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Guide to Sport Related Concussions For Student-Athletes, Parents, and Coaches

What is a concussion (SRC- Sport related concussion)?

A concussion is a brain injury resulting in a temporary disruption of normal brain function. A concussion occurs when the brain is rocked back and forth inside the skull (from a blow to the head or body, or from a whiplash injury to neck even without a head impact). An athlete DOES NOT need to lose consciousness (be "knocked out") to suffer a concussion. In fact, **less than ten percent of concussed athletes lose consciousness.**

Concussion Facts

• A concussion is a type of traumatic brain injury. The result is a functional problem rather than a structural injury, thus **concussions can't be seen with standard medical imaging (X-ray, CT, MRI scans).**

• Concussions occur most frequently in football, but ice hockey, lacrosse, soccer, basketball and cheerleading follow closely behind — all athletes are at risk.

• A concussion may cause multiple symptoms. Many symptoms appear immediately after the injury while others may develop over the next several days. The symptoms may be subtle and are often difficult to fully recognize at first. **Headache is the most common symptom, but other problems (even without a headache reported) may indicate a concussion.** Concussions are no longer labeled "mild" or "severe". One symptom does not indicate a less dangerous concussion and numerous symptoms are not required for a concussion to be serious. In the old days, the term "getting your bell rung" was often used and many athletes with symptoms were told this was 'part of the sport'- these incidents are concussions and should be removed from sport and evaluated by a health care provider knowledgeable in Concussion Management before returning to sport.

• **Concussion can cause symptoms which interfere with school, sleep, work and social life**.

• Concussion symptoms may last from a few days to several months.

• **An athlete should not return to sports** like physical education, team sport, conditioning, working-out, swimming, lifting weights, or dance/cheer while still having symptoms from a concussion. To do so, puts him or her at risk for prolonging symptoms and potential further injury. Research suggests after 1-2 days of rest- **adding activity (that doesn't risk a second head injury), such as walking or a stationary bike for 20 minutes a day has been shown to be safe and possibly aid in a quicker recovery.**

What should I do if I think my child has had a concussion?

If an athlete is suspected of having a concussion, he or she must be immediately removed from activity. Continuing to play or work out when experiencing concussion symptoms can lead to worsening symptoms, and increase risk for further injury and possibly even death (Second Impact Syndrome). Parents and coaches are not expected to make the diagnosis of a concussion. A medical professional trained in the diagnosis and management of concussions will determine the diagnosis, usually seeing the athlete within 2-3 days of the injury. However, coaches and parents must be aware of the signs and symptoms of a concussion. **If you are suspicious your child may have a concussion, he or she must stop activity right away and remain out of activity** until evaluated by a healthcare provider knowledgeable in treating concussions.

IF IN DOUBT, GET CHECKED OUT!

All student-athletes who may have a concussion need to be evaluated by a healthcare professional who is experienced in concussion management. You should call your child's physician- or see a Concussion trained healthcare provider. **If your child has worsening symptoms, begins vomiting, has a severe headache or is having difficulty staying awake or answering simple questions, he or she should immediately be taken to the emergency department. These symptoms may be a concussion- but they may also be clues to something other than a concussion needing immediate attention.**

What are the signs and symptoms of a concussion?

SIGNS OBSERVED BY PARENTS, FRIENDS, COACH, TEACHER OR SYMPTOMS REPORTED BY ATHLETE

While headache is most common, any of the following (with or without a headache) could indicate a Concussion

Headache and/or neck pain	Feeling sluggish
Appears dazed or stunned	Loses consciousness
Is confused about what to do	Feeling foggy or groggy
Nausea or vomiting	Shows behavior or personality changes
Forgets plays	Concentration or memory problems
Balance problems or dizziness	Can't recall events prior to the incident
Is unsure of game, score, or opponent	Confusion
Double or fuzzy vision	Can't recall events after the incident
Moves clumsily	Answers questions slowly or seems confused
Sensitivity to light or noise	Irritable or more emotional than usual

When can an athlete return to play following a concussion?

