



Sports Related Concussion Management Plan Guidelines

Medical management of sports-related concussion is evolving. In recent years, there has been a significant amount of research and expert consensus-gathering concerning sports-related concussion in student athletes. These guidelines outline procedures for staff to follow in managing concussions, and outlines Northeast Rehabilitation Hospital Network Sports Medicine Division management as it pertains to return to play issues after concussion. It is a template based on current research and best-practice. Specific situations may deviate from these procedures. The guidelines attempt to provide guidance and structure to ensure safe participation in sports.

Northeast Rehabilitation Hospital Network Sports Medicine Division (NRHN-SM) seeks to provide a safe return to activity for all athletes after injury, particularly after a concussion. In order to effectively and consistently manage these injuries, procedures have been developed to aid in ensuring that concussed athletes are identified, treated and referred appropriately, receive appropriate follow-up medical care during the school day, and are fully recovered prior to returning to activity. Finally, we state that parental commitment in monitoring the status of the student athlete at home is a critical component to the successful implementation of these guidelines.

In addition to recent research, two primary documents were consulted in developing these guidelines. The “Consensus Statement on Concussion in Sport—The 3rd International Conference on Concussion” in Sport held in Zürich, November 2008 (referred to as the Zürich Statement)¹ and the “National Athletic Trainers’ Association Position Statement: Management of Sport-Related Concussion” (referred to in this document as the NATA Statement).² Disagreement between resources was resolved in favor of the Berlin’s statement as it is the most recent. Additionally, these guidelines have been updated with the releases of the “Consensus Statement on Concussion in Sport: The 5th International Conference on Concussion in Sport held in Zurich, November 2012”. As well as, “The Consensus Statement on Concussions in Sports: The 5th International Consensus Conference on Concussion in Sport held in Berlin, October 2016”.

These guidelines should be reviewed on a yearly basis by the school medical staff, if the school does not have their own school concussion management policy.

I. Overview: The primary components of the guidelines

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II. Concussion Overview

A. Definitions

1. Concussion- is a brain injury and is defined as a complex pathophysiological process affecting the brain, induced by 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:
 - a. 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.
 - b. Concussion typically results in the rapid onset of short-lived impairment of neurologic function that resolves spontaneously. However, in some cases, symptoms and signs may evolve over a number of minutes to hours.
 - c. Concussion may result in neuropathological changes, but the acute clinical symptoms largely reflect a functional disturbance rather than a structural injury and, as such, no abnormality is seen on standard and structural neuroimaging studies.
 - d. Concussion results in a graded set of clinical symptoms that may or may not involve loss of consciousness. Resolution of the clinical and cognitive symptoms typically follows a sequential course. However, it is important to note that in some cases symptoms may be prolonged.
2. Second Impact Syndrome- A rare phenomenon of diffuse brain swelling with delayed catastrophic deterioration has been labeled “second-impact syndrome” due to the belief held by some that it occurs as the result of a second concussion before the effects of the initial concussion have resolved. While rare, it is catastrophic and a major concern.

B. Acute concussion assessment involves a range of domains including the following:

1. Symptoms – somatic (ie. headache), cognitive (ie. feeling like in a fog) and/or emotional symptoms (i.e. lability)
2. Physical signs (i.e. loss of consciousness, amnesia)
3. Behavioral changes (i.e. Irritability)
4. Cognitive impairment (i.e. slowed reaction times)
5. Sleep Disturbances (i.e.insomnia)

C. If any one or more of these components are present it is indicative of probable concussion. Other causes for symptoms should also be considered. It is important to review medical history and baseline symptoms from screening/baseline.

III. Concussion Education for Student-Athletes and Parent(s)/Guardian(s)

A. At the beginning of individual sports seasons, all student athletes regardless of sport, shall be presented with a discussion about concussion at either an athletes sports night, team discussion or through paperwork/online registration requirements and given a copy of the CDC's "Heads Up: Concussion in High School Sports –A Fact Sheet for Athletes" (www.cdc.gov/concussion) or other concussion education. This handout will also be available in the Athletic Training Rooms of the school.

B. At the beginning of the individual sports season, parent/guardians(s) shall be presented with a copy of the CDC's "Heads Up: Concussion in High School Sports – A Fact Sheet for Parents" (www.cdc.gov/concussion) or other concussion education at a parents sports night or through paperwork/online registration requirements. This handout will also be available in the Athletic Training Rooms of the school.

C. All student athletes and their parent/guardians will sign a statement or in which the student –athlete accepts the responsibility for reporting their injuries and illnesses to the athletic trainer, coach if the athletic trainer is not present, parents and/or other health care personnel including signs and symptoms of concussion. This statement will also acknowledge having received the above mentioned educational handouts. (See Appendix A)

IV. Concussion Education

A. It is recommended that each year coaches, school nursing staff and athletic trainers review the NRH Sports Related Concussion Management Plan Guidelines and a copy of the CDC's "Heads Up: Concussion in High School Sport – A Guide for Coaches" (www.cdc.gov/concussion) This handout will also be available in the Athletic Training Rooms of the school.

B. All coaches and athletics administration are recommended to complete a course dealing with concussion, its signs, symptoms and management. The CDC, in partnership with the National Federation of State High School Association, has developed a free web based course, Concussion in Sports: What you need to know", to be used for this purpose. This online course is available free of charge after registering at <http://www.nfhslearn.com>.

C. As part of the MA DPH (105 CMR 201) there is a requirement that by September 2013 all athletic trainers, physicians, nurse practitioners and neuropsychologist providing medical clearance shall verify they have received department approved training in traumatic head injuries assessment and management. The MA DPH approved clinical training can be found at www.mass.gov/dph/sportsconcussion under the heading of MDPH Approved Clinical Training.

V. Baseline Concussion Assessment and Other Concussion Assessment Tools

A. Baseline assessment and use of neurocognitive testing:

1. Neurocognitive testing is recommended to establish baseline level of cognitive functioning for all contact sports as defined by the American Academy of Pediatrics Classification of Sports According to Contact and recommended by ImPact. The list of contact sports is as follows: football, girls and boys soccer, field hockey, cheerleading, girls and boys diving, girls and boys basketball, girls and boys ice hockey, wrestling, girls and boys gymnastics, girls and boys skiing, girls and boys lacrosse and ultimate Frisbee (if a varsity level sport). Normative data can be used for all other limited contact and noncontact sport post concussed student athletes.
2. All the above listed contact sport athletes should be required to take a baseline neurocognitive test prior to participation in sports (usually freshman year, then again in junior year). Parental/guardian permission should be sought (Appendix B)
3. Baseline testing should be conducted under the auspices of a licensed athletic trainer or other designated school personnel trained in test administration in a controlled computer lab environment.
4. Neurocognitive testing baseline data shall be reviewed by an individual trained in administration and interpretation of such results, and under the supervision of or in consultation with a qualified neuropsychologist. Athletes with invalid baseline scores as identified by the ImPACT software will be discussed with the athletic trainer and considered for retesting.
5. Athletes in contact sports listed above are required to take a "new" baseline test prior to participation their junior year. Athletes who are new to a sport or new to the school will be tested prior to sport participation regardless of year in school to assure a valid baseline.
6. Computerized testing should be scheduled with adequate supervision
 - a. At least one trained proctor should be present.
 - b. The background information takes about 10-15 minutes.
 - c. Current symptoms mean "in the last 24 hours."
 - d. The tests themselves take about 20 minutes.
 - e. Tell athletes to read instructions twice before starting each test. Ask questions before starting the module. Some modules keep going whether you answer or not.

- f. The tests can detect "faking bad" - that is, trying to get bad results on baseline testing. Athletes may be asked to retake the test if it appears they were not trying.

- B. Cognitive impairment: General cognitive status can be determined by simple sideline cognitive testing.
 1. The athletic trainer may utilize any sideline cognitive test of their choice. Examples of SCAT5 (Sports Concussion Assessment Tool)⁵ for sideline cognitive assessment are attached. (Appendix C)
 2. Coaches or others medically responsible for athletes, may utilize the basic SCAT5 assessment form or other sideline cognitive test if trained to do so) on the field to assist them in recognizing cognitive impairment and possible concussion (if the athletic trainer is not available) and should then make appropriate referrals. (Appendix C)
- C. Balance/Vestibular testing is also an additional tool.
 1. Balance/Vestibular testing is desirable but often difficult to implement. Balance/Vestibular testing when feasible is recommended.

