



**SPORTS CONCUSSION INFORMATION FACTS AND RESOURCES
PRESENTED BY**





EDUCATION AND BASELINE CONCUSSION TESTING PRESENTED BY



ATHLETICO
PHYSICAL THERAPY

NorthShore
University HealthSystem

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The Chicago Blackhawks are committed to increasing the awareness, enthusiasm and participation in amateur hockey in the Midwest. Through our initiatives, we hope to supply the resources to allow EVERYONE to play hockey.

The **Amateur Hockey Association of Illinois (AHA)** was founded as the governing body of Illinois amateur hockey in 1975. AHA and the Chicago Blackhawks have been partnering in numerous programs for over 25 years. There are over 25,000 registered players and coaches in Illinois youth hockey.

The Sports Concussion Program at **NorthShore University HealthSystem** is led by nationally-recognized experts in concussion and sports medicine and provides a multidisciplinary approach to concussion care. Our specialists offer urgent care appointments at locations across Chicagoland, including Oakbrook and Glenview. We work to ensure seamless communication to patients and families, their care team, coaches and others involved in return-to-play decisions.

Athletico's Head Injury and Concussion Management Program benefits individuals suffering from ongoing concussion symptoms. As the largest provider of athletic trainers in the United States, Athletico recognizes the importance of providing concussion management training to its athletic trainers, who are often the first to come in contact with athletes who sustain concussions. Athletico also employs vestibular therapists who are trained in concussion management and can evaluate and treat patients with complaints of dizziness, balance deficits and motion sensitivity if symptoms persist 7-10 days after sustaining a concussion.

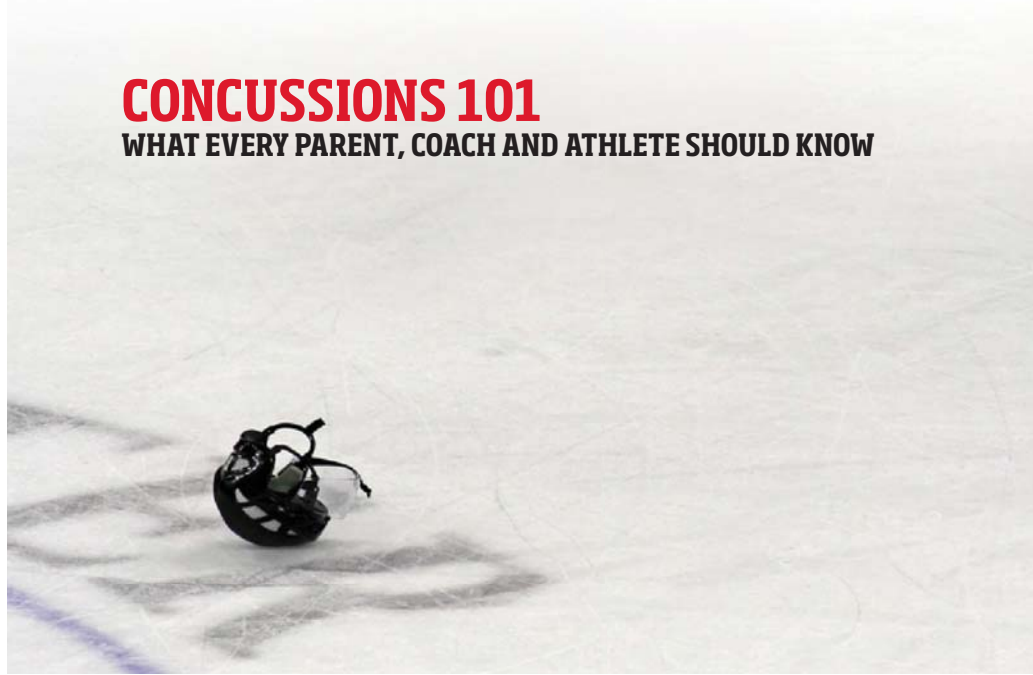
→ **"A Step aHead" Baseline ImPACT testing** is available, at no cost, to **AHA players ages 13-18**. To schedule your child's test at AthletiCo, visit **www.athletico.com/impact**.

