

Understanding Concussion

Reports of concussions are in the news nearly every day. Concussions were once thought of as simply “getting your bell rung” and that you would eventually “shake it off.”

But the health care community has found that concussions can be more serious and have lasting symptoms that need to be treated for a full recovery.

With celebrities and athletes reporting having concussions, awareness of this serious injury continues to rise. More and more information is being provided to help understand what they are, and more importantly, how they can be prevented.

Many people are susceptible to concussions because a wide variety of accidents can cause them, from a simple fall to a sport-related injury or a motor vehicle accident.

What is a concussion?

Concussions are a type of traumatic brain injury (TBI) caused by a blow or jolt to the head. The injury can range from mild to severe and can disrupt the way the brain normally works.

The brain has the consistency of gelatin. It’s cushioned from everyday jolts and bumps by the cerebrospinal fluid inside the skull. A violent blow to the head can cause the brain to slide forcefully against the inner wall of the skull.

If the jolt was hard enough, the brain can get bruised as it hits the skull. Just like bruises on an arm or leg, these go away in time. If there are many bruises, there may also be swelling. When the brain swells, it takes much longer to return to normal than a simple bruise may take.

Additionally, the brain is made of millions of cells called neurons that are connected to each other by long, thin fibers called axons. Some of these axons can become disrupted from a concussion if it is serious enough. When this happens, different cells in the brain cannot communicate properly with each other. Even though we can only see axons under a microscope, we know that they can heal because, in time, many patients recover completely.

Finally, like any other part of the body, the brain has blood vessels in it. If a TBI is very serious, some of these blood vessels can tear and bleed soon after the injury. Usually, the bleeding will stop on its own and the blood vessels heal like any other cut.

Different grades of concussion

There are two types of concussions, simple concussion and complex concussion. The type of concussion sustained depends on how long the symptoms occur after the injury.



With a **simple concussion**, often associated with a fall, a person’s symptoms improve in seven to 10 days.

With a **complex concussion**, symptoms last longer than 10 days. It is also considered a complex concussion if a person loses consciousness for more than one minute or has seizures after a blow to the head. And, if someone has already experienced a concussion and receives a subsequent one, it is considered a complex concussion.

Signs and symptoms of concussions

A concussion cannot be seen; however, symptoms might appear right away while other symptoms can appear days or even weeks after the injury. It is best to see a health care professional if someone thinks he or she might have a concussion. An undiagnosed concussion can affect someone’s abilities at school or work and in everyday activities.

Symptoms of a mild brain injury or concussion include:

- Dizziness, balance problems
- Difficulty with vision
- Sensitivity to light or noise
- Nausea
- Headache
- Feeling tired or groggy
- Confusion
- Difficulty remembering or recalling things
- Difficulty concentrating on tasks (BIAA)

Treatment of concussions

Approximately 38 percent of patients who sustain head

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trauma are diagnosed with post-concussion syndrome (PCS). Physicians treat a majority of cases with non-steroidal analgesics or antidepressants, and refer about 40 percent for psychological consultation.

For clinical treatment, non-steroidal analgesics (e.g., Motrin) were most often recommended. Antidepressant medication was the second most commonly prescribed medication overall and the treatment preferred by neurologists. Serotonin reuptake inhibitor and tricyclic antidepressants are effective therapies for anxiety and headache, as well as depression, and may also treat fatigue, irritability, and concentration difficulty. Preliminary studies also suggest that Zoloft and Xanax can be effective in reducing PCS symptoms.

If you get a concussion

Regardless of the level of concussion, it's best to take it easy for a few days. That means no exercise or activities. If the injury occurred during sports, one should never return to a sports practice or game on the day the injury occurred. Keep in mind that once an initial concussion is incurred, subsequent concussions are likely and can be more severe.

Wait for all symptoms to disappear before playing sports or other physical activity again — and that doesn't just mean physical symptoms like headaches or tiredness. In many teens, the physical symptoms get better before the cognitive ones (such as difficulty thinking or making decisions). So it's important to feel 100 percent before becoming active again.

If someone thinks he's had a concussion:

- Always make sure to inspect any bumps or bruises on the head.
- Tell a family member, friend, coach or teammate.
- Ask to be taken out of the game or sporting event if the concussion was received while playing.
- Pay attention: have there been any physical changes recently?
- Watch out for thinking problems: if someone is struggling to remember things or loses focus, they should tell someone.
- Talk to parents, teachers and medical professionals about any troubles someone is having.
- See a health care professional.
- Sleep at least seven to eight hours a night. Getting plenty of rest is crucial to staying healthy and healing after any injury.
- Return to practice only after receiving the OK from a health care professional. (BIAA)

Psychological treatment typically involves education.

Assuring the patient that symptoms are part of the normal recovery process and not signs of permanent brain dysfunction may reduce anxiety about the cause of PCS.

Treatment, along with prescribed antidepressant medication, was found to have a significantly better outcome. Education and cognitive restructuring was also associated with significantly improved outcome.