VI. Concussion Action Plan

- A. Sideline Management of Sports Related Concussion-- General Guidelines
 1. Sideline assessment will be administered by the athletic trainer to every athlete who is suspected of sustaining a potential concussion-causing injury and/or displaying concussion-like signs and symptoms. The athletic trainer will assess orientation, memory, concentration and other symptoms.
 2. History and oral examination, special tests, and physical exertion will be used to determine the presence and severity of the concussion, and to help the athletic trainer identify the appropriate referral course.
 3. Ideally, the sideline evaluation will be completed by the athletic trainer using a sideline cognitive test. (ie. Sports Concussion Assessment Tool SCAT5)
 4. Any athlete suspected of having a concussion by the athletic trainer, coach or school designated representative should be removed from play for the remainder of that day's game or practice.
- B. On-field Management of Sports Related Concussion IN THE ABSENCE OF ATHLETIC TRAINER – General Guidelines
 1. Any athlete with a witnessed loss of consciousness (LOC) of any duration should be transported immediately to nearest emergency department via emergency vehicle.
 2. Any athlete who has symptoms of a concussion, and who is not stable (i.e., condition is changing or deteriorating), is to be transported immediately to the nearest emergency department via emergency vehicle.
 3. An athlete who exhibits any of the following symptoms should be transported immediately to the nearest emergency department, via emergency vehicle.
 - a. Deterioration of neurological function
 - b. Decreasing level of consciousness
 - c. Decrease or irregularity in respirations
 - d. Decrease or irregularity in pulse
 - e. Unequal, dilated, or unreactive pupils
 - f. Any signs or symptoms of associated injuries, spine or skull fracture, or bleeding
 - g. Mental status changes: increasing lethargy, confusion or agitation and/or difficulty maintaining arousal
 - h. Seizure/posturing activity
 - i. Vomiting after sustaining a potentially concussion-causing injury
 4. An athlete who is symptomatic but stable, may be transported by his or her parents. The parents should be advised to contact the athlete's primary care physician, or seek care at the nearest emergency department, on the day of the injury.
 5. The coach/athletic director should contact the athletic trainer to advise him/her of the injury.
 6. **ALWAYS** give parents the option of emergency transportation, even if you do not feel it is necessary.
- C. Guidelines and Procedures for the Certified Athletic Trainer for the Sports Related Concussion: (Appendix E)

Certain concussions (e.g., mild, uncomplicated, resolving) may be managed by the AT (operating under the physician's standing orders) without referral to outside physician. In cases when an injured athlete has not seen a physician, the athletic trainer is empowered to clear an athlete to return to play. When an athlete has seen a physician, however, a physician note will be required prior to return to play clearance. Said note must come from a physician other than an emergency room physician. In NH Parental Permission is required before RTP protocol may be started with the athlete.

1. The athletic trainer will assess the injury, or provide guidance to the coach if unable to personally attend to the athlete.
 - a. Immediate referral to the athlete's primary care physician or to the hospital will be made when medically appropriate.
 - b. Delayed referrals will be made as necessary (See Section XI. B).
 - c. The athletic trainer will notify the athlete's parents and give written and verbal home and follow-up care instructions. (Appendix D)
 - d. The athletic trainer will notify the school nurse of the injury, prior to the next school day if possible (e.g., immediate encrypted email so it's there awaiting the nurse's next day arrival), so that the school nurse can initiate appropriate follow-up in school immediately upon the athlete's return to school.
 - e. The athletic trainer will communicate with the school nurse (or guidance counselor) regarding the athlete's neurocognitive and recovery status. If needed the school nurse should initiate procedures for academic accommodations for athlete.
 - f. School nurse and athletic trainer will determine which of them should communicate with the athlete's treating physician/provider and keep the other apprised of physician orders.
2. The athletic trainer will notify the athletic director that an athlete has suffered a concussion. *The athletic director should notify school administration.*
3. The athletic trainer will notify the consulting neuropsychologist of the injury.
4. The athletic trainer is responsible for administering post-concussion cognitive testing. (Appendix F)
 - a. Whenever possible, the initial post-concussion test will be administered 48-72 hours post-injury (or as soon as possible after 48 hours post-injury as allowed by athlete's return to school).
 - b. Repeat post-concussion tests will be given at appropriate intervals, dependent upon clinical presentation. The timing of retesting shall be determined on a case by case basis.
 - c. Athletic trainer will send notification of neurocognitive test data for neuropsychologist consultant to review as soon as possible upon the athlete's completion of the test.
 - d. The athletic trainer will review post-concussion test data with the athlete and the athlete's parent.
 - e. The athletic trainer will forward testing results to the athlete's treating physician, with parental permission.
5. The athletic trainer will monitor the athlete, and keep the School Nurse informed of the individual's symptomatology and neurocognitive status, for the purposes of developing or modifying an appropriate health care plan for the student-athlete. The athletic trainer will perform serial assessments of symptoms, signs and cognition using assessment tools and/or computerized neurocognitive tests, and possible balance/vestibular screening.
6. The athletic trainer is responsible for monitoring recovery & coordinating the appropriate return to play activity progression.
7. The athletic trainer will maintain appropriate documentation regarding assessment and management of the injury.

D. Guidelines and procedures for consulting neuropsychologist:

1. Review any and all flagged baseline testing
2. Consult with athletic trainer and determine needs for repeat baseline testing or follow-up discussions
 - a. In cases of high symptom counts, athletic trainer should review with athlete
3. Review follow-up assessments in a timely manner; communicate impressions with athletic trainer, and PCP if permission granted.
4. Provide consultation on return to play status and treatment as indicated.
5. Communicate with athletic trainer who will in turn communicate with the School Nurse regarding any suggestions regarding needed accommodations or treatment interventions at school.
6. Consult with involved medical providers in cases of potential retirement from contact sports.

E. Guidelines and procedures for coaches:

1. CALL FOR ATHLETIC TRAINER IMMEDIATELY IF AVAILABLE; IF NOT AVAILABLE:
RECOGNIZE, REMOVE, REFER
 - a. Recognize concussion: All coaches should become familiar with the signs and symptoms of concussion.
 - b. Remove from activity: If a coach suspects the athlete has sustained a concussion, the athlete should be removed from activity immediately, assessed, and *shall not be allowed to return to activity that day*. Hence, the athlete will not return to play until receiving clearance from appropriate medical personnel (i.e. athletic trainer, physician).

- c. Refer the athlete for medical evaluation: Coaches should report all head injuries to the athletic trainer (or to other healthcare professionals if the athletic trainer is not available) as soon as possible, for medical assessment and management, and for coordination of home instructions and follow-up care.
- 2. The athletic trainer should be contacted as soon as possible.
 - a. The athletic trainer will be responsible for contacting the athlete's parents and providing follow-up instructions. The athletic trainer will also be responsible for initiating school-based follow-up through the school nurses.
 - b. Coaches should seek assistance from the host site athletic trainer if at an away contest.
 - c. If the athletic trainer is unavailable, or the athlete is injured at an away event, the coach is responsible for notifying the athlete's parents of the injury.
 - d. This call or contact with parents should happen as soon as the person to make the call is not tied up taking care of this or another athlete. If the athlete has to be transported emergently, the parents should be notified immediately.
- 3. If there is any question about the status of the athlete, or if the athlete cannot be monitored appropriately, the athlete should be referred to the emergency department for evaluation. If possible, an adult should accompany the athlete and remain with the athlete until the parents arrive.
- 4. Contact the parents to inform them of the injury and make arrangements for them to pick the athlete up at school. In the event that an athlete's parents cannot be reached, and the athlete is able to be sent home:
 - a. The coach or athletic trainer should insure that the athlete will be with a responsible individual, who is capable of monitoring the athlete and understanding the home care instructions, before allowing the athlete to be taken home. Written home care instructions should be provided to the individual responsible for monitoring the athlete.
 - b. The coach or athletic trainer should continue efforts to reach the parent.
- 5. Remind the athlete to report directly to the school nurse before school starts, on the day he or she returns to school after the injury. If you have not spoken directly with the athletic trainer or athletic director, notify nurse about the injury via email or cell. The school nurse needs to know about the concussion before the athlete next returns to school.
- 6. Athletes with suspected concussions should not be permitted to drive home.
- 7. Notify athletic director of the injury ASAP via phone or encrypted email on the day of the injury.

VII. Concussion Follow-Up Care

- A. Responsibilities of the School Nurse during the school day (within 72 hours to allow for Friday night game to Monday unless athlete does not return to school)

The athlete will be instructed to report to the school nurse upon his or her return to school. At that point, the school nurse should:

- 1. Re-evaluate the athlete utilizing a graded symptom checklist. (Appendix H)
- 2. Provide an individualized health care plan (as needed) based on both the athlete's current condition, and initial injury information provided by the athletic trainer or parent.
- 3. Notify the student's guidance counselor and teachers of the injury immediately.
- 4. Notify the student's physical education/wellness teacher immediately that the athlete is restricted from all physical activity until further notice.
- 5. If the school nurse receives notification of a student athlete who has sustained a concussion from someone other than the athletic trainer (athlete's parent, athlete, physician note), the athletic trainer should be notified as soon as possible, so that an appointment for cognitive testing can be made.
- 6. The school nurse will monitor the athlete, and keep the athletic trainer informed of the individual's symptomatology and neurocognitive status, for the purposes of developing or modifying an appropriate health care plan for the student-athlete.
- 7. Monitor the athlete on a regular basis during the school day.

- B. Responsibilities recommended of the student's psychologist or guidance counselor during the day

- 1. Communicate with school health office on a regular basis, recommending appropriate academic accommodations (including removal from class if necessary) for students who are exhibiting signs/symptoms of post-concussion syndrome, to provide the most effective care for the student.
- 2. Advocate for and develop appropriate accommodations during recovery.

VIII. Return to Play (RTP) Procedures After Concussion

A. Returning to participate on the same day of injury

1. An athlete who exhibits signs or symptoms of concussion shall not be permitted to return to play on the day of the injury.
2. Any athlete who denies symptoms but has abnormal sideline cognitive testing should be held out of activity.
3. "When in doubt, hold them out."

