National Federation of State
High School Associations

A PARENT'S / GUARDIAN'S GUIDE TO CONCUSSION

National Federation of State High School Associations (NFHS)
Sports Medicine Advisory Committee (SMAC)

What is a concussion?

- A concussion is a traumatic brain injury that interferes with the normal function of the brain. Concussions were previously referred to as a "ding" or a "bell-ringer" but this undermines the seriousness of problem. Any suspected concussion must be taken very seriously. An athlete does not need to lose consciousness (be "knocked-out") to suffer a concussion. In fact, less than 5% of concussed athletes suffer a loss of consciousness.

Concussion Facts

- Structural injuries, like torn ligaments and broken bones, can be seen on an x-ray or on scans like an MRI. On the other hand, a concussion is a disruption of how the brain works, or its function, and not in its structure. That is why CAT scans and MRIs are typically normal. The injury affects the way the brain works, not how it looks.
- It is estimated that over 300,000 high school athletes across the United States suffer a concussion each year. (Data from the NFHS Injury Surveillance System, "High School RIO™")
- Concussions can happen in any sport. While they are more common in sports that involve collisions, athletes in all sports are at risk for a concussion. When researchers looked at 14 different high school sports, they found that over two-thirds of concussions result from contact with another athlete and the second leading cause of concussion, is player-to-surface contact. This includes falling and hitting the ground.
- An athlete may report many physical, behavioral, and cognitive symptoms. Physical symptoms include headaches, nausea, vomiting, dizziness, and sleep changes. Some behavioral changes include irritability, anxiety, and depression. Cognitive symptoms are changes in the way we think and include feeling sluggish, hazy, or foggy, difficulty concentrating or memory problems, and confusion.
- Many symptoms appear immediately after the injury, while others may develop over the next several days. The symptoms can interfere with normal daily life in addition to difficulty with school, work, and social life.
- Concussion symptoms may last from a few days to several months. It is important to remember that each student athlete responds and recovers differently.
- Athletes should not return to sports or activities that will put them at risk for another head injury until the concussion has completely resolved. To do so puts them at risk for worsening and prolonged symptoms and a more severe injury. While rare, a repeat concussion can also result in severe swelling and bleeding in the brain. This condition can lead to death or permanent disability.

What should I do if I think my child has had a concussion?
If your child sustains a head injury, it is good to be aware of the signs and symptoms of a concussion. If you suspect an athlete has a concussion, the athlete must be immediately removed from activity. Continuing to participate in a contact or collision sport while experiencing concussion symptoms can lead to worsening of symptoms, increased risk for further injury and sometimes death.

Parents and coaches should not make the diagnosis of a concussion. Any athlete suspected of having a concussion should be evaluated by a medical professional trained in the diagnosis and management of concussions.

When in doubt, sit them out!

All athletes who sustain a concussion need to be evaluated by an appropriate health-care professional who is experienced in concussion management. If your child's school has an athletic trainer (AT), please inform the AT of your concerns. You should also call your child's primary care provider and explain what has happened and follow the instructions you are given. Sometimes, an injury is more severe than it appears. If your child has persistent vomiting, a worsening headache, a seizure, or is acting differently, you should take your child to an emergency department for immediate attention.

What are the signs and symptoms of a concussion?

SIGNS OBSERVED BY PARENTS, ATHLETIC TRAINERS, FRIENDS, TEACHERS OR COACHES	SYMPTOMS REPORTED BY ATHLETE
• Dazed or stunned appearance. • Confusion about assignment or position. • Forgetfulness. • Uncertainty of game, score, or opponent. • Clumsy movements. • Slow response to questions. • Mood, behavior or personality changes. • Can't recall events prior to or after hit or fall.	• Headache or "pressure" in head. • Nausea • Balance problems or dizziness • Double or blurry vision • Sensitivity to light or noise • Feeling sluggish, hazy, foggy or groggy • Concentration or memory problems • Confusion • "Not feeling right" or "feeling down"

How can a concussion affect schoolwork?
Following a concussion, many students have difficulty in school due to difficulties with short-term memory, concentration, and organization.

