

**Section I. What is a Concussion?**

A concussion is defined as a transient alteration in brain function without structural damage, but with other potentially serious long-term ramifications. In the event of a concussion, the brain sustains damage at a microscopic level in which cells and cell membranes are torn and stretched. The damage to these cells also disrupts the brain at a chemical level, as well as causing restricted blood flow to the damaged areas of the brain, thereby disrupting brain function. A concussion, therefore, is a disruption in how the brain works; it is not a structural injury. Concussions are difficult to diagnose because the damage cannot be seen. A MRI or CT Scan cannot diagnose a concussion, but they can help rule out a more serious brain injury to a student athlete. Because concussions are difficult to detect, student athletes must obtain medical approval before returning to athletics following a concussion.

**Section II. Mechanism of Injury:**

A concussion is caused by a bump, blow or jolt to the head or body. Any force that causes the brain to bounce around or twist within the skull can cause a concussion. A bump, blow or jolt to the head or body can be caused by either indirect or direct trauma. The two direct mechanisms of injury are coup-type and contrecoup-type. Coup-type injury is when the head is stationary and struck by a moving object such as another player's helmet, a ball, or sport implement, causing brain injury at the location of impact. Contrecoup-type injury occurs when the head is moving and makes contact with an immovable or slowly moving object as a result of deceleration, causing brain injury away from the site of impact. Indirect forces are transmitted through the spine and jaw or blows to the thorax that whip the head while the neck muscles are relaxed. Understanding the way in which an injury occurred is vital in understanding and having a watchful eye for athletes who may exhibit symptoms of a concussion so these student athletes can receive the appropriate care.

**Section III. Signs and Symptoms:**

Signs (what you see):

- Confusion
- Forgets plays
- Unsure about game, score, opponent
- Altered coordination
- Balance problems
- Personality change
- Slow response to questions
- Forgets events prior to injury (retrograde amnesia)
- Forgets events after injury (anterograde amnesia)
- Loss of consciousness (any duration)

Symptoms (reported by athlete):

- Headache
- Fatigue
- Nausea or vomiting
- Double vision/ blurry vision
- Sensitivity to light (photophobia)

- Sensitivity to noise (tinnitus)
- Feels sluggish
- Feels foggy
- Problems concentrating
- Problems remembering
- Trouble with sleeping/ excess sleep
- Dizziness
- Sadness
- Seeing stars
- Vacant stare/ glassy eyed
- Nervousness
- Irritability
- Inappropriate emotions

If any of the above signs or symptoms are observed after a suspected blow to the head, jaw, spine or body, they may be indicative of a concussion and the student athlete must be removed from play immediately and not allowed to return until cleared by an appropriate allied health professional.

#### **Section IV. Management and Referral Guidelines:**

When an athlete loses consciousness for any reason, the athletic trainer will start the EAP (Emergency Action Plan) by activating EMS; check ABC's (airway, breathing, circulation); stabilize the cervical spine; and transport the injured athlete to the appropriate hospital via ambulance. If the athletic trainer is not available, the coach should immediately call EMS, check ABCs and not move the athlete until help arrives.

1. Any athlete who is removed from the competition or event and begins to develop signs and symptoms of a worsening brain injury will be transported to the hospital immediately in accordance with the EAP. **Worsening signs and symptoms requiring immediate physician referral include:**
  - Amnesia lasting longer than 15 minutes
  - Deterioration in neurological function
  - Decreasing level of consciousness
  - Decrease or irregularity of respiration
  - Decrease or irregularity in pulse
  - Increase in blood pressure
  - Unequal, dilated, or unreactive pupils
  - Cranial nerve deficits
  - Any signs or symptoms of associated injuries, spine or skull fracture, or bleeding
  - Mental-status changes: lethargy, difficulty maintaining arousal, confusion, agitation
  - Seizure activity
  - Vomiting/ worsening headache
  - Motor deficits subsequent to initial on-field assessment
  - Sensory deficits subsequent to initial on-field assessment
  - Balance deficits subsequent to initial on-field assessment
  - Cranial nerve deficits subsequent to initial on-field assessment
  - Post-Concussion symptoms worsen
  - Athlete is still symptomatic at the end of the game
2. After a student athlete sustains a concussion, the athletic trainer will use the Standardized Assessment for Concussion (SAC) to assess and document the student athlete's concussion. The athletic trainer will also report on the student athlete's signs and symptoms by using the Signs and Symptoms Check-List. On

