, amnesia)
C. Behavioral changes (eg, irritability)
D. Cognitive impairment (eg, slowed reaction times)
E. Sleep disturbance (eg, drowsiness)

***Symptoms Associated with a Concussion***[1,2,3]

| | | | |
|---|---|---|---|
| Headache | "Pressure in head" | Neck Pain | Sadness |
| Nausea | Vomiting | Dizziness | Irritability |
| Blurred Vision | Balance Problems | Sensitivity to Light | Drowsiness |
| Sensitivity to Noise | Feeling Slowed Down | "Don't Feel Right" | Nervous or Anxious |
| Feeling like "in a fog" | Fatigue or Low Energy | Difficulty Concentrating | Trouble Falling Asleep |
| Difficulty Remembering | More Emotional | Confusion | Amnesia |

***Red Flag Signs or Symptoms indicating Immediate Referral to Emergency Room*** [1,2,3]

| | | | | |
|---|---|---|---|---|
| Uneven Pupil Size | Loss of Consciousness | Severe Headache | Difficulty Remembering | Neck Pain |
| Vomiting | Amnesia | Confusion | Blurred Vision | Drowsiness |
| Deterioration of Neurological Function, Level of Consciousness or Mental Status Changes | | | | |
| Clear or Discolored Fluid, Bleeding or Bruising | | | | |
| Leaking from Eyes, Ears, Nose or Mouth | | | | |

When an athlete shows **ANY** features of a concussion[1,2,3]:

A. Athlete should be removed from play or practice.
B. Athlete should be medically evaluated by an Athletic Trainer or Physician utilizing the SCAT 2.
C. If no Athletic Trainer or Physician is available, Athlete's parents should be contacted and medical referral made to his/her current physician, urgent care or hospital.
D. Athlete should be under the observation of an adult, preferably a parent, for the next 24 hours following the injury and ongoing monitoring of signs and symptoms should be performed every 4 hours or as instructed by medical professional.
E. Athlete should follow up with Athletic Trainer and Physician the following day where **Impact will be performed and SCAT 2 repeated**.
F. An Athlete with a diagnosed concussion **should not** be allowed to return to play on the day of injury[1].

**Concussion Management**

Proper concussion management is essential to ensure proper recovery from injury and decreases the potential for long-term effects of the injury and prevention of re-injury. Return to play before the athlete is fully recovered can lead to complications such as a more severe concussion, permanent brain injury, Second Impact Syndrome, Post-Concussion disorder or death[1,2]. Therefore an athlete must be physically and cognitively sign and symptom free before return to play and be cleared by a physician. The athlete will also have to complete a graduated return to play protocol (See chart below). The Midwest Orthopedic Specialty Hospital currently follows return to play guidelines outlined by the WIAA and recommendations from the Zurich Conference on Concussions (2009). Each step in the graduated return to play guidelines should take 24 hours. An athlete cannot progress to the next step unless he/she remains sign and symptom free for the 24 hours between each step.

**To Simplify:**

- **A single concussion in a season will result in an athlete missing 7-10 days on average.**

- **A second concussion in the same season will result in the athlete missing 21-30 days on average (3-4 weeks)**
- **A third concussion in the same season is disqualification from the remainder of that season and will require a medical clearance from a concussion specialist to participate in another sport that calendar year. The school medical staff will assist with scheduling that appointment with parent approval.**
- **Physician Release to Return to Sport is a release to begin Return to Play Protocol, as seen below, unless Return to Play Protocol has already been initiated by Athletic Trainer and Athlete has been symptom free for the previous 24 hours.**

**Return to Play Protocol/Guidelines[1,3]**

| **Rehabilitation Stage** | **Functional Exercise at Each Stage** | **Objective of Each Stage** |
|---|---|---|
| 1. No Activity | Complete physical and cognitive rest<br>Athlete must be Sign and Symptom free for 24 hours before progressing to next step. | Recovery |
| 2. Light Aerobic Exercise | Walking, swimming or stationary cycling keeping intensity <70% MPHR; no resistance training | Increase HR |
| 3. Sport-Specific Exercise | Running drills in football or soccer, technique drills for Volleyball, agility or running drills in general; no head impact activities | Add movement |
| 4. Non-Contact training Drills | Progression to more complex training drills, eg, passing drills in football or soccer. Start progressive weight lifting. No head impact activities, non-contact. | Exercise, coordination and cognitive load |
| 5. Full Contact Practice | Following written medical clearance, participate in normal training activities* | Restore confidence and assess functional skills by coaching staff |
| 6. Return to Play | Normal game play | |

***Athlete should complete at least one full contact practice before game play to ensure that Signs/Symptoms do not return.***

At this time, it is the recommendation of the Zurich Conference on Concussions (2009) that athlete's at the high school level do not return to play the same day as a concussion is sustained. The Midwest Orthopedic Specialty Hospital, as per WIAA rule, has decided to not allow return to play on the same day as a concussion is sustained. Research has demonstrated adolescent, less physically mature and high school level "athletes allowed to return to play on the same day may demonstrate neurophysiological deficits post-injury that may not be evident on the sidelines and are more likely to have delayed onset of symptoms."[1] Thus to ensure the safety of the athlete, once a concussion is sustained the athlete may not return to play until he/she has medical clearance and has completed the graduated return to play guidelines.

## References


**1. McCrory et al. (2009) Consensus Statement on Concussion in Sport: 3rd International Conference on Concussion in Sport Held in Zurich, November 2008. Clin J Sport Med. 19:3;185195.**

**2. Prentice, W.E. (2006). Arnheim's Principles of Athletic Training. McGraw Hill, pgs 880-892.**

**3. Wisconsin Interscholastic Athletic Association. (2009). Medical Procedures Guide, pgs 66-70.**