There is no such thing as a minor head injury. The Chicago Blackhawks, Amateur Hockey Association of Illinois (AHA), Athletico Physical Therapy and NorthShore University HealthSystem have come together to create **A Step aHead**, an initiative to combat one of the most common head injuries: concussions. These four groups pledge to educate the Illinois youth hockey community on the importance of concussion management and to be proactive with implementing baseline testing. Through A Step aHead we will offer free baseline concussion testing, as well as educational programs, to youth hockey players in the AHA program.



CONCUSSIONS 101

WHAT EVERY PARENT, COACH AND ATHLETE SHOULD KNOW



What is a concussion?

Think of the head as an egg. The brain is the egg yolk, surrounded with fluid and then a hard outer shell. A concussion is caused when a “jolt” is sent to that egg. Specifically, a concussion occurs when an impulse is sent to the brain, causing a complex metabolic chain of events. In addition, what many people may not realize is that concussions can just as easily occur from a blow to the body, which causes the brain to move rapidly back and forth within the skull. A concussion is a functional injury to the brain, so structurally the brain appears normal on all imaging, including CT scans and MRIs.

Due to the metabolic chain of events, blood flow, and therefore glucose (the body’s main form of energy), decreases in the brain. In most injuries, the body wants to have more glucose flow to an injured area. With the decreased blood flow and increased need, the brain has a large gap of supply and demand for blood.

Diagnosis:

Diagnosis of a concussion is determined through clinical examination. By definition, all imaging tests, such as CT scan and MRI, appear normal.

Treatments/management of injury:

When anyone sustains a concussion, the main objective is to keep the exertion to the brain to a minimum. This will keep the gap of supply and demand to a minimum. This includes no physical exertion (running, biking), no extreme visual stimulus (texting, video games), limited cognitive stress (exams in schools) and altered food and drink intake (no spicy foods, no alcohol).

Prognosis:

The prognosis for a concussion that is properly managed is good. However, if the concussion is not managed appropriately, the athlete may have lingering side effects for weeks to months to years.

REMEMBER: There is no such thing as a minor head injury. Symptoms may become worse with exertion or possibly rest. Athletes should not return to play until cleared by medical personnel. Consult an athletic trainer or concussion expert immediately if any signs or symptoms are reported or observed.

What should I do if I think I have a concussion?

- **Tell your athletic trainer and/or coaches as well as your parents.** Never ignore a bump or blow to the head even if you feel fine. Also, tell your coach if one of your teammates might have a concussion.
- **Give yourself time to get better.** If you have had a concussion, your brain needs time to heal. While your brain is still healing, you are much more likely to have a second concussion. Second or later concussions can cause damage to your brain. It is important to rest until you get approval from a doctor or health care professional to return to play.

What should I do if I suspect my son or daughter has suffered a concussion?

- Consult a primary care physician immediately and/or **visit the nearest emergency room facility.**
- Contact NorthShore University HealthSystem at **847-503-4361** or **www.northshore.org/concussion**.

What to avoid and do when a concussion is suspected:

(Things that should be considered so recovery is not delayed)

- Avoid any loud noises (music, TV, band practices, earphones)
- Avoid texting, reading, video games, typing and internet use. All of these activities cause an increase in cognitive function which puts a strain on the brain.
- Avoid any over-the-counter medications (Advil, Motrin, Aleve) that may mask any symptoms, unless advised otherwise by a physician.
- If studying is needed to be done for a quiz or test the next day or that week, the school nurse, athletic director, administrator, and/or guidance counselor should be contacted and made aware that a concussion is suspected and postponement of any quizzes or exams may be needed.
- Staying home from school may be recommended if the concussed individual wakes up and begins to experience headaches right away. This may delay recovery as well.

Should my child stay home from school after a concussion?

Students who experience symptoms of a concussion often need extra help to perform school-related activities and may not perform at their best on classroom or standardized tests. If the athlete exhibits severe symptoms where they cannot concentrate for more than 30 to 45 minutes, staying home may be necessary until symptoms improve. If symptoms are less severe, rest breaks during school can help with the recovery process.