the signs and symptoms checklist, the athletic trainer will also check pulse and blood pressure of each student athlete with a suspected concussion. After the initial evaluation of a concussion, all signs and symptoms will be tracked on the computer using the ImPact Test.

3. Any athlete who is symptomatic but stable is allowed to go home with his/her parent(s)/guardian(s) following the head injury.
  - If the head injury occurs at practice, parent(s)/guardian(s) will immediately be notified and must come and pick up the student athlete and talk to the certified athletic trainer in person.
    - A. If the injury occurs at a game or event the student athlete may go home with the parent/guardian(s) after talking with the certified athletic trainer.
    - B. Parent(s)/guardian(s) will receive important information regarding signs and symptoms of deteriorating brain injury/function prompting immediate referral to a local emergency room as well as return to play requirements. Parent(s)/guardian(s), as well as student athletes, must read and sign the Concussion Information and Gradual Return to Play form and bring it back to the certified athletic trainer before starting with the return to play protocol.

#### **Gradual Return to Play Protocol:**

1. Student athletes, with the consent of their parent(s)/guardian(s), will start taking the ImPact Test (**or other approved test identified by the School District**). The ImPact Test is a tool that helps manage concussions, determine recovery from injury, and is helpful in providing proper communication between coaches, parents and clinicians. The ImPact Test is a neurocognitive test that helps measure student athletes' symptoms, as well as test verbal and visual memory, processing speed and reaction time. It is **mandatory** for all student athletes to take the ImPact Test for a baseline score in accordance with Massachusetts State Law. The law states that all public schools must develop safety protocols on concussions and all public schools must receive information on past concussion history. The ImPact Test appears to be a promising tool in monitoring a student athlete's prior concussions, as well as any future concussions.

2. Each student athlete will complete a baseline test at the beginning of their sport season. **All student athletes and club cheerleading members will undergo ImPact testing.** Student athletes will be re-tested every other year. If a student athlete plays more than one sport during the academic year, their test will remain valid. For example, if a soccer student athlete also plays basketball in the winter, the student athlete will not have to take the ImPact Baseline Test again in the winter. If a student athlete posts scores below the norm, the student athlete will be re-tested at another time with either the certified athletic trainer or school nurse. Student athletes cannot begin practice until a valid baseline score is obtained during their designated time to take the test.

A. At the beginning of every sport season, student athletes are required to complete a concussion history form and return it to the athletic department. This information will be recorded in the student information system for tracking purposes.

