



# BRAIN INJURY 2<sup>ND</sup> EDITION IN ADOLESCENCE

A GUIDE FOR PARENTS, COACHES, EDUCATORS  
AND THOSE WHO WORK WITH YOUTH



# BRAIN INJURY IN ADOLESCENCE

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2<sup>ND</sup>  
EDITION

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## ACKNOWLEDGEMENTS

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# INTRODUCTION

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The brain is the most sophisticated and complex organ in the human body. It controls the way we feel, think, behave, understand ourselves, and how we experience, and interact with the world around us. It continues to develop throughout the adolescent years and into young adulthood, with many important changes happening during that time. A brain injury sustained at this critical point may have a significant and long-lasting impact on brain development. A brain injury can harm not only the current functioning of the brain, but it may also affect how the brain grows and develops over time.

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## ■ THE EXTENT OF BRAIN DAMAGE WILL DEPEND ON

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### THE TYPE OF INJURY

- Traumatic (open or closed)
- Non-traumatic

### THE SEVERITY OF THE INJURY

- Mild
- Moderate
- Severe

### WHERE THE DAMAGE OCCURRED IN THE BRAIN

- Front
  - Back
  - Left
  - Right
  - Combinations of locations
- 

This guide will provide a basic overview on important issues pertaining to brain injury in adolescence. The goal of this guide is to help young people, parents, coaches, and other individuals who work with youth:

- 1** Better understand what brain injury looks like in adolescence.
- 2** Feel more comfortable talking with doctors or other health care professionals about brain injury.
- 3** Better understand, communicate with and help youth who suffer from brain injury.

# TYPES OF BRAIN INJURY

## TRAUMATIC

- Open brain injury
- Closed brain injury

## NON-TRAUMATIC

- Brain infections
- Strokes or bleeds
- Ingestion of toxic substances (including drugs)
- Metabolic disorders
- Lack of oxygen
- Brain tumors

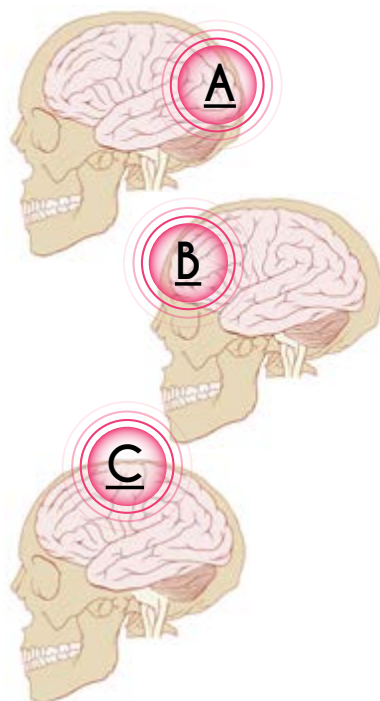
## OPEN BRAIN INJURY

Open brain injury happens when an object penetrates the skull or when the skull is broken. This type of injury is usually quite visible and requires medical treatment immediately. It can result in seizures, paralysis, coma, and death.

## CLOSED BRAIN INJURY

Imagine watching a hockey game and a player is skating up the ice with the puck. An opponent body checks him, causing him to fall backward and smack his head on the ice. This action may cause the player to damage his brain in at least two places, even if there was no obvious external head injury.

**Here's how:** The initial blow to the head causes damage to the back part of the brain where the head first struck the ice (see image A). This type of injury is called a “coup.” Following this, the brain will bounce around in the skull, striking the side opposite to where it first struck (see image B). This is called the “countercoup.” The brain may continue to bounce and strike the skull in different places, depending on the severity of the initial hit (see image C).





# ONCUSSIONS ARE BRAIN INJURIES

## ■ MILD TRAUMATIC BRAIN INJURY

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Mild traumatic brain injuries can have considerable complications, especially because without obvious external damage to the head, the adolescent, parent, or coach may not realize the seriousness of the injury. This is why it is so important to seek medical attention after a head injury. If the injury did damage the brain, immediate treatment is crucial. A concussion is one type of mild traumatic brain injury, but a concussion can happen without loss of consciousness.

A mild traumatic brain injury is usually diagnosed based on how the person felt at the time of injury or shortly afterward. The diagnosis can also be determined by a noticeable change in his or her behaviour, emotions, or thinking, as observed by family or friends.

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## ■ MODERATE TRAUMATIC BRAIN INJURY

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Moderate traumatic brain injury occurs when someone is knocked unconscious for longer than just a few moments (e.g., 5 minutes or longer). Symptoms include behavioural, emotional, or cognitive changes that can last for weeks, months, or even longer.

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## ■ SEVERE TRAUMATIC BRAIN INJURY

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Severe traumatic brain injury is diagnosed when someone sustains major head trauma with bleeding, prolonged loss of consciousness (e.g., over 6 hours), coma, or skull fractures. This type of injury is very serious and the effects can be long-lasting.

## QUICK FACTS

A brain injury can happen without a concussion and even without a direct hit to the head.

## KEY COMPONENTS OF LOOKING AFTER SOMEONE WITH A BRAIN INJURY OR SUSPECTED BRAIN INJURY

- 1 Seek medical attention as soon as possible. Make sure the youth gets proper medical attention.
- 2 Keep the injured youth (and yourself) calm. Explain what has happened and reassure him or her that medical attention is imminent.
- 3 Make sure the youth understands what treatment is being recommended and why. Don't assume that he or she understands just because he or she was present when the doctor explained the treatment.
- 4 Help the young person follow treatment recommendations.
- 5 Support his or her return to usual activities after he or she has been cleared by a doctor (see return to play guidelines on page 12).

A concussion is a brain injury that is caused by a blow to the head (or body) that leads to problems with brain function due to brain damage. It can occur without a loss of consciousness and can be caused by what seems to be a mild blow or bump. A concussion can occur in any sport or recreational activity, as a result of a fall, collision, or other mishap. There are many different symptoms that can appear with a concussion. These include:

