CONCEPT OF MOVEMENT | Sports Performance and Rehabilitation Centre

shift CONCUSSION MANAGEMENT PROGRAM

What is a concussion?

The working definition used today for concussion is "a complex pathophysiological process affecting the brain, induced by traumatic biomechanical forces" (developed by the consensus panel at the 1st International Conference on Concussion in Sport that was held in Vienna, Austria in 2001). Put simply, a concussion changes the way our brain functions – causes it to work less optimally. It may be caused either by a direct blow to the head, face, neck or elsewhere on the body with an "impulsive" force transmitted to the head. A Concussion **may or may not involve loss of consciousness** (loss of consciousness is not a diagnostic requirement). In fact, less than 20% of concussions result in a loss of consciousness.

What are the symptoms of a concussion?

Some common symptoms often reported with concussive injuries include:

- Headache
- Dizziness
- Neck pain
- Nausea or Vomiting
- Loss of balance
- Poor coordination
- Trouble focusing on objects or words
- Poor concentration
- Feeling "foggy"
- Confusion
- Amnesia, or poor memory
- "Flashing lights"
- Blurred or double vision
- Seeing "stars"
- Irritability or emotional changes
- Ringing in ears
- Slow to follow direction
- Decreased playing ability
- Easily distracted
- Vacant stare
- Drowsiness/fatigue
- Difficulty falling asleep
- Feeling "off" or not like oneself

What happens to the brain during a concussion?

A direct or indirect blow to the head, face or jaw can cause the brain to accelerate then rapidly decelerate within the skull. This acceleration/deceleration motion can induce mechanical changes to the nerve fibres – causing them to stretch – and in turn, alter several important metabolic pathways. Though injury is apparent given the spectrum of symptoms experienced by a concussed athlete, no *structural* damage is caused to the brain itself. That is, unlike other sports injuries (like a fractured wrist or dislocated shoulder) nothing appears abnormal on standard imaging studies like CT, or MRI. Instead, these imaging methods are used to rule out more severe trauma such as bleeding within the brain or skull or fractures of the skull or neck. We understand now, more than ever, that just because we can't *see* the injury, it doesn't mean that something's not *wrong*.

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Current evidence suggests that the rapid stretch of nerve fibres within the brain during a concussive trauma results in the release of various neurotransmitters (signalling molecules within the brain), which trigger the initiation of a complex neurometabolic pathway. Ultimately an energy crisis ensues, and the brain is unable to produce the energy required to sustain its normal processes. These changes take place within minutes of the injury and can last for hours or days before normalization occurs.It is thought to be this metabolic imbalance, along with other impaired physiological processes that contribute to the physical, cognitive, behavioural and emotional signs and symptoms typically seen in a concussed individual.

What is the recovery timeframe after a concussion?

The majority of concussion-related symptoms are thought to resolve in a short timeframe (days to weeks); however in some, symptoms may persist for months:

- Children & adolescents
- Players who have suffered multiple concussions in a close timeframe
- Athletes experiencing persistent migraine-like headaches or a high symptom load
- Athletes with history of migraine, depression, ADHD, learning disabilities or sleep disorders

Why some athletes seem to recover quickly and others do not remains unclear. Even when symptoms resolve quickly it is advisable that a proper gradual return-to-play protocol be carried out. The whole recovery process therefore may take upwards of 3-4 weeks (at minimum) to prevent premature return to sport.

Post-concussion syndrome is a diagnostic term used when symptoms persist for several weeks and sometimes months after the injury. If your symptoms persist beyond 3-4 weeks it is important that you undergo proper medical assessment (or re-assessment) in order to receive the right education and management strategies for your condition.

What is “second impact syndrome?”

Second Impact Syndrome is a rare, but serious consequence of head trauma which results in rapid swelling of the brain – potentially leading to severe disability or death. Controversy exists as to whether second impact syndrome is a product of cumulative head trauma (when an athlete sustains a concussion while still suffering the effects of a previous concussion), or if it is simply a product of a single, mild traumatic brain injury.
Regardless of its cause, second impact syndrome is a severe consequence of head injury in young athletes. There should be absolutely NO return to play while an athlete is displaying signs and symptoms of a concussion, regardless of the level of competition.

Once I've had a concussion, is it easier to sustain another?

When the brain is in a state of metabolic dysfunction (such as with a concussion) it is believed to be more "vulnerable" to subsequent trauma. That is, a relatively minor second blow to the head may produce more severe and irreversible changes in brain function. The physiologically altered brain is essentially weakened and less able to withstand or recover from a subsequent (though potentially mild) concussion. In this way, concussive injuries are thought to be cumulative, with progressively less force required to induce trauma to the brain each time (when occurring in close temporal relation). The symptoms experienced may be completely disproportionate to the mechanism of injury. What would have been two "mild" head injuries summate to form a more severe traumatic brain injury with longer lasting impairment.