B. Following any concussion, the athletic trainer must notify the athletic director and school nurses.

- C.** Following a concussion, the athlete will take a **post-injury test within 24 to 48 hours following the head injury. STUDENT ATHLETES WILL NOT BE ALLOWED TO MOVE ON TO FUNCTIONAL/PHYSICAL TESTING UNTIL THEIR IMPACT TEST IS BACK TO THE BASELINE SCORE AND ASYMPTOMATIC.** After a student athlete takes their first post-injury test, the student athlete will not be re-tested again for **5 days.**
- D.** If, after the first post-injury ImPact test, the athlete is not back to his/her baseline the parent/guardian(s) will be notified, and the student athlete will be referred to their healthcare provider and must have the Concussion Information and Gradual Return to Play form signed by a physician, physician assistant, licensed neuropsychologist or nurse practitioner stating when the athlete is allowed to return to play.
- E.** Following a post-injury test, the certified athletic trainer will take the Concussion Information and Gradual Return to Play form signed by the parent(s)/guardian(s) and fill in the date of all post-injury tests taken by each student athlete.
- F.** The certified athletic trainer will also document the date on which the athlete is asymptomatic and sign the document agreeing that all the above statements are true and accurate.
- G.** Once the athlete starts on the exertional post concussion tests, the parent(s)/guardian(s) will be notified and the athlete will be sent home with all signed documents relating to head injury. At this time the parent/guardian(s) must bring the student athlete to a licensed physician, licensed neuropsychologist, licensed physician assistant, nurse practitioner or other appropriately trained or licensed healthcare professional to be medically cleared for participation in the extracurricular activity.
- H.** Student athletes who continue to exhibit concussion symptoms for a week or more must be evaluated by a physician before returning to play.
- I.** Once a student athlete's post-injury test is back at the student athlete's baseline score, the student athlete will go through 5 days of Exertional Post Concussion Tests. The student athlete must be asymptomatic for all functional and physical tests to return to play (RTP). All tests will be administered by a certified athletic trainer.

### **Exertional Post Concussion Tests:**

- A. Test 1:** (30% to 40% maximum exertion): Low levels of light physical activity. This will include walking, light stationary bike for about 10 to 15 minutes. Light isometric strengthening (quad sets, UE light hand weights, ham sets, SLR's, resistive band ankle strengthening) and stretching exercises.
- B. Test 2:** (40% to 60% maximum exertion): Moderate levels of physical activity. Treadmill jogging, stationary bike, or elliptical for 20 to 25 minutes. Light weight strength exercises (resistive band exercises UE and LE, wall squats, lunges, step up/downs. More active and dynamic stretching.
- C. Test 3:** (60% to 80% maximum exertion). Non-contact sports specific drills. Running, high intensity stationary bike or elliptical 25 to 30 minutes. Completing regular weight training. Start agility drills (ladder, side shuffle, zig-zags, carioca, box jumps, and hurdles).
- D. Test 4:** (80% maximum exertion). Limited, controlled sports specific practice and drills.

E. Test 5: Full contact and return to sport with monitoring of symptoms.

### **Section VI. School Nurse Responsibilities:**

1. Assist in testing all student athletes with baseline and post-injury ImPact testing.
2. Participate and complete the CDC training course on concussions. A certificate of completion will be recorded by the nurse leader yearly.
3. Complete symptom assessment when student athlete enters Health Office (HO) with questionable concussion during school hours. Repeat in 15 minutes.
4. Observe students with a concussion for a minimum of 30 minutes.
5. If symptoms are present, notify parent/guardian(s) and instruct parent/guardian(s) that student must be evaluated by an MD.
  - (a) If symptoms are not present, the student may return to class.
6. If symptoms appear after a negative assessment, MD referral is necessary.
7. Allow students who are in recovery to rest in HO when needed.
8. Develop plan for students regarding pain management.
9. School nurse will notify teachers and guidance counselors of any students or student athletes who have academic restrictions or modifications related to their concussion.
10. Educate parents and teachers about the effects of concussion and returning to school and activity.
11. If injury occurs during the school day, inform administrator and complete accident/incident form.
12. Enter physical exam dates and concussion dates into the student information system.

### **Section VII. School Responsibilities:**

1. Review and, if necessary, revise, the concussion policy every 2 years.
2. Once the school is informed of the student's concussion, a contact or "point person" should be identified (e.g. the guidance counselor, athletic director, school nurse, school psychologist or teacher).
3. Point person to work with the student on organizing work assignments, making up work and giving extra time for assignments and tests/quizzes.
4. Assist teachers in following the recovery stage for student.
5. Convene meeting and develop rehabilitative plan.
6. Decrease workload if symptoms appear.
7. Recognize that the student's ability to perform complex math equations may be different from the ability to write a composition depending on the location of the concussion in the brain.
8. Educate staff on the signs and symptoms of concussions and the educational impact concussions may have on students.
9. Include concussion information in student handbooks.
10. Develop a plan to communicate and provide language-appropriate educational materials to parents with limited English proficiency.

