



Jacksonville Sports Medicine Program Recommends Revised Concussion Guidelines

The Jacksonville Sports Medicine Program (JSMP) is a non-profit organization of sports medicine volunteers that help to provide sports medicine coverage of various high school athletic events within the Duval County School System. In 2004 the JSMP Board requested that a committee be formed to review the existing *JSMP Athletic Concussion Guidelines*, and if deemed necessary, revise those guidelines.

The mission of the Concussion Recommendation Committee was “to evaluate the present medical literature with respect to the diagnosis and management of concussion in athletes, primarily high school-aged athletes or younger and to revise the JSMP Concussion Guidelines if necessary.”

The committee was composed of certified athletic trainers, a neuropsychologist, and physicians with backgrounds in primary care and orthopedic sports medicine. Concussion Committee members were: Walter C. Taylor, MD (Chair), Joseph Bourdon ATC, Paul Zawatsky, MD, Wesley Mills MD, Joseph Czerkawski MD, Stephen Lucie MD, Douglas Kleiner PhD ATC, Shane Shapiro MD, and Russell Addeo, Ph.D., ABPP-CN.

The committee reviewed the existing medical literature and focused on existing JSMP, national and international guidelines, in addition to new research in the field of athletic concussion, especially in the area of neuropsychological testing. The recommendations that follow are a divergence from prior guidelines in that there is no true grading scale. This, however, is in agreement with the most recent 2nd International Conference on Concussion in Sport held in Prague, Czech Republic in 2004. It is also important to note that the severity of the concussion cannot be determined at the time or shortly after the concussion has occurred. This can really only be determined after the athlete’s symptoms, signs and deficits have all resolved.

The recommendations are divided into on field and return to play guidelines. The Head Injury Safety Advice Form that is referenced and printed is also available on the DCMS web-site (www.dcmsonline.org). Further research is needed within the area of athletic concussion to better define which athletes are at risk of developing serious long term or devastating consequences from this injury. These recommendations take into account some of the latest developments in athletic concussion. It must be remembered that these were designed with the high school-aged or younger athlete in mind.

JSMP CONCUSSION GUIDELINES RECOMMENDATIONS

Introduction

After a review of the most recent medical literature, the following document is the recommendations of the Concussion Committee with respect to the on field management of concussion and the return to practice / play recommendations, for high school or younger aged athletes. Since the JSMP is an organization that primarily deals with this age group, the committee focused on literature that reflected evaluation and management of concussion in this younger age range. The references that were taken into account in formulating these recommendations are listed in the reference section at the end of this document.

Although the recommendations are a divergence from prior guidelines in the literature, the committee feels these follow a more sound approach utilizing new scientific information that is now available with respect to concussion. The definition of concussion (Table I) is based on the summary statement from the Summary and Agreement Statement of the First International Conference on Concussion in Sport, Vienna 2001. ¹ The definition of concussion was not changed at the Second International Conference on Concussion in Sports, Prague 2004. ²

It is important to recognize that there is no assignment of a grading scale in the recommendations presented below. The committee felt that it was more important to state what the medical provider should look for with regard to symptoms and length of symptoms or signs rather than apply an arbitrary scale that can be debated. Common post-concussive symptoms are listed in Table II.

On Field Management and Recommendations

1. DO NOT ALLOW ANY PLAYER WITH A SUSPECTED CONCUSSION TO RETURN THE SAME DAY TO A GAME.
2. Transport player by ambulance to Emergency Department (ED) if any of the following exist:
 - a. Prolonged loss of consciousness
 - b. Inability of athlete to stand and walk
 - c. Deteriorating symptoms/status
 - d. Focal neurological signs (such as dilated pupil, persistent weakness, persistent numbness or paraesthesias)
 - e. Severe headache
3. See *Table III* for an example of on-field mental status evaluation of the athlete with a possible concussion. The Standard Assessment of Concussion (SAC) Form or Sports Concussion Assessment Tool (SCAT)² could also be used to assess the athlete with a suspected concussion.
4. It is important to provide the player and parents of a player, if present, with your recommendations for follow-up and return to play. It is best to discuss your recommendations with the athlete's parents. Every reasonable effort should be made to inform the athlete's parents of the situation. Also, discuss the recommendations with the athletic trainer for the school and the head coach so that every one is aware of your recommendations. This must be in accordance with Health Insurance Portability and Accountability Act of 1996 (HIPAA) guidelines. It is suggested that the form developed by the committee, labeled the *Head Injury Safety Advice Form*, be used to help transmit this information.
5. If the athlete did not require transportation to the ED:
 - a. Recommend rest from all exercise or strenuous activity (this could involve work, other sports, or other recreational activities).
 - b. Recommend that the athlete go home immediately after the game and that a responsible individual be in the home that can monitor the athlete.
 - c. With respect to transporting the athlete home, the athlete should not drive himself or herself. In case of clinical deterioration, it would be best if the responsible adult identified above in 5 b., transported the athlete home.
 - d. If the concussed athlete is at an away contest, the on-site physician and/or athletic trainer must make a determination if it is appropriate for the athlete to ride back to the school on the bus vs. having a parent or another responsible individual transport him/her. Every reasonable effort should be made to consult with the athlete's parents, even by phone if necessary.
 - e. If there is any question about whether or not the athlete can be transported by school bus back to the school and the parent or another responsible adult (approved by the parent) are not available to transport the athlete home, then consideration for transport to the nearest ED for evaluation may be prudent.

