Canadian Guideline on Concussion in Sport
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Overview

Purpose
This guideline covers pre-season education and the recognition, medical diagnosis, and management of athletes who sustain a suspected concussion during a sport activity. It aims to ensure that athletes with a suspected concussion receive timely and appropriate care, and proper management to allow them to return to their sport. This guideline may not address every possible clinical scenario that can occur but is intended as a general overview that includes critical elements based on the latest evidence and current expert consensus.

Application to non-sport related concussion
This guideline has been developed based on a review of the current scientific evidence and expert consensus on best practices for the evaluation and management of Canadian athletes who sustain a concussion during a sport activity. However, the management principles described in this guideline should also be applied to children, adolescents and adults who sustain a concussion outside of a sporting environment and are returning to activity (in school, in the workplace, and so on).

Certain terminology has been used to make this guideline as specific as possible and to directly reflect the International Consensus Statement on Concussion in Sport. These terms may be new to some readers and two examples are worth noting. A Return-to-School Strategy is recommended to address the process commonly known as “return to learn”. The Return-to-School Strategy focuses on the individual returning to a formal, structured learning environment rather than engaging more broadly in cognitive day-to-day activities. A Return-to-Sport Strategy is recommended to address the process known as “return to play”. The Return-to-Sport Strategy focuses on individuals returning to training, practice, and competition in organized sport, not unstructured day-to-day activity or play. For further information on terminology used in this guideline, please see the “Key Term Definitions” section.

Who should use this guideline?
This guideline is intended for use by all stakeholders who interact with athletes inside and outside the context of school and non-school based organized sports activity, including athletes, parents, coaches, officials, teachers, trainers, and licensed healthcare professionals.
How to read this guideline

This guideline addresses 7 areas in the prevention, recognition, diagnosis, and management of sport-related concussion:

1. Pre-season education
2. Head injury recognition
3. Onsite medical assessment
4. Medical assessment
5. Concussion management
6. Multidisciplinary concussion care
7. Return to sport

For each area, recommendations are provided, along with:

› **Who:** Who are the people that play a key role to implement the recommendations in this area.

› **How:** What are the key tools and documents people can use to implement the recommendations in this area. All tools are included directly in this guideline.

Role of clinical judgment

Several recommendations in this guideline are aimed at licensed healthcare professionals with the aim of helping them make informed decisions about their patients. However, this guideline is not intended to take the place of clinical judgment in diagnosing and treating concussion. Healthcare professionals must make their own decisions about care after consultation with their patients, using their clinical judgement, knowledge and expertise.

Key Term Definitions

**Concussion:** A form of traumatic brain injury induced by biomechanical forces that result in signs and symptoms that typically resolve spontaneously within 1-4 weeks of injury.¹

**Athlete:** Any youth or adult participating in a school or non-school based sport activity, competing at any level of play (amateur or national team). This term refers to all sport participants and players. The most appropriate term will vary across different sports and settings.

**Youth or youth athlete:** An athlete or sport participant who is less than 18 years of age.

**Sport or sport activity:** A school or non-school based physical activity that can be played as an individual or a team including games and practices.

**Recognition:** The detection of an event (i.e. a suspected concussion) occurring during sports or a sport activity.

**Exercise:** Any physical activity that requires bodily movement including resistance training as well as aerobic and anaerobic exercise or training.

**Persistent symptoms:** Concussion symptoms that last longer than 2 weeks after injury in adults and longer than 4 weeks after injury in youth.

**Licensed healthcare professional:** A healthcare provider who is licensed by a national professional regulatory body to provide concussion-related healthcare services that fall within their licensed scope of practice. Examples include medical doctors, nurses, physiotherapists, and athletic therapists.

Among licensed healthcare professionals, only medical doctors and nurse practitioners are qualified to conduct a comprehensive medical assessment and provide a concussion diagnosis in Canada. The types of medical doctors qualified to do such an evaluation are: pediatricians; family medicine, sports medicine, emergency department and rehabilitation (physiatrists) physicians; neurologists; and neurosurgeons.

**Medical Assessment:** The evaluation of an individual by a licensed healthcare professional to determine the presence or absence of a medical condition or disorder, such as a concussion.

