Horseheads Central School District
Athletic Department

CONCUSSION MANAGEMENT

In recent years, the global medical community has come to recognize that any head injury has the potential for long-term residual effects. Individuals who sustain injuries to the head vary widely in their response to this bodily insult; symptoms and recovery time do not necessarily correlate with the apparent severity of the mechanism of injury. Many of the markers used in the past to predict the course of recovery have been found to be invalid, and it is now recognized that the treatment plan for each individual must be tailored to that person's symptoms as recovery progresses.

Concussion is largely a FUNCTIONAL, not a STRUCTURAL, injury. The injured brain is unable to regulate cerebral blood flow, and there are changes in glucose metabolism by the brain. The resulting cerebral "energy crisis" causes concussion symptoms. In addition, the juvenile brain may be more vulnerable to harm and slower to heal, and may be in greater jeopardy of subsequent damage. The risk of Second Impact Syndrome (sustaining a blow to the head before full recovery from a concussion) and Post Concussion Syndrome (permanent neurological deficits caused by one or more concussions) is greater in youngsters than in adults.

Factors previously thought to be indicative of severity of concussion, and of predicted course of recovery, are no longer valid. Diagnostic imaging is generally not helpful in identifying concussion in children and youth. X-rays, MRIs and CT scans are useful in identification of conditions such as skull fracture and subdural hematoma, but these are present in less than 10% of those who sustain concussion. It is also important to remember that only 20% of the concussions sustained by young people are sports related. The other 80% come from other causes, especially vehicular accidents (cars, all-terrain vehicles and other recreational vehicles, motorcycles, bicycles, and pedestrian collisions) and falls. We must abandon old markers of severity of concussion, and educate our students, parents, coaches and trainers in newer techniques of concussion identification and management.

What was once considered a "relatively benign condition" is being recognized as a critical medical issue with distressing, potentially permanent consequences. In a sports-driven culture that celebrates the competitor who pushes through pain, some coaches, parents and young athletes have minimized or overlooked warning signs. Deaths resulting from Second Impact Syndrome, and permanent neurological handicaps to students resulting from Post Concussion Syndrome, are unacceptable and may be significantly reduced if a proper protocol is followed when reacting to head injuries.

Components of Head Injury Prevention and Management:

A comprehensive program of head injury prevention and management is comprised of the following components and concepts:

1. Careful screening of student athletes during medical clearance before the sport season begins.
2. Consistent use of protective equipment that is in good condition and fits properly.
3. Teaching of safe play techniques by coaches.
4. Conscientious enforcement of rules by officials.

5. Honest reporting of injuries and symptoms by athletes and parents. Education of parents and athletes about concussion yearly.
6. Creation of a new "culture" around the subject of concussion:
    a. "if in doubt, sit them out"
    b. "better to miss one game than a whole season"
    c. there is no such thing as "just a ding" or a "bell ringer" – these need to be evaluated carefully, keeping the possibility of concussion in mind
    d. there does not need to be a blow to the head, or loss of consciousness, for concussion to happen – forceful acceleration or deceleration, such as jerking, can generate coup/contrecoup injury to the brain
    e. VERY FEW student athletes are potential Division I or professional players – the risk is not worth it
7. Prompt recognition of concussion on the sidelines – education every 2 years for coaches, phys. ed. teachers, and athletic trainers.
8. Education of school nurses every 2 years, and other school staff as needed.
9. No return to play until cleared by a doctor, nurse practitioner, or physician assistant.
10. One cannot predict on day one, or at any point along the path of recovery, how long complete recovery will take. **Once concussion has been sustained, "the horse is out of the barn." Only time will heal the insult to the brain. There is nothing one can do to accelerate recovery – but pushing too hard and ignoring symptoms, may slow or hinder recovery**.
11. Exertion, whether physical or mental, can exacerbate or prolong symptoms as the adolescent brain heals. **Gradual step-wise return to mental and physical activity is key to management.**
12. Individuals become more "concussable" with each successive concussion – that is, once a person has sustained one concussion, it takes less and less impact to produce symptoms with each subsequent incident.
13. Prevention is the **only** treatment for Second Impact Syndrome. Even a mild blow to the head, before complete recovery from a previous concussion, can be fatal.
14. Support for students whose recovery is slow – academic accommodations, emotional support, and education of others who may not understand that slow recovery is not a sign of weakness or lack of motivation.