B. Return to play after concussion

1. The athlete must meet all of the following criteria in order to progress to activity:
 - a. Asymptomatic at rest and with exertion (including mental exertion in school) AND:
 - b. Within normal range of baseline on post-concussion neurocognitive testing
 1. When clinically indicated, asymptomatic athletes who have not yet returned to baseline on cognitive tests may begin a daily program of light walking as long as symptoms do not return.
 - c. Have written clearance from primary care physician or specialist **if** they saw a physician for this injury. (This clearance cannot be provided by the Emergency Room physician.) (Appendix I)
 - d. If in NH, have written permission from parent to begin return to play progression. (Appendix I)
2. Treatment during recovery
 - a. If symptoms worsen or recur at any point throughout recovery, the level of activity should be regressed.
 - b. School activities can proceed as long as the athlete does not experience an increase in physical, cognitive, somatic or emotional symptoms; any increase should result in a reduction in the level of activity.
 - c. School personnel should be notified of status changes.
3. Once the above criteria are met, the athlete will be progressed back to full activity following a stepwise process, (as recommended by both the Zurich and NATA Statements) under the supervision of the athletic trainer.
4. Progression is individualized, and will be determined on a case by case basis.
 - a. Factors that may affect the rate of progression include: previous history of concussion, duration and type of symptoms, and age of the athlete.
 - b. An athlete with a prior history of concussion, one who has had severe or prolonged symptoms **should be progressed more slowly**. In athletes with previous concussions, slower progression (e.g., 48 hours between stages) may be appropriate.
 - c. See further specifics regarding past concussions in the physician referral section at the end of the document.
5. Stepwise progression based on the Zurich Statement recommendations with 24-48 hours between stages, determined on a case by case basis considering past concussion history and severity of the current concussion, will begin after the athlete has been asymptomatic for 24 hours. (Appendix G) A sample progression is detailed below:
 - a. Only light, sub-symptom activities of daily living including physical and mental activity should be allowed. Do not progress to step b until asymptomatic and cognitive tests are within normal limits.
 - i. When clinically indicated, asymptomatic athletes who have not yet returned to baseline on cognitive tests may begin a daily program of light walking as long as symptoms do not return.
 - b. Stage 1 of RTP progression: Light aerobic, nonimpact, exercise – e.g., walking, stationary bike, supervised by athletic trainer.
 - c. Stage 2 of RTP progression: Light aerobic exercise – e.g., jogging on field, track or treadmill, supervised by athletic trainer.
 - d. Stage 3 of RTP progression: Sport-specific training - progress aerobic activities depending on the athlete's sport and position (to include sprinting, stop/start, cutting as indicated), incorporate progressive balance training, increasing difficulty of balance task and adding toss and catch over the next several stages supervised by athletic trainer.
 - e. Stage 4 of RTP progression: Non-contact (no hitting, no scrimmaging, and no heading) training drills with team.
 - f. Stage 5 of RTP progression: Full contact practice (no game play) with team.
 - g. Stage 6 of RTP progression: Released for game play.
6. Note: If the athlete experiences post-concussion symptoms during any stage, activity should cease for that day and until symptoms have again resolved. Once the athlete has a new 24-hour asymptomatic period, the athlete may resume the RTP progression beginning at the previous asymptomatic level.
7. If symptoms (self-report and/or sub-baseline test scores) persist for more than 10-14 days post injury, referral to a physician with expertise managing concussions should be considered.

C. Stages 1-3 are to be supervised by the athletic trainer. Stages 4-6 can be supervised by the team coach after she or he has received specific instructions from the athletic trainer.

D. Progression through RTP stages is to be approved by athletic trainer ONLY, and not left up to the coach.

E. The athlete should see the athletic trainer daily for re-assessment and instructions until he, or she, has progressed to unrestricted activity (i.e., Stage 6). This daily monitoring should continue until the concussion has resolved regardless of whether the athlete's sports season has ended.

F. Coaches should be instructed to be aware that the athletic trainer will be providing such guidance and should not allow the athlete to participate until he has spoken to the athletic trainer each day.

IX. Disqualifying an Athlete

A. Current Game or Practice- This decision will be based on the sideline evaluation, the symptoms the athlete is experiencing, the severity of the symptoms and the patient's past history. Any question of concussion will result in removal from the contest and the athlete will be ineligible to return on the same day. Any suspected concussion will start the athlete on the Return to Play After Concussion pathway as outlined above.

B. Season- The decision for disqualification for the season will be based on the recommendations of a physician with expertise managing concussion and the student athlete's medical team. Concussion history, severity of episodes, and athlete's future health should be considered when this decision is made.

C. Career- Disqualification from a certain sport will be done in the same manner as the season disqualification above. This may only keep this athlete from contact and collision sports.

X. Home Instruction

A. Parents should be notified the day of the suspected concussion. A Post Concussion Care Instruction sheet (Appendix D) shall be given to the athlete or parent. Athletes should not drive if concussion is suspected. Alternative transportation should be coordinated by the injured athlete, parents, coaches, athletic trainer and/or athletic director.

XI. Physician Referral – In non-emergency situations, a written injury report including test results should be sent to the physician who will see the athlete; the athlete may hand carry the documents or they may be faxed to the physician. In cases where a written report cannot be produced/delivered to the physician, the athletic trainer may contact the physician with a verbal report.

A. Same-Day Referral in the presence of the athletic trainer

1. An athlete will be immediately referred if there is any single or combination of:
 - a. Prolonged (>15 seconds) loss of consciousness
 - b. Seizure or posturing activity
 - c. Deteriorating signs and symptoms. Worsening of symptoms should result in activation of EMS.
 - d. Significant amnesia (e.g., repetitive questioning)
 - e. Vomiting
2. Serious consideration for rapid referral should be given when athlete:
 - a. Complains of severe headache
 - b. Complains of prolonged (20 minutes) disturbance of vision or hearing
 - c. Paresthesia or weakness

B. Delayed Referral-

1. A referral will be deemed necessary any time signs and symptoms worsen (i.e., neurocognitive status deteriorates). If mild symptoms do not improve in a 2-hour time-frame post-injury (or by the time the athlete will be leaving the presence of the AT), the athletic trainer will exercise clinical judgment regarding referral at that time.
2. A referral shall be deemed necessary in cases where symptoms significantly interfere with ADLs and/or are persistent.
3. Symptoms of any severity that are not improving after 7-10 days may warrant referral to the team physician, primary care physician or a physician with expertise managing concussion.
4. If symptoms persist for more than 10-14 days post injury, referral to a physician with expertise managing concussion should be considered.
5. Athletes whose reported symptoms have resolved but whose neurocognitive test scores are not within normal range 7-10 days after resolution of symptoms may warrant referral to a neuropsychologist or physician with expertise managing concussion.
6. Athletes who have suffered a concussion within 6-12 months of the current concussion will be referred to a physician with expertise managing concussion, and then if cleared by the concussion specialist, a more conservative timeframe (e.g., 48+ hours between stages) will be applied to the return to play progression.

Appendix A



AUTHORIZATION FOR SPORTS MEDICINE SERVICES AND CONSENT FOR TREATMENT

I, the undersigned, am the parent/legal guardian of, _____, a minor and student-athlete at _____, who plans on participating in _____.

(Name of school)

(Student athlete name - please print)

(Sport)

I understand that Northeast Rehabilitation Hospital Network ("NRH") is contracted by the school to provide sports medicine services for the school's athletes. I, hereby give consent for a Certified Athletic Trainer and/or other NRH sports medicine clinical staff to provide sports medicine services for the above minor. Sports medicine services include, but are not limited to: administering first aid for athletic injuries, providing initial treatment and management of acute injuries, and assessing athletic injuries at the request of the athlete, the athlete's coach, or the athlete's parent/guardian. The Athletic Trainer and/or sports medicine clinical staff will perform only those procedures that are within their training, credential limitations and scope of professional practice to prevent, care for and rehabilitate athletic injuries. I understand that a written report of any athletic injury assessment for the athlete will be confidentially maintained in the files of the training room or school nurse's office.

I, hereby authorize the Athletic Trainer and/or other NRH clinical staff who provide services to the above-named athlete to disclose information about the athlete's injury assessments and post-injury status. I understand such disclosures will be done, as needed, with the involved coaching staff, Athletic Director of the school, the school nurse, any treating healthcare provider and/or consulting concussion management specialist.

I understand that there is no charge to me for the above listed athletic training services. If the athlete is in need of further treatment by a physician, or of rehabilitation services for the injury, he or she may see the physician or provider of his/her choice. Injured athletes that have been evaluated and/or treated by a physician must submit written clearance from that physician to the Athletic Trainer prior to the athlete being permitted to resume activity. In circumstances where an athlete has been removed from play because of a suspected head injury or concussion, the athlete will not be permitted to return to play until the athlete is evaluated by a healthcare provider, receives medical clearance and written authorization from that provider. This Authorization shall remain in effect for one sports season beginning with the date set forth below.

Parent/Guardian Name(print) _____ Signature _____ Date _____
Relationship to student athlete _____ Cell/Work phone _____
Home Address _____ Home phone _____

Student Athlete Name _____ Sex _____ Grade _____ Date of Birth _____
Allergies _____
Current Medications (ie asthma inhalers, epi-pen, etc) _____
Physical impairments _____
Other pertinent medical history (surgeries, diabetes, seizures, heart condition, etc) _____

Physician Name _____ Physician Phone _____

Pre-Participation Head Injury/Concussion Reporting:

Has student ever experienced a traumatic head injury (a blow to the head)? Yes ___ No ___ If yes, when? Dates(month/year) _____
Has student ever received medical attention for a head injury? Yes ___ No ___ If yes, when? Dates(month/year) _____
If yes, please describe the circumstances: _____
Was student diagnosed with a concussion? Yes ___ No ___ If yes, when? Dates(month/year) _____
Duration of symptoms (such as headache, difficulty concentrating, fatigue) for most recent concussion: _____

Student Athlete Signature _____

Parent/Guardian Signature _____

Statement Acknowledging Receipt of Education and Responsibility to Report Signs/Symptoms of Concussion:

I, _____ of _____ School hereby acknowledge having received education about the signs, symptoms and risk of sports related concussion. I also acknowledge my responsibility to report to the school athletic trainer, coaches, parent(s)/guardian(s) any signs/symptoms of a concussion.

Signature and Printed Name of student athlete _____

Date _____

I, the parent/guardian of the student athlete named above, hereby acknowledge having received education about the signs/symptoms and risks of sport related concussion and acknowledge my responsibility to report to the school athletic trainer and coaches, any signs/symptoms of a concussion in the above minor.

