



Concussions - More Than Just a Bump on the Head

(Mild Traumatic Brain Injury)

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No pain no gain

Bump on the head

Dinger

No Big Deal

Not a concussion

Lights knocked out

Took a good one

Bell Rung

Take one for the team

Mild Traumatic Brain Injury

- The formal medical definition of concussion is: a clinical syndrome characterized by immediate and transient alteration in brain function, including alteration of mental status and level of consciousness, resulting from mechanical force or trauma.
- Neurosurgeons and other brain-injury experts emphasize that although some concussions are less serious than others, there is no such thing as a "minor concussion." In most cases, a single concussion should not cause permanent damage. A second concussion soon after the first one, however, does not have to be very strong for its effects to be deadly or permanently disabling.

Athletics



- Education Code 49475, formerly Assembly Bill 25, addresses concussion in high school athletics * became active on January 1st, 2012
- Protocols for athletic concussions
- Return to the playing field
- Symptom free

NCAA requires a concussion management plan

- The plan:
- Requires student-athletes receive information about the signs and symptoms of concussions. They also are required to sign a waiver that says they are responsible for reporting injuries to the medical staff.
- Mandates institutions provide a process for removing a student-athlete that exhibits signs of a concussion. Student-athletes exhibiting signs of concussions must be evaluated by a medical staff member with experience in the evaluation and management of concussions before they can return to play.
- Prohibits a student-athlete with concussion symptoms from returning to play on the day of the activity.
- Requires student-athletes diagnosed with a concussion be cleared by a physician or a physician's designee before they are permitted to return.

ImPACT- Assessment

- ImPACT (Immediate Post-Concussion Assessment and Cognitive Testing) is the first, most-widely used, and most scientifically validated computerized concussion evaluation system.
- 20-minute test
- Neurocognitive assessment can help to objectively evaluate the concussed athlete's post-injury condition and track recovery for safe return to play, thus preventing the cumulative effects of concussion.

ImPACT features

- Measures player symptoms
- Measures verbal and visual memory, processing speed and reaction time
- Reaction time measured to a 1/100th of second
- Assists clinicians and athletic trainers in making difficult return-to-play decisions
- Provides reliable baseline test information
- Produces a comprehensive report of test results
- Results are presented as a PDF file and can be emailed
- Automatically stores data from repeat testing
- Testing is administered online for individuals or groups

Scores

- The program measures multiple aspects of cognitive functioning in athletes, including:
 - Attention span
 - Working memory
 - Sustained and selective attention time
 - Response variability
 - Non-verbal problem solving
 - Reaction time

Concussion



- A concussion is a traumatic brain injury that alters the way your brain functions. Effects are usually temporary, but can include problems with headache, concentration, memory, judgment, balance and coordination.
- The signs and symptoms of a concussion can be subtle and may not be immediately apparent. Symptoms can last for days, weeks or even longer.

National TBI Estimates

- Each year, an estimated 1.7 million people sustain a TBI annually.
- TBI is a contributing factor to a third (30.5%) of all injury-related deaths in the United States.
- About 75% of TBIs that occur each year are concussions or other forms of mild TBI.

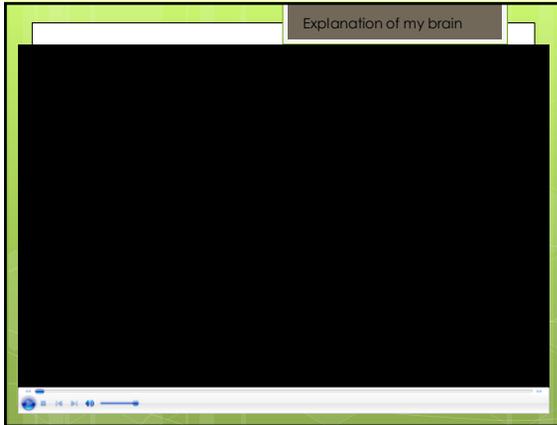
Faul M, Xu L, Wald MM, Coronado VG. Traumatic brain injury in the United States: emergency department visits, hospitalizations, and deaths. Atlanta (GA): Centers for Disease Control and Prevention, National Center for Injury Prevention and Control; 2010.

Centers for Disease Control and Prevention (CDC). National Center for Injury Prevention and Control. Report to Congress on mild traumatic brain injury in the United States: steps to prevent a serious public health problem. Atlanta (GA): Centers for Disease Control and Prevention; 2003.

TBI AGE FACTORS

- Children aged 0 to 4 years, older adolescents aged 15 to 19 years, and adults aged 65 years and older are most likely to sustain a TBI.
- Almost half a million (473,947) emergency department visits for TBI are made annually by children aged 0 to 14 years.
- Adults aged 75 years and older have the highest rates of TBI-related hospitalization and death.