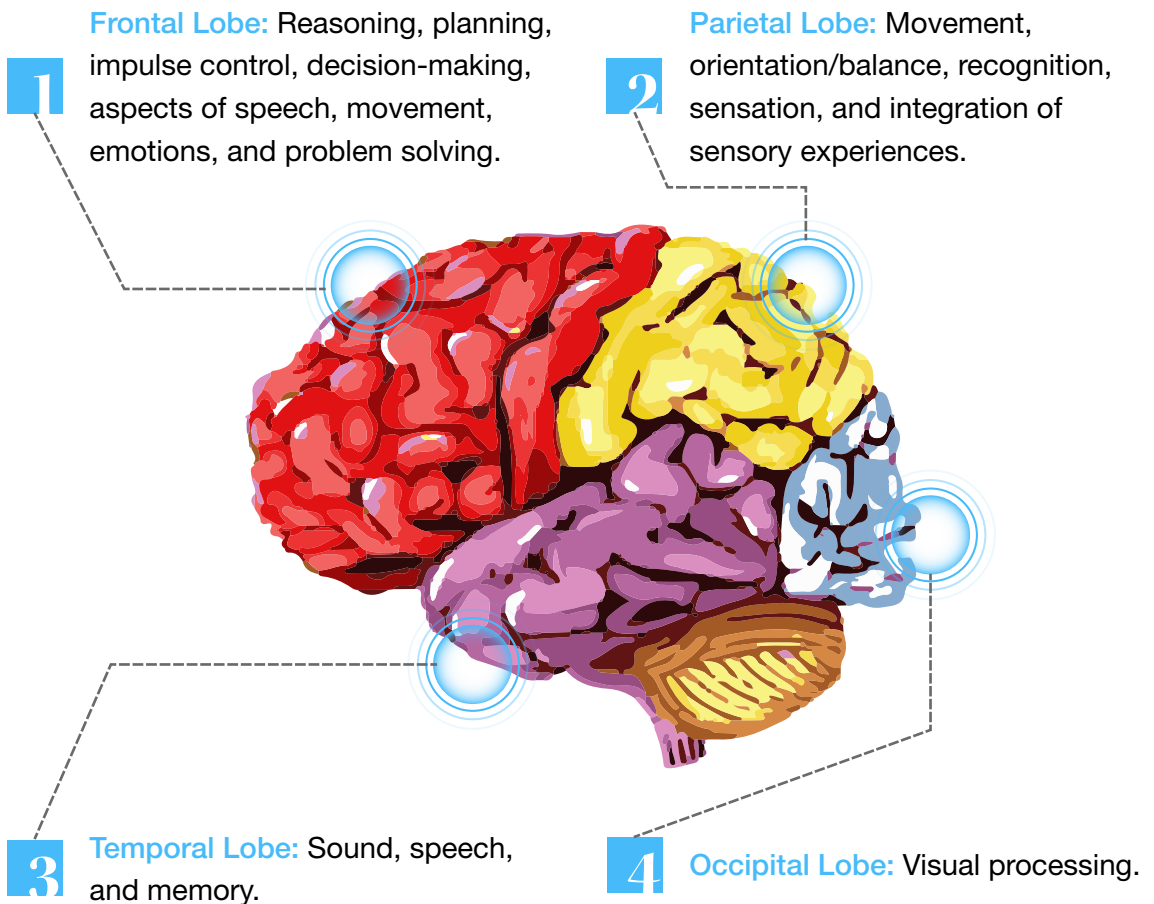
- |                                |                          |                          |
|--------------------------------|--------------------------|--------------------------|
| ■ Confusion                    | ■ Balance problems       | ■ Mood swings            |
| ■ Headache                     | ■ Slurred speech         | ■ Feeling slowed down    |
| ■ Feeling pressure in the head | ■ Attention difficulties | ■ Irritability           |
| ■ Difficulty concentrating     | ■ Sensitivity to light   | ■ Sadness or depression  |
| ■ Difficulty remembering       | ■ Sensitivity to noise   | ■ Nervousness or anxiety |
| ■ Drowsiness                   | ■ Feeling "in a fog"     | ■ Loss of consciousness  |
| ■ Neck pain                    | ■ Not feeling "right"    | ■ Seizures               |
| ■ Dizziness                    | ■ Fatigue or low energy  | ■ Coma                   |
| ■ Blurred vision               | ■ Trouble sleeping       | ■ Paralysis              |
|                                | ■ Heightened emotions    |                          |

Symptoms may appear on their own or in any combination.

**Note:** Sometimes it can be difficult to recognize the symptoms of a brain injury. Subtle symptoms can conceal serious brain damage. Whatever the degree of brain injury, it's important to seek immediate medical attention. Some brain injuries that are not treated or not treated properly may be fatal.