Athletes often minimize the severity of concussion-like symptoms, or do not report symptoms at all following head injury. This may be because the athlete wants to continue playing and believes the symptoms are mild enough to play through. The athlete may believe having their "bell rung" is part of the game. In these situations, often the athlete, parent, coach, or trainer does not realize the significant consequences of playing with a concussion.

However – in general, when a concussion is identified early, managed properly, and return to sport is gradual, the risk to that athlete of sustaining a future concussion is not likely to be different.

How do I know if my son/daughter or player has sustained a concussion?

Concussions can be difficult to properly recognize given the wide range of symptoms & individual responses (especially for the lay person). Symptoms such as headache and dizziness are common yet can also occur in a variety of other sport-related issues (eg. dehydration, heat-related illness).To complicate things further, the appearance of symptoms may be delayed for several minutes or even hours after the initial injury.

A useful rule of thumb to convey to athletes, parents, or coaches**:** If a player presents with one of the symptoms listed previously and has the mechanism of a head injury, treat it as a concussion. It is important to realize that the mechanism of injury may be subtler and not as obvious as a "big hit." An athlete that is not acting normally, having difficulty remembering plays or following instructions may have sustained an injury several hours previously. There should be absolutely **NO** return to play on the same day as the injury regardless of the level of athletic performance.

Parents, coaches, and trainers should be taught that a symptom scale/checklist is a good method for identifying symptoms that may be indicative of concussion. For the team coach or trainer who knows the athlete well, it may be obvious that the athlete is struggling with simple questions and/or is acting unusual or different. Other cases are less apparent. Sideline concussion evaluations, which assess orientation,

concentration, and memory, help to determine how well the athlete's brain is working. **The Pocket Concussion Recognition Tool** is a valuable sideline assessment tool that can be used to evaluate the domains above, however it is not designed to take the place of a more comprehensive evaluation by a medical professional.

Once symptom free, how does the return-to-play process work?

Once symptom free, it is recommended that each athlete undergo a graduated program of exercise testing. Similar to weight training, athletes recovering from a concussion should not skip to 100% exertion from 0% in a short time frame. Physical exertion testing is important not only for physical re-conditioning, but to guard against symptom relapse and help prevent premature return-to-sport. It is well known that concussive symptoms can be aggravated with exercise and even though you may feel well, running, jumping, or stick handling are things that may cause your symptoms return.

The return-to-play process is *gradual*. The first stage typically involves light cycling or jogging to elevate your heart rate a moderate amount. If no symptoms are aggravated either *during* or for 24 hours *after* this exercise session, you may progress to a more difficult workout routine. Eventually you may advance to on-field or on-ice practice and finally full game play (with proper medical clearance). The whole process could take anywhere from 5 days to 2 weeks depending on your specific situation or the stipulations of your governing sport organization. At any time if your symptoms return, you must return to a lower level exertion (or modified activities) depending on the advice of your health professional.

I think I may have a Concussion. What should I do?

STEP 1

Make sure that you tell someone (your coach, parent, teacher etc.) so that you are not left alone. Remove yourself from sport, class, and/or work until a Medical Physician can properly assess you. Complete rest is the best treatment during the initial hours of the injury.

STEP 2

Schedule an appointment to see a Medical Physician as soon as possible. It is not usually necessary to visit the emergency room unless your symptoms are severe and/or rapidly worsening. It is not usually necessary to have someone wake you in the night – get a good night's sleep, and nap when you need to. Limit use of your phone, television, and computer – try to rest both your body and your brain.

STEP 3

Undergo proper medical evaluation by a Physician. This does not typically include CT or MRI unless more severe injury is suspected or needs to be ruled out.

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STEP 4

Visit one of the Shift Concussion Management clinics in your area for further assessment. If you have previously undergone baseline testing, repeat testing will demonstrate any areas that may be impaired due to the injury and will help guide management recommendations. If you have not previously undergone baseline testing, a follow-up assessment with one of our Health Professionals is still highly recommended.

STEP 5

Follow any management recommendations given to you by your Physician and Shift Health Professional. These may include manual therapy (eg. for associated neck pain), specific rest strategies and home recommendations, modified school and/or work requirements, specialized rehabilitative techniques (eg. vision therapy), and other recovery strategies.

STEP 6

Follow-up with the Health Professionals involved in your care so that your recovery is properly monitored. If you have questions – ask! Knowledge of your injury will aid in your recovery.

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