**Treatment:** An intervention provided by a licensed healthcare professional to address a diagnosed medical condition/disorder or its associated symptoms, such as physical therapy.

**Multidisciplinary concussion clinic:** A facility or network of licensed healthcare professionals that provide assessment and treatment of concussion patients and are supervised by a physician with training and experience in concussion.

**Tool:** A standardized instrument or device that can be used to help recognize an event (i.e. a suspected concussion) or assess an individual with a suspected medical diagnosis (i.e. Sport Concussion Assessment Tool 5).

**Document:** A standardized written letter or form that can help facilitate communication between sport stakeholders.

**Concussion Recognition Tool – 5th Edition (CRT5):** A tool intended to be used for the identification of suspected concussion in children, youth, and adults. Published in 2017 by the Concussion in Sport Group, the CRT5 replaces the previous Pocket Concussion Recognition Tool from 2013.
Sport Concussion Assessment Tool – 5th Edition (SCAT5): A standardized tool for evaluating concussions in individuals aged 13 years or older, designed for use by physicians and licensed healthcare professionals. Published in 2017 by the Concussion in Sport Group, the SCAT5 replaces the previous SCAT3 from 2013.

Child Sport Concussion Assessment Tool – 5th Edition (Child SCAT5): A standardized tool for evaluating concussions in individuals aged 5 to 12 years, designed for use by physicians and licensed healthcare professionals. Published in 2017 by the Concussion in Sport Group, the Child SCAT5 replaces the previous Child SCAT3 from 2013.

Return-to-School Strategy: A graduated stepwise strategy for the process of recovery and return to academic activities after a concussion. The broader process of returning to cognitive activities has commonly been referred to as “return to learn”.

Return-to-Sport Strategy: A graduated stepwise strategy for the process of recovery and then return to sport participation after a concussion. The broader process of returning to unstructured and structured physical activity has commonly been referred to as “return to play”.
Guideline Recommendations
1. Pre-Season Education

Despite recent increased attention focusing on concussion there is a continued need to improve concussion education and awareness. Optimizing the prevention and management of concussion depends highly on annual education of all sport stakeholders (athletes, parents, coaches, officials, teachers, trainers, and licensed healthcare professionals) on evidence-informed approaches that can prevent concussion and more serious forms of head injury and help identify and manage an athlete with a suspected concussion.

Concussion education should include information on:

- the definition of concussion,
- possible mechanisms of injury,
- common signs and symptoms,
- steps that can be taken to prevent concussions and other injuries from occurring in sport,
- what to do when an athlete has suffered a suspected concussion or more serious head injury,
- what measures should be taken to ensure proper medical assessment including Return-to-School and Return-to-Sport Strategies, and
- Return-to-sport medical clearance requirements.

As an example, this education could be provided using an education sheet that is reviewed and signed by all stakeholders at the time of sport registration or before the beginning of each sports season to confirm that the key information has been received by all participants.

In addition to reviewing information on concussion, it is also important that all sport stakeholders have a clear understanding of the concussion protocol and policies for their sport and sport setting at the beginning of each sport season. For example, this can be accomplished through pre-season in-person orientation sessions for athletes, parents, coaches and other sport stakeholders.

- **Who:** Athletes, parents, coaches, officials, teachers, and trainers, licensed healthcare professionals
- **How:** Pre-season Concussion Education Sheet
2. Head Injury Recognition

Although the formal diagnosis of concussion should be made following a medical assessment, all sport stakeholders including athletes, parents, coaches, officials, teachers, trainers, and licensed healthcare professionals are responsible for the recognition and reporting of athletes who demonstrate visual signs of a head injury or who report concussion symptoms. This is particularly important because many sport and recreation venues will not have access to on-site licensed healthcare professionals.

A concussion should be suspected in any athlete who sustains a significant impact to the head, face, neck, or body and demonstrates ANY of the visual signs of a suspected concussion or reports ANY symptoms of a suspected concussion as detailed in the Concussion Recognition Tool 5. A concussion should also be suspected if a player reports ANY concussion symptoms to one of their peers, parents, teachers, or coaches or if anyone witnesses an athlete exhibiting any of the visual signs of concussion.