When can my child return to play after a concussion?

An athlete should not participate in physical education class, physical activity at recess, sports practices or games when symptoms are present. The injured person should never return to sports or active recreation with any symptoms unless directed by a health care professional. In the case of physical education class and athletics, we encourage parents to obtain a written note from a healthcare provider excusing them from participation.

How can I reduce the likelihood of a concussion?

Every sport is different, but there are steps you can take to protect yourself.

- Follow your coach's rules for safety and the rules of the sport
- Practice good sportsmanship at all times
- Use the proper sports equipment, including personal protective equipment (such as helmets, padding, shin guards and eye and mouth guards)

In order for equipment to protect you, it must be:

- The right equipment for the game, position or activity
- Worn correctly, fit well and used every time you play





What is BASELINE ImPACT® testing?

A Step aHead will use a computer based online test called ImPACT® (Immediate Post-Concussion Assessment and Cognitive Testing) to establish a baseline of normal cognitive function for each individual athlete. The BASELINE test will then be used as part of a comprehensive clinical evaluation to determine recovery following a concussion.

How does the BASELINE ImPACT® test work?

The test takes approximately 30 minutes and is designed to evaluate and document multiple aspects of an athlete's neurocognitive state – brain processing speed, memory and visual motor skills. All NHL players undergo such a test.

The BASELINE ImPACT® test is used to establish a benchmark score when a player is in his or her non-concussed or "normal" state. It should be noted: ***The BASELINE test does not evaluate the subject for a concussion, identify past concussion(s), prevent future concussions or determine if your son or daughter is predisposed to a concussion.***

The result of the BASELINE test is used as a benchmark (comparison) tool to determine if your son or daughter can safely return to play following a subsequently incurred concussion.

If for any reason you think your son or daughter may have had a hit to the head or any other potential concussion prior to taking this BASELINE test, it is strongly recommended that he or she seek medical care from NorthShore University HealthSystem.

NorthShore University HealthSystem is an official Certified ImPACT Consultation (CIC) testing site with locations in Oakbrook and Glenview. Additional information regarding the NorthShore Sports Concussion Program is available at www.northshore.org/concussion.

CONCUSSION FACTS AND MYTHS

Concussion facts:

- Symptoms can be subtle, such as a headache or feeling sluggish.
- Symptoms may not surface until 48 to 72 hours after the injury.
- Recovery is different for every person who sustains a concussion, thus recovery time cannot and should not be predetermined until after medical evaluation and post-concussion evaluation by an appropriate, trained healthcare provider.

Concussion myths:

- **Myth:** You have to lose consciousness to have sustained a concussion.
Reality: Studies show that less than 10 percent of concussions result in loss of consciousness.
- **Myth:** Concussions are only a result of a direct blow to the head.
Reality: A concussion can be sustained by a sudden, violent movement of the head caused by an unexpected external force to the body.
- **Myth:** You need to wake someone with a concussion every 20 minutes.
Reality: Though it is important to check on someone periodically, once every 2-3 hours is sufficient.
- **Myth:** You need to check pupils with a flashlight to see if they are dilated or uneven.
Reality: Any response to the pupils is indicative of a much more serious brain injury. Typically, this is only present when the injured individual is unconscious. Therefore, if the athlete is coherently speaking to you, there is no need to check their pupils.

REMEMBER: There is no such thing as a minor head injury. Symptoms may become worse with exertion or possibly rest. Athletes should not return to play until cleared by medical personnel. Consult an athletic trainer or concussion expert immediately if any signs or symptoms are reported or observed.

Signs and Symptoms

Athletes who experience any of the signs and symptoms listed below after a bump, blow or jolt to the head or body may have a concussion.