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Dear Parent/Guardian,
 Northeast Rehabilitation Hospital Network and _____ are currently implementing an innovative program for our student-athletes. This program will assist our athletic trainer and others involved with the healthcare of your son/daughter in evaluating and treating head injuries (e.g., concussion). In order to better manage concussions sustained by our student-athletes, we have acquired a software tool called ImPACT (Immediate Post Concussion Assessment and Cognitive Testing). ImPACT is a computerized exam utilized in many professional, collegiate, and high school sports programs across the country to successfully diagnose and manage concussions. If an athlete is believed to have suffered a head injury during competition, ImPACT is used to help determine the severity of head injury and when the injury has fully healed.

The computerized exam is given to athletes at the beginning a contact sport season. Contact sports are defined by the American Academy of Pediatrics Classification of Sports According to Contact. The list of contact sports is as follows: football, girls and boys soccer, field hockey, cheerleading, girls and boys diving, girls and boys basketball, girls and boys ice hockey, wrestling, girls and boys gymnastics, girls and boys skiing, girls and boys lacrosse and ultimate Frisbee (if varsity sport). This non-invasive test is set up in “video-game” type format and takes about 15-20 minutes to complete. It is simple, and actually many athletes enjoy the challenge of taking the test. Essentially, the ImPACT test is a preseason physical of the brain. It tracks information such as memory, reaction time, speed, and concentration. It, however, is not an IQ test.

If a concussion is suspected, the contact sport athlete will be required to re-take the test. Both the preseason and post-injury test data is given to the athletic trainer and consulting clinicians, to help evaluate the injury. If a limited contact sport athlete or a noncontact sport athlete is suspected of having a concussion they too will be tested and compared to baseline normative data. The information gathered can also be shared with your family doctor. The test data will enable these health professionals to determine when return-to-play is appropriate and safe for the injured athlete. If an injury of this nature occurs to your child, you will be promptly contacted with all the details.

We wish to stress that the ImPACT testing procedures are non-invasive, and they pose no risks to your student-athlete. We are excited to implement this program given that it provides us the best available information for managing concussions and preventing potential brain damage that can occur with multiple concussions. The administration, coaching, and athletic trainer are striving to keep your child’s health and safety at the forefront of the student athletic experience. Please return the attached page with the appropriate signatures. If you have any further questions regarding this program please feel free to contact the Athletic Director or Athletic Trainer.



Consent Form

For use of the Immediate Post-Concussion Assessment and Cognitive Testing (ImPACT)

I have read the attached information. I understand its contents. I have been given an opportunity to ask questions and all questions have been answered to my satisfaction. I agree to participate in the ImPACT Concussion Management Program.

Printed Name of Athlete _____

Athlete date of birth _____

Sports _____

Signature of Athlete

Date

Signature of Parent

Date

www.impacttest.com



SPORT CONCUSSION ASSESSMENT TOOL – 5TH EDITION
DEVELOPED BY THE CONCUSSION IN SPORT GROUP
FOR USE BY MEDICAL PROFESSIONALS ONLY

supported by





Patient details
Name: _____
DOB: _____
Address: _____
ID number: _____
Examiner: _____
Date of Injury: _____ Time: _____

WHAT IS THE SCAT5?

The SCAT5 is a standardized tool for evaluating concussions designed for use by physicians and licensed healthcare professionals. The SCAT5 cannot be performed correctly in less than 10 minutes.

If you are not a physician or licensed healthcare professional, please use the Concussion Recognition Tool 5 (CRT5). The SCAT5 is to be used for evaluating athletes aged 13 years and older. For children aged 12 years or younger, please use the Child SCAT5.

Preseason SCAT5 baseline testing can be useful for interpreting post-injury test scores, but is not required for that purpose. Detailed instructions for use of the SCAT5 are provided on page 7. Please read through these instructions carefully before testing the athlete. Brief verbal instructions for each test are given in *italics*. The only equipment required for the test is a watch or timer.

This tool may be freely copied in its current form for distribution to individuals, teams, groups and organizations. It should not be altered in any way, re-branded or sold for commercial gain. Any revision, translation or reproduction in a digital form requires specific approval by the Concussion in Sport Group.

Recognise and Remove

A head impact by either a direct blow or indirect transmission of force can be associated with a serious and potentially fatal brain injury. If there are significant concerns, including any of the red flags listed in Box 1, then activation of emergency procedures and urgent transport to the nearest hospital should be arranged.

Key points

- Any athlete with suspected concussion should be REMOVED FROM PLAY, medically assessed and monitored for deterioration. No athlete diagnosed with concussion should be returned to play on the day of injury.
- If an athlete is suspected of having a concussion and medical personnel are not immediately available, the athlete should be referred to a medical facility for urgent assessment.
- Athletes with suspected concussion should not drink alcohol, use recreational drugs and should not drive a motor vehicle until cleared to do so by a medical professional.
- Concussion signs and symptoms evolve over time and it is important to consider repeat evaluation in the assessment of concussion.
- The diagnosis of a concussion is a clinical judgment, made by a medical professional. The SCAT5 should NOT be used by itself to make, or exclude, the diagnosis of concussion. An athlete may have a concussion even if their SCAT5 is "normal".

Remember:

- The basic principles of first aid (danger, response, airway, breathing, circulation) should be followed.
- Do not attempt to move the athlete (other than that required for airway management) unless trained to do so.
- Assessment for a spinal cord injury is a critical part of the initial on-field assessment.
- Do not remove a helmet or any other equipment unless trained to do so safely.

IMMEDIATE OR ON-FIELD ASSESSMENT

The following elements should be assessed for all athletes who are suspected of having a concussion prior to proceeding to the neurocognitive assessment and ideally should be done on-field after the first first aid / emergency care priorities are completed.

If any of the "Red Flags" or observable signs are noted after a direct or indirect blow to the head, the athlete should be immediately and safely removed from participation and evaluated by a physician or licensed healthcare professional.

Consideration of transportation to a medical facility should be at the discretion of the physician or licensed healthcare professional.

The GCS is important as a standard measure for all patients and can be done easily if necessary in the event of deterioration in conscious state. The Maddocks questions and cervical spine exam are critical steps of the immediate assessment; however, these do not need to be done initially.

STEP 1: RED FLAGS

RED FLAGS:

- Neck pain or tenderness
- Double vision
- Weakness or tingling/ burning in arms or legs
- Severe or increasing headache
- Seizure or convulsion
- Loss of consciousness
- Deteriorating conscious state
- Vomiting
- Incontinently redness, agitation or combative

STEP 2: OBSERVABLE SIGNS

Witnessed ☐ Observed on Video ☐

Lying motionless on the playing surface	Y	N
Balance / gait difficulties / motor coordination abnormal, slow / abnormal movements	Y	N
Disorientation or confusion, or an inability to respond appropriately to questions	Y	N
Abnormal head/neck	Y	N
Facial injury after head trauma	Y	N

STEP 3: MEMORY ASSESSMENT MADDOCKS' QUESTIONS¹

¹Temporarily set aside the questions above when initially and give your best effort. If not, tell me what happened.

What if the current season / the season?	Y	N
What month are we in today?	Y	N
Who scored best in this match?	Y	N
What team did you play last week / game?	Y	N
Did your team win the last game?	Y	N

Note: Appropriate sport specific questions may be substituted.

Name: _____
DOB: _____
Address: _____
ID number: _____
Examiner: _____
Date: _____

STEP 4: EXAMINATION GLASGOW COMA SCALE (GCS)²

Time of assessment: _____

Date of assessment: _____

Best eye response (E)			
No eye opening	1	1	1
Eye opening in response to pain	2	2	2
Eye opening to speech	3	3	3
Eye opening spontaneously	4	4	4
Best verbal response (V)			
No verbal response	1	1	1
Incomprehensible sounds	2	2	2
Inappropriate words	3	3	3
Confused	4	4	4
Oriented	5	5	5
Best motor response (M)			
No motor response	1	1	1
Extension to pain	2	2	2
Abnormal flexion to pain	3	3	3
Flexion / withdrawal to pain	4	4	4
Localizes to pain	5	5	5
Obeys commands	6	6	6
Glasgow Coma score (E+V+M)			

CERVICAL SPINE ASSESSMENT

Does the athlete report that their neck is painful at rest?	Y	N
If flexion ROM is painful at rest, does the athlete have a full range of active pain free movement?	Y	N
Is the limb strength and sensation normal?	Y	N

In a patient who is not lucid or fully conscious, a cervical spine injury should be assumed until proven otherwise.

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OFFICE OR OFF-FIELD ASSESSMENT

Please note that the neurocognitive assessment should be done in a distraction-free environment with the athlete in a resting state.

STEP 1: ATHLETE BACKGROUND

Sport / team / school: _____

Date / time of injury: _____

Years of education completed: _____

Age: _____

Gender: M / F / Other

Dominant hand: left / neither / right

How many diagnosed concussions has the athlete had in the past? _____

When was the most recent concussion? _____

How long was the recovery (time to being cleared to play)? _____

from the most recent concussion? _____ (days)

Has the athlete ever been:

Hospitalized for a head injury?

Yes	No
-----	----

Diagnosed / treated for headache disorder or migraine?

Yes	No
-----	----

Diagnosed with a learning disability / dyslexia?

Yes	No
-----	----

Diagnosed with ADD / ADHD?

Yes	No
-----	----

Diagnosed with depression, anxiety or other psychiatric disorder?