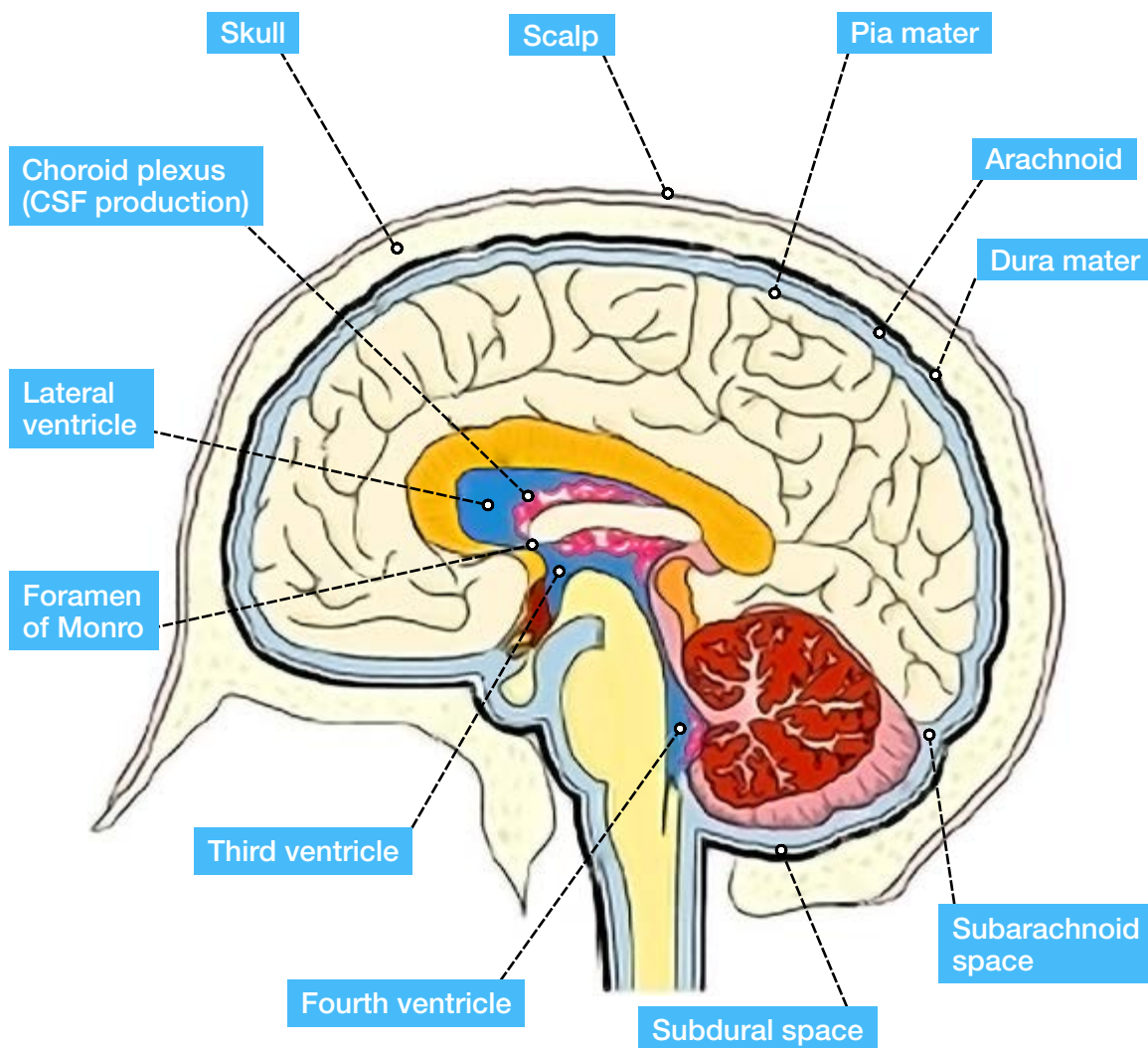
# UNDERSTANDING THE BRAIN

The brain is divided into four lobes and each lobe performs many different brain functions. The areas of the brain that are damaged or the degree of damage to the connections between areas will determine what aspects of brain functioning are affected.



## QUICK FACTS

Recovery from a concussion may take longer for adolescents than for adults.

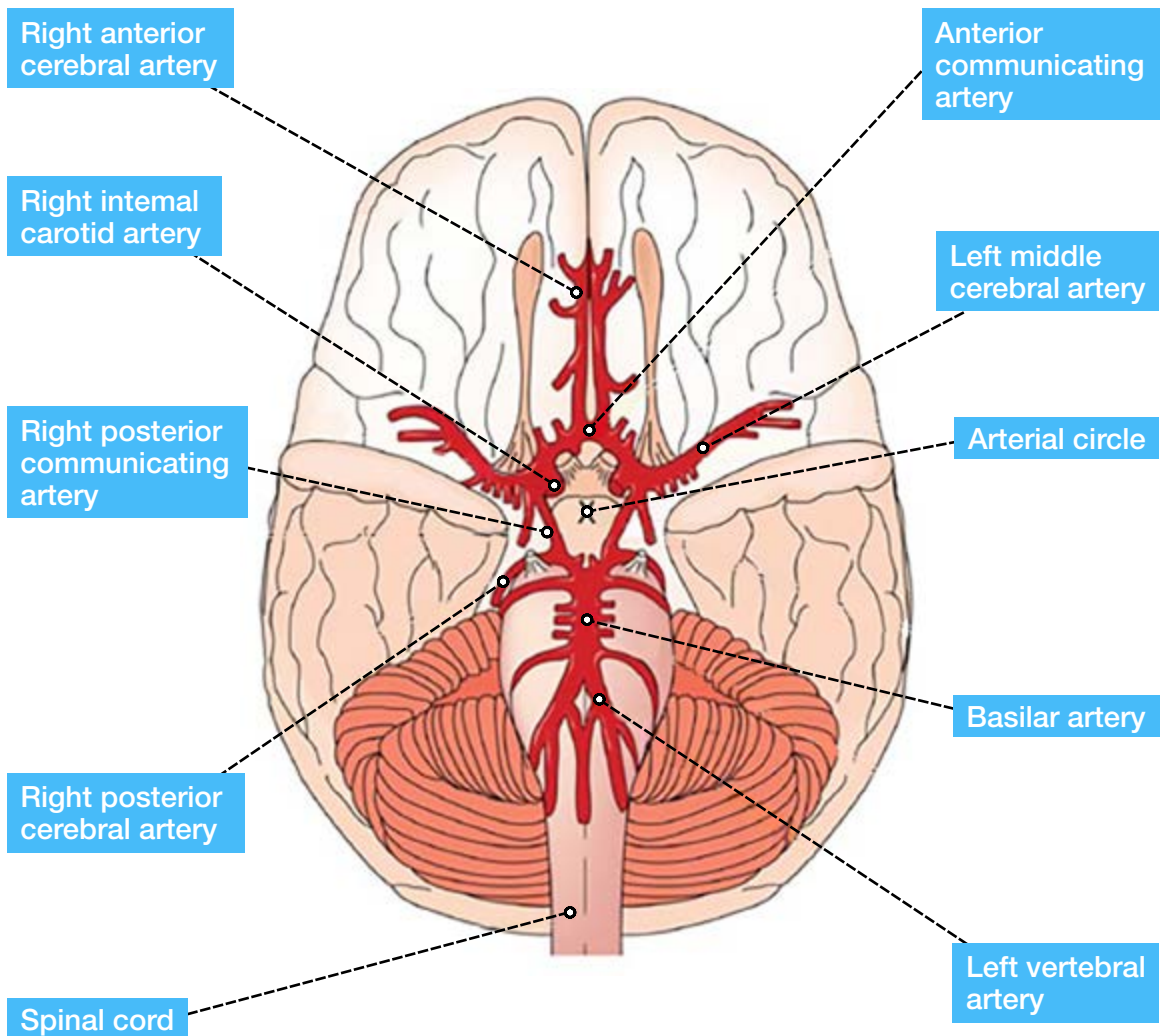


This diagram shows the various membrane layers under the skull, surrounding the brain. A head injury can affect one or more of these layers. These membranes can be torn or damaged if the brain collides with ridges in the skull.

Occasionally a head injury can cause bleeding into the space between the Dura matter and the brain. This is called a "Sub Dural Bleed". Symptoms of a Sub Dural Bleed are similar to those listed on page 6 but may only show up many hours after the injury. Dural Bleed can be extremely dangerous or even fatal.

## QUICK FACTS

Following a brain injury, a student's academic performance may change because the brain functions differently than it used to and some abilities may be reduced. Therefore, the student's learning style may need to be altered.

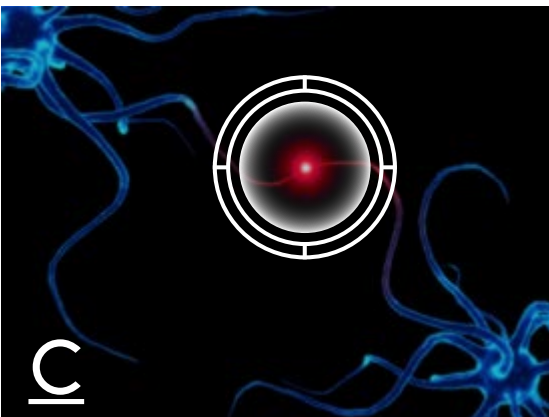


This diagram shows the arteries at the base of the brain called the Circle of Willis. These arteries supply the brain with blood and are connected through a looping pattern, which helps blood flow reach different brain regions. If blockage or injury occurs to these arteries, there can be serious consequences, including not having blood reach parts of the brain or having blood spill into areas where it does not belong.