### **Section VIII. Athletic Director Responsibilities:**

1. Provide parents, athletes, coaches, and volunteers with educational training and concussion materials yearly.
2. Ensure that all educational training programs are completed and recorded.
3. Ensure that all students meet the physical exam requirements consistent with 105 CMR 200.000 prior to participation in any extracurricular athletic activity
4. Ensure that all students participating in extracurricular athletic activity

have completed and submitted their pre-participation forms, which include health history form, concussion history form, and MIAA form.

5. Ensure that athletes are prohibited from engaging in any unreasonably dangerous athletic technique that endangers the health or safety of an athlete, including using a helmet or any other sports equipment as a weapon.
6. Ensure that all head injury forms are completed by parent/guardian(s) or coaches and reviewed by the coach, athletic trainer, school nurse and school physician.
7. Inform parent/guardian(s) that, if all necessary forms are not completed, their child will not participate in athletic extracurricular activities.

### **Section IX. Parent/Guardian Responsibilities:**

1. Complete and return concussion history form to the athletic department.
2. Inform school if student sustains a concussion outside of school hours. Complete new concussion history form following new injury.
3. If student suffers a concussion outside of school, complete head injury form and return it to the school nurse.
4. Complete a training provided by the school on concussions and return certificate of completion to the athletic department.
5. Watch for changes in your child that may indicate that your child does have a concussion or that your child's concussion may be worsening. Report to a physician:
  - A. Loss of consciousness
  - B. Headache
  - C. Dizziness
  - D. Lethargy
  - E. Difficulty concentrating
  - F. Balance problems
  - G. Answering questions slowly
  - H. Difficulty recalling events
  - I. Repeating questions
  - J. Irritability
  - K. Sadness
  - L. Emotionality
  - M. Nervousness
  - N. Difficulty with sleeping
6. Encourage your child to follow concussion protocol.
7. Enforce restrictions on rest, electronics and screen time.
8. Reinforce recovery plan.
9. Request a contact person from the school with whom you may communicate about your child's progress and academic needs.
10. Observe and monitor your child for any physical or emotional changes.
11. Request to extend make up time for work if necessary.
12. Recognize that your child will be excluded from participation in any extracurricular athletic event if all forms are not completed and on file with the athletic department.

### **Section X. Student and Student Athlete Responsibilities:**

1. Complete Baseline ImPact Test prior to participation in athletics.
2. Return required concussion history form prior to participation in athletics.

3. Participate in all concussion training and education and return certificate of completion to the athletic department prior to participation in athletics.
4. Report all symptoms to athletic trainer and/ or school nurse.
5. Follow recovery plan.
6. **REST. NO ATHLETICS.**
7. **BE HONEST!**
8. Keep strict limits on screen time and electronics.
9. Don't carry books or backpacks that are too heavy.
10. Tell your teachers if you are having difficulty with your classwork.
11. See the athletic trainer and/or school nurse for pain management.
12. Return to sports only when cleared by physician and the athletic trainer.
13. Follow Gradual Return to Play Guidelines.
14. Report any symptoms to the athletic trainer and/or school nurse and parent(s)/guardian(s) if any occur after return to play.
15. Return medical clearance form to athletic trainer prior to return to play.
16. Students who do not complete and return all required trainings, testing and forms will not be allowed to participate in sports.