Prevention and Safety:

Protecting students from head injuries is the most important way to prevent a concussion. Strategies to minimize risk include:

- Education of students about symptoms of concussion, and encouragement to report any such signs to an adult.
- Use of proper equipment and supervision during phys. ed. and athletic participation – follow rules of play and sportsmanship, and enforce penalties for deliberate violations – encourage proper playing technique and body alignment, and encourage participants to be aware of what is going on around them.
- Periodic inspection, maintenance, and repair of school facilities – including playgrounds, physical plants, school grounds and athletic facilities.

Identification:

Symptoms of concussion may appear immediately, may not appear for a few hours, or may evolve and worsen over a few days. District staff members who observe a student displaying signs and/or symptoms of a concussion, or learn of a head injury from the student, should have

the student accompanied to the school nurse for evaluation. If the school nurse is not available, the parent/guardian should be contacted. Symptoms of concussion include, but are not necessarily limited to:

- Amnesia - decreased or absent memory of events prior to or immediately after the injury, or difficulty retaining new information
- Confusion or appearing dazed
- Headache or head pressure
- Loss of consciousness
- Balance difficulty or dizziness; clumsy movements
- Double or blurry vision
- Sensitivity to light and/or sound
- Nausea, vomiting, and/or loss of appetite
- Irritability, sadness or other changes in personality
- Feeling sluggish, foggy, groggy or lightheaded
- Concentration or focusing problems
- Slowed reaction times, drowsiness
- Fatigue and/or sleep issues (e.g., sleeping more or less than usual)

All students with a suspected concussion are to be seen as soon as possible by one of the following medical providers: physician, nurse practitioner, or physician assistant. The student must be removed from participation in phys. ed., athletics and recess activities and observed until an evaluation can be completed by a provider. If concussion is diagnosed, the provider must give written clearance for the student to begin to return to activities. This will be managed according to the protocol below – refer to "post-concussion management" section.

NOTE: In rare cases, students may experience signs and symptoms which may indicate a more serious condition, even several days post-injury. The school nurse must be alert for such signs and symptoms. Students who develop **any of the following signs** during the recovery period, or if the above listed symptoms worsen, must be seen and evaluated immediately at the nearest hospital emergency room:

- Headaches that worsen
- Seizures
- Looks drowsy and/or cannot be awakened
- Repeated vomiting
- Slurred speech
- Unable to recognize people or places
- Weakness or numbing in arms or legs, facial drooping
- Unsteady gait
- Dilated or pinpoint pupils, or change in pupil size of one eye
- Significant irritability
- Any loss of consciousness
- Suspicion of skull fracture: blood draining from ear, or clear fluid from nose

Post-Concussion Management:

All students who are suspected of having a concussion **must** be evaluated by their private healthcare provider – doctor (MD or DO), nurse practitioner, or physician assistant. The student must bring a note from the healthcare provider to the school nurse. **If the student is diagnosed**

with a concussion, they will be started on the district's post-concussion management protocol, whether the concussion was sustained during school activities, or away from school. At this point, the **school RN** becomes the coordinator for school management of the student's recovery. In cases where the student is participating in interscholastic athletics, the school RN collaborates closely with the athletic trainer (AT). This means the nurse will be responsible for coordinating communication among several groups:

- the student/family – symptom reporting; education about concussion, treatment, and school management;
- the student's healthcare provider(s) – medical clearance for school and PE/athletics; ongoing communication about signs/symptoms/progress seen at school;
- the students' teachers/academic advisor/school administration – serve as a consultant and advocate - development and implementation of plans for accommodation as needed for school work (e.g., home tutoring, gradual return to school, rest periods in a quiet place, allowing sunglasses/brimmed hat for light sensitivity, etc.), education of staff about need for titrating mental and physical activity to symptoms;
- the coach/PE teacher/AT – step-wise return to PE and athletics, symptom reporting, coordination of medical clearance as needed.