Symptoms in children



Head trauma is very common in young children. But concussions can be difficult to recognize in infants and toddlers because they can't readily communicate how they feel. Nonverbal clues of a concussion may include:

- Listlessness, tiring easily
- Irritability, crankiness
- Change in eating or sleeping patterns
- Lack of interest in favorite toys
- Loss of balance, unsteady walking



Symptoms





- Like concussions, mild injuries to the brain may not be observable in routine neurological examinations. Diagnostic tests typically will not show any changes. Therefore, diagnosis is based on the nature of the incident and the presence of specific symptoms, confusion being a primary one. The three principal features of confusion are:
 - Inability to maintain a coherent stream of thought
 - A disturbance of awareness with heightened distractibility
 - Inability to carry out a sequence of goal-directed movements

Concussion Symptoms

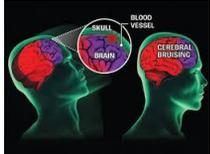


- Prolonged headache
- Vision disturbances
- Dizziness
- Nausea or vomiting
- Impaired balance
- Confusion
- Memory loss
- Ringing ears
- Difficulty concentrating
- Sensitivity to light
- Loss of smell or taste

Seek emergency care for a child who experiences a head injury:

- Vomiting
- A headache that gets worse over time
- Changes in his or her behavior, including irritability or fussiness
- Changes in physical coordination, including stumbling or clumsiness
- Confusion or disorientation
- Sturred speech or other changes in speech
- Vision or eye disturbances, including pupils that are bigger than normal (dilated pupils) or pupils of unequal sizes
- Changes in breathing pattern
- Lasting or recurrent dizziness
- Blood or fluid discharge from the nose or ears
- Large head bumps or bruises on areas other than the forehead, especially in infants under 12 months of age

Complications from Concussions



- Epilepsy
- Cumulative Effect
- Second Impact Syndrome
- Post Concussion Syndrome

Second Impact Syndrome

- Second-impact syndrome results from acute, often fatal brain swelling that occurs when a second concussion is sustained before complete recovery from a previous concussion. This is thought to cause vascular congestion and increased intracranial pressure, which can occur very rapidly and may be difficult or impossible to control. The risk of second-impact syndrome is higher in sports such as boxing, football, ice or roller hockey, soccer, baseball, basketball and snow skiing.
- The CDC reports an average of 1.5 deaths per year from sports concussions. In most cases, a concussion, usually undiagnosed, had occurred prior to the final one.

Sports

- In addition to other safety apparel or gear, helmets or head gear should be worn at all times for:
 - Baseball and Softball (when batting)
 - Cycling
 - Football
 - Hockey
 - Horseback Riding
 - Powered Recreational Vehicles
 - Skateboards/Scooters
 - Skiing
 - Wrestling



- Head gear is recommended by many sports safety experts for:

- Marital Arts
- Pole Vaulting
- Soccer



Post-Concussion Syndrome (PCS) is defined by the ICD-10 Diagnostic Criteria as:

- History of head trauma with loss of consciousness preceding symptom onset by maximum of 4 weeks
- Three or more symptom categories:
 - Headache, dizziness, malaise, fatigue, noise intolerance
 - Irritability, depression, anxiety, emotional lability
 - Subjective concentration, memory, or intellectual difficulties without neuropsychological evidence of marked impairment
 - Insomnia
 - Reduced alcohol tolerance
 - Preoccupation with above symptoms and fear of brain damage with hypochondriacal concern and adoption of sick role. (Trevena et al 2004)

Post Concussion Syndrome

- Post-concussion syndrome is a complex disorder in which a variable combination of post-concussion symptoms — such as headaches and dizziness — last for weeks and sometimes months after the injury that caused the concussion.
- The risk of post-concussion syndrome doesn't appear to be associated with the severity of the initial injury.



- Post-concussion syndrome symptoms occur within the first seven to 10 days and go away within three months, though they can persist for a year or more. Post-concussion syndrome treatments are aimed at easing specific symptoms



Post Concussion Syndrome Symptoms

- Post-concussion symptoms include:
 - Headaches
 - Dizziness
 - Fatigue
 - Irritability
 - Anxiety
 - Insomnia
 - Loss of concentration and memory
 - Noise and light sensitivity



- In some cases, people experience behavior or emotional changes after a mild traumatic brain injury. Family members may notice that the person has become more irritable, suspicious, argumentative or stubborn.



Treatment of Post Concussion Syndrome



Grading of Concussions

Severity	Grade 1: Mild	Grade 2: Moderate	Grade 3: Severe
R: Concussion Guidelines (2001)	- Post-traumatic amnesia < 30 min - No loss of consciousness	- Loss of consciousness < 5 min, or - Amnesia lasting 30 min - 24 hours	- Loss of consciousness > 5 min, or - Amnesia > 24 hours
Consensus Medical Society	- Confusion - No loss of consciousness	- Confusion - Post-traumatic amnesia - No loss of consciousness	- Any loss of consciousness
American Academy of Neurology	- Confusion - Symptoms last < 15 min - No loss of consciousness	- Symptoms last > 15 min - No loss of consciousness	- Loss of consciousness

- There is no universal agreement on the grades of severity for a concussion. There are many different guidelines for concussion evaluation and return-to-play decisions in athletes. Most guidelines recognize three different grades of concussions and share similar recommendations for return to play.

