

Concussion

Concussions are a mild form of traumatic brain injury that, if not properly screened and treated, can lead to a variety of physical, cognitive, and behavioral complications. Physical therapists and healthcare providers can evaluate and treat these complications through rest and recovery programs, restoring strength and endurance, reducing dizziness and restoring balance, reducing headaches, and ultimately returning to normal activity or sport. Patients with a history of concussions are more susceptible to future concussions, which makes it vital that therapists adequately screen and assess to prevent future complications



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Cause

Brain Trauma

Brain Trauma-spike

Brain trauma can result from any type of injury that occurs to the brain due to an external force, such as a blow to the head in a fall or car accident. Traumatic brain injuries can range from mild, such as a concussion, to severe, in the case of a penetrating head injury. Traumatic brain injuries (TBIs) are a leading cause of death and disability worldwide, and the risks associated with them increase with age and also increase based on the number of prior TBIs suffered by the patient.

Pathophysiology

Neurometabolic Cascade

NT-metal-ball on Cascading-steps

Neurometabolic cascade describes a series of changes in the brain's metabolism and an influx of neurotransmitters during a concussion. The cascade sends the brain into a depressive state and an energy crisis as the brain attempts to recover. During this state, the patient may experience increased symptoms of dizziness, confusion, or fatigue, which will typically resolve in seven to ten days. Therapists must be cautious, as patients during this period are at increased risk of brain damage and future concussions if not allowed to properly recover.

Signs & Symptoms

Visual Disturbances

Wavy Eyes

Patients who suffer concussions may present with a variety of visual disturbances. These disturbances may include blurred or double vision, sensitivity to light and/or sound, and difficulty tracking objects, especially when the patient or the object is in motion.

Cognitive Dysfunction

Broken Cogs

Cognitive dysfunction is often one of the most debilitating symptoms that comes with concussions, as it can directly impair a patient's capacity for focus and attention. In some patients, memory is also directly affected, making it difficult to recall recent events or learn new information. Patients may find it more difficult to process information and make executive decisions. Personality changes in the form of mood swings and other behavioral symptoms such as irritability, depression, and anxiety may also be present.

Sleep Disturbances

[Disturbed while Sleeping](#)

Sleep disturbances are a common symptom of concussion and can occur due to various factors, including the impact on the brain's function, changes in brain chemicals, pain, discomfort, or anxiety related to the injury. It's important to note that these disturbances are typically temporary and improve as the concussion heals.

Emotional Instability

[Emotions Instability](#)

Concussions can sometimes cause individuals to become emotionally unstable, becoming easily annoyed or agitated over things that would not normally bother them. This emotional instability is often a result of the involvement of the frontal lobe of the brain, which aids in impulse control and decision-making. This involvement may cause patients to display mood swings as well as difficulties with managing aggression and other negative emotions.

Diagnosis

Sport Concussion Assessment Tool 5th Edition (SCAT5)

[SCAT-man \(5\) Hand](#)

The SCAT5 is a standardized tool used by healthcare professionals for evaluating concussions for athletes above the age of 13 (Child SCAT5 is available for children aged 5-12). This tool has an immediate on-field assessment, which includes red flags, observable signs, memory assessments, a Glasgow Coma Scale examination, and a cervical spine assessment. This tool also has an off-field assessment, which includes the athlete's background, a symptom evaluation questionnaire, a cognitive screen, a neurological screen, and a recall screen.

Diagnostic Imaging

[Diagnostic-computer Images](#)

Diagnostic imaging may be ordered by a physician and be used to assess the brain after injury to aid in confirming the presence of a concussion, its severity, and any additional injuries sustained by the patient. In particular, this may include computed tomography (CT) scans or magnetic resonance imaging (MRI).

Treatment

Physical and Cognitive Rest

[Physical and Cog Rest](#)

It is important to limit activities that can strain the brain, including physical exercise, reading, excessive screen time, and demanding mental tasks. Resting allows the brain to heal and reduces the risk of further injury. Sleep is extremely important for post-concussion recovery as it aids with tissue repair, cognitive function, and immune function, which are all important for recent post-concussion patients. Research has shown that post-injury sleep declines may be associated with increased symptom severity and worsened reaction time during the initial stages of recovery after a concussion. The exact amounts and duration of rest are not yet defined. However, normally, 24-48 hours of cognitive and physical rest is appropriate for most patients, followed by a gradual increase in activity.

Monitored Exercise

[Monitor on Treadmill](#)

Early supervised aerobic exercise in the acute symptomatic stage of a sport-related concussion is considered safe and associated with earlier return to sport for post-concussive athletes. Supervised exercise by a healthcare professional may include the use of treadmills, stationary bikes, or elliptical machines, as well as non-contact exercises in the case of athletes. For post-concussion patients, physicians should be watchful of signs of second impact syndrome, such as increased headaches, dizziness, and brain fog.

Vestibular Rehabilitation

Vest-bull Rehabilitation

Most concussions resolve within 7-10 days. However, PT interventions should start within the subacute phase (14-21 days) if symptoms are still prevalent. Along with supervised exercise, physical therapists can also treat cervicogenic headaches, dizziness, and other concussion-related symptoms such as gait imbalances and vertigo.

Considerations

Second Impact Syndrome

(2) Tutu Impact

Second impact syndrome (SIS) is a rare but potentially life-threatening condition that can occur after an individual has a second concussion before their first concussion is fully resolved. This syndrome is most common in young athletes who return to sports too soon before allowing their previous concussion to resolve itself. Symptoms include headache, confusion, loss of consciousness, seizures, and respiratory failure. Proper evaluation and treatment by a healthcare professional are important so SIS does not occur.