The cornerstone of proper concussion management is rest until all symptoms resolve, and then a graded program of exertion before return to sport.

Concussion management proceeds in 2 phases: return to learn, then return to play. The sequence of these phases reflects their relative priority, and the usual pattern of the recovering brain's ability to tolerate increasing mental exertion, THEN physical exertion, as it returns to its usual healthy state.

Once the student has been cleared by his/her private healthcare provider (MD/DO, NP or PA) to participate in the district's concussion management protocol, the student will be advanced through a series of gradual, step-wise stages of activity, with physical exertion/demands and risk of physical contact increasing in increments. **The student and family must be advised that activity levels/restrictions must be adhered to both at home and at school.**

Return to Learn:

"Pre-Level 1": The student must be at least 24 hours symptom-free, doing only normal activities of daily living and usual school/academic workload, **and** be cleared by his/her private healthcare provider, **before** beginning physical activities at level 1. Cognitive rest, as well as physical rest, is needed initially – this means eliminating or limiting reading, "screen time" (computers, television, video games, etc.), and new learning activities. For some students, one or more days of rest at home may be needed before they can return to school at all. Remember, the student must be symptom-free for at least 24 hours, performing only routine activities of daily living, before returning to school and beginning to resume learning activities/cognitive work. Activities are gradually increased, as tolerated, but restricted again if they produce symptoms. The student is excused from physical education during this time, and may not participate in athletic activities; due to the need for cognitive rest, the student should not be required to write a report in lieu of participation in physical education.

For some students, this stage will last as long as 7-10 days, and the occasional student may take even longer to attain relief from symptoms with even the usual activities of daily living. For

some students, symptoms may resolve at home and at rest, only to recur once they resume the more demanding mental activity of school. During this stage, the nurse can assume a pivotal role: acting as a liaison between home and school, helping communicate symptom information and helping develop a plan for accommodation if the student is experiencing symptoms due to the mental exertion of school work. **The goal at this stage is to allow the student to do as much cognitive work as he/she is able, until symptoms are experienced. At that point, rest must be provided until symptoms subside again.**

Occasionally, for the student who experiences a slow recovery, development of a 504 plan may be helpful. Appropriate education accommodations must be individualized, and correlated to the type of symptoms the student is experiencing. **It is important that activity limitations are adhered to at home as well as at school**, to facilitate recovery – recommended accommodations should serve as a guide for both home and school.

Physical symptoms:

- headache, nausea; dizziness, balance problems; light sensitivity, blurred vision; noise sensitivity; neck pain

Accommodations related to physical symptoms:

- limit physical exertion, including activities at home such as mowing the lawn, taking out trash, doing chores, shooting hoops with friends, going out with friends
- limit loud activities (e.g., dances, sports events, movies, restaurants, parties, etc.)
- restrict rough-housing and play between siblings/peers
- remove all physical activities such as recreational, club and organized sports, and physical education – for younger students, no recess – see section on "return to play" for more specifics
- allow child to keep light low and shades drawn if bothered by light – allow to wear sunglasses or cap with shading brim
- reduce brightness on monitors/screens; limit computer, TV screen, bright screen use
- preferential seating as needed
- keep noise levels low, or allow child to wear noise cancelling headsets or earplugs – allow class transitions before the bell
- allow student to put head down on desk briefly if symptoms begin at school - provide rest periods as needed in quiet, low-light environment (e.g., school nurse office) if symptoms increase – allow student to go home if symptoms do not subside with brief rest
- lunch in a quiet place with a friend
- avoid music and shop classes

Emotional symptoms:

- feeling more emotionally labile, nervous, sad, angry, irritable

Accommodations related to emotional symptoms:

