

## Concussion Management Policy

*The following protocol is based on the US Soccer Development Academy Concussion Management Protocol, the current international consensus statements, and the guidelines set forth by the US Centers for Disease Control*

We recognize that concussion reflects a constellation of symptoms related to traumatic brain injury, and reflects a complex pathophysiological process, induced by traumatic biomechanical forces applied to the brain. As described in other concussion management protocols, we note the following:

- Concussions are brain injuries.
- Concussions produce complex physiological processes that occur when traumatic biomechanical forces are applied to the brain.
- Concussions may be caused either by a direct blow to the head, face, neck, or elsewhere on the body, which causes an "impulsive" force to be transmitted to the head.
- Loss of consciousness MAY occur but is NOT necessary for concussion. In fact, only about 10% of concussion injuries result in a loss of consciousness.
- Concussion results in a diverse set of clinical signs and symptoms.
- The symptoms of concussion may not appear immediately, it may take hours or up to a day for the symptoms to become apparent.
- Concussions (mild traumatic brain injuries) typically are not visible on traditional neuroimaging (CT scans, MRI).
- Neuropsychological or "neurocognitive" tests may be used to detect abnormalities in thinking abilities caused by concussion. However, these tests are only one part of the return to play decision process and ideally should be interpreted by a qualified neuropsychologist.

### Acute Signs & Symptoms of Concussion

We will utilize a signs and symptoms approach to concussion recognition, assessment, and management as part of our concussion protocol. Of note, "signs" reflect what a Coach, Athletic Trainer, Neuropsychologist, other Health Care Provider, or even a teammate or parent/observer might see in an injured athlete. These include, but are not limited to:

- Loss of consciousness/Lying motionless on field
- Slow to get up/Stumbling upon standing
- Unsteady gait (walking)
- Falling to ground
- Obvious difficulties with balance
- Grabbing/clutching of head
- Dazed or confused expression
- Blank or vacant look
- Active vomiting
- Slurred or incoherent speech

Symptoms refer to what an athlete reports or is observed doing as part of an assessment. These are sometimes grouped into cognitive, physical, and emotional areas:

- **Cognitive:** 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; reports of feeling "foggy" or disconnected; reports of concentration/memory difficulties
- **Physical:** Reports of 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, double vision, or other symptoms.
- **Emotional:** Depressed mood, sadness, anxiety, irritability, easily frustrated, heightened emotionality, etc.

Delayed symptoms such as sleep disturbance, memory disturbance, decreased information processing speed, fatigue, psychological disturbance (e.g. depression/anxiety/irritability/emotional instability), and others can be noted in the hours and possibly days after the injury warranting follow up assessment 24-48 hours after a possible/suspected concussion event. **No athlete should return to play on the same day if a possible concussion is suspected.**

### **Acute Evaluation/Management Protocol for the Dallas Cup Tournament**

We will have licensed Athletic Trainers (ATs) at each game location and at least one Board Certified Clinical Neuropsychologist at one of the locations and on call to the others throughout the tournament. These health care professionals will provide initial assessment and management of any athlete that sustains an injury that may have resulted in a concussion in accordance with the following protocol:

- Players who are suspected of having sustained a concussion by official, athlete, coach, parent, or medical staff shall be removed from play immediately and evaluated by team medical staff, ATC, or Clinical Neuropsychologist.
  - This evaluation shall consist of a standardized acute concussion evaluation such as the SCAT5.
  - This evaluation is expected to take 5-10 minutes and should be sufficient to make a clinical determination of possible concussion.
  - No coach, parent/guardian, or player may overrule the healthcare professional.
- If after initial evaluation no concussion suspected upon evaluation by medical staff, player may return to play with instructions given to the player and coach to monitor for emergence of symptoms upon return to play. Should symptoms emerge, the athlete should be removed from play, returned to the medical staff for further assessment, and will be managed as a suspected concussion (see below).
- If after initial evaluation the player is **suspected** of having a possible concussion, he or she shall not be returned to play on the same day. The player's card will be pulled and given to tournament officials. The athlete is to return to Dallas Cup medical staff or other healthcare provider for additional assessment the following day for further assessment to make a final determination regarding return to play (concussion suspected but not found versus probable/definite concussion). The athlete will not be able to return to play until clearance is obtained from a physician, neuropsychologist, or other health care professional adequately trained for the evaluation of concussion.
- If after initial evaluation, sufficient signs and symptoms are noted to warrant an impression of **probable or definite concussion**, further assessment will be conducted to determine whether or not emergent care is needed via private vehicle transport or emergency transport.
  - Signs that would indicate a need for immediate, emergent care include but are not limited to any signs of cervical/neck injury; the presence of focal neurologic signs; headache that gets progressively worse or is very severe; severe nausea and/or repeated vomiting; persistent weakness, numbness, and/or decreased coordination; slurred/incoherent speech
- In cases of **definite concussion**, the athlete should be evaluated by a healthcare professional who is specifically trained in the evaluation and management of sports concussion. Having obtained a medical or other healthcare degree does not, by itself, indicate that the professional is adequately trained for the evaluation of concussion. The player should not return to play until the healthcare provider has provided written clearance for return to play and the return to play protocol outlined below is completed.
- Return to full contact play only occurs after (1) player is symptom free at rest, (2) player remains symptom free after graded exercise progression and heading training (see below), and (3) the player is judged to be at his or her neurocognitive baseline. At this point the appropriately trained healthcare professional should provide a written note clearing the player for full-contact play.
  - Given the short duration of the Dallas Cup tournament, it is unlikely that a player who has sustained a probable or definite concussion will be able to complete the 7 day return to play protocol outlined by the US Soccer Development Academy in sufficient fashion to obtain full clearance (see full return to play protocol below).

