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Concussion

by Wendy Quick

Definition and causes:

A concussion is not just a "bump on the head." It is a traumatic brain injury that needs proper treatment whether it is mild or severe. A concussion can change the way your brain normally functions. The brain has the consistency of gelatin and is cushioned from everyday jolts and bumps by cerebrospinal fluid inside the skull. A violent bump, blow, or jolt to the head and neck or upper body can cause the brain to slide back and forth forcefully against the inner walls of the skull. Although concussions are usually caused by a blow to the head, they can also occur when there is a sudden acceleration or deceleration of the head. Certain events such as a car crash or being violently shaken can also cause brain injury. An injury to the brain may lead to bleeding in or around the brain causing a plethora of signs and symptoms that may occur immediately or a few hours, days or even weeks following the injury. Bleeding in the brain can be fatal, and the Mayo Clinic recommends that anyone who experiences a brain injury be monitored in the hours afterward and receive emergency care if symptoms worsen.

Even a "ding" to the head, "getting your bell rung," or a seemingly mild bump or blow to the head can be serious. These injuries to the brain can cause a loss of consciousness, but most concussions do not. Because of this, some people have concussions and don't realize it. The Centers for Disease Control and Prevention agrees that *most* concussions occur without loss of consciousness and that all concussions are "serious". They also report that falls are the most common cause of traumatic brain injuries (TBI).

Does Dehydration Increase an Athlete's Risk for Concussion?

Dehydration is very common when exercising, especially when done outside in the heat, and it can lead to more serious problems like heat exhaustion and heat stroke. The question is whether dehydration can increase an athlete's risk for concussion. Researchers from the University of Windsor have been exploring this idea recently. The researchers hypothesized that dehydrated athletes suffer more concussions based on the fact that dehydration, even mild cases, causes a reduction of cerebrospinal fluid in the brain which is important for protecting the brain by providing cushion for the brain during hard hits and blows. Some studies have shown that even two-percent dehydration, which is often signaled by the feeling of thirst, leads to

significant reduction in CSF levels. At the 2014 Experimental Biology Conference of over 10,000 scientists, the research team presented their preliminary findings. The conclusion is that athletes may, in fact, face a greater risk of concussion when dehydrated. However, the results weren't definitive and they reported that more research needs to be conducted. Based on these preliminary findings, athletes should be encouraged to maintain good hydration as a possible cushion against concussion.

Signs Observed by coaching staff, parents or medical personnel:

- Appears dazed or stunned
- Confusion or disorientation, such as difficulty recognizing people or places, confusion about an assignment
- asks the same questions repeatedly
- answers questions slowly
- Changes in behavior and personality, such as irritability
- Forgets an instruction, obvious difficulty with mental function/memory
- Seizures
- Is unsure of game, score, or opponent or general situation
- Vision or eye disturbances, such as pupil dilation or pupils of unequal sizes
- Obvious difficulty with physical coordination and balance
- Balance seems wobbly, moves clumsily, unsteady on their feet, stumbling
- Vomiting, sometimes intractable
- Delayed response to questions
- Loses consciousness (*even briefly*)
- Shows mood, behavior, or personality changes
- Can't recall events *prior* to hit or fall
- Can't recall events *after* hit or fall

Symptoms in children:

Although head trauma is very common in young children, concussions can be difficult to recognize in infants and toddlers. The reason for this may be due to the fact that they may not be able to describe how they feel. Nonverbal clues of a concussion in a child:

- Appearing dazed
- Listlessness and tiring easily
- Irritability and crankiness
- Loss of balance and unsteady walking
- Crying excessively
- Change in eating or sleeping patterns
- Lack of interest in favorite toys and other things which would normally capture his/her attention
- Large head bumps or bruises on areas other than the forehead in children, especially in infants under 12 months of age

Symptoms reported by athlete/patient:

- Headache which may get worse over time
- A feeling of “pressure” in the head
- Temporary loss of consciousness
- Amnesia which may or may not follow a loss of consciousness, and usually involves the loss of memory of the event that caused the concussion
- Nausea or vomiting
- Balance problems, lasting or recurrent dizziness
- Double or blurry vision, "seeing stars"
- Sensitivity to light
- Sensitivity to noise
- Ringing in the ears
- Slurred speech or other changes in speech
- Feeling sluggish, hazy, foggy, or groggy
- Feeling fatigued
- Concentration or memory problems
- Confusion or feeling as if in a fog
- Does not “feel right” or is “feeling down”
- Symptoms that worsen over time

Emotional impact of concussion:

- Inappropriate Emotions
- Irritability
- Personality Change
- Sadness
- Nervousness/Anxiety
- Lack of Motivation
- Feeling "More Emotional"

Sleep/Energy impact of concussion:

- Fatigue
- Drowsiness
- Excess Sleep
- Sleeping Less Than Usual
- Trouble Falling Asleep

Symptoms of concussions may be delayed in onset by hours or days after an injury, such as:

- Concentration and memory complaints
- Irritability and other personality changes
- Sensitivity to light and noise

- Sleep disturbances
- Psychological adjustment problems and depression
- Disorders of taste and smell

Special considerations with athletes:

Concussions are common, particularly in contact sports, such as football, but can occur in any sport or recreation activity. Every concussion injures the brain to some extent. This injury needs time and rest to heal properly. Most concussive traumatic brain injuries are mild, and people usually recover fully.

