

## Concussion: The Basics

### WHAT IS CONCUSSION?

Concussion occurs when the brain is jostled inside the skull as a result of a blow to the head or body or a fall on a hard surface or object. The jostling can lead to damage and stretching of brain cells, causing chemical changes and temporary loss of normal brain function, especially as it relates to memory and orientation.

### WHAT ARE THE SYMPTOMS?

A concussion may result in a loss of consciousness for a few seconds or a few minutes. People may feel dazed for days or weeks afterwards. Symptoms that can occur immediately include headache and dizziness, slurred speech, and confusion. Other symptoms can include nausea, vomiting, a delayed response to questions, and fatigue. Most people recover within a week or two, but some have symptoms such as memory problems, headaches, and behavioral changes that may persist for weeks or even months.

### WHAT ARE THE CAUSES?

The most common causes are car accidents, falls, and injuries from sports such as football, basketball, ice hockey, wrestling, soccer, field hockey, and lacrosse. Among children, a fall on the playground or while riding a bicycle can also cause a concussion.

### HOW IS IT DIAGNOSED?

Doctors evaluate signs and symptoms that can indicate a concussion, such as memory loss or confusion. They may test hearing, vision, language function, balance, reflexes, coordination, sensation, and strength. They also may conduct tests of recall and concentration. For patients who experience bouts of vomiting, seizures, or severe headaches, or whose symptoms are getting worse, doctors may order imaging like CT and MRI scans to check for swelling or bleeding in the brain or other trauma-related signs.

### WHAT TREATMENTS ARE AVAILABLE?

If the concussion was sustained while playing a sport, the person should be removed from play immediately and evaluated by a neurologist. Athletes should not resume play until cleared by a neurologist. Acetaminophen (Tylenol) is used to treat headache rather than nonsteroidal anti-inflammatory drugs like ibuprofen (Advil) and aspirin, which may increase the risk of a brain bleed. Daily use of analgesics is not recommended as it can result in rebound headache. The American Academy of Pediatrics updated its guidelines for treating sports-related concussions. They now suggest limited activity, such as brisk walking; say it's okay to resume using electronic devices; and encourage kids to return to school earlier but to discuss reducing their workload with teachers, if necessary.

### WHAT RESEARCH IS BEING DONE?

A consortium of the National Collegiate Athletic Association (NCAA), the Department of Defense (DoD), the Center for Injury Research and Prevention (CIRP) at the Children's Hospital of Philadelphia Research Institute, the US Centers for Disease Control and Prevention (CDC), and the National Institutes of Health (NIH) is gathering information on prevention, diagnosis, and treatment. As part of the Concussion Assessment, Research and Education (CARE) consortium, the NCAA and DoD have enrolled more than 40,000 student athletes and military service academy students in the Federal Interagency Traumatic Brain Injury Research database. CIRP's multidisciplinary group of professionals translate research results into advice for families, doctors, and policymakers.

For more *Brain & Life* articles on concussion, visit [BrainandLife.org](http://BrainandLife.org).

For resources on concussion—including sports concussion patient summary guidelines, concussion checklist, and a Concussion Quick Check app—go to [AAN.com/concussion](http://AAN.com/concussion).

For other resources and support, contact:

- Brain Injury Association of America: [biausa.org](http://biausa.org); 800-444-6443
- Brain Trauma Foundation: [braintrauma.org](http://braintrauma.org); 408-369-9735
- Concussion Legacy Foundation: [concussionfoundation.org](http://concussionfoundation.org); 857-244-0810
- International Concussion Society: [concussion.org](http://concussion.org); [info@concussion.org](mailto:info@concussion.org)
- National Institute of Neurological Disorders and Stroke: [ninds.nih.gov](http://ninds.nih.gov); 800-352-9424

**PUBLICACIONES EN ESPAÑOL:** *Brain & Life* en español y Basics en español disponibles ya en [BrainandLife.org](http://BrainandLife.org); Traumatismo Cerebral: Esperanza en la Investigación: [bit.ly/NINDS-TraumatismoCerebral-Espanol](http://bit.ly/NINDS-TraumatismoCerebral-Espanol)

SOURCES: AMERICAN JOURNAL OF MEDICINE, AMERICAN ACADEMY OF PEDIATRICS, US CENTERS FOR DISEASE CONTROL AND PREVENTION, CLEVELAND CLINIC, MAYO CLINIC, NATIONAL INSTITUTES OF HEALTH