## QUICK FACTS

For young athletes, it's better to miss one or more games than the whole season. Take the proper precautions and listen to the doctor. Do not allow them to go back to play until the doctor says it's safe. The brain takes time to heal!





The human brain includes approximately 100 billion specialized cells, called neurons. They communicate with each other through complex chemical and electrical signals. When this signaling occurs, it's called a neuron firing.

**Diagram A** depicts the firing of many neurons, whereas **Diagram B** is a magnified view of the firing of a single neuron. The firing of neurons in specific areas signals that the brain is active in that area. Neurons manufacture chemicals called neurotransmitters. A part of the neuron called the axon transmits a chemical/electrical signal through the space between neurons, called a synapse, where it's picked up by part of another neuron called the dendrites. This process is shown in **Diagram C**. This is how information is transmitted from one neuron to another. If there is damage to these cells or to their connections, information does not get transmitted and consequently, the brain fails to operate the way it should. Complex networks of neuronal and axonal connections are created when multiple connections are established between neurons, like in **Diagram B**. Many brain injuries can affect the communication between neurons at the network level. For example, although the part of the brain responsible for balance might not be injured, the brain is so interconnected that damage to a different part of the brain can interfere with the communication network of other parts. Thus, even though the part of the brain that controls balance wasn't directly affected by the injury, a person's balance may still be impaired.

# BRAIN INJURY

## ■ TREATMENT

---

For a **mild brain injury**, the focus is on symptom management, such as:

- |   |   |
|---|---|
| <b>1</b> Rest.  | <b>4</b> Treatment of headaches.  |
| <b>2</b> Gradual transition back to school, work and play.      | <b>5</b> Avoiding multitasking and reducing stress.                     |
| <b>3</b> Reducing the number and complexity of cognitive tasks. | <b>6</b> Following a medically supervised Return to Play/Activity plan. |

If symptoms persist, Post Concussion Syndrome may be diagnosed and the adolescent may need to see a neurologist, or another health care professional who specializes in the diagnosis and management of Post Concussion Syndrome.

For a **moderate to severe brain injury**, an accurate and detailed assessment of the brain's functioning and a person's overall performance is necessary in order for health professionals to design the most appropriate rehabilitation program. It may be beneficial to have an appointment with a number of specialists, such as a speech-language pathologist, occupational therapist, or neuropsychologist. These professionals will conduct different types of tests that may involve computer-based evaluations or real-life skills assessment (e.g., travelling or shopping). This will help the health care team design a specific and uniquely tailored treatment plan to improve the person's functioning and will also help measure improvement over time.

**Note:** A number of computer based assessments of brain function related to concussion (such as IMPACT®) are now available. A school should consult with an appropriate health care expert to determine if any (or which one) of these tests are appropriate for use.

A neuropsychological assessment is an important part of getting help. This type of assessment usually involves interviews, written and computer-based tests, and performance tasks, which are then usually interpreted by the neuropsychologist to determine how the brain is working and how the brain injury has affected the adolescent’s life (e.g., cognitively, emotionally, socially, behaviourally). Neuropsychological assessments provide information on:

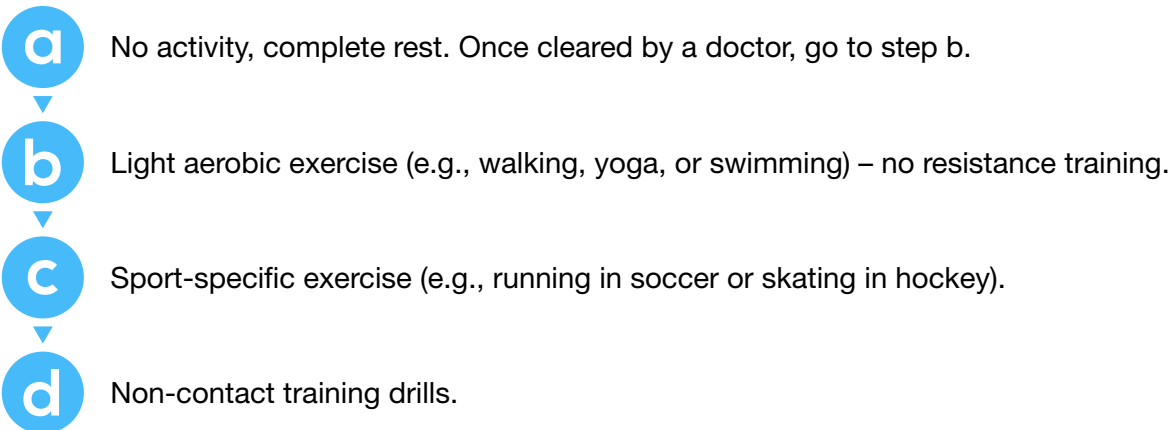
- Attention/concentration
  - Memory
  - Thinking speed
  - Social, emotional, and behavioural functioning
- Language
  - Problem solving
  - Academic abilities
  - Planning and organizational skills

Recently, a number of good computer based neuropsychological tests (such as IMPACT®) have been developed. To help decide which of these tests is best for you, ask your doctor.

## POST-CONCUSSION RETURN TO PLAY PROCESS

No one should ever return to play on the same day as a confirmed or suspected brain injury – regardless of their level of athletic performance. After symptoms are no longer being experienced, a step-wise and supervised Return to Play process can begin. The Return to Play process must be gradual and under medical supervision. Rushing back to play can lead to further problems. If any signs or symptoms are experienced during the Return to Play process, the adolescent must be re-evaluated by a physician before trying the activity again. It is extremely important to note that symptoms may not always occur immediately following the injury. Symptoms may not appear until later that day or even the next day.

## MEDICALLY-SUPERVISED STEPS TO RETURN TO PLAY





Full contact practice after medical clearance.

Return to game play.

If concussion symptoms return during any step, the teen must stop what he or she is doing and see a doctor as soon as possible. Each step should take a minimum of one day. If symptoms return during any step, he or she must return to step one. Returning to play too soon increases the risk for a more severe brain injury.

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## TIPS TO HELP PREVENT CONCUSSIONS

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Not all concussions can be prevented; however, following the suggestions below can help reduce the risk:

- 1 Ensure all passengers wear a seat belt while in a moving vehicle.
  - 2 Act as a role model – wear the proper equipment for the activity and never use alcohol or drugs while driving a vehicle (or bike, skateboard, rollerblades, etc.)
  - 3 Ensure players use the right equipment for the game, position, or activity and that equipment is certified/approved and fits correctly.
  - 4 Create awareness and educate youth on the effects of brain injury.
  - 5 Promote rules for safety and rules of sport.
  - 6 Promote fair play and sportsmanship.
- 

## QUICK FACTS

The most common assessment after a concussion is called a neurological exam, which is comprised of a series of questions and tests about the brain and the nervous system.