The Mayo Clinic states that no one should return to play or vigorous activity while signs or symptoms of a concussion are present. Experts recommend that an athlete with a suspected concussion not return to play until he or she has been medically evaluated by a health care professional trained in evaluating and managing concussions. Children and adolescents should be evaluated by a health care professional trained in evaluating and managing pediatric concussions. Experts also recommend that adult, child and adolescent athletes with a concussion not return to play on the same day as the injury.

How to recognize a possible concussion:

Look for a history of a forceful bump, blow, or jolt to the head or body that results in rapid movement of the head and a change in the athlete's or patient's behavior, thinking, or physical functioning. The Centers for Disease Control and Prevention states that athletes who experience **any** of the signs and symptoms listed above after a bump, blow, or jolt to the head or body should be kept out of play the day of the injury and until a health care professional, experienced in evaluating for concussion, says they are symptom-free and it's okay to return to play.

Keep in mind that some athletes may not experience and/or report symptoms until hours or days after the injury. Most people with a concussion will recover quickly and fully. But for some people, signs and symptoms of concussion can last for days, weeks, or longer.

Risk factors that may increase the risk of a concussion:

- Participating in a high-risk sport, such as football, hockey, soccer, rugby, boxing or other contact sport; the risk is further increased if there's a lack of proper safety equipment and supervision
- Being involved in a motor vehicle collision
- Being involved in a pedestrian or bicycle accident
- Being a soldier involved in combat
- Being a victim of physical abuse
- Falling, especially in young children and older adults
- Having had a previous concussion

Potential complications:

Epilepsy: People who have had a concussion double their risk of developing epilepsy within the first five years after the injury.

Cumulative effects of multiple brain injuries: Evidence exists indicating that people who have had multiple concussive brain injuries over the course of their lives may acquire lasting, and even progressive, impairment that limits their ability to function.

Post-concussion syndrome: Some people begin having post-concussion symptoms — such as headaches, dizziness and thinking difficulties — a few days after a concussion. Symptoms may continue for weeks or up to a few months after a concussion.

Post-traumatic headaches: Some people experience headaches within a week to a few months after a brain injury.

Post-traumatic vertigo: Some people experience a sense of spinning or dizziness for days, week or months after a brain injury which can lead to falls and a second concussion.

Second impact syndrome: Experiencing a second concussion before signs and symptoms of a first concussion have resolved may result in rapid and usually fatal brain swelling.

Treatments and drugs

The best known concussion treatment is rest. However, it can take between seven days to three weeks to fully recover from a concussion, and it is very important that the concussion is managed throughout the entire recovery process. Rest is the most appropriate way to allow the brain to recover from a concussion. For headaches, acetaminophen is recommended. Ibuprofen and aspirin should be avoided, as there's a possibility they may increase the risk of bleeding.

Some programs are adopting the **R.E.A.P. Project** as a community-based model for concussion management:

- **Remove** physical demands and **Reduce** physical and cognitive (mental) demands and home stimulation
- **Educate** the student/athlete, families, educators, coaches and medical professionals on all of the potential symptoms
- **Adjust/Accommodate** the student/athlete academically and with home activities
- **Pace** the student/athlete back to learning and eventually to play and physical activity

It is recommended that patients physically and mentally rest to recover from a concussion, avoiding general physical exertion, including sports or any vigorous activities, until no symptoms remain. This includes limiting activities that require thinking and mental concentration, such as playing video games, watching TV, schoolwork, reading, texting or using a computer. Shortened school day or workdays may be recommended, taking breaks during the day, or have reduced school workloads or work assignments during recovery. As symptoms improve, it is recommended to gradually add more activities that involve thinking, such as doing more schoolwork or work assignments, or increasing the amount of time spent at school or work. Resuming sports or other vigorous physical activity too soon increases the risk of a second concussion and of lasting, potentially fatal brain injury. Recent evidence shows that some people who have had multiple concussions over the course of their lives are at greater risk of developing lasting, and even progressive, impairment that limits their ability to function.

The levels of brain chemicals are altered for about a week after a concussion before they stabilize again. The recovery time is variable, and it's important for athletes never to return to sports while they're still experiencing signs and symptoms of concussion.

Sources:

Craig Hospital

<http://www.craighospital.org/>

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http://www.cdc.gov/concussion/headsup/online_training.html

Mayo Clinic

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<http://rockymountainhospitalforchildren.com/service/sports-medicine>

Drip Drop

<http://dripdrop.com/dehydration-increase-athletes-risk-concussion/>