Yes	No
-----	----

Current medication? If yes, please list:

Name: _____
DOB: _____
Address: _____
ID number: _____
Examiner: _____
Date: _____

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STEP 2: SYMPTOM EVALUATION

The athlete should be given the symptom form and asked to read the instructions **carefully and slowly**. Then, complete the symptom scale. For the baseline assessment, the athlete should rate the symptoms based on how they are currently. Then, for the post-injury assessment the athlete should rate their symptoms at this point in time.

Please Check: ☐ Baseline ☐ Post-injury

Please hand the form to the athlete

	none	mild	moderate	severe
Headache	0	1	2	3
"Pressure in head"	0	1	2	3
Neck Pain	0	1	2	3
Nausea or vomiting	0	1	2	3
Dizziness	0	1	2	3
Blurred vision	0	1	2	3
Balance problems	0	1	2	3
Sensitivity to light	0	1	2	3
Sensitivity to noise	0	1	2	3
Feeling slowed down	0	1	2	3
Feeling like "in a fog"	0	1	2	3
"Don't feel right"	0	1	2	3
Difficulty concentrating	0	1	2	3
Difficulty remembering	0	1	2	3
Fatigue or low energy	0	1	2	3
Confusion	0	1	2	3
Disorientation	0	1	2	3
Mood emotional	0	1	2	3
Irritability	0	1	2	3
Sleepiness	0	1	2	3
Nervous or Anxious	0	1	2	3
Trouble falling asleep (if applicable)	0	1	2	3
Total number of symptoms	0-12			
Symptom severity score	0-100			
Do your symptoms get worse with physical activity?	Y N			
Do your symptoms get worse with mental activity?	Y N			
100% or feeling perfectly normal, what percent of normal do you feel?				

If not 100%, why?

Please hand form back to examiner

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STEP 3: COGNITIVE SCREENING

Standardized Assessment of Concussion (SAC)

ORIENTATION

What month is it?

0 1

What is the date today?

0 1

What is the day of the week?

0 1

What year is it?

0 1

What time is it right now? (within 1 hour)

0 1

Orientation score

0/5

IMMEDIATE MEMORY

The Immediate Memory component can be completed using the traditional 5-word per trial set or optionally using 10-words per trial to minimize any ceiling effect. All 2 trials must be administered irrespective of the number correct on the first trial. Administer at the rate of one word per second.

Please choose 5/10MB (the 5 or 10 word list groups and circle the specific word list chosen for this test).

I am going to test your memory. I will read you a list of words and when I am done, repeat back the first words as you can remember. In separate, for Tables 3.2.1 and 3.2.2, I am going to repeat the words for again. Repeat back as many words as you can remember in any order, even if you miss the word before.

List

Alternate 5 word lists

Score (0/5)

Word 1

Word 2

Word 3

A

Pigeon

Peony

Elephant

Lemon

Island

B

Candle

Paper

Sugar

Sandwich

Wagon

C

Ruby

Monkey

Peacock

Squirrel

Isle

D

Elephant

Apple

Cajun

Saddle

Island

E

Jacket

Arrow

Paper

Cotton

Wagon

F

Dollar

Honey

Mirror

Saddle

Anchor

Immediate Memory Score

0/5

Time that test (trial) was completed

List

Alternate 10 word lists

Score (0/10)

Word 1

Word 2

Word 3

G

Pigeon

Peony

Elephant

Lemon

Island

H

Candle

Paper

Sugar

Sandwich

Wagon

I

Ruby

Monkey

Peacock

Squirrel

Isle

J

Elephant

Apple

Cajun

Saddle

Island

K

Jacket

Arrow

Paper

Cotton

Wagon

L

Dollar

Honey

Mirror

Saddle

Anchor

Immediate Memory Score

0/10

Time that test (trial) was completed

Name

DOB

Address

ID number

Examiner

Date

CONCENTRATION

DIGITS BACKWARDS

Please circle the Digit list chosen (A, B, C, D, E, F). Administer at the rate of one digit per second reading DOWN the selected column.

I am going to read a string of numbers and when I am done, you repeat them back to me in reverse order of how I read them to you. For example, if I say 7-4-9, you would say 9-4-7.

Concentration Number Lists (circle one)

List A

List B

List C

6-9-3

3-0-6

1-4-2

Y

N

0

9-2-8

4-1-0

6-8-8

Y

N

1

3-8-1-4

1-0-8-0

8-8-3-1

Y

N

0

3-2-7-9

8-9-8-8

3-4-8-1

Y

N

1

6-2-9-0-1

4-8-0-0-7

4-8-1-0-8

Y

N

0

1-0-3-8-6

5-1-8-4-3

8-8-0-0-1

Y

N

1

7-1-8-4-6-2

8-0-1-8-6-4

9-0-8-0-1-0

Y

N

0

5-5-9-1-4-8

7-0-4-8-5-6

9-0-8-5-1-4

Y

N

1

List D

List E

List F

7-8-2

3-8-2

2-0-1

Y

N

0

9-2-6

3-1-8

4-7-8

Y

N

1

4-1-8-3

2-0-8-0

1-8-8-3

Y

N

0

9-2-3-3

2-0-8-0

3-0-0-4

Y

N

1

1-0-8-2-6

4-1-8-4-4

2-4-7-3-8

Y

N

0

4-1-7-0-3

9-4-1-7-3

8-9-8-4-4

Y

N

1

2-8-4-8-1-7

9-9-7-8-0-2

9-8-8-0-4-8

Y

N

0

8-4-1-8-3-5

4-2-7-8-8-8

3-1-7-8-0-6

Y

N

1

Digits Score

0/4

MONTHS IN REVERSE ORDER

Please list the months of the year in reverse order. Start with the last month and go backward. Do not list September, November, or April.

Dec

Nov

Oct

Sept

Aug

Jul

Jun

May

Apr

Mar

Feb

Jan

0 1

Months Score

0/1

Concentration Total Score (Digits + Months)

0/5

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STEP 4: NEUROLOGICAL SCREEN

See the instruction sheet (page 7) for details of test administration and scoring of the tests.

Can the patient read aloud (e.g. alphabet, words list) and follow tasks without difficulty?	Y	N
Does the patient have a full range of joint flexion/extension movement?	Y	N
Without moving their head or neck, can the patient look either to the left or right without double vision?	Y	N
Can the patient perform the finger nose coordination test correctly?	Y	N
Can the patient perform tandem gait correctly?	Y	N

BALANCE EXAMINATION

Modified Balance Error Scoring System (mBESS) testing¹

Which foot was tested (i.e. which is the non-dominant foot)?

☐ Left
 ☐ Right

Heeling surface (hard floor, mat, etc.)

Footwear (sneakers, barefoot, trainers, boots, etc.)

Condition

Score

Double leg stance

☐ 10
 ☐ 5
 ☐ 0

Single leg stance (non-dominant foot)

☐ 10
 ☐ 5
 ☐ 0

Tandem stance (non-dominant foot at the back)

☐ 10
 ☐ 5
 ☐ 0

Total Score

☐ 30
 ☐ 25
 ☐ 20
 ☐ 15
 ☐ 10
 ☐ 5
 ☐ 0

Name

DOB

Address

ID number

Examiner

Date

5

STEP 5: DELAYED RECALL:

The delayed recall should be performed after 5 minutes have elapsed since the end of the Immediate Recall section. Score 1 pt. for each correct response.

Do you remember that list of words I read a few times earlier? Tell me as many words from the list as you can remember in any order.

Time Taken

Please record each word accurately recalled. Total score equals number of words recalled.

Total number of words recalled accurately

☐ 5
 ☐ 4
 ☐ 3
 ☐ 2
 ☐ 1
 ☐ 0

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STEP 6: DECISION

Date & time of assessment

Details

Signature

Number (of 22)

Signature assembly score (of 122)

Orientation (of 10)

Immediate memory

☐ 15
 ☐ 10
 ☐ 5
 ☐ 0

Concentration (of 1)

☐ 1
 ☐ 0

Neuro exam

☐ Normal
 ☐ Abnormal
 ☐ Not Assessed

Reflex score (of 30)

☐ 15
 ☐ 10
 ☐ 5
 ☐ 0

Delayed Recall

☐ 5
 ☐ 4
 ☐ 3
 ☐ 2
 ☐ 1
 ☐ 0

Date and time of injury

If the athlete is known to you prior to their injury, are they different from their usual self?

☐ Yes
 ☐ No
 ☐ Unsure
 ☐ Not Applicable

If different, describe why in the clinical notes section.

Concussion diagnosed?

☐ Yes
 ☐ No
 ☐ Unsure
 ☐ Not Applicable

If we testing, has the athlete responded?

☐ Yes
 ☐ No
 ☐ Unsure
 ☐ Not Applicable

I am a physician or licensed healthcare professional and I have personally administered or supervised the administration of this SCAT5.

Signature

Name

Title

Registration number (if applicable)

Date

SCAT5 Concussion to Return Form 10213

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[illegible]

Name: _____
DOB: _____
Address: _____
ID number: _____
Examiner: _____
Date: _____

CONCUSSION INJURY ADVICE

(To be given to the person monitoring the concussed athlete)

This patient has received an injury to the head. A careful medical examination has been carried out and no sign of any serious complications has been found. Recovery time is variable across individuals and the patient will need monitoring for a further period by a responsible adult. Your treating physician will provide guidance as to this timeframe.

If you notice any change in behaviour, vomiting, worsening headache, double vision or excessive drowsiness, please telephone your doctor or the nearest hospital emergency department immediately.

Other important points:

Initial rest: Limit physical activity to routine daily activities (avoid exercise, training, sports) and limit activities such as school, work, and screen time to a level that does not worsen symptoms.

- 1) Avoid alcohol
- 2) Avoid prescription or non-prescription drugs without medical supervision. Specifically:
 - a) Avoid sleeping tablets
 - b) Do not use aspirin, anti-inflammatory medication or stronger pain medications such as narcotics
- 3) Do not drive until cleared by a healthcare professional.
- 4) Return to play/sport requires clearance by a healthcare professional.