- f. If the athlete does ride the bus back to school and the athletic trainer is not in attendance, the coaching staff must be alerted to the nature of the injury and what to watch for. They should be instructed to monitor the athlete closely during the trip and ensure that the player is taken home in an appropriate manner. If any deterioration in the status of the concussed player occurs **during the trip home**, the responsible coach should call 911 to obtain Emergency Medical Services (EMS).
6. Discuss with the player and coach that the player must be cleared to return to play or practice by either a physician (preferably the team physician) or the school's assigned certified athletic trainer (ATC). The on field physician must determine if it is acceptable in their opinion to have the ATC clear the athlete to return to practice instead of a physician. A circumstance where this is appropriate is when the athlete with the concussion has more mild symptoms, no prolonged loss of consciousness and no amnesia. See below for further return to play suggestions ([Section 3C – Return to Practice / Play](#)).
7. If the athlete remains unconscious, he/she must be transported by emergency medical services (EMS), **and treated as a patient with a** suspected severe neck injury.

RETURN TO PRACTICE RECOMMENDATIONS

These recommendations apply to high school athletes and those younger participating in sports.

1. A key point is, no athlete should return to exercise in any form, practice or game play if he/she continues to have post-concussion symptoms. *See Table II.*
2. **If computerized neuropsychological testing is available pre-season and post-concussion, then the athlete should not return to exercise/practice until their neuropsychological test is back to baseline and any symptoms have been resolved.** If this program is available, the athlete should ultimately be cleared to return to exercise by a physician familiar with this type of program and how to utilize and interpret the results. The return to play should not be based solely on the results of neuropsychological testing. If an athlete still has post-concussive symptoms, **yet the** computerized neuropsychological testing is normal, the athlete should not be cleared to return until all symptoms have resolved. In this instance, more formal neuropsychological testing may be advisable if symptoms are prolonged.
3. Return to Practice/Play Guidelines
 - A. If the athlete had prolonged loss of consciousness (> 1 min.) at the time of the concussion, he/she should not return to exercise practice until evaluated by a physician. That athlete should have been transported to an ED for immediate evaluation. In order to return to exercise/practice, the athlete must also have met the following criteria:

- (1) If the athlete is evaluated in the ED soon after sustaining a concussion, the athlete and his/her parents should be given instructions that in order to return to exercise or practice the athlete must be medically re-evaluated in several days to a week. He/she will need to be followed for a period of time in order to ensure that all post-concussive symptoms and signs have resolved or not returned. Ideally the school's team physician should be involved in the decision-making with respect to return to practice. Athletes with the above symptoms are most likely at higher risk for persistent problems, and it is unlikely that all their symptoms will have resolved by the time they are discharged from the ED. Therefore, medical follow-up of these patients is a must before any return to practice decisions should be made.

To rule out other more serious pathology than concussion, it is recommended that imaging of the brain, (CT scan or MRI) be obtained for patients with prolonged loss of consciousness. A NORMAL IMAGING STUDY OF THE BRAIN GIVES NO OTHER INFORMATION WITH RESPECT TO THE DEGREE OR SERIOUSNESS OF CONCUSSION AND IF NO OTHER MORE SERIOUS PATHOLOGY IS IDENTIFIED, THE RESULTS OF SUCH IMAGING SHOULD NOT BE USED AS THE ONLY FACTOR TO DETERMINE THE RETURN TO PLAY.

- (2) If neuropsychological testing is unavailable, the athlete must not return to exercise for at least 1 month and must be asymptomatic for at least the last week of a month long rest. At some point it may be prudent to have the athlete consult with a neuropsychologist who can obtain formal neuropsychological testing. This testing should include not only an assessment of cognitive functioning, but preferably include a self-report measure of post-concussion symptoms.
- (3) **If baseline and post-concussion neuropsychological testing is available, the player may return to exercise if their brain imaging is normal, there is resolution of all post-concussive symptoms, and neuropsychological testing returns to baseline. However, it is still the responsibility of the physician, utilizing this information, to clear the athlete to practice.**
- (4) Once the athlete is cleared to start exercising, he/she must progress through a return to exercise running program **first** without symptoms, **before returning to practice**. The athlete would then progress to non-contact drills and then eventually full practice before game play. The athlete must remain asymptomatic before he/she can progress to the next step. If the athlete does become symptomatic again, this may warrant another medical evaluation.

