New Hampshire
ORTHOPAEDIC
CENTER

Every Day Kids Suffer Concussions – What You Need to Know

What are they?
A concussion is an injury to the brain that alters its function, the effects of which are usually temporary. These effects are variable and can include difficulty with concentration, memory, balance, and coordination.

Symptoms
These can range from very subtle, to obvious and severe. Headache, loss of memory, and confusion are often seen. Loss of memory can include events prior to the injury and will often include loss of memory of how the injury occurred.

MOST CONCUSSIONS DO NOT RESULT IN LOSS OF CONSCIOUSNESS.

Things to look for include:

- Headache/pressure
- Dizziness
- Confusion/fogginess/amnesia to event
- Dazed appearance
- Delayed response to questions
- Ear ringing/slurred speech
- Loss of consciousness
- Nausea/vomiting

Seizures, altered vision, pupils that don't appear symmetric, or prolonged loss of consciousness require immediate evaluation

Causes
The brain is a very delicate structure encased in a solid container (skull). Anything that causes the brain to knock up against the side of the skull may result in a concussion. A DIRECT BLOW TO THE HEAD IS NOT REQUIRED TO RESULT IN A CONCUSSION, NOR IS DIRECT CONTACT. Rapid deceleration of the head can cause the brain to hit the skull and result in a concussion.

Risk Factors
Participation in collision sports such as lacrosse (in this case) is a risk factor. Another very important risk factor is having had a previous concussion.

Testing/Evaluation
On field evaluation includes evaluating consciousness and protecting any neck injury. There are various sideline tools used to assess the athletes symptoms and ability to recall or think. These are brief screening tools for the in-game setting which are usually followed by more comprehensive neurocognitive testing.

There is no routine x-ray or medical test to diagnose concussion. CT SCANS AND MRIs ARE TYPICALLY NORMAL with a concussion. If a patient develops specific neurological symptoms such as prolonged or worsening pain, loss of vision, asymmetric pupils, repeated vomiting or seizures CT scans and/or MRI can tell if there is bleeding on the brain that may be the cause.

Treatment
1. "When in doubt, keep 'em out". The first step is removing the athlete from participation as soon as a concussion is suspected.
2. Rest. This includes rest from both physical and mental activity. This includes all "thinking" activities like reading, video games, TV, etc.

3. Tylenol (acetaminophen) is useful for headaches, but NSAIDs such as Ibuprofen (Motrin, Advil), Aleve, and Aspirin are NOT recommended, as this may increase the risk of bleeding.

4. Progression back to activity begins with mental activity first.

5. Some studies have suggested that gentle exercise that keeps the athlete below their symptom threshold might help decrease the possibility of post concussion syndrome and help both athletes and non-athletes return to activity.

Return to Play
Most athletes will have resolution of symptoms after two weeks and a return of their neurological testing to a baseline ("normal") in 7-10 days. Internationally accepted return to play criteria includes:

1. The athlete must have no symptoms at rest
2. The athlete must have no symptoms with full mental and physical exertion
3. Balance testing must return to baseline
4. Neurocognitive (brain/thinking) testing must return to baseline.

Once an athlete has no symptoms at rest, they can then progress through a guided protocol of rehab to return to play. Each stage takes 24 hrs, so that it takes at least 5 days to progress through the protocol prior to full game participation.

Prevention
Education!!

Preventative measures are of paramount importance in high risk sports. Players, Coaches, and parents have a role to play in not only recognition of sports concussions, but in changing the behavior and culture that may result in concussion. Many players, coaches, and parents may feel like aggressive behavior is required in certain sports. These feelings are often heard expounded from the sidelines. Proper technique, age appropriate rules for contact, and sportsmanship can result in decreased incidence of concussions.

Helmets and new helmet technology have been shown to decrease the risk of concussion and newer technologies are promising.

There is lack of conclusive evidence that the use of a mouth guard or specific types of mouth guards reduce the risk of concussion. Mouth guards do, however, reduce the risk of dental trauma which makes them invaluable in that role.

Complications
Post Concussion Syndrome is the persistence of any of the following after a concussion: headaches, dizziness, fatigue, irritability, difficulty with concentration and mental tasks, memory impairment, insomnia, and reduced tolerance to stress. It's suspected if these symptoms persist more than 1-6 weeks after initial injury. Athletes who present initially with more symptoms take longer to recover.

Epilepsy: The risk of developing Epilepsy is doubled in the first 5 years post concussion.

Second Impact Syndrome: This is when an athlete sustains 2 successive injuries before recovery of the first is complete. Younger athletes seem especially susceptible to this, which can be a devastating complication leading to rapid brain swelling and death. Second Impact Synrome highlights the importance of restricting athletes from play until they have NO SYMPTOMS.

CTE (Chronic Traumatic Encephalopathy): This is a degenerative condition of the brain that occurs years after recovery. It is the topic of much conversation and research. Early in CTE, patients can have problems with irritability, depression, and poor memory. Later on, it can affect physical movement and speech. (See Junior Seau, Jim McMahon, both former NFL players)

Resources

There are multiple resources available for education for players, parents, coaches, and trainers on this topic which include programs for preseason baseline testing for players which is instituted in many local high schools and routinely at the collegiate and professional levels.

NCAA Concussion in Sports	*www.ncaa.org/wps/portal/ncaahome?WCM_GLOBAL_CONTEXT* = /ncaa/NCAA/Academics+and+Athletes/Personal+Welfare/Health+and+Safety/Concussion
Centers for Disease Control and Prevention Heads Up Toolkit for High School Sports	*www.cdc.gov/concussion/HeadsUp/high_school.html*
Centers for Disease Control and Prevention Heads Up Toolkit for Schools	*www.cdc.gov/concussion/HeadsUp/schools.html*
Centers for Disease Control and Prevention Heads Up Toolkit for Physicians	*www.cdc.gov/concussion/HeadsUp/physicians_tool_kit.html*
Computerized neuropsychological tests	
ImPACT	*www.impacttest.com*
CogState	*www.cogstate.com/go/sport*
HeadMinder	*www.headminder.com*
U.S. Army Medical Department, Automated Neurocognitive Assessment Metrics (ANAM)	*www.armymedicine.army.mil/prr/anam.html*

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Another I would add to this is sportslegacy.org, which is an organization headed by Chris Nowinski and Dr. Robert Cantu with cutting edge education and policy on this enormously important matter. There are several links and guides to setting up and maintaining an active concussion surveillance and management program for teams and institutions.