In some cases, an athlete may demonstrate signs or symptoms of a more severe head or spine injury including convulsions, worsening headaches, vomiting or neck pain. If an athlete demonstrates any of the ‘Red Flags’ indicated by the Concussion Recognition Tool 5, a more severe head or spine injury should be suspected, and Emergency Medical Assessment should be pursued (see 3a. Emergency Medical Assessment).

- **Who:** Athletes, parents, coaches, officials, teachers, trainers, and licensed healthcare professionals
- **How:** Concussion Recognition Tool - 5th Edition (CRT5)
3. Onsite Medical Assessment

Depending on the suspected severity of the injury and access to medical services, an initial assessment may be completed by emergency medical professionals or by an on-site licensed health professional where available. In cases where an athlete loses consciousness or it is suspected an athlete might have a more severe head or spine injury, Emergency Medical Assessment by emergency medical professionals should take place (see 3a below). If a more severe injury is not suspected, the athlete should undergo Sideline Medical Assessment or Medical Assessment, depending on if there is a licensed healthcare professional present (see 3b below).

3a. Emergency Medical Assessment

If an athlete is suspected of sustaining a more severe head or spine injury during a game or practice, an ambulance should be called immediately to transfer the patient to the nearest emergency department for further Medical Assessment.

Coaches, parents, trainers and sports officials should not make any effort to remove equipment or move the athlete until an ambulance has arrived and the athlete should not be left alone until the ambulance arrives. After the emergency medical services staff has completed the Emergency Medical Assessment, the athlete should be transferred to the nearest hospital for Medical Assessment. In the case of youth (under 18 years of age), the athlete’s parents or legal guardian should be contacted immediately to inform them of the athlete’s injury. For athletes over 18 years of age, their emergency contact person should be contacted if one has been provided.

Who: Emergency medical professionals

3b. Sideline Medical Assessment

If an athlete is suspected of sustaining a concussion and there is no concern for a more serious head or spine injury, the player should be immediately removed from the field of play.

Scenario 1: If a licensed healthcare professional is present

The athlete should be taken to a quiet area and undergo Sideline Medical Assessment using the Sport Concussion Assessment Tool 5 (SCAT5) or the Child SCAT5. The SCAT5 and Child SCAT5 are clinical tools that should only be used by a licensed medical professional that has experience using these tools. It is important to note that the results of SCAT5 and Child SCAT5 testing can be normal in the setting of acute concussion. As such, these tools can be used by licensed healthcare professionals to document initial neurological status but should not be used to make sideline return-to-sport decisions in youth athletes. Any youth athlete who is suspected of having sustained a concussion must not return to the game or practice and should be referred for Medical Assessment.
If a youth athlete is removed from play following a significant impact and has undergone Sideline Medical Assessment, but there are NO visual signs of a concussion and the athlete reports NO concussion symptoms then the athlete can be returned to play but should be monitored for delayed symptoms.

In the case of national team-affiliated athletes (age 18 years and older) who have been removed from play following a suspected concussion, an experienced certified athletic therapist, physiotherapist or medical doctor providing medical coverage for the sporting event may make the determination that a concussion has not occurred based on the results of the Sideline Medical Assessment. In these cases, the athlete may be returned to the practice or game without a Medical Clearance Letter but this should be clearly communicated to the coaching staff. Players that have been cleared to return to games or practices should be monitored for delayed symptoms by the licensed healthcare professional. If the athlete develops any delayed symptoms the athlete should be removed from play and undergo Medical Assessment by a medical doctor or nurse practitioner (see 4. Medical Assessment).

**Scenario 2: if there is no licensed healthcare professional present**
The athlete should be referred immediately for Medical Assessment by a medical doctor or nurse practitioner, and the athlete must not return to play until receiving medical clearance.