Clinic phone number: _____

Patient's name: _____

Date / time of injury: _____

Date / time of medical review: _____

Healthcare Provider: _____

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Contact details or stamp

INSTRUCTIONS

Words in *italics* throughout the SCATS are the instructions given to the athlete by the clinician

Symptom Scale

The time frame for symptoms should be based on the type of test being administered. At baseline it is advantageous to assess how an athlete "typically" feels whereas during the acute/post-acute stages it is best to ask how the athlete feels at the time of testing.

The symptom scale should be completed by the athlete, not by the examiner. In situations where the symptom scale is being completed after exercise, it should be done in a resting state, generally by approximating the athlete's resting heart rate.

For total number of symptoms, maximum possible is 22 except immediately post injury. If sleep then is omitted, which then creates a maximum of 21.

For Symptom severity score, add all scores in table, maximum possible is $22 \times 6 = 132$, except immediately post injury if sleep then is omitted, which then creates a maximum of 216/126.

Immediate Memory

The Immediate Memory component can be completed using the traditional 5-word per trial test or, optionally, using 13 words per trial. The literature suggests that the Immediate Memory Test is reliable using either when a 5-word list is used. In settings where this ceiling is prominent, the examiner may wish to make the task more difficult by incorporating two 5-word groups for a total of 10 words per trial. In this case, the maximum score per trial is 10 with a total time maximum of 30.

Choose one of the word lists (either 5 or 10). Then perform 3 trials of Immediate memory using this list.

Complete **all 3 trials** regardless of score on previous trials.

"I am going to test your memory. I will read you a list of words and when I am done, repeat back as many words as you can remember, in any order." "The words must be read at a rate of one word per second.

Trials 2 & 3 MUST be completed regardless of score on trial 1 & 2.

Trials 2 & 3:

"I am going to repeat the same list again. Repeat back as many words as you can remember in any order, even if you said the word before."

Score 1 pt. for each correct response. Total score equals sum across all 3 trials. Do NOT inform the athlete their delayed recall will be tested.

Concentration

Digits backward

Choose one column of digits from letters A, B, C, D, E, or F and administer those digits as follows:

Say "I am going to read a string of numbers and when I am done, you repeat them back to me in reverse order of how I read them to you. For example, if I say 7-4-6, you would say 6-4-7."

Begin with first 3 digit string.

If correct, slide "7" for correct and go to next string length. If incorrect, slide "4" for the first string length and read trial 2 in the same string length. One point possible for each string length. Stop after incorrect on both trials (2 trials) in a string length. The digits should be read at the rate of one per second.

Months in reverse order

"Now tell me the months of the year in reverse order. Start with the last month and go backward. Do you? (see December, November... Go ahead)"

1 pt. for entire sequence correct

Delayed Recall

The delayed recall should be performed after 5 minutes have elapsed since the end of the Immediate Recall section.

"Do you remember that list of words I read a few times earlier? Tell me as many words from that list as you can remember in any order."

Score 1 pt. for each correct response

Modified Balance Error Scoring System (mBESS)* testing

This balance testing is based on a modified version of the Balance Error Scoring System (BESS).¹ A timing device is required for this testing.

Each of 20-second trials/incre is scored by counting the number of errors. The examiner will begin counting on one only after the athlete has assumed the proper start position. The modified BESS is calculated by adding one error point for each error during the three 20-second tests. The maximum number of errors for any single condition is 10. If the athlete commits multiple errors simultaneously, only

one error is recorded but the athlete should quickly return to the testing position, and counting should resume once the athlete is set. Athletes that are unable to maintain the testing procedure for a minimum of five seconds at the start are assigned the highest possible score, ten, for that testing condition.

OPTION: For further assessment, the same 3 stances can be performed on a surface of medium density foam (e.g., approximately 50cm x 40cm x 5cm).

Balance testing – types of errors

- | | | |
|---------------------------|---|--|
| 1. Hands lifted off floor | 2. Step, stumble, or fall | 5. Lifting forefoot or heel |
| 3. Closing eyes | 4. Missing hip into > 30 degree abduction | 6. Remaining out of start position > 5 sec |

*I am now going to test your balance. Please take your shoes off (if applicable) roll up your pants/shorts while (if applicable), and remove any ankle bracing (if applicable). This test will consist of three twenty-second tests with different stances."

(a) Double leg stance:

"The first stance is standing with your feet together with your hands on your hips and with your eyes closed. You should try to maintain stability in that position for 30 seconds. I will be counting the number of times you move out of this position. I will start timing when you are set and have closed your eyes."

(b) Single leg stance:

"If you were to kick a ball, which foot would you use? (This will be the dominant foot) Now stand on your non-dominant foot. The dominant leg should be held in approximately 30 degrees of hip flexion and 45 degrees of knee flexion. Again, you should try to maintain stability for 30 seconds with your hands on your hips and your eyes closed. I will be counting the number of times you move out of this position. If you stumble out of this position, open your eyes and return to the start position and continue balancing. I will start timing when you are set and have closed your eyes."

(c) Tandem stance:

"Now stand heel-to-toe with your non-dominant foot in back. Your weight should be evenly distributed across both feet. Again, you should try to maintain stability for 30 seconds with your hands on your hips and your eyes closed. I will be counting the number of times you move out of this position. If you stumble out of this position, open your eyes and return to the start position and continue balancing. I will start timing when you are set and have closed your eyes."

Tandem Gait

Participants are instructed to stand with their feet together behind a starting line (the test is best done with footcues removed). Then, they walk in a forward direction as quickly and as accurately as possible along a 10-meter wide sports field, 2 meter line with an alternate foot heel-to-toe gait ensuring that they approximate that heel and toe on each step. Once they cross the end of the test line, they turn 180 degrees and return to the starting point using the same gait. Athletes fail the test if they step off the line, have a separation between their heel and toe, or if they touch or graze the machine or subject.

Finger to Nose

"I am going to test your coordination now. Please sit comfortably on the chair with your eyes open and your arm (either right or left) outstretched (shoulder flexed to 90 degrees and elbow and forearm extended), pointing to front of you. When I give a start signal, I would like you to perform five successive finger to nose repetitions using your index finger to touch the tip of the nose, and then return to the starting position, as quickly and as accurately as possible."

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CONCUSSION INFORMATION

Any athlete suspected of having a concussion should be removed from play and seek medical evaluation.

Signs to watch for

Problems could arise over the first 24-48 hours. The athlete should not be left alone and must go to a hospital at once if they experience:

- Worsening headache
- Repeated vomiting
- Weakness or numbness in arms or legs
- Drowsiness or inability to be awakened
- Unusual behaviour or confusion or irritability
- Uneasiness on their feet
- Seizure (arms and legs jerk uncontrollably)
- Slurred speech
- Inability to recognize people or places

Consult your physician or licensed healthcare professional after a suspected concussion. Remember, it is better to be safe.

Rest & Rehabilitation

After a concussion, the athlete should have physical rest and relative cognitive rest for a few days to allow their symptoms to improve. In most cases, after no more than a few days of rest, the athlete should gradually increase their daily activity level as long as their symptoms do not worsen. Once the athlete is able to complete their usual daily activities without concussion-related symptoms, the second step of the return to play/report progression can be started. The athlete should not return to play/report until their concussion-related symptoms have resolved and the athlete has successfully returned to full school/learning activities.

When returning to play/report, the athlete should follow a stepwise, medically managed exercise progression, with increasing amounts of exercises. For example:

Graduated Return to Sport Strategy

Exercise step	Functional exercise at each step	Goal of each step
1. Symptom-limited activity	Daily activities that do not provoke symptoms.	Gradual reintroduction of work/school activities.
2. Light aerobic exercise	Walking or stationary cycling at slow to medium pace, no resistance training.	Increase heart rate.
3. Sport-specific exercise	Running or skating drills, no head impact activities.	Add movement.
4. Non-contact training drills	Harder training drills, e.g., passing drills. May start progressive resistance training.	Exercise, coordination, and increased thinking.
5. Full contact practice	Following medical clearance, participate in normal training activities.	Restore confidence and assess functional skills by coaching staff.
6. Return to play/report	Normal game play.	

In this example, it would be typical to have 24 hours (or longer) for each step of the progression. If any symptoms worsen while exercising, the athlete should go back to the previous step. Resistance training should be added only in the later stages (Stage 3 or 4 at the earliest).

Written clearance should be provided by a healthcare professional before return to play/report as directed by local laws and regulations.

Graduated Return to School Strategy

Concussion may affect the ability to learn at school. The athlete may need to miss a few days of school after a concussion. When going back to school, some athletes may need to go back gradually and may need to have some changes made to their schedule so that concussion symptoms do not get worse. If a particular activity makes symptoms worse, then the athlete should stop that activity and not until symptoms get better. To make sure that the athlete can get back to school without problems, it is important that the healthcare provider, parents, caregivers and teachers talk to each other so that everyone knows what the plan is for the athlete to go back to school.

Note: If mental activity does not cause any symptoms, the athlete may be able to skip step 2 and return to school part-time before doing school activities at home first.

Mental Activity	Activity at each step	Goal of each step
1. Daily activities that do not give the athlete symptoms	Typical activities that the athlete does during the day as long as they do not increase symptoms (e.g., reading, watching news, travel). Start with 5-15 minutes at a time and gradually build up.	Gradual return to typical activities.
2. School activities	Homework, reading or other cognitive activities outside of the classroom.	Increase tolerance to cognitive work.
3. Return to school part-time	Gradual introduction of school-work. May need to start with a partial school day or with increased breaks during the day.	Increase academic activities.
4. Return to school full-time	Gradually progress school activities until a full day can be tolerated.	Return to full academic activities and catch up on missed work.