- make sure child is feeling connected with peers, athletic team, etc. – child may "hang out" with team (e.g., travel with them, be on sidelines) as long as they don't need the time to be at home resting and only if he/she is able to be at school successfully
- don't punish child for emotional outbursts – understand that being more emotional or irritable is part of having a head injury
- develop a plan with the child if he/she is feeling emotional, for home and for school

Cognitive symptoms:

- trouble with concentration, remembering; feeling mentally "foggy"; slowed processing

Accommodations related to cognitive symptoms:

- limit "screen time" activities (computer time, texting, TV/movie watching, video game playing, etc.), reading, homework, socializing, extracurricular activities, and working
- restrict driving until cognitive symptoms resolve and seem back to baseline
- encourage and support student to follow cognitive reduction plan developed by the school
- prorate workload when possible
- reduce overall amount of make-up work, class work and homework
- reduce amount of homework given each night
- consider shorter school week or school day, to reduce cognitive workload – support with home tutoring as needed
- give only one task at a time for student to complete, and allow additional time for child to respond to questions
- write things down for student to remember – pre-printed class notes, or peer share their notes
- additional time to complete tests – no more than one test/day – no standardized testing until symptom-free during usual school day – allow for scribe/oral questions/oral response, if available
- determine if student is feeling stressed about school – adjust expectations and requirements at school

Sleep/energy symptoms:

- mental fatigue; drowsy; sleeping too much or too little; can't initiate/maintain sleep

Accommodations for sleep/energy symptoms:

- get regular and sustained sleep – for the first few days after the injury, extra sleep is OK
- after the first days, start getting back to a regular sleep schedule – allow napping but try to limit napping to no more than 20 minutes/day – eventually eliminate naps
- do not allow napping too late in the afternoon
- don't allow student to text, read, talk on cell phone, watch movies, videos/computer or eat in bed – educate about healthy sleep hygiene

Rule of Thumb:

If symptoms intensify, there has probably been TOO MUCH use of technology, social media, or home activity! Cut back the technology/social media and home activity and INCREASE rest.

Return to Play:

Once the student has been symptom-free at the "return to learn" phase of recovery (pre-level 1 of the return to play protocol) for at least 24 hours, progression toward resumption of PE/sports may begin. There are 6 levels in the student's return to full activity, as follows:

To begin graduated return to physical activity, the student must:

- **be *symptom-free for 24 hours*, doing normal ADL's and usual school/academic workload;**

- **bring in written clearance by private healthcare provider who has examined the student – physician (MD or DO), nurse practitioner or physician assistant** – initial note diagnosing concussion may serve as authorization to implement the district's protocol, unless it includes activity restrictions that are more strict than allowed under the protocol at some point – at that point, a new release would be needed to continue progression through increasing demands of the protocol
- **If student is determined not to have a concussion and cleared by their provider on their initial visit, then they will not have to follow the return to play protocol. However, if the nurse or athletic trainer feel that is not safe for the student to return to activity they can get a second opinion from the school provider, or have them complete the protocol to make sure they are safe to return.**

Level 1: low impact non-strenuous, light aerobic activity such as walking or riding a stationary bike.
Level 2: higher impact, higher exertion, and moderate aerobic activity such as running or jumping rope. No resistance training.
Level 3: Sport specific non-contact activity. Low resistance weight training with a spotter.
Level 4: Sport specific activity, non-contact drills. Higher resistance weight training with a spotter.
Student must be cleared again by private healthcare provider, to progress to level 5.
Level 5: Full contact training drills and intense aerobic activity.
Level 6: Return to full activities without restriction.

Acute Concussion Evaluation (ACE) Care Plan:

The ACE Care Plan form will be used to document all stages of concussion management for each student who sustains a concussion, whether at home or during school activities. The care plan form will be kept in the school nurse's office (for students not participating in interscholastic athletics) or by the district's athletic trainer (for students participating on a school team) throughout the student's recovery period, and the nurse or AT will be responsible for assessment data collection to support decisions to move the student to each level. Information about symptoms may be gathered from the student, the parents, the coach, and others (e.g., teachers, including phys. ed. teachers, counselors, etc.) by the school nurse and/or AT as needed to adequately assess the student's progress. This should be done as frequently as indicated by the student's progress – for most students, daily progress will allow rapid movement through the levels of participation. For others, progress will be slower, and data collection/consultation may be more sporadic.

