

## What is a concussion?

A concussion is a temporary interruption of brain function that occurs when a person's brain is violently rocked back and forth inside the skull due to a blow to the head or neck.

## What are the common symptoms of a sports-related concussion?

Athletes with a concussion may exhibit a wide variety of symptoms, including temporary loss of consciousness and altered memory or awareness of surroundings. Most concussions resolve quickly and do not leave permanent deficits.

### Athletes may experience:

- ▶ Headache or nausea
- ▶ Balance problems or confusion
- ▶ Memory problems
- ▶ Loss of consciousness
- ▶ Double or fuzzy vision
- ▶ Sensitivity to light or noise
- ▶ Sluggish or foggy feeling
- ▶ Changes in sleep pattern

### Observable symptoms:

- ▶ Appears dazed, stunned, or confused
- ▶ Moves clumsily
- ▶ Forgets events prior to play or after being hit
- ▶ Answers questions slowly
- ▶ Shows behavior or personality change

## How often does concussion occur in sports?

The Centers for Disease Control and Prevention estimate that 1.6 to 3.8 million sports-related concussions occur each year. More than 60,000 concussions occur annually in high school athletics (Brain Injury Association of Massachusetts).

## Which sports present a high risk for concussion?

While many sports carry risk for concussion, contact sports, such as football, soccer, hockey, basketball, rugby, and lacrosse, have a much higher incidence.

## What is second impact syndrome?

Second impact syndrome occurs when an athlete experiences a second concussion, generally within ten days of the first injury. Second impact syndrome can lead to severe brain damage and death in some instances.

## How are sports-related concussions diagnosed?

Neuropsychological testing has proven to be one of the most effective indicators of the persistent effects of a concussion. If an athlete experiences an injury, his or her pre-season baseline neuropsychological test results can be compared to post injury test results and provide a very accurate return-to-play assessment. Computerized neuropsychological testing enables large numbers of athletes to be evaluated, and provides more accurate measurement of cognitive processes—such as reaction time and information processing speed—than

traditional CT scans and MRIs. While these diagnostic tools (CT scans and MRIs) are useful in identifying severe brain injury, they are not often helpful in identifying more subtle brain-related changes. Advances in Functional Magnetic Resonance Imaging (fMRI) are providing a more viable tool for the assessment of neurological and recovery processes following mild traumatic brain injury.

### **What can parents, coaches, and trainers do to protect athletes from serious injury due to concussion?**

Properly fitted helmets and the use of safe practices in sports can help reduce the risk of concussion. Not all concussions can be prevented, but knowledge and preparedness in case of an injury can make a great difference in an athlete's recovery. Parents, coaches, and trainers can protect athletes from the risk of permanent brain damage or death following an injury by making sure they are fully recovered before allowing them to return to play. It is also important to provide local emergency response personnel with clear and accurate directions to athletic fields or arenas.

### **What can be done to help a person who has been seriously injured due to sports-related concussion?**

Individuals who receive prompt diagnosis and treatment for a brain injury often make great progress in regaining skills following a trauma. Treatment should include rehabilitation and special education services provided by a multidisciplinary team of professionals, including licensed psychologists, physical and occupational therapists, speech and language pathologists, behavioral specialists, and teachers trained specifically in the treatment of brain injury. Residential services can also be useful for individuals who need extra care.

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*May Institute is a nonprofit organization that provides educational, rehabilitative, and behavioral healthcare services to individuals with autism spectrum disorder (ASD) and other developmental disabilities, brain injury, and neurobehavioral disorders. Since its founding more than 65 years ago, the organization has evolved into an award-winning national network that serves thousands of individuals and their families every year at nearly 140 service locations across the country. May Institute operates several schools for children and adolescents with ASD and other developmental disabilities. It also operates a specialized school for children and adolescents with brain injury and neurobehavioral disorders; it is located in Brockton, Mass.*

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