ATHLETE MAY REPORT

headache/pressure in head
dizziness/nausea/vomiting
blurred/double vision
sensitivity to light/sound
difficulty concentrating or remembering/loss of memory
spots before eyes
ringing in the ears
feeling “in a fog”

COACH OR PARENT MAY OBSERVE

loss of consciousness
sleepiness/grogginess
balance problems
slurred speech
abnormal behavior
“out of it” behavior



CONCUSSION RECOVERY PROCESS



Each concussion should be treated individually depending on the symptoms and evaluation test results. The following recommendations are made to improve concussion management and speed up the recovery process:

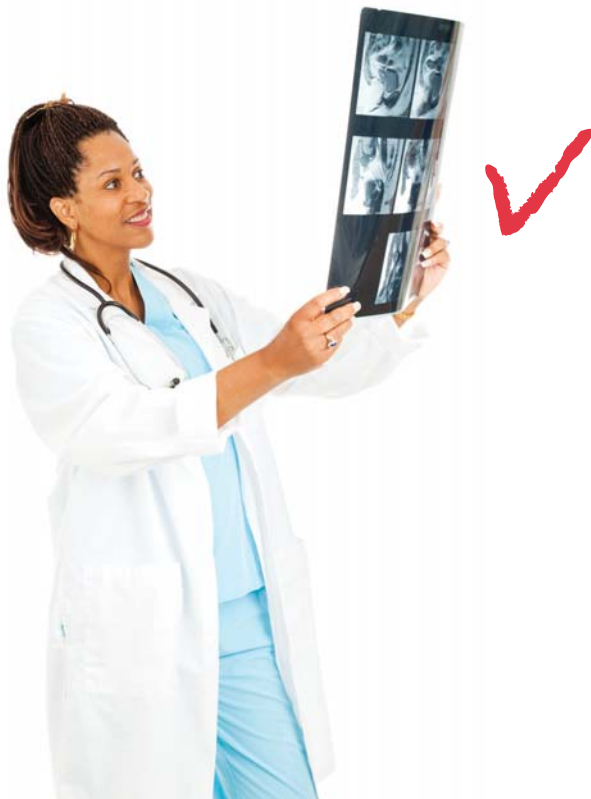
- **No athlete with a suspected head injury or concussion should continue to play or return to activity.**
- An individual sustaining a concussion should cease doing any activity that causes the symptoms of a concussion to increase.
- School attendance and activities may need to be modified **with healthcare provider permission.**
- Neurocognitive testing is an important component of concussion management.
- No athlete should return to competitive contact sports until they are symptom free, both at rest and with exercise, and are **cleared by a physician or certified athletic trainer.**
- All sports and health education programs should teach students the specific signs and symptoms of concussions and **have a concussion management plan in place.**

No athlete with a concussion should continue to play or return to a game after sustaining a concussion.

Athletes continuing to play or exercise after suffering a concussion may take longer to recover from a concussion. They also may be more at risk for developing post-concussion syndrome (see Page 20 for more information on PCS).

Immediate Evaluation and Exam after a Concussion:

- A neurological exam is important to rule out a bleed, although in the vast majority of patients this will appear normal. Balance issues or nystagmus on lateral gaze may be found, and they usually disappear as the patient recovers.
- CT scans and MRIs of the head usually come back normal but are necessary when the patient has an increase in concussion symptoms or there is concern that there might be a bleed (research indicates that functional MRIs and PET scans can show the area of the brain affected).



An individual sustaining a concussion should cease doing any activity that aggravates the symptoms of a concussion (e.g. headaches, dizziness, nausea).

Due to the metabolic imbalance that occurs following a concussion, it has been shown that increased blood flow to the brain during recovery may impede or slow down the recovery process and worsen the symptoms of a concussion. Most patients do not need to be placed on bed rest unless they are having severe symptoms (severe headaches, marked photophobia, disorientation, balance problems, extreme fatigue, etc). They may participate in any activity that doesn't cause increased symptoms (headaches). In some cases, activities such as reading, watching TV, working at the computer, taking hot baths and having heated discussions with others may increase symptoms.

If patients develop increased symptoms while doing a specific activity, that activity should be discontinued.

Many concussed individuals may be unable to concentrate. They may not be able to read or absorb material and may develop an increased headache while doing so. When this occurs, they might be able to participate in an activity for only a few minutes before symptoms increase. If a resting break can be interspersed between those few minute intervals, these activities can be done. As the symptoms begin to subside longer intervals can be spent reading, watching TV and using the computer.