In many cases after the injury, it is best to decrease the athlete's class load early in the recovery phase. This may include staying home from school for no more than 1 or 2 days, followed by academic adjustments (such as a reduced class schedule), until the athlete has fully recovered. Decreasing the stress on the brain and not allowing the athlete to push through symptoms will shorten the recovery time and ensure total resolution of symptoms. The academic adjustments are best managed by a school concussion team. Speak with the school guidance counselor, school nurse, or athletic trainer to help with this process.

When can an athlete return to play following a concussion?
After suffering a concussion, or if you suspect an athlete has a concussion, **no athlete should EVER return to play or practice on that same day**.

Concerns over athletes returning to play too quickly led lawmakers in all 50 states and the District of Columbia to pass laws stating that **no player shall return to play the day of a concussion, and the athlete must be cleared by an appropriate health-care professional before being allowed to return to play in either games or practices.** Many of these laws require players, parents and coaches to receive education on the dangers of concussion in addition to recognizing the signs and symptoms of concussion. **Click here to see what your state law requires:**
http://www.ucdenver.edu/academics/colleges/medicalschool/departments/pmr/documents/concussion_toolkit/laws/state.htm

Once an athlete no longer has symptoms of a concussion AND is cleared by an appropriate health-care professional to begin a return to play progression, the athlete must proceed with activity in a step-wise fashion in a carefully controlled and monitored environment to allow the brain and body to re-adjust to exertion. On average, the athlete will complete a new step every 24-48 hours. An example of a typical return-to-play schedule is shown below:

Return to Play Progression:

Step 1: Back to Regular Activities
To enter into the return to play protocol the athlete should first be back to regular activities (such as school) and has the cleared by their health-care professional to begin the return to play process. In most all cases, the athlete should have all concussion-related academic adjustments removed prior to beginning the Return to Play Program.

Step 2: Light Aerobic Activity
Begin with light aerobic exercise only to increase heart rate. This means about 5 to 10 minutes on an exercise bike, brisk walking, or light jogging. No anaerobic activity such as weight lifting should be done at this stage.

Step 3: Moderate Activity
Continue with activities that increase an athlete's heart rate while adding movement. This includes running and skating drills.

Step 4: Non-Contact Training Activity
Add sports specific, more intense, non-contact physical activity, such as such as passing in hockey, dribbling in basketball or soccer, high-intensity stationary biking, regular weightlifting routine.

Step 5: Practice and Full Contact
The athlete may return to practice and full contact (if appropriate for the sport) in a controlled practice setting where the skills can be assessed by the coaches.

Step 6: Competition
The athlete may return to competition.

If symptoms occur at any step, the athlete should immediately stop activity and consult with a qualified appropriate health-care professional before moving on to the next step.

What can I do?

- Both you and your child should learn to recognize the "Signs and Symptoms" of concussion as listed above.
- Encourage your child to tell the medical and/or coaching staff if any of these signs and symptoms appear after a blow to the head or body.
- Emphasize to administrators, coaches, physicians, athletic trainers, teachers and other parents your concerns and expectations about concussion and safe play.
- Encourage your child to tell the medical and coaching staff if there is suspicion that a teammate has suffered a concussion.
- Ask teachers to monitor any decrease in grades or changes in behavior in students that could indicate a concussion.
- Report concussions that occurred during the school year to appropriate school staff. This will help in monitoring injured athletes as they move to the next season's sports.

Click here for more information about returning to school after a concussion:
http://www.cdc.gov/headsup/basics/return_to_school.html

Other Frequently Asked Questions:

Why is it so important that athletes not return to play until they have completely recovered from a concussion?
Students that return to play too soon may worsen concussion symptoms, prolong the recovery time, and they also risk catastrophic consequences if they suffer another head injury. These consequences are preventable if each athlete is allowed time to recover from their concussion including completing the stepwise return-to-play protocol. No athlete should return to sport or other at-risk activity when signs or symptoms of concussion are present and recovery is ongoing.

Is a "CAT scan" or MRI needed to diagnose a concussion?
No! The diagnosis of a concussion is based upon the athlete's history of the injury and an appropriate health-care professional's physical examination and testing. CT and MRI scans are rarely needed following a

concussion since this is a functional injury and not a structural one. However, they are helpful in identifying life-threatening head and brain injuries such as skull fractures, bleeding or swelling.