- **Who:** Athletic therapists, physiotherapists, medical doctor
- **How:** Sport Concussion Assessment Tool – 5th Edition (SCAT5)  
  Child Sport Concussion Assessment Tool – 5th Edition (Child SCAT5)
4. Medical Assessment

In order to provide comprehensive evaluation of athletes with a suspected concussion, the medical assessment must rule out more serious forms of traumatic brain and spine injuries, must rule out medical and neurological conditions that can present with concussion-like symptoms, and must make the diagnosis of concussion based on findings of the clinical history and physical examination and the evidence-based use of adjunctive tests as indicated (i.e. CT scan). In addition to nurse practitioners, the types of medical doctors that are qualified to evaluate patients with a suspected concussion include: pediatricians; family medicine, sports medicine, emergency department, internal medicine and rehabilitation (physiatrists) physicians; neurologists; and neurosurgeons.

In geographic regions of Canada with limited access to medical doctors (i.e. rural or northern communities), a licensed healthcare professional (i.e. nurse) with pre-arranged access to a medical doctor or nurse practitioner can facilitate this role. The medical assessment is responsible for determining whether the athlete has been diagnosed with a concussion or not. Athletes with a diagnosed concussion should be provided with a Medical Assessment Letter indicating a concussion has been diagnosed. Athletes that are determined to have not sustained a concussion must be provided with a Medical Assessment Letter indicating a concussion has not been diagnosed and the athlete can return to school, work and sport activities without restriction.

- **Who:** Medical doctor, nurse practitioner, nurse
- **How:** Medical Assessment Letter

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2 Medical doctors and nurse practitioners are the only healthcare professionals in Canada with licensed training and expertise to meet these needs; therefore all athletes with a suspected concussion should undergo evaluation by one of these professionals.
5. Concussion Management

When an athlete has been diagnosed with a concussion, it is important that the athlete’s parent/legal guardian or spouse is informed. All athletes diagnosed with a concussion must be provided with a standardized Medical Assessment Letter that notifies the athlete and their parents/legal guardian/spouse that they have been diagnosed with a concussion and may not return to any activities with a risk of concussion (such as sport) until medically cleared to do so by a medical doctor or nurse practitioner. Because the Medical Assessment Letter contains personal health information, it is the responsibility of the athlete or their parent/legal guardian to provide this documentation to the athlete’s coaches, teachers, or employers. It is also important for the athlete to provide this information to sport organization officials that are responsible for injury reporting and concussion surveillance where applicable.

Athletes diagnosed with a concussion should be provided with education about the signs and symptoms of concussion, strategies about how to manage their symptoms, the risks of returning to sport without medical clearance and recommendations regarding a gradual return to school and sport activities. Athletes diagnosed with a concussion are to be managed according to their Return-to-School and Sport-Specific Return-to-Sport Strategies under the supervision of a medical doctor or nurse practitioner. When available, athletes should be encouraged to work with the team athletic therapist or physiotherapist to optimize progression through their Sport-Specific Return-to-Sport Strategy. Once the athlete has completed their Return-to-School and Sport-Specific Return-to-Sport Strategies and are deemed to be clinically recovered from their concussion, the medical doctor or nurse practitioner can consider the athlete for a return to full sport activities and issue a Medical Clearance Letter.

The stepwise progressions for Return-to-School and Return-to-Sport Strategies are outlined below. As indicated in stage 1 of the Return-to-Sport Strategy, reintroduction of daily, school, and work activities using the Return-to-School Strategy must precede return to sport participation.

**Return-to-School Strategy**

The following is an outline of the Return-to-School Strategy that should be used to help student-athletes, parents, and teachers to partner in allowing the athlete to make a gradual return to school activities (Table 1). Depending on the severity and type of the symptoms present, student-athletes will progress through the following stages at different rates. If the student-athlete experiences new symptoms or worsening symptoms at any stage, they should go back to the previous stage. Athletes should also be encouraged to ask their school if they have a school-specific Return-to-Learn Program in place to help student-athletes make a gradual return to school.
Table 1. Return-to-School Strategy: Graduated Approach