# FOLLOWING A BRAIN INJURY: SCHOOL ISSUES

## THE SCHOOL SYSTEM: WORKING WITH STUDENTS WHO HAVE SUFFERED A CONCUSSION

- 1** Regardless of whether or not a concussion occurs during school hours or elsewhere, the outcome of the concussion may impact the student's behaviour in school and ability to learn.
- 2** Restricting mental and physical exertion until symptoms have disappeared and then gradually increasing physical and mental expectations is the cornerstone of treatment. Appropriate school personnel should be informed of the student's condition. This may include coaches, teachers, nurses, and guidance counsellors.
- 3** Medically-supervised steps to Return to Play/Activity must be followed. Do not allow a student/athlete to play until a doctor has provided written permission, regardless of how important the player is to the team.
- 4** Immediately following a concussion, the adolescent may need to rest at home until symptoms have decreased. Return to school may need to be gradual, starting with a few hours per day. If symptoms persist or return, further home rest may be needed. If symptoms are present at school, the student should rest in a quiet and supervised location.
- 5** Test-taking may be difficult and may need to be modified. Important tests or exams may need to be delayed. It's not a good idea to take a college entrance exam or other key tests until symptoms have cleared. Students may need specific testing accommodations, such as teacher assistance, untimed testing, or seclusion from distractions. Extra homework time may also be necessary.
- 6** Light and loud noises can cause problems.

## QUICK FACTS

Rest is the most important treatment for most head injuries. Don't rush, rest!



**7** Some injured students may experience difficulties with distraction, concentration, and mood swings. These may take months to resolve and school procedures and expectations may need to be modified during this time.

**8** Persistent or severe concussion symptoms may require special educational interventions and plans. In such cases, a neuropsychological examination is recommended and should be used to guide learning interventions.

When a youth with a brain injury returns to school, assessment results should be shared with the school and used to develop appropriate academic accommodations and adaptations. Depending on the student, it may be necessary to design an individual program plan. These plans usually modify academic expectations, provide support for memory and organization, and use the student's strengths to compensate for his or her new challenges. In addition to monitoring academic functioning, teachers and other educators can play a crucial role in helping family members and health professionals monitor the adolescent's emotional and behavioural functioning.

## HELPING STRATEGIES FOR TEACHERS

CHALLENGE	STRATEGY
Student has difficulty concentrating and very short attention span.	Allow more time for task completion. A quiet, non-distracting environment can help.
Student has difficult recalling material and repeating what they have learned.	Using cue cards, rephrasing material in their own words immediately after learning, and other mnemonic devices can help with memory and learning.
Student has difficulty speaking and communicating with others.	Communicate to student's family and health professionals. Student may benefit from meeting with a Speech & Language Therapist to learn specific techniques.
Student becomes more anxious or tired throughout the day.	Allow more frequent breaks and briefly excuse student from class if necessary. Coordinate with student's family and health professionals to ensure breaks are not reinforcing anxiety or becoming avoidance techniques.
Student requires longer to think things through and to complete tasks.	Allow more time to complete tasks and assignments. Outside help (such as a tutor) may be necessary.
Student's personality or behaviour changes, sometimes dramatically.	Communicate to student's family and health professionals. Student may benefit from behavioural support at home and school, and perhaps psychological treatment or medication.

**■** Promote needed rest: Don't rush, rest.

# CONCUSSIONS & MENTAL HEALTH

## DEPRESSION

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Depression is one of the most common mental disorders in young people. Youth who have suffered a concussion are at higher risk of developing Depression. In some cases, the effects of a concussion can mimic Depression and sometimes the effects of a concussion on the brain may make someone more susceptible to developing Depression.

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## SIGNS OF DEPRESSION

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- |  |                                      |
|--|--------------------------------------|
| <b>1</b> Appetite or weight changes.   | <b>7</b> Concentration difficulties. |
| <b>2</b> Suicidal thoughts, plans, acts.   | <b>8</b> Lack of energy.             |
| <b>3</b> Hopelessness.   | <b>9</b> Excessive irritability      |
| <b>4</b> Predominantly depressed or sad mood.  |                                      |
| <b>5</b> Irregular sleep patterns (too much or too little).                              |                                      |
| <b>6</b> Lack of interest, pleasure or motivation in activities that used to be enjoyed. |                                      |

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For more information about Depression, visit: [www.teenmentalhealth.org](http://www.teenmentalhealth.org) or watch our video: [youtu.be/i8EPzkxAiVw](https://youtu.be/i8EPzkxAiVw)

TMH speaks... Depression (Magazine): [www.teenmentalhealth.org/toolbox/tmh-speaks-depression/](http://www.teenmentalhealth.org/toolbox/tmh-speaks-depression/)

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## ANXIETY DISORDERS

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Anxiety Disorders are a group of common mental illness in adolescence. They can be triggered by biological changes in the brain as a result of brain injury, and may also occur due to anticipation of difficulties associated with having a brain injury. A brain injury can also lead to more emotional reactivity and more challenges in modulating every day stress. This type of anxiety is not an Anxiety Disorder but may also need some specialized treatment if it persists and interferes with functioning.

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## SYMPTOMS OF ANXIETY MAY INCLUDE

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- 1** Feeling excessively anxious or worried about a situation, activity, or object that would not normally trigger such intense feelings of anxiety. This anxiety is so intense that it interferes with the person's ability to live his or her life, making it difficult for him or her to go to school, work at a job, or succeed in relationships.
- 2** There are different kinds of Anxiety Disorders. The most common are: Generalized Anxiety Disorder, Panic Disorder, Social Anxiety Disorder.

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For more information about Anxiety Disorders, visit: [www.teenmentalhealth.org](http://www.teenmentalhealth.org) or watch our video: [youtu.be/kitHQUWrA7s](https://youtu.be/kitHQUWrA7s), [youtu.be/jEkFp0Ux4OQ](https://youtu.be/jEkFp0Ux4OQ)

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## QUICK FACTS

Any blow to the head, even if it may seem harmless, can lead to a concussion. Some symptoms take time to develop and may not appear until later. Depression and Anxiety Disorders are usually noticed weeks to months after the injury.