The student will be monitored by the school nurse/AT following each step-up in activity level, for any return of signs and symptoms of concussion. Activity restrictions at each level must be adhered to at school and at home – this includes recess, free/play time, physical education classes, extracurricular activities, private "club" sports, etc. Staff members (including coaches) should report any observed return of signs and symptoms to the school nurse/AT. A student may only be cleared by the school nurse/AT to move to the next level of activity, and the nurse/AT may only clear the student for such progression if the student remains symptom free at the current level for 24 hours. (That is, the student may only move up one level, at most, every 24 hours.) If any post-concussion symptoms return, the student will be dropped back to the previous level of activity, then re-attempt the new activity after another 24 hours (symptom free) have passed. Note that the student will need to be evaluated twice by his/her private healthcare provider: soon after injury, to establish a diagnosis of concussion and clear the student to begin

step-wise progression of exertion; and again before progressing from level 4 to level 5, since this is when contact is resumed.

The school RN/AT may wish to consult with the district provider and/or the student's private healthcare provider at any time during this process. (Release of information form is not necessary, since this is "need to know" communication regarding a medical condition being treated by both parties – the private provider and the school nurse/AT. However, some medical practices may be unwilling to release information without a signed release.) Students whose symptoms worsen or generally show no reduction after 7-14 days, should be considered for referral to their primary healthcare provider for re-evaluation; the provider in turn may elect to refer to a neuropsychologist, neurologist, physiatrist, or other medical specialist in traumatic brain injury.

School LPNs may collect data regarding the student's status: that is, self-reports of signs and symptoms, input from teachers, coaches, etc. They will do so in close consultation with the RN or a district provider. Because the LPN scope of practice does not include formulation of a care plan, decisions to allow a student to progress to a higher level of athletic participation will be made only by school RN's (and AT) or the district provider.

The school RN/AT will share responsibility for communicating with other district staff as needed about the student's progress, but only the RN, AT or the district provider may give clearance for a student to move to the next level. (**Exception**: students must be cleared by their personal physician, NP or PA to move from level 4 to level 5. The district provider may provide this service if the student does not have access to a personal healthcare provider.) If the district provider clears the student for progress to a higher level, they must communicate this clearly to the school RN/AT, who will document the clearance on the ACE form in the health office. ***District staff must not clear a student for more activity than the student's personal health care provider has authorized.***

NOTE: Whenever staff (nurse, coach, AT, teacher, others) are talking to the student about symptoms, the conversation should take place in a private area, away from others' range of hearing. Hopefully, this will alleviate any perceived pressure on the student/athlete to "suck it up" in front of others, and promote honest symptom reporting.

Neurocognitive Testing for Athletes:

All students participating in high impact interscholastic athletic teams will undergo ImPACT ® testing as follows:

- baseline test will be administered before or near the beginning of the student's first season on a district team, and re-administered every 2 years for the remainder of their athletic career in the district
- if the student sustains a concussion, a post-injury test will be administered when the student is deemed to have a concussion and before the see their Provider of choice– the school nurse/AT will determine when this is the case – upon request from students provider the AT will have the student take an ImPACT test before seeing them for clearance to return to contact, and a copy of the results will be attached to the student's ACE form, for the provider's review when the student is seen for his/her clearance appointment. A copy of the post-injury test results will also be provided to the school nurse, for inclusion in the student's school health record.