<table>
<thead>
<tr>
<th>Stage</th>
<th>Aim</th>
<th>Activity</th>
<th>Goal of each step</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Daily activities at home that do not give the student-athlete symptoms</td>
<td>Typical activities during the day as long as they do not increase symptoms (i.e. reading, texting, screen time). Start at 5-15 minutes at a time and gradually build up.</td>
<td>Gradual return to typical activities</td>
</tr>
<tr>
<td>2</td>
<td>School activities</td>
<td>Homework, reading or other cognitive activities outside of the classroom.</td>
<td>Increase tolerance to cognitive work.</td>
</tr>
<tr>
<td>3</td>
<td>Return to school part-time</td>
<td>Gradual introduction of schoolwork. May need to start with a partial school day or with increased breaks during the day.</td>
<td>Increase academic activities.</td>
</tr>
<tr>
<td>4</td>
<td>Return to school full-time</td>
<td>Gradually progress.</td>
<td>Return to full academic activities and catch up on missed school work.</td>
</tr>
</tbody>
</table>

**Sport-Specific Return-to-Sport Strategy**

The following is an outline of the *Return-to-Sport Strategy* that should be used to help athletes, parents, coaches, trainers, teachers, and medical professionals to partner in allowing the athlete to make a gradual return to sport activities (Table 2). Activities should be tailored to create a sport-specific strategy that helps the athlete return to their respective sport.

An initial period of 24-48 hours of rest is recommended before starting their *Sport-Specific Return-to-Sport Strategy*. If the athlete experiences new symptoms or worsening symptoms at any stage, they should go back to the previous stage. It is important that youth and adult student-athletes return to full-time school activities before progressing to stage 5 and 6 of the *Sport-Specific Return-to-Sport Strategy*. It is also important that all athletes provide their coach with a *Medical Clearance Letter* prior to returning to full contact sport activities.

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*McCrory et al. (2017).*
### Table 2. Return-to-Sport Strategy: Graduated Approach

<table>
<thead>
<tr>
<th>Stage</th>
<th>Aim</th>
<th>Activity</th>
<th>Goal of each step</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Symptom-limiting activity</td>
<td>Daily activities that do not provoke symptoms.</td>
<td>Gradual re-introduction of work/school activities.</td>
</tr>
<tr>
<td>2</td>
<td>Light aerobic activity</td>
<td>Walking or stationary cycling at slow to medium pace. No resistance training.</td>
<td>Increase heart rate.</td>
</tr>
<tr>
<td>3</td>
<td>Sport-specific exercise</td>
<td>Running or skating drills. No head impact activities.</td>
<td>Add movement.</td>
</tr>
<tr>
<td>4</td>
<td>Non-contact training drills</td>
<td>Harder training drills, i.e. passing drills. May start progressive resistance training.</td>
<td>Exercise, coordination and increased thinking.</td>
</tr>
<tr>
<td>5</td>
<td>Full contact practice</td>
<td>Following medical clearance.</td>
<td>Restore confidence and assess functional skills by coaching staff.</td>
</tr>
<tr>
<td>6</td>
<td>Return to sport</td>
<td>Normal game play.</td>
<td></td>
</tr>
</tbody>
</table>

- **Who:** Medical doctor, nurse practitioner and team athletic therapist or physiotherapist (where available)
- **How:** Return-to-School Strategy  
  Sport-Specific Return-to Sport Strategy  
  Medical Assessment Letter

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4McCrory et al. (2017).
Most athletes who sustain a concussion while participating in sport will make a complete recovery and be able to return to full school and sport activities within 1-4 weeks of injury. However, approximately 15-30% of individuals will experience symptoms that persist beyond this time frame. If available, individuals who experience persistent post-concussion symptoms (>4 weeks for youth athletes, >2 weeks for adult athletes) may benefit from referral to a medically-supervised multidisciplinary concussion clinic that has access to professionals with licensed training in traumatic brain injury that may include experts in sport medicine, neuropsychology, physiotherapy, occupational therapy, neurology, neurosurgery, and rehabilitation medicine.

Referral to a multidisciplinary clinic for assessment should be made on an individualized basis at the discretion of an athlete's medical doctor or nurse practitioner. If access to a multidisciplinary concussion clinic is not available, a referral to a medical doctor with clinical training and experience in concussion (e.g. a sport medicine physician, neurologist, or rehabilitation medicine physician) should be considered for the purposes of developing an individualized treatment plan. Depending on the clinical presentation of the individual, this treatment plan may involve a variety of healthcare professionals with areas of expertise that address the specific needs of the athlete based on the assessment findings.