# COPIING STRATEGIES

It's not unusual for someone to feel low, unhappy, anxious, and unlike themselves after a concussion. This usually improves over time. Once the young person's symptoms have improved and his or her doctor has given permission, encourage him or her to try some of these strategies to start feeling better:

- 1 LIGHT EXERCISE.** 20-30 minutes of walking every day.
- 2 HEALTHY EATING.** Healthy foods such as fruits and vegetables. Drink plenty of water.
- 3 SOCIAL ACTIVITIES.** Spending time each day with people he or she likes and enjoys being around.
- 4 LIGHT.** Spend part of each day outside instead of holing up in a gloomy room. It's amazing what fresh air and sunlight can do for mood.
- 5 PACE THEMSELVES.** In recovery from a brain injury, young people will need periods of time to rest. They may need to pace themselves in social situations, as well as in academic work. Some young people will need your support to help them take breaks when necessary.
- 6 MUSIC, ART, MOVIES, AND BOOKS.** Listening to music that makes him or her feel good; drawing, painting, or writing to express his or her feelings; watching movies he or she likes; reading a good book. Doing everyday activities that he or she enjoys can help the teen get back to feeling like him or herself.
- 7 TALK.** Talking to people the young person likes and trusts about how he or she is feeling can make it feel like a weight is lifted off his or her shoulders. However, don't try to force the teen to speak to you, if he or she isn't comfortable. What matters is that he or she has someone to whom he or she feels comfortable speaking. It doesn't have to be you.
- 8 AVOID DRUGS.** Avoid alcohol, tobacco, and any illegal drugs.

**9 SLEEP.** Most teenagers need 8-9 hours of sleep every night. If he or she has trouble sleeping, encourage the teen to try these tips:

- Unplug (no phone, TV, computer, tablet, or gaming device) at least an hour before bed. This isn't a punishment. These devices stimulate the brain and make it difficult for people to fall asleep and experience a restful sleep.
- If he or she isn't tired yet, doing something quiet in his or her room until he or she feels tired can help – reading, drawing, and writing in a journal are all great options.
- Going to sleep and waking up within 30 minutes of the same time every day – even on the weekend. Our bodies can't tell the difference between a weekday and a weekend. Staying up late or sleeping in on the weekend can make it difficult to fall asleep and wake up during the week.
- Develop and follow a regular nightly routine before he or she goes to bed (e.g., brush teeth, wash face, read for 15-30 minutes, etc.). A series of steps to follow every night cues our bodies that it's time to fall asleep.
- Encourage him or her not to read, do homework, or text friends from bed. Our beds should be used for sleeping. This teaches our body that when we're in bed, we should be asleep.
- For more information on getting a good night's sleep, check out: [teenmentalhealth.org/toolbox/healthy-sleeping/](https://teenmentalhealth.org/toolbox/healthy-sleeping/)

If symptoms don't improve after a few weeks or months, consult with the adolescent's health professionals about the possibility that he or she might need more intensive help through other interventions, including rehabilitation, psychological therapy or medication.

## QUICK FACTS

Thousands of brain injuries occur in Canada each year, many of which occur in youth under the age of 25.





# PROVIDING SUPPORT

Brain injury during adolescence is most common while playing contact sports. These injuries can sometimes have permanent and severe consequences. For example, sports such as hockey, football, soccer, rugby, and boxing have a high number of reported concussions. It is important for athletic organizations to work to improve players' safety by ensuring the proper equipment is being worn and rules of play are revised to ensure the safety of the players.

## ADULTS CAN HELP BY

- 1 Ensuring the proper equipment is being used correctly.
- 2 Ensuring the equipment is up-to-date and safe.
- 3 Ensuring activities are appropriate for the youth's skill and comfort level.
- 4 Ensuring the equipment meets national certification standards.
- 5 Keeping a record of any concussions.
- 6 Addressing rules of play to decrease risk of injury.

## IF YOU SUSPECT THAT AN ADOLESCENT MAY HAVE SUFFERED A CONCUSSION, IT'S IMPORTANT THAT YOU

- Do**
- Check for symptoms.
  - Ensure that a responsible adult (preferably a parent) takes the adolescent for a medical assessment as soon as possible.
  - Follow up to determine what the result of the assessment was.

- Do NOT**
- Do not allow the adolescent to go back to playing until he or she has written medical clearance from his or her doctor.

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## REMEMBER

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Remember that it often takes longer for adolescents to recover from a concussion than it would an adult.

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## FAMILY IMPACT

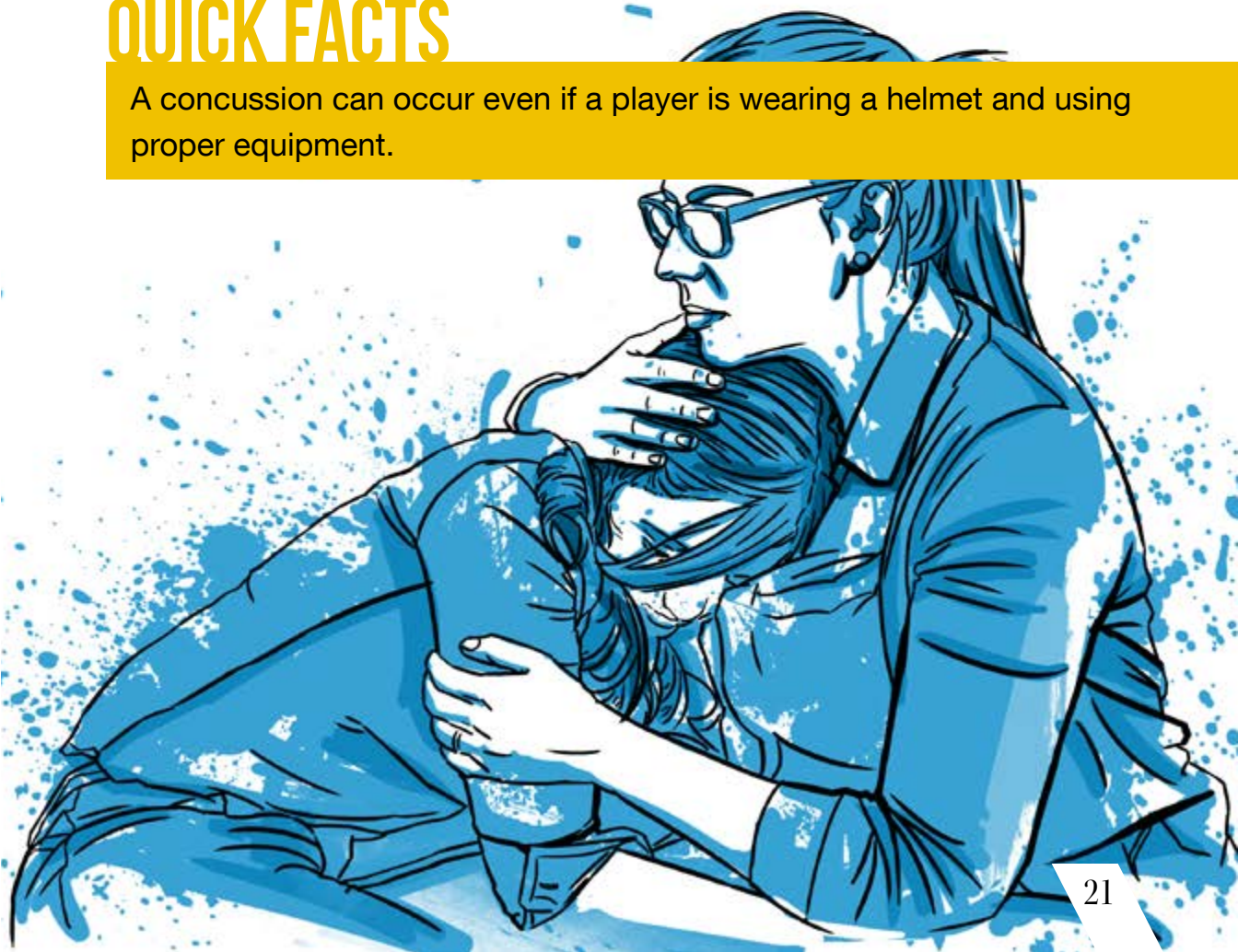
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Having a family member with a brain injury can be very demanding. It can be easy for family members to get overwhelmed and preoccupied with caring for the brain-injured adolescent, and consequently, forget to take care of themselves. It's essential for all family members to remember to look after themselves as well. You will be no help to your family member if you don't look after yourself. Strive for balance and give yourself permission to take some time away to recharge. If you find that the stress is too much, it may help to speak with your doctor about getting therapy or counselling. There is no shame or weakness in seeking help when you need it. Recognizing that you need additional help is a sign of strength.