- The two sets of guidelines most followed in the U.S. were formulated by the [American Academy of Neurology](#) (AAN) and Robert C. Cantu, MD.

Grade 1 Concussion

- The most widely accepted characteristics of a Grade 1 concussion are confusion, brief memory loss, a headache and no loss of consciousness.

Symptoms of Grade 1

- **Symptoms:** Some of the most common symptoms include dizziness, nausea, motion sickness, blurry vision, vomiting and impaired balance. Grade 1 symptoms tend to last between 15 and 30 minutes, however as with any concussion they can linger for days in minor capacities after the initial accident.

Grade 2

- Critics differ on whether or not there is a loss of consciousness with a Grade 2 concussion, but it is agreed that this type is generally a stronger version of a Grade 1, with initial symptoms lasting anywhere from 30 minutes to an entire day. Some medical experts also argue that a Grade 2 concussion can feature unconsciousness for up to five minutes.

Symptoms of Grade 2

- **Symptoms:** A Grade 2 concussion can also feature brief memory loss, headaches and confusion, but is not generally associated with unconsciousness. While the symptoms of a Grade 1 concussion last up to 15 minutes, a Grade 2 can linger for as much as 24 hours, with additional traits lingering for days after. As concussions become more serious, the symptoms will increase in duration, and the victim can become more prone to light sensitivity and double vision.

Grade 3

- This type of concussion involves unconsciousness and lasting presence of the aforementioned symptoms. Treatment and observation are required immediately as a Grade 3 concussion can signal mild brain damage or even brief comas. The effects of a Grade 3 concussion can last for weeks.

Symptoms of Grade 3

- **Symptoms:** A Grade 3 concussion will feature brief unconsciousness that can last mere seconds to as many as five minutes. In serious cases, amnesia can set in for more than a day, in addition to more extreme cases of the aforementioned symptoms. People suffering from Grade 3 concussions can suffer from intense confusion and be found often repeating themselves, be prone to vacant staring and be slow to respond in basic conversation or movement.

Cantu Guidelines

- Grade I concussions are not associated with loss of consciousness, and post-traumatic amnesia is either absent or less than 30 minutes in duration. Athletes may return to play if no symptoms are present for one week.
- Grade II concussions lose consciousness for less than five minutes or exhibit posttraumatic amnesia between 30 minutes and 24 hours in duration. They also may return to play after one week of being asymptomatic.
- Grade III concussions involve post-traumatic amnesia for more than 24 hours or unconsciousness for more than five minutes. Players who sustain this grade of brain injury should be sidelined for at least one month, after which they can return to play if they are asymptomatic for one week.

What about the non athletic concussions...

- How do we help
- What can we do...

What can we do to support these individuals

- Education- general population
 - Symptoms
 - Implications
 - Affects of concussion
- Modifications
 - Based on symptoms
 - 504
 - Special Education

- Supporting a student recovering from a concussion requires a collaborative approach among school professionals, health care providers, and parents, as s/he may need accommodations during recovery. If symptoms persist, a 504 meeting may be called. Section 504 Plans are implemented when students have a disability (temporary or permanent) that affects their performance in any manner.



When students return to school after a concussion, school professionals should watch for:

- Increased problems paying attention or concentrating
- Increased problems remembering or learning new information
- Longer time needed to complete tasks or assignments
- Difficulty organizing tasks
- Inappropriate or impulsive behavior during class
- Greater irritability
- Less ability to copy with stress or more emotional

Returning to school

Students who return to school after a concussion may need to:

- Take rest breaks as needed,
- Spend fewer hours at school,
- Be given more time to take tests or complete assignments,
- Receive help with schoolwork, and/or
- Reduce time spent on the computer, reading, or writing.



- Students may need to limit activities while they are recovering from a concussion. Exercising or activities that involve a lot of concentration, such as studying, working on the computer, or playing video games, may cause concussion symptoms (such as headache or tiredness) to reappear or get worse

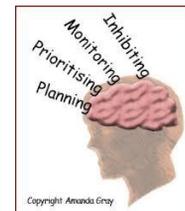


What can we put in place

- | | |
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| <ul style="list-style-type: none"> • Organizational supports • Academic supports <ul style="list-style-type: none"> • Reading • Additional time • Assistive technology • Support for memory issues <ul style="list-style-type: none"> • Study guides • Notes • Assistive Technology • Time | <ul style="list-style-type: none"> • Medical Issues <ul style="list-style-type: none"> • Headaches • Migraines • Sleep issues • Anxiety • Irritability • Personality changes |
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Supports for Executive Functioning

- Managing Time
- Managing space and materials
- Managing Work



- Cerebral concussions occur as a result of head trauma sustained in motor vehicle accidents, acts of violence, industrial accidents, falls, and sports. It is difficult to assess the incidence of cerebral concussions in the general population, but they are likely underreported. Each year 100,000 to 250,000 concussions may occur in sports alone.

Noah