‣ **Who:** Multidisciplinary medical team, medical doctor with clinical training and experience in concussion (e.g. a sports medicine physician, neurologist, or rehabilitation medicine physician), licensed healthcare professionals
7. Return to Sport

Athletes who have been determined to have not sustained a concussion and those that have been diagnosed with a concussion and have successfully completed their Return-to-School and Sport-Specific Return-to-Sport Strategies can be considered for return to full sport activities. The final decision to medically clear an athlete to return to full game activity should be based on the clinical judgment of the medical doctor or nurse practitioner taking into account the athlete’s past medical history, clinical history, physical examination findings and the results of other tests and clinical consultations where indicated (i.e. neuropsychological testing, diagnostic imaging).

Prior to returning to full contact practice and game play, each athlete must provide their coach with a standardized Medical Clearance Letter that specifies that a medical doctor or nurse practitioner has personally evaluated the patient and has cleared the athlete to return to sport. In geographic regions of Canada with limited access to medical doctors (i.e. rural or northern communities), a licensed healthcare professional (i.e. a nurse) with pre-arranged access to a medical doctor or nurse practitioner can provide this documentation. A copy of the Medical Clearance Letter should also be submitted to sport organization officials that have injury reporting and surveillance programs where applicable.

Athletes who have been provided with a Medical Clearance Letter may return to full sport activities as tolerated. If the athlete experiences any new concussion-like symptoms while returning to play, they should be instructed to stop playing immediately, notify their parents/legal guardian, coaches, trainer or teachers, and undergo follow-up Medical Assessment. In the event that the athlete sustains a new suspected concussion, the Canadian Guideline on Concussion in Sport should be followed as outlined here.

› **Who:** Medical doctor, nurse practitioner

› **How:** Medical Clearance Letter
Canadian Sport Concussion Pathway

The figure that follows is a visual representation of the decision-making pathway that reflects the recommendations in this guideline.
1. Pre-Season Education
   - **Who:** Athletes, parents, coaches, officials, trainers, teachers, healthcare professionals
   - **How:** Pre-season Education Sheet

2. Head Injury Recognition
   - **Who:** Athletes, parents, coaches, officials, trainers, teachers, healthcare professionals
   - **How:** Concussion Recognition Tool 5 (CRT5)

   Is a more serious head or spine injury suspected?
   - **YES**
     - Remove from play
   - **NO**

   3A. Emergency Medical Assessment
   - **Who:** Emergency medical personnel

   4. Medical Assessment
   - **Who:** Medical doctor, nurse practitioner
   - **How:** Medical Assessment Letter

   Is a concussion suspected?
   - **YES**
     - Return to Sport
   - **NO**

   5. Concussion Management
   - **Who:** Medical doctor, nurse practitioner, and team athletic therapist or physiotherapist
   - **How:** Return-to-School Strategy, Sport-Specific Return-to-Sport Strategy

   Does the athlete have persistent symptoms?*
   - **YES**
     - 6. Multidisciplinary Concussion Care
       - **Who:** Multidisciplinary medical team, medical doctor with clinical training and experience in concussion, licensed healthcare professionals
   - **NO**

   7. Return to Sport Medical Clearance
   - **Who:** Medical doctor, nurse practitioner
   - **How:** Medical Clearance Letter

*Persistent symptoms: lasting > 4 weeks in children & youth or > 2 weeks in adults

**PARACHUTE | Canadian Guideline on Concussion in Sport**
Guideline Development Process

Evidence

This guideline was developed using the results of a systematic evidence search and consensus process conducted external to the guideline’s development.

The most current high quality scientific evidence addressing concussion in sport is reviewed roughly every 4 years by the Scientific Committee and Expert Panel of the International Consensus Conference on Concussion in Sport. The consensus process includes:

- Drafting, feedback, and revision of systematic review questions by the Scientific Committee and Expert Panel
- Systematic reviews
- Submission and review of scientific abstracts to supplement the systematic reviews with the latest evidence
- Consensus meeting with: public plenary lectures to address the review questions; closed Expert Panel meeting; and, updating of tools (CRT, SCAT, Child SCAT)

Additional details on the consensus process and methodology are available here: http://bjsm.bmj.com/content/51/11/873. The results of this process are subsequently published in the form of a consensus statement, systematic review articles, and tools in the British Journal of Sports Medicine.