If the athlete continues to have symptoms with mental activity, some other accommodations that can help with return to school may include:

- Starting school later, only going for half days, or going only to certain classes
- Taking lots of breaks during class, homework, tests
- No more than one exam/day
- More time to finish assignments/tests
- Shorter assignments
- Quiet room to finish assignments/tests
- Repetition/memory cues
- Use of a student helper/tutor
- Not going to noisy areas like the cafeteria, assembly hall, sporting events, music class, shop class, etc.
- Reassurance from teachers that the child will be supported while getting better

The athlete should not go back to sports until they are back to school/learning, without symptoms getting significantly worse and no longer needing any changes to their schedule.



Post Concussion Care Instructions

On _____, your son /daughter _____ sustained/reported a head injury while participating the sport of _____. Assessment by the Certified Athletic Trainer indicates that your student-athlete has suffered a concussion (also known as a traumatic brain injury). These instructions are designed to help speed your recovery. Your careful attention to them can also prevent further injury.

Sometimes the signs and symptoms from a concussion do not become apparent until hours after the initial trauma. The following list includes some but not all possible signs and symptoms of a concussion:

- | | | |
|----------------------------|------------------------|-------------------------------|
| - Headache | - Nausea | - Balance problems/ dizziness |
| - Fatigue | - Drowsiness | - Trouble sleeping |
| - Blurred vision | - Vomiting | - Sleeping more than usual |
| - Sensitivity to light | - Sensitivity to noise | - Sadness |
| - Irritability | - Numbness/ tingling | - Feeling like in a "fog" |
| - Difficulty concentrating | | - Difficulty remembering |

If any of the following symptoms noted below occur, please seek medical attention immediately. Any questions about the injury please do not hesitate to call me, _____, Certified Athletic Trainer at _____ or go to your local emergency room.

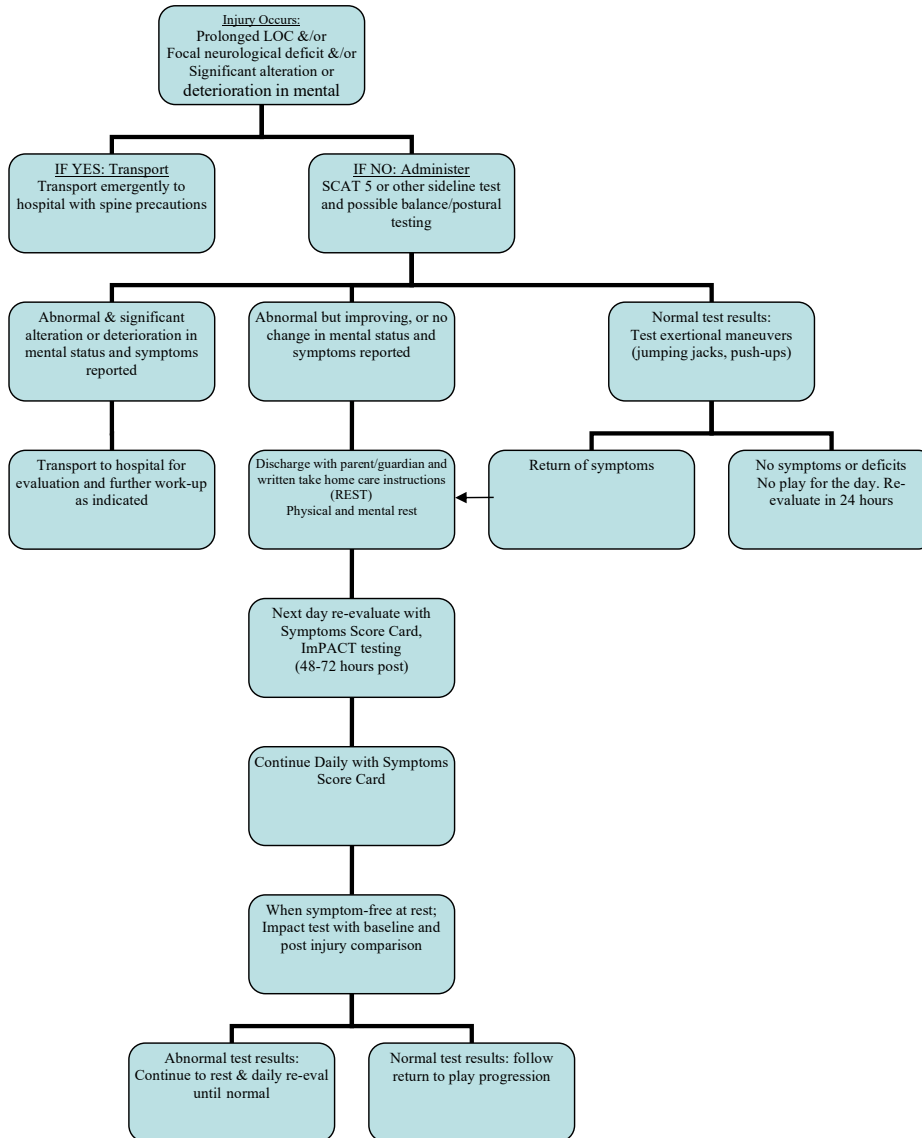
- Any of the above signs and symptoms significantly increases in intensity.
- Severe headache that is not alleviated by Tylenol or cool packs applied to the head
- Repetitive or persistent vomiting
- Difficulty seeing, any peculiar eye movements, or one pupil larger than the other
- Restlessness, irritability, or drastic changes in emotional control
- Convulsions/ seizures
- Difficulty walking or using arms
- Dizziness/ unsteady gait or confusion that gets progressively worse
- Difficulty being awakened
- Difficulty speaking or slurring of speech
- Bleeding or drainage of fluid from the nose or ears
- Any new or severe symptoms

Instructions:

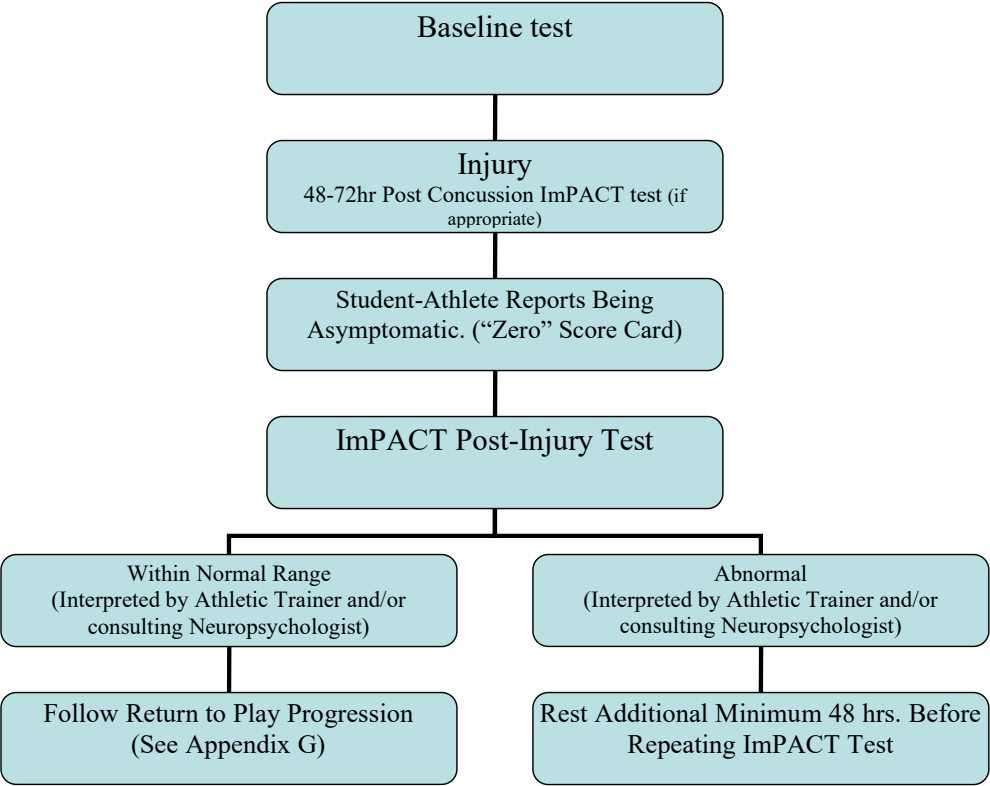
- **REST is the key** - get lots of rest. Physical rest and "brain" rest. Be sure the student athlete gets enough sleep at night & take naps if possible.
- Limit physical activity as well as activities that require a lot of thinking or concentration (homework, video games, texting). These activities can make symptoms worse.
- The student athlete should not physically exert him/herself (e.g., sports, lifting, running, biking) until cleared to do so by a medical professional. Simply walking at a normal pace is okay, if symptoms do not increase.
- The student athlete should drink lots of fluids and eat healthy foods.
- If you approve the student athlete may take Tylenol (acetaminophen) as needed for headache. Nothing stronger unless authorized by a medical provider.
- **Please report to the athletic trainer the next school day.**