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## QUICK FACTS

A concussion can occur even if a player is wearing a helmet and using proper equipment.



# RECOGNIZING A CONCUSSION

With better understanding about concussions now developing, the importance of early identification of concussions has been increasingly highlighted. Every coach or trainer should be aware of how to do this.

International medical meetings on concussions have resulted in consensus recommendations pertaining to concussion in sport. One useful tool is the Sport Concussion Assessment Tool (SCAT3) found here: [www.parachutecanada.org/downloads/resources/SCAT3.pdf](http://www.parachutecanada.org/downloads/resources/SCAT3.pdf)

The Pocket Concussion Recognition Tool is an abbreviated version, which can be used by coaches or trainers to identify athletes who may have suffered a brain injury. Remember, young people may initially exhibit fewer signs of concussion than adults. If you suspect that your child/player may have suffered a concussion, **DO NOT allow him or her to return to play and make sure he or she is medically assessed as soon as possible**. A concussion is a medical diagnosis. It cannot be determined by an adolescent, parent, teacher, trainer, or coach. If you suspect a concussion, seek immediate medical assessment.

This information on concussion identification has been modified from the Pocket Concussion Recognition Tools and other concussion evaluative suggestions.

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## RECOGNIZE & REMOVE

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Concussion should be suspected if one or more of the following clues, signs, symptoms or errors in memory questions are present.



### VISIBLE CLUES OF SUSPECTED CONCUSSION

ANY ONE OR MORE OF THE FOLLOWING VISUAL CLUES CAN INDICATE A POSSIBLE CONCUSSION.

- Loss of consciousness.
- Lying motionless on ground / slow to get up.
- Unsteady on feet / balance problems or falling over / incoordination

- Grabbing / clutching of head.
- Dazed, blank or vacant look.
- Confused / not aware of what is happening.
- Unusual behaviour

## 2

### SIGNS AND SYMPTOMS OF SUSPECTED CONCUSSION

PRESENCE OF ANY ONE OR MORE OF THE FOLLOWING SIGNS & SYMPTOMS MAY SUGGEST A CONCUSSION HAS RECENTLY OCCURRED..

- |                         |                            |                            |
|-------------------------|----------------------------|----------------------------|
| ■ Balance problems      | ■ Difficulty remembering   | ■ Amnesia                  |
| ■ Nausea                | ■ Headache                 | ■ Feeling like "in a fog"  |
| ■ Drowsiness            | ■ Dizziness                | ■ Neck Pain                |
| ■ Irritability          | ■ Confusion                | ■ Sensitivity to noise     |
| ■ Fatigue or low energy | ■ Feeling slowed down      | ■ Difficulty concentrating |
| ■ Agitated              | ■ Feeling pressure in head |                            |
| ■ Confusion             | ■ Blurred vision           |                            |
| ■ "Don't feel right"    | ■ Sensitivity to light     |                            |

## 3

### MEMORY FUNCTION

FAILURE TO ANSWER ANY OF THESE OR SIMILAR QUESTIONS CORRECTLY MAY SUGGEST A CONCUSSION.

- |                                   |   |
|-----------------------------------|---|
| ■ "Where are you right now?"      | ■ "What does 3 minus 2 plus 5 equal?"         |
| ■ "What is the date today?"       | ■ "What team did you play against last game?" |
| ■ "Who scored last in this game?" |   |

Any athlete with a suspected concussion should be **IMMEDIATELY REMOVED FROM PLAY**, and should not be returned to activity until they are assessed medically and given written permission to return to play. Athletes with a suspected concussion should not be left alone and should not drive a motor vehicle.

It is recommended that in all cases of suspected concussion, the player is referred to a medical professional for diagnosis and guidance as well as return to play decisions even if the symptoms resolve quickly.

■ Don't push return to play. Rest is essential for healing.

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## RED FLAGS: FOR IMMEDIATE MEDICAL ATTENTION

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If ANY of the following are reported then the player should be safely and immediately removed from the field. If no qualified medical professional is available, consider transporting by ambulance for urgent medical assessment:

- Athlete complains of increasing neck pain
- Increasing confusion or agitation
- Repeated vomiting
- Seizure or convulsion
- Weakness or tingling / burning in arms or legs
- Increasing confusion
- Increasing headache
- Unusual behaviours
- Double vision
- Increasing drowsiness

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## REMEMBER

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- In all cases of head injury, the basic principles of first aid (danger, response, airway, breathing, circulation) should be followed.
- Do not attempt to move the player (other than required for airway support) unless trained to do so.
- Do not remove helmet (if present) unless trained to do so.

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To view the original Concussion Recognition Tool:

[www.parachutecanada.org/downloads/resources/Pocket\\_CRT\\_Final.pdf](http://www.parachutecanada.org/downloads/resources/Pocket_CRT_Final.pdf)



# CONCUSSION IDENTIFICATION TOOL (CIT)

## ?HOW TO USE THE CIT

Mark any item with an ☒. Even one ☒ may indicate the player could have suffered a concussion. If so, remove them from play and monitor. Send for medical assessment as appropriate.

### 1 VISIBLE CLUES OF SUSPECTED CONCUSSION

ANY ONE OR MORE OF THE FOLLOWING VISUAL CLUES CAN INDICATE A POSSIBLE CONCUSSION.