A review of controlled treatment outcome studies conducted over the past two decades in Scandinavia, Great Britain, Canada, and the United States suggests that early single session treatment can prevent PCS as effectively as traditional outpatient therapy.

A typical study will randomly assign those who have acquired a mild head trauma or concussion to either a control group or a treatment group. Patients in both groups receive routine inpatient care. Patients in the treatment group receive information about their injury, what symptoms to expect and how to manage them, likely prognosis and recovery times, stress reduction techniques, methods for coping with memory and intellectual inefficiency and advice on graded return to normal levels of activity.

Patients were contacted six months following injury by an interviewer who was unaware of group assignments to obtain outcome data using a standardized checklist of symptoms (King et al., 1995). The treatment group reported significantly fewer and less severe post-concussive symptoms and significantly less disruption of social and occupational functions. (2001)

Tests and diagnosis

Diagnosing a concussion is usually straightforward. It can be difficult, however, to determine whether the blow caused potentially serious bleeding or swelling in the skull because the signs of injury can be delayed.

After a doctor asks detailed questions about an accident, he or she may perform a neurological exam. This evaluation includes checking:

- Memory and concentration
- Vision
- Hearing
- Balance
- Coordination
- Reflexes

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Capturing images of the brain to assess damage

There are two popular methods of capturing images of the brain: computerized tomography (CT) scan and magnetic resonance imaging (MRI).

A CT scanner takes multiple cross-sectional X-rays and combines all the resulting images to produce detailed, two-dimensional images of the skull and brain. During the procedure, the patient lies still on a table that slides through a large, circle-shaped X-ray machine. The scan is painless and generally takes less than 10 minutes.

The MRI uses a powerful magnetic field to align the nuclear magnetization of (usually) hydrogen atoms in water in the body. Radio frequency (RF) fields are used to systematically alter the alignment of this magnetization. This causes the hydrogen nuclei to produce a rotating magnetic field detectable by the scanner. This signal can be manipulated by additional magnetic fields to build up enough information to construct an image.

Not every concussion requires capturing an image, but it is usually done as a precaution if there's a chance an injury is more severe than the immediate condition that person presents with. A scan is likely if the person who received the concussion:

- Is a child of any age or an adult 65 years or older
 - Fell from a height of more than three feet
 - Was involved in a motor vehicle crash
 - Was under the influence of alcohol or drugs
 - Was unable to recall the accident for at least 30 minutes after it occurred
 - Was having persistent trouble with short-term memory — that is, retaining new information — after they've completely regained consciousness
 - Has vomited
 - Has had a seizure
 - Suffered bruises, scrapes or cuts on the head and neck
 - Fractured his or her skull
- (mayoclinic.com)

Concussion testing in professional football

ImPACT, the first computerized testing system to evaluate the severity of concussions in athletes, takes testing one step further. The system also replaces a time-consuming written form of testing.

Mark Lovell, Ph.D., the director of the Center for Sports

Medicine Concussion Program at the University of Pittsburgh Medical Center (UPMC Health System) and neurosurgery professor, and Pittsburgh Steelers team neurosurgeon Joseph Maroon, M.D., teamed up to develop ImPACT. Currently, only the Philadelphia Eagles and the Steelers use the computerized testing method while other teams still employ the paper and pencil version of the test.

NFL players and professional hockey players undergo neuro-psychological testing before the start of each season. Such an evaluation is known as baseline testing and includes a neurological exam and short tests that measure memory, concentration and motor skills.

Once a player suffers a concussion during the season, he takes the test again 24 hours later. Those results and any follow-up tests are then compared with his baseline testing to give team doctors an idea of when a player has returned to normal and can play again. (abcnews.go.com)

Preventing concussions

The following tips are provided by the Mayo Clinic in helping to prevent or minimize risk of head injury:

Wear a helmet during recreational activities. When bicycling, motorcycling, skiing, horseback riding, skating or engaging in any recreational activity that may result in head injury, wear protective headgear.

Buckle the seat belt. Wearing a seat belt may prevent serious injury, including an injury to the head during a car accident.

Make the home fall-proof. Keep the home well lit and floors free of clutter — meaning anything that might cause a trip and fall. Falls around the home are the leading cause of head injury for infants, toddlers and older adults.

Protect small children. To help lessen the risk of head injuries to small children, pad countertops and edges of tables, block off stairways and install window guards. Don't let children use sporting equipment or play sports that aren't suitable for their age.

Use caution in and around swimming areas. Don't dive into water less than nine feet (three meters) deep. Read and follow posted safety rules at water parks and swimming pools.

Wear sensible shoes. Older people should wear thinner, hard-soled, flat shoes. Resilient-soled athletic shoes may impair their balance and contribute to falls. Avoid wearing high heels, sandals with light straps, or shoes that are either too slippery or too sticky.

Most people who suffer a concussion recover completely in time because the damage can be minor. Most doctors

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who treat people with brain injuries agree that recovery is faster when the patient gets enough rest and resumes responsibilities gradually. However, this is only the case if the symptoms of a concussion are not ignored, medical attention is received, and directions given by the doctor are followed. ❖

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