



## US Soccer National Teams Concussion Evaluation and Management Protocols

The Return To Play (RTP) decision-making process is complex and dynamic. Although there has been a virtual explosion of research into the diagnosis and management of sport-related traumatic brain injury in the past 10 years, the RTP decision remains largely a clinical endeavor without firm empirically derived guidelines. The weight of clinical and empirical evidence suggests that the RTP decision-making process should be individualized rather than relying on generic RTP guidelines. Of significance is our current understanding from the research literature that the signs and symptoms of concussion are dynamic and evolve over time. Consequently, symptoms may not be present until hours or days following the initial blow(s).

### **Concussion Defined (Concussion in Team Sports):**

Concussion is 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:

- 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.
- Concussion typically results in the rapid onset of short-lived impairment of neurological function that resolves spontaneously.
- Concussion may result in neuropathological changes, but the acute clinical symptoms largely reflect a functional disturbance rather than structural injury.
- Concussion results in a graded set of clinical syndromes that may or may not involve loss of consciousness. Resolution of the clinical and cognitive symptoms typically follows a sequential course.
- Concussion is typically associated with grossly normal structural neuroimaging studies.

### **Early Signs & Symptoms of Concussion:**

*Cognitive features:* unaware of game specifics (opposition colors, score of game, last play); confusion; amnesia (does not recall events prior to the hit or after the hit); alteration in consciousness; not oriented to time, place, or date.

*Physical symptoms:* Headache, dizziness, nausea, unsteadiness/loss of balance, feeling "dinged" or stunned or "dazed," "having my bell rung," seeing stars or flashing lights, ringing in the ears, and double vision.

*Delayed symptoms:* Sleep disturbance, memory disturbance, decreased information processing speed, fatigue, psychological disturbance (e.g. depression/anxiety/irritability/emotional stability).

## **Baseline Testing**

- ImPACT has been chosen as the baseline instrument for all national teams.
- All new players to national teams will be baseline tested by Athletic Trainer Certified (ATC) staff (and additional help) as needed once named to a roster.
- ATC'S are to determine whether any new, incoming players have been baseline tested within the U.S. Soccer database. If the player has not been tested then a new ImPACT baseline will be administered prior to the player engaging in any contact play.

## **Acute Evaluation/Management**

Players who are suspected of having sustained a concussion shall be removed from play immediately and evaluated by team medical staff. The evaluation shall consist of a standardized acute concussion evaluation using the SCAT2.

If after initial evaluation the player is diagnosed with a concussion he or she shall not be returned to play on the same day. A player does not need to have lost consciousness to suffer a concussion.

## **Post-Acute Evaluation and Management**

An individualized and graded approach to RTP should begin after the player is asymptomatic at rest for at least 24-48 hours. During this time the player should have both physical and cognitive rest. The length of time a player must be symptom free will vary depending on the nature of the injury, the player's age, concussion history and psychological status.

Once symptom free the player shall undergo a post-injury evaluation. Whenever possible the player will be referred to a consulting neuropsychologist for a standardized neuropsychological evaluation that will consist of an interview, ImPACT test and the U.S. Soccer Neuropsychological Test Battery. The Consulting Neuropsychologist will communicate the results of the evaluation to the Team Physician who is ultimately responsible for making the RTP decision using the guidelines contained herein. The U.S. Soccer Consulting Neuropsychologist functions in a consulting capacity to both the team and U.S. Soccer. He/she functions under the directive of U.S. Soccer.

In the case of youth athletes, the consulting neuropsychologist will function in a liaison capacity with the school system to ensure appropriate academic accommodations. At those times when an injury occurs outside of country or in an area where a consulting neuropsychologist cannot be accessed, the team ATC will administer a post-injury ImPACT test and contact Dr. Echemendia for post-injury consultation/interpretation.

Once the player is symptom free at rest and deemed to be neurocognitively at or above baseline, he or she can begin the gradual process of light aerobic workout, followed by more intense aerobic workouts, strength training, non-contact sport-specific drills, contact sport-specific drills, heading drills and finally, full RTP. At all times the player should be monitored for a re-emergence of somatic and cognitive symptoms. Symptoms should be monitored on a daily basis using the Post Concussion Symptom Checklist.

In accordance with current consensus guidelines, there is no mandatory period of time that a player must be withheld from play following a concussion. However, at minimum, a player **MUST** be symptom free at rest and upon exertion, and determined to be neurocognitively at baseline. Players under the age of 18 shall be managed more conservatively than older players. **At no time shall a player under the age of 18 be returned to play sooner than seven days after becoming symptom free.**

### **Graded Return to Play Example (Prague Modified):**

- (1) Rest (cognitive and physical) until asymptomatic at rest (24 hours)
- (2) Light aerobic exercise (e.g. stationary bicycle) for 15-20 minutes.
- (3) Moderate intensity aerobic exercise (30 minutes).
- (4) Sport-specific training (ball handling, passing, light running, NO HEADING).
- (5) Non-contact training drills, including full exertion interval training (may start resistance training).
- (6) Begin heading training (steps 1 & 2 below)
- (7) Full contact training with heading steps 3 & 4 listed below
- (8) Return to competition (game play)

Typically, progression to the next level only occurs if the player remains symptom free for 24 hours (time frame may be lessened or lengthened depending on individual player symptoms and history). If symptoms re-emerge, the player should begin with the previous step after being symptom free for 24 hours. Player should only progress to the next level when instructed to do so by the team ATC or the Team Physician.

### **Heading Training Example (Modified from Johnston, et al., 2004)**

1. Partner and player inside six yard box. Partner tosses ball softly to player; controlled, straight header, appropriate technique. Five tosses straight ahead, then five to the left, and five to the right. If no symptoms occur then proceed to step 2 the following day.
2. Repeat step 1 to start. After an active rest period (run, ball work with feet), partner and player within 18 yard box. Partner tosses ball (longer distance, slightly harder), player does controlled header with good technique. Five, tosses straight ahead, left and right. If no symptoms occur then proceed to step 3 the following day.
3. Same as Step 2 with partner and player outside 18 yard box (longer distance, harder throw). If player remains symptom-free then move to step 4 the following day.
4. Full practice with more dynamic, unpredictable heading.