Continuing activities or exercise that increases symptoms can delay the recovery from the concussion.



School attendance and activities may need to be modified.

School: While some individuals may be able to attend school without increasing their symptoms, the majority will probably need some modifications depending on the nature of the symptoms. Trial and error may be needed to discover what they can and cannot do. **If students are unable to attend school for an entire day without symptoms, they should leverage their healthcare provider for next actions.** Based on physician direction, some students may benefit from the following:

- Only be able to attend for one period, some not at all, due to severe headaches or other symptoms.
- Frequent breaks with rest in the nurse's office may be necessary.
- They should not attend gym or exercise classes and should have a written physician note excusing them from such activities.
- Often, alternating a class with a rest period may be helpful. Math has been shown to cause more symptoms in patients than other subjects.
- As recovery proceeds, hours spent in school may be gradually increased.
- Workload and homework may need to be reduced.
- Frequent breaks while doing homework may be helpful.
- Term papers may need to be postponed or deadlines renegotiated.
- Pre-printed class notes and tutors may help relieve the pressure of schoolwork.
- Some students may need to be driven to school to avoid walking and should be given elevator passes to avoid stairs.

Tests: If there are concentration and memory problems, quizzes, tests, standardized tests and final exams should be postponed. If test results are poor, a note to the school should request that the scores be voided. Extra time may be necessary initially when test-taking is resumed.

Activities: If noise increases symptoms, students with concussions should not listen to loud music. They should avoid attending dances, parties, concerts and sporting events until the hyperacusis is gone. If light causes increased symptoms or students have photophobia, they should avoid bright sunlight and exposure to flashing lights (computer and video games). Sunglasses may be necessary.

Neurocognitive testing is an important component for the management of concussions.

The use of neurocognitive testing is one piece of the puzzle in assessing recovery from concussions and determining the timing of return to play. It should only be used as a tool and should not be the only deciding factor in returning a concussed athlete to play. It provides objective data and prevents athletes who hide their symptoms from returning to play before they are fully recovered.

While there are several available tests to accomplish this, the one with the widest acceptance and the largest database is the ImPACT® Test. The ImPACT® Test is used by the NFL, NHL and other professional sports organizations. ImPACT® is headquartered in Pittsburgh.

There are two components of the test: the **Symptom Score** and the **six-part neurocognitive test**. Both component scores should return to baseline or normal before an athlete is allowed to resume playing a contact sport.

Generally, the symptoms of a concussion disappear before the neurocognitive findings return to normal, although occasionally, this can be reversed. For example, a patient may have zero symptoms following a concussion but their ImPACT® test takes two weeks to return to normal. It is for these reasons that symptom evaluations alone cannot be used as the sole criteria for return to play.

Migraine headache concussion symptoms, as opposed to the usual generalized headache of a concussion, are predictive of poorer scores on ImPACT® testing and are associated with a longer healing time. Increased headaches often occur when taking the initial ImPACT® test after a concussion. The different components that are measured (verbal and visual memory, processing speed and reaction time) usually correlate with different regions of brain function that maybe involved with the concussion.

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Individuals who score well below expected levels of function initially (e.g. 1st percentile across all four summary scores) should be monitored very carefully as they will usually take longer to heal and may be more prone to developing post-concussion syndrome.

They may need greater school or activity modification, perhaps not attending school for a prolonged period. Initial bed rest may be necessary.

Individuals with high reaction times (e.g. scores greater than .70 on ImPACT®) should not drive and initially might need greater activity modifications, sometimes even bed rest.

Increasingly poorer successive ImPACT® test scores will identify those individuals who continue to exercise or do activities that cause their symptoms to increase.



No athletes should return to competitive contact sports until they are symptom-free, both at rest and with exercise, and have normal neurocognitive testing.