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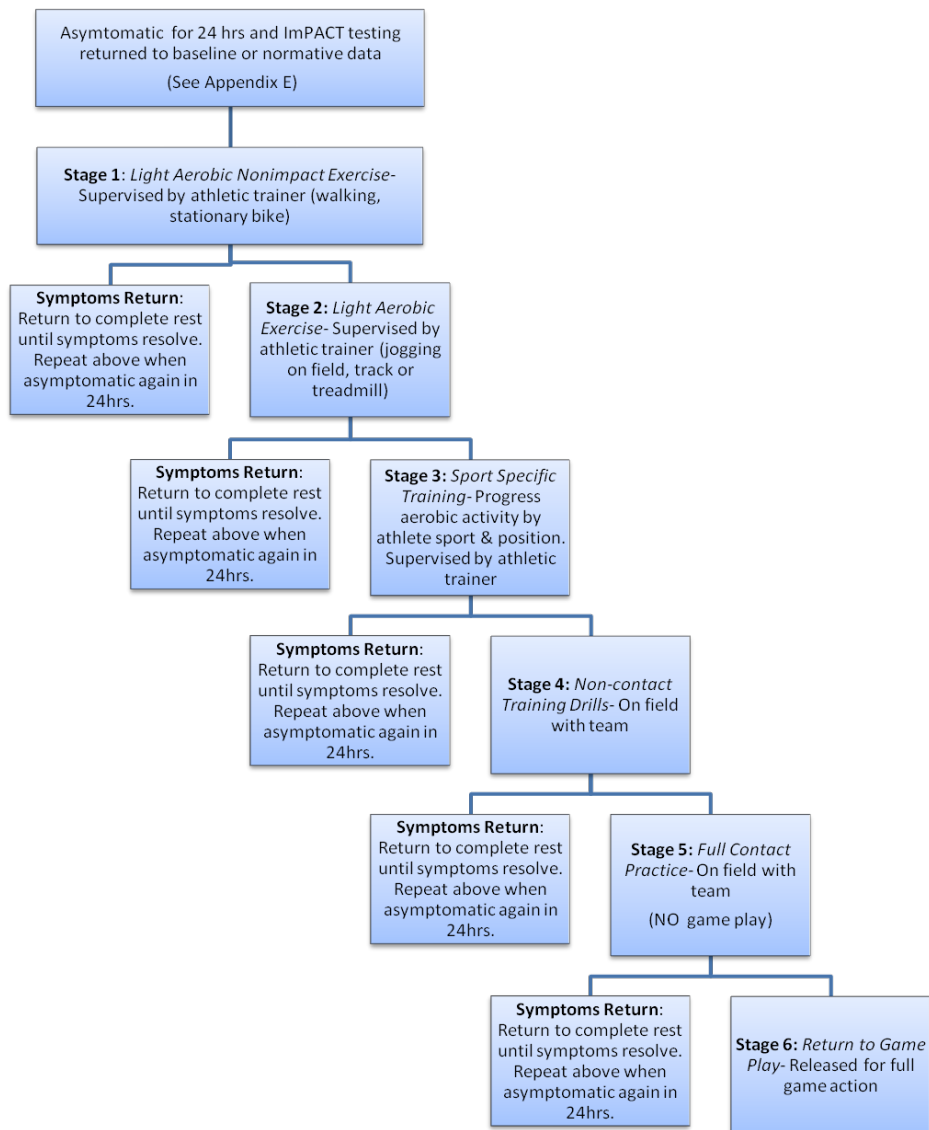
Appendix E



ImPACT Testing Flow Chart



Return to Play Flow Chart





Symptoms Card

NAME: _____

DATE: _____

Date of Injury: _____

Symptom	None	Mild		Moderate		Severe	
HEADACHE	0	1	2	3	4	5	6
NAUSEA	0	1	2	3	4	5	6
VOMITING	0	1	2	3	4	5	6
BALANCE PROBLEM	0	1	2	3	4	5	6
DIZZINESS	0	1	2	3	4	5	6
FATIGUE	0	1	2	3	4	5	6
TROUBLE FALLING to SLEEPING	0	1	2	3	4	5	6
SLEEPING MORE THAN USUAL	0	1	2	3	4	5	6
LOSS OF SLEEP	0	1	2	3	4	5	6
DROWSINESS	0	1	2	3	4	5	6
SENSITIVITY TO LIGHT	0	1	2	3	4	5	6
SENSITIVITY TO NOISE	0	1	2	3	4	5	6
IRRITABILITY	0	1	2	3	4	5	6
SADNESS	0	1	2	3	4	5	6
NERVOUSNESS	0	1	2	3	4	5	6
MORE EMOTIONAL	0	1	2	3	4	5	6
NUMBNESS	0	1	2	3	4	5	6
FEELING “SLOW”	0	1	2	3	4	5	6
FEELING LIKE “IN A FOG”	0	1	2	3	4	5	6
DIFFICULTY CONCENTRATING	0	1	2	3	4	5	6
DIFFICULTY REMEMBERING	0	1	2	3	4	5	6
VISUAL PROBLEMS	0	1	2	3	4	5	6

Column Total Score (add #s)

Total # of Items Endorsed: _____ Overall Total Score: _____

Assuming you were at 100% before your concussion, give a percentage rate to your current overall condition: _____% Rev. 7/19



NH

SPORTS RELATED CONCUSSION MEDICAL CLEARANCE AND PARENTAL PERMISSION TO BEGIN "RETURN TO PLAY" PROTOCOL FORM

Student/athlete name: _____

Date of Birth: _____ Grade: _____ Gender: ☐ male, or ☐ female

Name of health care provider: _____

Address of health care provider: _____

Phone number of health care provider: _____

I HEREBY AUTHORIZE THE ABOVE NAMED STUDENT-ATHLETE FOR "RETURN TO PLAY" PROTOCOL TO BEGIN.

Health Care Provider's Signature: _____

Date: _____

I attest that I am licensed, certified, or otherwise statutorily authorized by the state to provide medical treatment and am trained in the evaluation and management of concussions.

If the health care provider does not complete this form, attach a copy of the written clearance for return to play, which is signed and dated by the health care provider.

Parent/ Guardian Name: _____

Phone: _____

Due to the passage of SB 402, the student athlete must present written permission from a parent or guardian before returning to sport activity. Once written permission is received, the student athlete will begin the "Return to Play" protocol. The "Return to Play" protocol is a minimum of 5 days before full game play can begin for the safety of the student athlete and is outlined below.

NHIAA Medical Clearance RTP Protocol

1. No exertional activity until asymptomatic.
 2. When the athlete appears clear, begin low impact activity such as walking, stationary bike, etc.
 3. Initiate aerobic activity fundamental to specific sport such as skating or running, and may also begin progressive strength training activities.
 4. Begin non-contact skill drills specific to sport such as dribbling, fielding, batting, etc.
 5. Full contact in practice setting.
 6. If athlete remains asymptomatic, he or she may return to game/play.
- A. ATHLETE MUST REMAIN ASYMPTOMATIC TO PROGRESS TO THE NEXT LEVEL.**
B. IF SYMPTOMS RECUR, ATHLETE MUST RETURN TO PREVIOUS LEVEL.
C. MEDICAL CHECK SHOULD OCCUR BEFORE CONTACT.

All steps must be approved, guided and progressed by the athletic trainer. If the student athlete has symptoms return he/she will return to the previously step where he/she was asymptomatic after again being symptom-free for 24 hours. For the safety of the student athlete, steps may not be skipped or changed. The athletic trainer reserves the right to make the final determination of return to play.

I HEREBY AUTHORIZE THE ABOVE NAMED STUDENT-ATHLETE FOR "RETURN TO PLAY" PROTOCOL TO BEGIN.

Parent/ Guardian Signature: _____

Date: _____

The Commonwealth of Massachusetts
Executive Office of Health and Human Services
Department of Public Health

**POST SPORTS-RELATED HEAD INJURY
MEDICAL CLEARANCE AND
AUTHORIZATION FORM**

The student must be completely symptom free at rest, during exertion, and with cognitive activity prior to returning to full participation in extracurricular athletic activities. Do not complete this form until a graduated return to play plan has been completed and the student is found to be symptom free at rest, during exertion and with cognitive activity.

Student's Name	Sex	Date of Birth	Grade
----------------	-----	---------------	-------

Date of injury: _____ Nature and extent of injury: _____

Symptoms following injury (check all that apply):

- | | | |
|--|---|--|
| ☐ Nausea or vomiting | ☐ Headaches | ☐ Light/noise sensitivity |
| ☐ Dizziness/balance problems | ☐ Double/blurry vision | ☐ Fatigue |
| ☐ Feeling sluggish/"in a fog" | ☐ Change in sleep patterns | ☐ Memory problems |
| ☐ Difficulty concentrating | ☐ Irritability/emotional ups and downs | ☐ Sad or withdrawn |
| ☐ Other | | |

Duration of Symptom(s): _____ Diagnosis: ☐ Concussion ☐ Other: _____

If concussion diagnosed, date student completed graduated return to play plan without recurrent symptoms: _____

Prior concussions (number, approximate dates): _____

I HEREBY AUTHORIZE THE ABOVE NAMED STUDENT FOR RETURN TO EXTRACURRICULAR ATHLETIC ACTIVITY

Practitioner signature: _____ Date: _____

Print Name: _____

☐ Physician ☐ Licensed Athletic Trainer ☐ Nurse Practitioner ☐ Neuropsychologist ☐ Physician Assistant

License Number: _____

Address: _____ Phone number: _____

Name of Physician providing consultation/coordination/supervision (if not person completing this form; please print): _____

I ATTEST THAT I HAVE RECEIVED CLINICAL TRAINING IN POST-TRAUMATIC HEAD INJURY ASSESSMENT AND MANAGEMENT APPROVED BY THE DEPARTMENT OF PUBLIC HEALTH* OR HAVE RECEIVED EQUIVALENT TRAINING AS PART OF MY LICENSURE OR CONTINUING EDUCATION.

Practitioner's initials: _____

Type of Training: ☐ CDC on-line clinician training ☐ Other MDPH approved Clinical Training ☐ Other

(Describe) _____

* MDPH approved Clinical Training options can be found at: www.mass.gov/dph/sports/concussion

This form is not complete without the practitioner's verification of such training.