After a head injury, no athlete should return to play or practice on the same day. Concerns over athletes returning to play too quickly have led to legislation in almost all states regarding removal from sport and return to play guidelines after concussion. Most state laws also mandate players, parents and coaches receive education on the dangers of concussion as well as recognize the signs and symptoms of a concussion. Once an athlete no longer has symptoms of a concussion, has a normal exam, and scores within normal limits on a neurocognitive test, he or she may proceed with activity in a step-wise fashion to allow the brain to re-adjust to exertion. Typically, the athlete will complete a new step each day as long as they continue to have no symptoms. An example of a return to play protocol is shown below:

Step 1: Light aerobic exercise for 10-20 minutes (if your healthcare provider agrees, this step can start early on during recovery)
Step 2: Light exercise and a body weight circuit for 30-40 minutes (this step can't start until symptom free and allowed by your healthcare provider)
Step 3: Moderate exercise and a plyometric and resistance workout for 50-60 minutes
Step 4: Limited controlled return to full practice with safeguards against full contact
Step 5: Full Participation in contact practice advancing to competition
Step 6: Release by Concussion knowledgeable health care provider

If symptoms occur at any step, the athlete should cease activity and discuss with their healthcare provider.

How can a concussion affect schoolwork?

Following a concussion, student-athletes may have difficulty in school. These problems may last from days to months, and often involve difficulties with short and long-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 a few days, followed by academic accommodations (such as reduced class schedule), until the athlete has fully recovered. Decreasing the stress on the brain and not allowing the athlete to push through symptoms may help shorten the recovery time.

Research has suggested getting the student athlete back to a regular routine as soon as possible (sleep, socializing with friends, back to school) can aid in recovery- as long as symptoms don't increase during re-introduction.

In the "old days" it was recommended to have a concussed athlete stay in a dark room and avoid all activity. Today- recommendations have changed- it is recommended to avoid anything that could cause a second injury (such as sport) and to avoid things that increase symptoms. But if schoolwork, listening to music, short periods of time reading or using the computer do not increase symptoms- this is "ok" in most cases. Driving (and using machinery) should be restricted until discussed with a Concussion knowledgeable healthcare provider.

What can I do as a Parent and/or Guardian?

- Both you and your child should learn to recognize the "Signs and Symptoms" of a concussion as listed above.
- Teach your child to tell the coaching staff (or certified athletic trainer or school nurse) if he or she experiences symptoms of a concussion.

• Emphasize to administrators, coaches, teachers and other parents your concerns and expectations about concussion and safe play.
• Teach your child to tell the coaching staff if he or she suspects a teammate has suffered a concussion.
• Ask teachers to monitor any decrease in grades or changes in behavior that could indicate a concussion.
• Report concussions that occurred during the school year to appropriate school staff. This will help monitoring injured athletes as they move to the next sport season.

Other Frequently Asked Questions

Why is it important athletes not return to play until they have completely recovered from a concussion?

Student-athletes that return to activity too soon (school work, social activity, weight lifting or sports activity), can prolong their recovery time. They also risk recurrent, cumulative, or even catastrophic consequences if they suffer another concussion before the first concussion is resolved. Such risk and difficulties may be prevented if each athlete is allowed time to recover from his or her concussion and the return to play decisions are carefully and individually made. No athlete should return to sport or other at-risk activity when signs or symptoms of concussion are present. A concussion knowledgeable healthcare provider should give clearance before resuming sport.

Is a "CAT scan" (CT) or MRI needed to diagnose a concussion? Are there other tests that can help diagnose a concussion?

Diagnostic testing, which includes CT ("CAT") and MRI scans are rarely needed following a concussion. While these are helpful in identifying life-threatening head and brain injuries (skull fractures, bleeding or swelling of the brain), they are currently not sensitive in detecting a concussion. **Concussion diagnosis is based upon the athlete's injury history in conjunction with a healthcare provider's physical examination, neurocognitive and balance testing, and evaluation.** There is newer technology such as MRI spectroscopy and DTI that are being researched for aiding in diagnosing concussions. Standards have not been accepted for use in patient care yet. In fact, there are even blood tests (biomarkers) that are being considered to aid in diagnosing concussion in the near future.

What about Concussion computer testing done at schools?

IMPACT, SWAY, and SPORT GAIT are a few examples of neurocognitive and balance tests completed on a computer or smart phone to aid in concussion decision making. Many schools use this as a tool to get baseline information pre-season- in case an athlete is suspected of having a concussion during the season- a second test can be given to see if there is a decrease in scores. While a baseline is not required, it does increase the usefulness of the test.
Computer testing is an additional tool but should not be used by itself for decision making in diagnosing a sport's concussion or when it is safe to return to sport.
Like equipment (such as a helmet), monitoring systems (such as alarms after contact), and rule changes (such as keeping your head up during a tackle)- computer testing may help with concussion management- but it is the Athletic Trainer on the field and the concussion knowledgeable healthcare provider that is most important in making decisions about the student athlete's safety after a suspected concussion.

