

What is it?

Concussion is the mildest form of traumatic brain injury. While it is at the mild end of the spectrum it is a traumatic injury to the brain and must be respected - traumatic brain injury can be potentially life threatening and if mismanaged can have adverse long term outcomes. Contrary to popular belief, one does not have to lose consciousness to suffer serious brain injury. While most concussions will recover completely, resolving in 7-10 days with no long term problems, the utmost care must be taken to decrease the risk of re-injury.



Boxing provides an example of the angular acceleration and deceleration to the brain when the head is hit.



Initial impact of concussion (coup)



Secondary impact (contrecoup)

Figure 1

What are the symptoms?

Concussion should be suspected if there is a collision, trauma or acceleration / deceleration to the head and any of the following symptoms are present.

Cognitive features:

Disorientation, confusion, amnesia, loss of consciousness

Physical symptoms:

Headache, dizziness, nausea, feeling "dinged" or foggy, visual disturbance, hearing problems, irritability

Physical signs:

Impaired consciousness, poor coordination and balance, poor postural control, seizure, poor concentration, inappropriate demeanour, vomiting, slurred speech, personality changes, poor playing ability.

How did I get it?

The most important factor in brain injury **is not the magnitude of force imparted on the skull** but the biomechanical mechanism on the brain i.e. the acceleration/ deceleration of the brain. In fact, rotational acceleration produces maximum shear stress. Studies have shown that an unrestrained head hit by an angular acceleration/ deceleration process is most likely to result in brain injury. See figure 1. This explains why a lower force contact may render someone unconscious when a high force contact may not. Watch the accompanying video to see a typical mechanism of this injury.



Go online for more
information

[www.youtube.com/
watch?v=zCCD52Pty4A](https://www.youtube.com/watch?v=zCCD52Pty4A)

What should I do?

It is important to seek medical attention if there is any concern regarding brain injury. Brain injury is the leading cause of death in athletes. A trained medical professional needs to confirm that there is no possibility of the injury being more severe than a concussion and that there is no bleeding in the brain. If you have any of the following symptoms you must immediately seek attention from a doctor or an emergency department.

- unconsciousness
- lack of full consciousness (for example problems keeping eyes open)
- any confusion (not knowing where you are, getting things muddled up)
- any drowsiness (feeling sleepy) that goes on for longer than 1 hour when you would normally be wide awake
- any problems understanding or speaking
- any loss of balance or problems walking
- any weakness in one or both arms or legs
- any problems with your eyesight
- very painful headache that won't go away
- any vomiting – getting sick
- any fits (collapsing or passing out suddenly)
- clear fluid coming out of your ear or nose
- bleeding from one or both ears
- unusual behaviour
- seizures

How is a diagnosis made?

A diagnosis of concussion is always made by an appropriately trained medical professional. If there is a history of trauma and there is evidence of altered brain behaviour then, regardless of the absence of any signs or symptoms concerning a bleed in the brain. A SCAT3 (Sports Concussion Assessment Tool) will probably be used to confirm the diagnosis and monitor the progression of recovery.

- slurred speech
- double vision
- new deafness in one or both ears
- inability to answer simple questions e.g. What day is it? What happened to you?

Recovery can be accelerated and your risk of any further deterioration can be improved if you:

- **Do not** stay at home alone for the first 48 hours after leaving hospital.
- **Do** make sure you stay within easy reach of a telephone and medical help.
- **Do** have plenty of rest and avoid stressful situations.
- **Do not** take any alcohol or drugs.
- **Do not** take sleeping pills, sedatives or tranquilisers unless they are prescribed by a doctor.
- **Do not** play any contact sport (for example, rugby or football) for at least 3 weeks without talking to your doctor first.
- **Do not** return to your normal school, university or work activity until you feel you have completely recovered.
- **Do not** drive a car, motorbike or bicycle or operate machinery unless you feel you have completely recovered.



What does rehab involve?

Rehab and return to play after concussion involves the following progression.

Rehabilitation stage	Functional exercise at each stage of rehabilitation	Objective of each stage
1. No activity	Complete physical and cognitive rest	Recovery
2. Light aerobic exercise	Walking, swimming or stationary cycling keeping intensity <70% maximum predicted heart rate	Increase heart rate
	No resistance training	
3. Sport-specific exercise	Running drills in the football codes. More intense fitness drills including footwork drills in combat sports. No head impact or collision activities	Add movement
4. Non-contact training drills	Progression to more complex training drills, e.g. ball work and passing drills in the football codes. Bag work in combat sports. No head impact or collision activities	Exercise, coordination, and cognitive load
	May start progressive resistance training	
5. Full contact practice	Following medical clearance you can now participate in normal training activities	Restore confidence and assess functional skills by coaching staff
6. Return to play	Normal game play	

You should only proceed to the next rehabilitation stage when you are asymptomatic i.e. experiencing no adverse symptoms at the current level. There is no specific time frame for each rehabilitation stage nor can there be an expectation that a player will progress through the stages in a certain period of time. This is critical as recovery is specific to the injury and the individual. If any post-concussion symptoms occur you should drop back to the previous asymptomatic level and try to progress again after a further 24-hour

period of rest has passed.

Stage 5 is critical. Coaches must watch the player closely and functional skills must be carefully assessed. While the testing performed in the clinic is very good, no clinical test will be sensitive enough to pick up the small differences in anticipation and reaction time that may be the difference between a boxer successfully defending a punch and being knocked out. Similarly a gymnast who would normally be

able to back-flip on a 10cm wide beam will certainly require a very significant deterioration of her postural control before she fails tests developed for the general population. For these reasons feedback from the coaching staff in stage 5 is critical.

Do you have a question? Email info@sportsclinicnq.com.au