- |  |   |
|--|---|
| <input type="checkbox"/> Loss of consciousness                       | <input type="checkbox"/> Unresponsive to questions  |
| <input type="checkbox"/> Lying motionless on ground / slow to get up | <input type="checkbox"/> Unusual behavior   |
| <input type="checkbox"/> Grabbing / clutching of head                | <input type="checkbox"/> Unsteady on feet / balance problems or falling over / incoordination |
| <input type="checkbox"/> Dazed, blank or vacant look                 |   |
| <input type="checkbox"/> Confused / not aware of what is happening   |   |

### 2 SIGNS AND SYMPTOMS OF SUSPECTED CONCUSSION

PRESENCE OF ANY ONE OR MORE OF THE FOLLOWING SIGNS & SYMPTOMS MAY SUGGEST A CONCUSSION.

- |  |   |   |
|--|---|---|
| <input type="checkbox"/> Balance problems      | <input type="checkbox"/> Difficulty remembering   | <input type="checkbox"/> Amnesia                  |
| <input type="checkbox"/> Nausea                | <input type="checkbox"/> Headache                 | <input type="checkbox"/> Feeling like "in a fog"  |
| <input type="checkbox"/> Drowsiness            | <input type="checkbox"/> Dizziness                | <input type="checkbox"/> Neck Pain                |
| <input type="checkbox"/> Irritability          | <input type="checkbox"/> Feeling slowed down      | <input type="checkbox"/> Sensitivity to noise     |
| <input type="checkbox"/> Fatigue or low energy | <input type="checkbox"/> Feeling Pressure in head | <input type="checkbox"/> Difficulty concentrating |
| <input type="checkbox"/> Nervous or anxious    | <input type="checkbox"/> Blurred vision           |   |
| <input type="checkbox"/> Confusion             | <input type="checkbox"/> Sensitivity to light     |   |

### 3 MEMORY FUNCTION

FAILURE TO ANSWER ANY OF THESE QUESTIONS CORRECTLY MAY SUGGEST A CONCUSSION.

- |  |  |
|--|--|
| <input type="checkbox"/> "Where are you right now?"      | <input type="checkbox"/> "What team did you play against last game?" |
| <input type="checkbox"/> "What is the date today?"       | <input type="checkbox"/> "Did your team win the last game?"          |
| <input type="checkbox"/> "Who scored last in this game?" | <input type="checkbox"/> "What does 3 minus 2 plus 5 equal?"         |

### 4 RED FLAGS: FOR IMMEDIATE MEDICAL ATTENTION

If ANY of the following are reported then the player should be safely and immediately removed from the field. If no qualified medical professional is available, consider transporting by ambulance for urgent medical assessment:

- |  |   |  |
|--|---|--|
| <input type="checkbox"/> Increasing neck pain  | <input type="checkbox"/> Weakness or tingling / burning in arms or legs | <input type="checkbox"/> Unusual behaviours    |
| <input type="checkbox"/> Increasing agitation  | <input type="checkbox"/> Increasing confusion                           | <input type="checkbox"/> Double vision         |
| <input type="checkbox"/> Vomiting              | <input type="checkbox"/> Increasing headache                            | <input type="checkbox"/> Increasing drowsiness |
| <input type="checkbox"/> Seizure or convulsion |   |  |

# REFERENCES & FURTHER READING

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FOR MORE INFORMATION ABOUT CONCUSSIONS AND YOUNG ATHLETES, CHECK OUT THESE RESOURCES

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## ParachuteCanada.org

Parachute aims to reduce preventable injury to ensure that Canadian youth, families, and adults are able to live long and healthy lives.

Parachute merged with ThinkFirst.ca, a website and organization dedicated to teaching school-aged children and youth, sports teams, and community volunteers to safely participate in the activities they enjoy.

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## Centers for Disease control and Prevention ([www.cdc.gov](http://www.cdc.gov))

The CDC works to protect public health and safety by providing information to enhance health decisions. It also promotes health through partnerships with state health departments and other organizations.

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## Other Online Resources

General information about the teen brain and teen mental health:

[teenmentalhealth.org](http://teenmentalhealth.org)

[brainline.org](http://brainline.org)

Brain injury guides for educators:

[www.bced.gov.bc.ca/specialed/docs/moe\\_abi\\_resource\\_rb0116.pdf](http://www.bced.gov.bc.ca/specialed/docs/moe_abi_resource_rb0116.pdf)

Brain Injury Association of Canada

[biac-aclc.ca](http://biac-aclc.ca)

Brain injury and school: a problem solving system for students with brain injury:

[projectlearnnet.org](http://projectlearnnet.org)

Medical care after brain injury

[tbirecoverycenter.org/treatment.htm](http://tbirecoverycenter.org/treatment.htm)

Sport Concussion Assessment Tool (SCAT3)

[sportsclinic.ca/resources/TSC-SCAT3-Assessment.pdf](http://sportsclinic.ca/resources/TSC-SCAT3-Assessment.pdf)

Brain Injury Alliance New Jersey (Articles and Publications)

[www.bianj.org/brain-injury-articles-and-publications](http://www.bianj.org/brain-injury-articles-and-publications)

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## Books

Ashley, M.J. (2010). Traumatic brain injury: rehabilitation, treatment, and case management, 3rd ed. Boca Raton, FL: CRC Press.

McCrea, M. (2008). Mild traumatic brain injury and post-concussion syndrome: the new evidence base for diagnosis and treatment. American Academy of Clinical Neuropsychology. New York: Oxford University Press.

Roy-Bornstein, C. Crash. (2012). Morris Publishing Group, USA.

Silver, J.M., McAllister, T.W., & Yudofsky, S.C. (2005). Textbook of traumatic brain injury. Arlington, VA: American Psychiatric Publishing, Inc.

Patient: Family Education Working Group, Calgary Brain Injury Strategy. The Brain Injury Book. [www.albertahealthservices.ca/hp/if-hp-cbi-pf-coping-brain-injury-booklet.pdf](http://www.albertahealthservices.ca/hp/if-hp-cbi-pf-coping-brain-injury-booklet.pdf)

Mason, M. P. (2008). Head cases: Stories of brain injury and its aftermath (6th ed.). New York: Farrar, Straus and Giroux.

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## Articles

Laker, S. (2011). Return to play decisions. Physical Med Rehabilitation Clinical, 22: 619-634.

Harmon, K.G., et al. (2013). American Medical Society for Sports Medicine Position Statement: Concussion in Sport. BR J Sports Med. 47 (1): 15-26.

McCrory, P., Meeuwisse, WH, Aubry, M, et al. (2013). Consensus statement on concussion in sport: The 4th International Conference on Concussion in Sport held in Zurich, November 2012. British Journal of Sports Medicine, 47: 250-258.

Powell, K. (2006). How does the teenage brain work? Nature, 442(24): 865-867.

Grady, M. F. (2010) Concussion in the adolescent athlete. Current Problems Pediatric Adolescent Health Care. 40 (7): 154-169.

# Notes