After an athlete has been evaluated by an athletic trainer **and** physician and it has been determined that the athlete has sustained a concussion, the following protocol will be used to safely progress their return to play. Under no circumstances will this protocol be accelerated. **There should be approximately 24 hours (or longer) for each stage, and the athlete should return to previous stages if symptoms recur. Resistance training should only be added in later stages.**

Rehabilitation stage	Functional exercise	Success goal
1. No activity	Complete physical and mental rest	Recovery (symptom free at rest)
2. Biking	Stationary cycling keeping intensity, under 70% maximum predicted heart rate (30 min. max)	Increase heart rate without symptoms
3. Running	Running while keeping intensity, under 70% maximum predicted heart rate (30 min. max)	Add movement without symptoms
4. Agility exercises	Sport-specific exercises. No head-impact activities.	Add coordination and cognition without symptoms
5. Non-contact practice	Full practice without contact; may start progressive resistance training	Increase exercise, cognitive load, coordination without symptoms
6. Full contact practice	Following medical clearance, participate in normal training activities	Restore confidence and assess functional skills by coaching staff without symptoms
7. Return to play	Normal game play	

Protocol established from: "Consensus statement on concussion in sport – The 3rd International Conference on concussion in sport, held in Zurich, November 2008." *Journal of Clinical Neuroscience*. (2009) 16:755–763

Return to Participation*: An athlete will not return to participation the same day as a concussive event. An athlete is able to return to play when they are symptom-free at rest and at exertion and have returned to a baseline state of any of the tests they were administered. When returning athletes to play, they will follow the stepwise symptom-limited program outlined above. Once the athlete has received clearance from a physician licensed in all branches, and/or the athletic trainer, they may return to play. If an athlete receives clearance from a physician, the athletic trainer still reserves the right to hold the athlete out of participation. A parent's consent is not a sufficient means for an athlete to return to participation.

* This protocol is implemented to promote compliance with: IHSA Return to Play Policy, IHSA Protocol for Implementation of NFHS Sports Playing Rule for Concussions, Illinois HB 0200, and City of Chicago Ordinance – Concussion Injuries in Student Athletes in Chicago Schools (Ch. 7-22 Municipal Code of Chicago) which outline that athletes exhibiting symptoms of a concussion cannot return to play until cleared by an appropriate healthcare professional.

Post-concussion syndrome

Fortunately, post-concussion syndrome occurs only occasionally, but it is devastating to those individuals encountering it. It is usually defined as having concussion symptoms that last for greater than a month after the initial blow.

The problems that can develop are categorized as follows.

Sleep Issues: Initially, most concussed individuals are very fatigued and sleep more than usual. As the concussion persists, they may have difficulty falling asleep and sleep less than usual. Lack of sleep causes major difficulties and should be resolved before treating the next two issues.

Concentration and memory Issues: Inability to concentrate and poor memory, often associated with increased headaches during schoolwork, may cause poor school attendance and performance. It can take months, or even longer, to recover from this. Full neurocognitive testing and rehabilitation may be indicated in some cases.

Depression and other psychiatric problems: Although depression may be caused by the concussion itself, the persistence of symptoms and being unable to play may also cause depression. Individuals with concussions often suffer frustration and anger due to the curtailment of their normal activities. They may not be able to participate in their chosen sport or attend school.

Some athletes may not be able to return to contact sports due to the long-term symptoms they have suffered as a result of their concussion.

In summary, each concussion should be treated individually. No one guideline will work for each patient. The general public, physicians, coaches, athletic trainers, parents and athletes themselves must be educated about the signs, symptoms and treatment of concussions. Generally, the athlete may be unaware that they have sustained a concussion. In order to prevent poor outcomes from concussions, education is crucial.



Action plan

If you suspect that an athlete has a concussion, you should take the following four steps:

1. Remove the athlete from play.
2. Ensure that the athlete is evaluated by a health care professional experienced in the evaluation of concussions.
3. Inform the athlete's parent(s) or guardian(s) about the possible concussion, and give them a fact sheet on concussions.
4. Keep the athlete out of play the day the injury occurred and until a health care professional experienced in the assessment and treatment of concussions says **they are symptom-free and cleared to return to play.**

It is better to miss one game than the whole season.



WEB RESOURCES

www.athletico.com/concussions

www.northshore.org/concussion

www.impacttest.com/about/background

www.cdc.gov/concussion/sports



chicagoblackhawks.com



ahai.org



athletico.com



www.northshore.org/concussion