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

*The following provides recommendations for further assessment and management of concussion injuries. This information will be provided to team representatives when an athlete is removed from play due to a concussion as a guide for further treatment and management.*

An individualized approach to assessment and management should take place following the injury. A brief period of **cognitive and physical rest** is recommended for a period of 1-4 days. The athlete should avoid all types of physical activity including running, jumping, bike riding, etc. Athletes should avoid cognitively taxing activities such as reading, computer use, video games, extended TV watching, excessive texting, etc. It may be necessary for some athletes to take one or more days off from school to allow themselves to recover. Once symptoms start to improve, new research indicates that a return to light, non-contact, activities can help promote recovery and limit some of the negative physical, emotional, and cognitive effects associated with prolonged rest and sensory deprivation. Dark room/cocooning is no longer recommended and has been shown to prolong the recovery process.

**Neurocognitive/Neuropsychological Testing:** The use neuropsychological or “neurocognitive” tests has become widespread in the evaluation and management of concussion. These tests measure “thinking” abilities such as learning, memory, problem solving, information processing speed and reaction time, which are often - but not always - affected by concussion. As part of their comprehensive protocol, all players in the US Soccer Development Academy have baseline testing (ImPACT) completed at the start of the season. The test is then repeated after a concussion and the results are compared to the baseline test. The tests have shown to be useful in assessing the effects of concussion even if a baseline test is not available. An appropriately trained neuropsychologist is in the best position to interpret the results of these tests. Of note, a return to play assessment is multifaceted and includes not only neurocognitive assessment, but also balance and stability, visual-vestibular-oculomotor, and other neurobehavioral factors. The neuropsychologist communicates the results of the evaluation to the team athletic trainer and/or team physician for further recommendations regarding return to play.

**Graded Exercise Progression (as outlined by the US Soccer Development Academy):** Once a player has been symptom free for a minimum of 24 hours, a graded exercise program can be initiated under the guidance of an appropriately trained healthcare professional. The key steps to such a progression are:

1. Light aerobic exercise (e.g. stationary bicycle) for 15-20 minutes (do not allow player to break a sweat).
2. Moderate intensity aerobic exercise (30 minutes, moderate intensity, breaking a sweat).
3. Sport-specific training (ball handling, passing, light running, NO heading).
4. Non-contact training drills, including full exertion interval training (may start light resistance training).
5. Begin Heading Training (steps 1 & 2 below)
6. Full contact training with heading steps 3 & 4
7. Return to competition (game play).

Typically, a player progresses from one step to the next every 24 hours as long as they remain symptom free. If the player develops symptoms during one of the steps the activity should be stopped and the player should be allowed to rest for 24 hours or until symptom free, whichever is later. The player should then return to the prior step and resume the progression.

Patience is key as symptoms may re-emerge during this process. Do not attempt to speed up this process unless under the supervision of a well-qualified concussion specialist who has access to a multi-disciplinary team of qualified healthcare professionals.

**Heading Training** (Modified from Johnston, et al., 2004) – To be completed under the supervision/monitoring of the team athletic trainer or coach with regular assessment of symptoms:

1. Partner and player inside 6-yd box. Partner tosses ball softly to player; controlled, straight header, within box, perfect technique (ball off forehead, eyes open, mouth closed, and neck rigid). Five tosses straight ahead, then five to the left, and five to the right. If no symptoms occur then proceed to step 2 the **NEXT DAY**.
2. Repeat step 1 to start. After an active rest period (run, ball work with feet), partner and player within 18yd box. Partner tosses ball (longer distance, slightly harder), player does controlled header with perfect technique within box. Five each straight, left, right. If no symptoms occur then proceed to step 3 the **NEXT DAY**.

3. Same as Step 2 with Partner and Player outside 18yd 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.

**Final Return to Play:** Return to full contact play only occurs after (1) player is symptom free at rest, (2) player remains symptom free after graded exercise progression and heading training, and (3) the player is judged to be at his or her neurocognitive baseline. At this point the appropriately trained healthcare professional should provide a written note clearing the player for full-contact play.

**Final Thoughts/Recommendations:** As an athlete recovers, he/she should be regularly monitored/assessed for a re-emergence of symptoms. Symptoms can be monitored on a daily basis using a 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 before returning to play. ***Players under the age of 18 shall be managed more conservatively than older players.***

For any questions regarding this concussion management protocol, please contact Mark Barisa, PhD, ABPP (469-400-6230 – [mbarisa@performancenp.com](mailto:mbarisa@performancenp.com)) or Andrea Strebler Santos, MAT, LAT (972-512-7404; 314-620-9065 – [andrea.strebler@bswhealth.org](mailto:andrea.strebler@bswhealth.org)).