The 5th International Consensus Conference on Concussion in Sport was held October 27-28, 2016 in Berlin, Germany. This iteration of the consensus process included 12 systematic review questions. A new International Consensus Statement on Concussion in Sport, 12 systematic reviews, and updated tools (CRT5, SCAT5, Child SCAT5) were published in April 2017. Three of the lead authors of the Consensus Statement – Dr. Carolyn Emery, Dr. Kathryn Schneider, and Dr. Charles Tator – are members of the Expert Committee that developed this guideline.

The full scope of evidence included in the Consensus Statement and systematic reviews is broader than the scope of this guideline. Selection of the recommendation areas and evidence to include in this guideline was determined by the Expert Committee and informed by Russell et al.5’s framework for youth sport concussion in Canada.

Stakeholder Consultation

A broad group of stakeholders was consulted throughout the guideline development process to ensure the views of end users were considered. The following sectors and professions were included:

• Healthcare professionals including: Neurosurgery, Pediatrics, Sports Medicine, Physiotherapy, Occupational Therapy
• Health and sport injury researchers
• National Sport Organization representatives
• National Multisport Service Organization representatives including coaching
• Government
• Education

An initial draft of guideline recommendations based on evidence and practice-based expertise was developed by the Expert Committee. A national stakeholder event was hosted by Parachute in May 2017, where the recommendations were presented to health, sport, and government representatives for open discussion. Feedback received was incorporated into subsequent revisions of the document, which underwent ongoing review by the Expert Committee and Parachute Project Team.

External review by health, sport, government, and education representatives was the final step for completion of the document.

Updates to this Guideline
At the time of its publication, this guideline reflects the most current high quality evidence on concussion in sport. New scientific evidence and its impact on the areas of recommendation in this guideline will have to be considered as it emerges.

The next iteration of the consensus conference is expected to occur before December 31, 2020.
Appendix: Documents & Tools

The documents and tools that follow are included to support the implementation of the recommendations contained in this guideline. They are free to use and distribute.
Pre-Season Concussion Education Sheet

WHAT IS A CONCUSSION?
A concussion is a brain injury that can’t be seen on x-rays, CT or MRI scans. It affects the way an athlete thinks and can cause a variety of symptoms.

WHAT CAUSES A CONCUSSION?
Any blow to the head, face or neck, or somewhere else on the body that causes a sudden jarring of the head may cause a concussion. Examples include getting body-checked in hockey or hitting one’s head on the floor in gym class.

WHEN SHOULD I SUSPECT A CONCUSSION?
A concussion should be suspected in any athlete who sustains a significant impact to the head, face, neck, or body and reports ANY symptoms or demonstrates ANY visual signs of a concussion. A concussion should also be suspected if an athlete reports ANY concussion symptoms to one of their peers, parents, teachers, or coaches or if anyone witnesses an athlete exhibiting ANY of the visual signs of concussion. Some athletes will develop symptoms immediately while others will develop delayed symptoms (beginning 24-48 hours after the injury).

WHAT ARE THE SYMPTOMS OF A CONCUSSION?
A person does not need to be knocked out (lose consciousness) to have had a concussion. Common symptoms include:

- Headaches or head pressure
- Dizziness
- Nausea and vomiting
- Blurred or fuzzy vision
- Sensitivity to light or sound
- Balance problems
- Feeling tired or having no energy
- Not thinking clearly
- Feeling slowed down
- Easily upset or angered
- Sadness
- Nervousness or anxiety
- Feeling more emotional
- Sleeping more or sleeping less
- Having a hard time falling asleep
- Difficulty working on a computer
- Difficulty reading
- Difficulty learning new information

WHAT ARE THE VISUAL SIGNS OF A CONCUSSION?
Visual signs of a concussion may include:

- Lying motionless on the playing surface
- Slow to get up after a direct or indirect hit to the head
- Disorientation or confusion or inability to respond appropriately to questions
- Blank or vacant stare
- Balance, gait difficulties, motor incoordination, stumbling, slow labored movements
- Facial injury after head trauma
- Clutching head

WHAT SHOULD I DO IF I SUSPECT A CONCUSSION?
If any athlete is suspected of sustaining a concussion during sports they should be immediately removed from play. Any athlete who is suspected of having sustained a concussion during sports must not be allowed to return to the same game or practice.