What is the best treatment to help my child recover quickly from a concussion?

The best treatment for a concussion is rest.
In the "old days" we advised awakening a concussed patient every few hours at night. This is not recommended today- your health care provider can give recommendations on a safe sleep routine for your individual case.
There are no research proven medications that can help speed recovery. There is limited research on vitamins, supplements, over-the-counter medicines and some prescription medicines that may help alleviate concussion symptoms in certain circumstances. Some medicines, such as NSAIDS (ibuprofen and naproxen) may cause worsening symptoms (or rebound headaches that initially help but then headaches increase). Talk to your healthcare provider to help decide if medications should be a part of the concussion treatment plan in your individual case. Exposure to loud noises, bright lights, computers, video games, television and phones (including text messaging) may worsen the symptoms of a concussion and may need to be limited or removed. As the symptoms lessen, you can allow increased use of computers, phone, video games, etc., but access may still need to be limited. If symptoms worsen, access of what activity "triggers" the symptoms must be limited and closely monitored by a parent or guardian.

How long do the symptoms of a concussion usually last?

Every concussion is different, and so, everyone's timeline of recovery is different as well. We used to say that symptoms of a concussion will typically resolve within 10-14 days of the initial injury with rest and appropriate treatment. Today, we understand that each student athlete's injury is unique, and each will require different resources and accommodations, a different timeline back to school, and a different timeline back to sport. While some student athletes are safe and ready in 1-2 weeks, others can take far longer- even months. Symptoms such as headache, memory problems or poor concentration, difficulty sleeping, and mood changes can interfere with school, work and social interaction. In some instances, if there is delayed recovery, prescription medications, additional specialists such as a neuropsychologist, and vestibular rehabilitation (a form of physical therapy that can help dizziness, unsteadiness, visual problems, and nausea) may be required. Choosing a healthcare provider that is familiar with Concussion Management can help ensure the current standard of care treatment options are offered from the start- and what other providers may be able to help resolve symptoms more quickly.

How many concussions can an athlete have before he or she should stop playing sports?

There is no "magic number" of concussions that determine when an athlete should give up playing contact or collision sports. The circumstances that surround each individual injury, such as how the injury occurred and the duration of symptoms following the concussion, along with the athlete's personality, performance in school, and sleep are each important and must be individually considered when assessing an athlete's risk for and potential long-term consequences from further and potentially more serious injury. The decision to "retire" from contact sports is best reached after a complete evaluation by your child's health care provider and consultation with a physician or neuropsychologist who specializes in treating sports concussions. The short term goal is to have a resolution of symptoms and ability to return to academic and sport participation. **The long-term goals are to have no difficulty with memory or concentration, a normal personality and normal relationship with others, normal sleep, no symptoms during activity, and the ability to perform the cognitive and physical demands the patient will need for their lifetime.**

What is the purpose of the Return to Play (RTP) protocol?

Upon increasing activity after concussion, some athletes may experience a return of symptoms, indicating the brain has not fully healed from the initial injury. Therefore, a sport-specific and step-wise protocol is used and must be completed prior to full medical clearance. Successful completion of this indicates the brain is able to handle the demands of athletic participation. The protocol is typically five steps, each step separated by at least 24 hours, during which the athlete gradually increases duration and intensity of athletic participation, while at the same time is monitored by a Certified Athletic Trainer (if available at your school/club) for any signs or symptoms.

Research suggests starting Step 1 (10-20 minutes of light aerobic exercise such as a fast walk or stationary bike- without resistance, without plyometric exercise, and no exercise that could risk another head injury) may be safe after 1-2 days of rest, so long as symptoms are decreasing (rather than waiting for symptoms to completely go away). In fact, starting safe activity sooner, may quicken recovery. Research continues to recommend not progressing with the Five Step Return to Sport (Steps 2-5) until completely symptom free. Discuss with your concussion management team.

Final comments:

Concussion can occur in any sport and to any athlete. It's a head (or neck) injury that results in a change in brain function- showing up as a sign (like poor balance) or symptom (like a headache or dizziness). Imaging (such as CT or MRI) isn't needed for diagnosis- and while special tests are often used it is the experienced healthcare provider that is the key to making decisions on diagnosis, treatment, and return to play decisions after a concussion.

With carefully thought-out rule changes, continuing improvement in protective equipment, coach/parent/athlete knowledge of what to look for and how to respond to a suspected concussion, and continuing research in tools to diagnosis and possibly prevent head injury- **we can all be a part of the team to help athletes stay safe during sport.**

Be well.

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