Documentation and Tracking Issues:

- All concussions that are known to the school nursing staff will be documented on the student's Cumulative Health Record. This will facilitate tracking of successive concussions, and assist the district provider when the student requests clearance to participate in future athletic programs.
- When a child has sustained any head injury that may produce concussion, the nurse (if during the regular school day) or coach or athletic trainer (if at an athletic event) will notify the parents upon pick up. As for any injury incurred during school/school activities, a student accident report will also be completed per usual district protocol, and injury care will be documented in the student's health record appropriately.
- The original ACE form will become part of the student's school health record. The duplicate/copy may be sent with the student when he/she sees the personal healthcare provider, for signature to clear him/her to move from level 4 to level 5 activities. (The provider may elect to write this clearance on a prescription pad/letterhead etc.) If/when the copy is returned to the health office or to the AT, both copies will become part of the student's school health record, once the student has completed the entire return-to-play protocol. NOTE: if AT is the primary staff person following student, they will forward the ACE form to school nurse once student has completed the protocol (recovered fully), for inclusion in the student's school health record.

Education about Concussion:

- District coaches, physical education teachers, athletic trainers, and nurses will be educated about concussion prevention, identification and management. Training will be required **every 2 years.**
    - Nurses and athletic trainers will access their training online at: www.preventingconcussions.org
    - Coaches and phys. ed. teachers will access their training online at: www.cdc.gov/concussion/headsup/online_training.html
- Student-athletes and parent/guardian will be required to sign a Fact Sheet for Parents – Head Injury and Concussion at least once yearly, which provides educational information about concussion in general, and about the district's procedure for return to participation after concussion. This form will be incorporated into the online sign-up packet that all students/parents are required to complete before each sports season.
- The concussion fact sheet is also available on the district's website, in a location which is accessible by all district staff and the general public.

Oversight of Protocol:

NYS Education Department's June 2012 "Guidelines for Concussion Management in the School Setting" (updated in 2014) suggests that districts form a concussion management team to oversee implementation of the concussion management protocol, and to monitor any individual student's progress as he/she recovers from concussion. At any time during the student's recovery, the following people may be involved in discussion about the student's progress:

- Student and his/her parents/guardians
- School nurse
- District nurse practitioner
- District physician/medical director
- School administrator, guidance staff, faculty

- Pupil personnel services director
- Athletic director, physical education teaching staff, coach and (when applicable) athletic trainer
- Student's personal healthcare provider – including any medical specialist who may be following the student

Most of the students whose concussion recovery has been managed under this protocol, have had an uneventful recovery, returning to full academic and physical education/sports participation in 2 weeks or less. Individuals listed above have been involved in discussion, consultation, and collaborative decision-making on an as-needed basis. We will continue with this practice in future, to assure that students receive optimal care, and that timely referrals are made when necessary. The school nurse is the district employee who has primary responsibility for oversight of the student's progress, often collaborating with the athletic trainer; for communication with school faculty, including physical education teachers and coaches; for liaison with the student's parent/guardian, and with the private healthcare provider as appropriate; for consultation with the district nurse practitioner and the parent/guardian and healthcare provider in cases of protracted recovery, multiple concussions, or atypical recovery.

Revised 1-2019

Forms:
- Acute Concussion Evaluation (ACE) Care Plan

References:
- New York State Education Department: "Guidelines for Concussion Management in the School Setting", June 2012 (updated 2014).
- Centers for Disease Control and Prevention (CDC): http://www.cdc.gov/ncipc/tbi/
- Prague Conference: "Summary and Agreement Statement of the 2nd International Conference on Concussion in Sport, Prague 2004". Clinical Sport Medicine; Vol. 15, No. 2, March 2005.
- Prague Conference: http://bjsm.bmj.com/cgi/reprint/39/4/196
- National Federation of State High School Associations: http://www.nfhs.org/core/contentmanager/
- "Concussion Management for Interscholastic Athletics" – educational program presented jointly by the New York State Public High School Athletic Association and the New York State Athletic Administrators' Association" – www.keepyourheadinthegame.org

Training/education (state-approved) resources:
- For healthcare professionals (school nurses, district NP): www.preventingconcussions.org
- For coaches, phys. ed teachers, athletic trainers: www.cdc.gov/concussion/headsup/online_training.html