### **Section XI. Coach & Band Instructor Responsibilities:**

1. Participate in Concussion Education Course offered by the National Federation of State High School Associations (NFHS) on a yearly basis. Complete certificate of completion and return to the athletic department.
2. Ensure all student athletes have completed ImPact baseline testing before participation.
3. Ensure all student athletes have returned concussion history and health history form prior to participation in athletics.
4. Complete a head injury form if their player suffers a head injury and the athletic trainer is not present at the athletic event. This form must be shared with the athletic trainer and school nurse.
5. Ensure all students have completed a concussion educational training and returned their certificate of completion prior to participation in athletics.
6. Remove from play any student athlete who exhibits signs and symptoms of a concussion.
7. Do not allow student athletes to return to play until cleared by a physician and athletic trainer.
8. Follow Gradual Return to Play Guidelines.
9. Refer any student athlete with returned signs and symptoms back to athletic trainer.
10. Any coach, band instructor, or volunteer coach for extracurricular activities shall not encourage or permit a student participating in the activity to engage in any unreasonably dangerous athletic technique that unnecessarily endangers the health of a student athlete, including using a musical instrument, helmet or any other sports equipment as a weapon.

### **Section XII. Post-Concussion Syndrome:**

Post-Concussion Syndrome is a poorly understood condition that occurs after a student athlete receives a concussion. Student athletes who receive concussions can have symptoms that last a few days to a few months, and even up to a full year, until their neurocognitive function returns to normal. Therefore, all school personnel must pay attention to and closely observe all student athletes for post-concussion syndrome and its symptoms. Student athletes who are still suffering from concussion symptoms are not ready to return to play. The signs and symptoms of post-concussion syndrome are:

- Dizziness
- Headache with exertion
- Tinnitus (ringing in the ears)
- Fatigue
- Irritability
- Frustration
- Difficulty in coping with daily stress
- Impaired memory or concentration
- Eating and sleeping disorders
- Behavioral changes
- Alcohol intolerance
- Decreases in academic performance
- Depression
- Visual disturbances

### **Section XIII. Second Impact Syndrome:**

Second impact syndrome is a serious medical emergency and a result of an athlete returning to play and competition too soon following a concussion. Second impact syndrome occurs because of rapid brain swelling and herniation of the brain after a second head injury that occurs before the symptoms of a previous head injury have been resolved. The second impact that a student athlete may receive may only be a minor blow to the head or it may not even involve a hit to the head. A blow to the chest or back may create enough force to snap the athlete's head and send acceleration/deceleration forces to an already compromised brain. The resulting symptoms occur because of a disruption of the brain's blood auto regulatory system which leads to swelling of the brain, increasing intracranial pressure and herniation. After a second impact a student athlete usually does not become unconscious, but appears to be dazed. The student athlete may remain standing and be able to leave the field under his/her own power. Within fifteen seconds to several minutes, the athlete's condition worsens rapidly, with dilated pupils, loss of eye movement, loss of consciousness leading to coma and respiratory failure. The best way to handle second impact syndrome is to prevent it from occurring altogether. All student athletes who incur a concussion must not return to play until they are asymptomatic and cleared by an appropriate health care professional.

### **Section XIV. Concussion Education:**

It is extremely important to educate coaches, athletes and the community about concussions. On a yearly basis, all coaches must complete the online course called "Concussion In Sports: What You Need to Know". This course is offered by the National Federation of State High School Associations (NFHS). Student athletes also need to understand the importance of reporting a concussion to their coaches, parents, athletic trainer and other school personnel. Every year student athletes and parents will participate in educational training on concussions and complete a certificate of completion. This training may include:

- CDC Heads-Up Video Training, or
- Training provided by the school district
- The school district may also offer seminars, speakers, and discussion panels on the topic of concussions. Seminars offer an opportunity for the certified athletic trainer, athletic director and nurse leader to speak about concussions on the field at practices and games and to discuss the protocol and policy that the

district has enacted. Providing education within the community will offer the residents and parents of athletes an opportunity to ask questions and voice their concerns on the topic of brain injury and concussions. When it comes to concussions, everyone needs to be aware of the potential dangers and remember that a concussion is a brain injury. Whenever anyone has a doubt about a student athlete with a concussion, **SIT THEM OUT and have them see the appropriate healthcare professional!**

### References:

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### Version Control

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