- B. If the athlete had amnesia or other post-concussion symptoms (*See Table I*) for **> 5 min.** or loss of consciousness < 1 minute, he/she should not return to any exercise/practice for at least 1 week and that is only after any other post-concussion symptoms or signs have resolved. In order to return to play, the athlete must first exercise aerobically. If he/she remains asymptomatic the next day, **then return** to non-contact practice/drills. If the athlete remains asymptomatic the next day, **then return** to full contact practice. If the athlete's symptoms return, he/she must rest without any exercise for 5 – 7 days longer and then if asymptomatic may again try to work through this progression although at a slower rate. Because some of these athletes will take longer to have resolution of their symptoms and a slow return to their cognitive baseline; if they are evaluated in the ED soon after a concussion, it is recommended that they be followed up and cleared by a physician again prior to return to exercise. The same recommendations in A (1), A (2) and A (4) apply to this group of concussed athletes. If the athletes in this group have any prolonged symptoms, it is wise to wait to return them to exercise so they are asymptomatic for at least 1 full week before starting any aerobic exercise. If the athlete is having persistent symptoms, it may be prudent to obtain an evaluation by a neuropsychologist who can obtain neuropsychological testing.
- C. If the athlete has concussion symptoms or amnesia that lasted < 5 minutes, he/she may return to exercise without contact/collision after 4 days of rest, if remaining symptom free. Therefore, if the concussion occurred **at** a Friday night game, the athlete may not exercise until Tuesday afternoon, if the initial symptoms at the time of injury resolved within 5 minutes and did not return. At that time, he/she must progress through the usual return to play program after concussion. This involves Day 1: aerobic exercise, Day 2: non-contact drills, Day 3: contact drills and Day 4: game play. This requires the athlete to remain symptom free as he/she progresses through each step. **If any recurrence of symptoms develop, the athlete** must continue to rest without any exercise for another 5 – 7 days before starting this progression of activity again. With respect to clearing this group of athletes with the most mild form of concussion symptoms, the following health care providers should be in charge of this decision: the school's team physician, another physician familiar with these guidelines, the school's certified athletic trainer under the direction of the team physician, or the physician that covered the prior game.

- D. Under no circumstances should the coach, athletic director or other school official make the determination for when the athlete is cleared to return to practice or play with respect to concussion. This last statement is true for any of the concussion recommendations presented in this document.
- E. Multiple Concussions: The athlete **who** sustains multiple concussions within the same season or year is certainly at more risk for long term complications of concussion with respect to a decline in cognition and is at risk for repeat concussion. There is very limited research or data in this group of subjects with concussion. Therefore, the committee recommends being very cautious with respect to return to practice/play with these individuals. **Obtaining neuropsychological testing by a neuropsychologist may be prudent so the cognitive skills of these athletes can be followed in the future should repeat concussions occur. Medical providers could consult the prior revised guidelines of Cantu^{3, 4} or the American Academy of Neurology¹¹ guidelines with respect to return to practice/play guidelines in this group.**

APPENDIX

Table I – Definition of Concussion

Definition of Concussion as per the First International Conference on Concussion in Sport, Vienna 2001¹ and the Second International Conference on Concussion in Sport, Prague 2004²

A complex pathophysiological process affecting the brain, induced by traumatic biomechanical forces. Several common features that incorporate clinical, pathological, and biomechanical injury constructs may be utilized in defining a concussive head injury, which include:

- A. Concussion may be caused by either a direct blow to the head, face, neck or elsewhere on the body with an “impulsive” force transmitted to the head.
- B. Concussion typically results in the rapid onset of short-lived impairment of neurological function that resolves spontaneously.
- C. Concussion may result in neuropsychological changes, but the acute clinical symptoms **are** largely a functional disturbance rather than structural injury.
- D. 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.
- E. Concussion is typically associated with grossly normal structural imaging studies.

Table II – Post-Concussion Symptoms and Signs

- 1. Headache
- 2. Amnesia (retrograde or anterograde)
- 3. Confusion
- 4. Dizziness
- 5. Lightheadedness
- 6. Unsteadiness/Imbalance
- 7. Concentration or Memory Difficulties
- 8. Nausea
- 9. Feeling “foggy” or “fuzzy” headed
- 10. Blurred or Double Vision

Table III – Example of On Field Mental Status Testing
(Adapted from UPMC Center for Sports Medicine Concussion Card)

A. Orientation

1. Where are we?/What stadium or school is this?
2. What city is this?
3. Who are you playing
4. What month is it?
5. What day of the week and date is it?
6. What is the name of your coach or trainer?

B. Anterograde Amnesia

1. Ask the athlete to initially repeat 3 words that you choose (such as apple, hammer, bucket). Tell him/her to remember these, as you will ask the athlete to recall them in several minutes.

C. Retrograde Amnesia

1. What happened in the first quarter/period?
2. What is the last thing you remember prior to the hit/injury?
3. Do you remember the hit/injury?
4. What was the score prior to the hit/injury?

D. Concentration

1. Ask the athlete to state the days of the week backwards.
2. Ask the athlete to repeat several numbers backwards e.g. 47 (74 is correct) and 318 (813 is correct)

E. Recall

1. Ask athlete to repeat the 3 words he/she was asked to remember

F. Neurologic Exam

1. Cranial nerves
2. Check for focal deficits
3. Check balance and coordination