

# WHAT IS A CONCUSSION?



A concussion is a bruise to the brain caused by a blow to the head, face, or jaw. A concussion may also be a whiplash effect on the neck which can injure the brain stem. The injured athlete usually feels a headache and/or dizziness and may complain of nausea and vomiting. Disorientation (confusion as to time and place), amnesia (forgetting), about what happened, and sometimes loss of consciousness are definite signs of concussion. It is not necessary to lose consciousness to have a concussion.

Concussion is one of the most serious of all sports injuries. It can lead to lifelong impairments and even death. Despite this, concussion in sports is not well understood. Education, awareness, and workshops are tools to help participants in all sporting events prevent concussion, recognize the symptoms, and provide immediate treatment.

Unfortunately, concussions are sustained in all sports. The most evident are contact sports, e.g. football, hockey, boxing, rugby, and soccer. Individuals in recreational sports are also at risk, e.g. bicycling, skiing, skating, skateboarding, diving, horseback riding, and while performing gymnastics or playing on playground equipment.

There is no visible physical evidence of a concussion and the damage is not always detected on CT or MRI (Magnetic Resonance Imaging) scans or with other imaging diagnostics.

## WHAT HAPPENS TO THE BRAIN?

Concussions in sports may be roughly divided into two common types: Acceleration-deceleration and rotational injuries.

**Acceleration Injury** - Occurs when the immobile head is struck by a moving object.

**Deceleration Injury** - Occurs when the head is moving and hits an immobile object.

Both injuries can result in swelling of the brain, shearing of neurons, and interference in mental processing.

**Rotational Injury** - Is usually caused by a blow to the side of the head which causes the brain to swivel at its base on the spinal column causing injury to the signal carrying circuits within the brain.

**Second Impact Syndrome** - If an athlete returns to play too soon after suffering a mild concussion and receives a second blow to the head, the effects of the second trauma can be far more debilitating than the first and can lead to very significant and permanent deficits, sometimes even death.

**Post Concussion Syndrome** - A concussion or series of concussions may leave the athlete with a variety of behavioural symptoms. Lapses in memory, general problems with thinking and concentration and mood swings are often prevalent. Headaches, fatigue, dizziness, depression, anxiety, and irritability are frequent complaints.

Any change in the alert mental state may indicate a mild, moderate, or severe concussion.

## FOLLOWING A CONCUSSION

Here are some special precautions a parent or caregiver should take following a concussion, in order of appearance:

1. Contact a physician or go directly to the hospital emergency department if any of the following symptoms develop:
  - Loss of balance, dizziness, double vision.
  - Severe headache or headache lasting more than 48 hours.
  - Weakness, tingling, or numbness in the arms, legs, hands, and/or feet.
  - Stiff neck.
  - Unusual drowsiness or mental disorientation/confusion.
  - Seizures or convulsions.

2. Have someone stay in the room with the athlete and wake them up every 2 hours during the night. If they are unable to be awakened, they need to be taken by ambulance to the hospital emergency department immediately.
3. Reduce diet to light fluids only. Avoid alcohol or any drugs which may make the athlete drowsy and thus mask the symptoms of concussion.

## SIDELINE EVALUATION MENTAL STATUS TESTING

- Orientation:
- Time, place, person and circumstances of injury.
- Concentration:
- Digits backward (e.g. 3-1-7, 4-6-8-2).
  - Months of the year in reverse order.
- Memory:
- Names of teams in prior contests.
  - Recall 3 words and 3 objects at 0 and 5 minutes.
  - Recent newsworthy events.
  - Details of competition or event.

## GRADES OF CONCUSSION

- Grade 1**
- No loss of consciousness.
  - Transient confusion - Inattention, inability to maintain a coherent stream of thought and carry out goal directed movements. Athletes refer to this as "having their bell rung" and may attempt to play or keep playing.
  - Concussion symptoms and/or mental status abnormalities on examination lasting **less than 15 minutes**.
- Grade 2**
- No loss of consciousness.
  - Transient confusion - Inattention, inability to maintain a coherent stream of thought and carry out goal directed movements. Athletes refer to this as "having their bell rung" and may attempt to play or keep playing.
  - Concussion symptoms and/or mental status abnormalities on examination lasting **more than 15 minutes**.
- Grade 3**
- Any loss of consciousness, brief (seconds) or prolonged (minutes).

## MANAGEMENT RECOMMENDATIONS

- Grade 1**
- Remove from contest.
  - Examine immediately and at 5 minute intervals for the development of mental status abnormalities or post-concussive symptoms at rest and with exertion.
  - May return to contest if mental status abnormalities or post-concussive symptoms clear within 15 minutes.
- Grade 2**
- Remove from contest and disallow return that day.
  - Examine on-site frequently for signs of evolving mental status abnormalities.
  - A medical professional should re-examine the athlete the same day.
  - A physician should perform a neurological examination to clear the athlete to return to play after 1 full asymptomatic week at rest and without exertion.
- Grade 3**
- Transport the athlete to the nearest emergency department by ambulance if still unconscious or if still worrisome signs as neck pain are detected (with cervical spine immobilization).
  - A thorough neurologic evaluation should be performed right away - including appropriate neuroimaging procedures when indicated.

## PREVENTION

**The number one goal is prevention. All of us are aware of the way parents support and protect the head of a newborn baby, recognizing how fragile and vulnerable it is and the importance of keeping it safe. As we mature, we must never lose sight of how fragile and vulnerable the brain is to the slightest injury. If we choose to participate in a sport in any capacity, it is our responsibility to learn how to better protect our brain.**

## SIGNS & SYMPTOMS

Any period of loss of consciousness (paralytic coma, unresponsiveness to arousal).	Gross observable incoordination (stumbling, inability to walk tandem/straight lines).
Vacant stare (befuddled facial expression).	Emotions out of proportion to circumstances (distracted, laughing or crying for no apparent reason).
Delayed verbal and motor responses (slow to answer questions or follow instructions).	Memory deficits (exhibited by the athlete repeatedly asking the same question that has already been answered or inability to memorize and recall 3 of 3 words or 3 of 3 objects in 5 minutes).
Confusion and inability to focus attention (easily distracted and unable to follow through with normal activities).	Complaints of headaches, dizziness, seeing stars or colours, ringing in the ears, nausea/vomiting, impaired vision, sensitivity to light, inappropriate emotions.
Disorientation (walking in the wrong direction; unaware of time, date, and place).	Slurred or incoherent speech (making disjointed or incomprehensible statements).

Credit to the British Columbia Brain Injury Association for the information provided in this article.  
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