What is the best treatment to help my child recover quickly from a concussion?
Treatment for concussion varies from one person to the next. Immediately after a concussion, the best treatment is physical and cognitive rest. Exposure to loud noises, bright lights, computers, tablets, video games, television and smart phones may worsen the symptoms of a concussion. You should allow your child to rest in the days following a concussion. As the symptoms lessen, an appropriate health-care professional may allow increased physical and cognitive activity, but this has to be monitored closely for a recurrence of symptoms.

There are no medications to treat concussions, but an appropriate health-care professional may prescribe medications and therapies to treat symptoms of a concussion, such as headache, dizziness, sleep changes, etc. Some athletes may require rehabilitative therapies, such as physical, occupational, vestibular, ocular or speech/cognitive. Others may require treatment for mood and behavior changes. All of these interventions are done on a personalized basis.

How long do the symptoms of a concussion usually last?
For most concussions, symptoms will usually go away within 2–3 weeks after the initial injury. You should anticipate that your child will not fully participate in sports for several weeks following a concussion. In some cases, symptoms may last longer, sometimes several months. Since recovery differs from person to person, all concussions should be carefully managed.

How many concussions can an athlete have before we should consider retiring from playing sports?
There is no "magic number" of concussions that determine when an athlete should give up playing sports that put one at high risk for a concussion. The circumstances that surround each individual injury, such as how the injury occurred as well as the number and duration of symptoms following the concussion, are very important. These circumstances must be individually considered when assessing an athlete's risk for potential long-term consequences and potentially more serious brain injuries. The decision to "retire" from sports is a decision best reached after a complete evaluation by your child's primary care provider and consultation with an appropriate health-care professional who specializes in treating concussions.

I've read recently that concussions may cause long-term brain damage in athletes, especially professional football players. Is this a risk for high school athletes who have had a concussion?
Recently, increasing attention has been directed at CTE or Chronic Traumatic Encephalopathy. CTE is a *brain disease* that results from changes in the brain. These changes can affect how a person thinks, feels, acts, and moves. The cause of CTE has not been definitively established. Traumatic brain injuries, including concussions, and repeated hits to the head, called sub-concussive head impacts, may contribute to CTE.

Sub-concussive head impacts are impacts to the head that do not cause a concussion. Unlike concussions, which cause symptoms, sub-concussive head impacts do not cause symptoms. A collision while playing sports is one way a person can get a sub-concussive head impact.

Early evidence suggested that the more years a person has repeated sub-concussive head impacts or other brain injuries, the higher the chance they have of getting CTE. However, we have now learned that CTE does

not just occur in athletes. And, most people with head impacts or brain injuries will not get CTE. Furthermore, CTE has been diagnosed in people who have never had any history of brain trauma.

In light of the suggestion of a correlation between head impacts and CTE, the NFHS SMAC recommends limiting full contact during practice sessions and limiting the total number of quarters or periods played per week in sports at high risk for head impacts, such as football and ice hockey. These recommendations and guidelines were defined in the report from the July 2014 NFHS Concussion Summit Task Force. The guiding principles used to develop this report were to reasonably limit the opportunity for multiple hits to the head and to minimize concussion risk. The goal is also to maintain the integrity of the games and avoid unintended consequences. The report can be read in its entirety in the Resources section on the Sports Medicine page of the NFHS Website.

We cannot eliminate all of the risk of concussion from sports. However, we can take what we learn from science to reduce the chance for injury and set policy to ensure that students with a concussion get the care they need.

Everyone involved in high school sports plays an active role in educating others about concussion and other serious brain injuries. Please check out the Resource section on the Sports Medicine page of the NFHS Website for more information on how you can take an active role and get involved in keeping students safe, healthy and active.

Some of this information has been adapted from the CDC's "Heads Up: Concussion in High School Sports" materials by the NFHS's Sports Medicine Advisory Committee. Please go to **www.cdc.gov/ncipc/tbi/Coaches_Tool_Kit.htm** for more information.

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