It is important that ALL athletes with a suspected concussion undergo medical assessment by a medical doctor or nurse practitioner, as soon as possible. It is also important that ALL athletes with a suspected concussion receive written medical clearance from a medical doctor or nurse practitioner before returning to sport activities.

WHEN CAN THE ATHLETE RETURN TO SCHOOL AND SPORTS?
It is important that all athletes diagnosed with a concussion follow a step-wise return to school and sports-related activities that includes the following Return-to-School and Return-to-Sport Strategies. It is important that youth and adult student-athletes return to full-time school activities before progressing to stage 5 and 6 of the Return-to-Sport Strategy.
Return-to-School Strategy

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<td>Daily activities at home that do not give the student-athlete symptoms</td>
<td>Typical activities during the day as long as they do not increase symptoms (i.e. reading, texting, screen time). Start at 5-15 minutes at a time and gradually build up.</td>
<td>Gradual return to typical activities</td>
</tr>
<tr>
<td>2</td>
<td>School activities</td>
<td>Homework, reading or other cognitive activities outside of the classroom.</td>
<td>Increase tolerance to cognitive work.</td>
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<tr>
<td>3</td>
<td>Return to school part-time</td>
<td>Gradual introduction of schoolwork. May need to start with a partial school day or with increased breaks during the day.</td>
<td>Increase academic activities.</td>
</tr>
<tr>
<td>4</td>
<td>Return to school full-time</td>
<td>Gradually progress.</td>
<td>Return to full academic activities and catch up on missed school work.</td>
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</tbody>
</table>

Return-to-Sport Strategy

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<td>Light aerobic activity</td>
<td>Walking or stationary cycling at slow to medium pace. No resistance training.</td>
<td>Increase heart rate.</td>
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<td>3</td>
<td>Sport-specific exercise</td>
<td>Running or skating drills. No head impact activities.</td>
<td>Add movement.</td>
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<td>4</td>
<td>Non-contact training drills</td>
<td>Harder training drills, i.e. passing drills. May start progressive resistance training.</td>
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<td>Return to sport</td>
<td>Normal game play.</td>
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HOW LONG WILL IT TAKE FOR THE ATHLETE TO RECOVER?
Most athletes who sustain a concussion will make a complete recovery within 1-2 weeks while most youth athletes will recover within 1-4 weeks. Approximately 15-30% of patients will experience persistent symptoms (>2 weeks for adults; >4 weeks for youth) that may require additional medical assessment and management.

HOW CAN I HELP PREVENT CONCUSSIONS AND THEIR CONSEQUENCES?
Concussion prevention, recognition and management require athletes to follow the rules and regulations of their sport, respect their opponents, avoid head contact, and report suspected concussions.

TO LEARN MORE ABOUT CONCUSSIONS PLEASE VISIT: Parachute Canada: www.parachutecanada.org/concussion

SIGNATURES (OPTIONAL): The following signatures certify that the athlete and his/her parent or legal guardian have reviewed the above information related to concussion.

Printed name of athlete ___________________________ Signature of athlete ___________________________ Date ____________

Printed name of parent ___________________________ Signature of parent ___________________________ Date ____________
Medical Assessment Letter

Date: __________________________

Athlete’s name: __________________________

To whom it may concern,

Athletes who sustain a suspected concussion should be managed according to the Canadian Guideline on Concussion in Sport. Accordingly, I have personally completed a Medical Assessment on this patient.

Results of Medical Assessment

☐ This patient has not been diagnosed with a concussion and can resume full participation in school, work, and sport activities without restriction.

☐ This patient has not been diagnosed with a concussion but the assessment led to the following diagnosis and recommendations:

____________________________________________________________________________________

____________________________________________________________________________________

☐ This patient has been diagnosed with a concussion.

The goal of concussion management is to allow complete recovery of the patient’s concussion by promoting a safe and gradual return to school and sport activities. The patient has been instructed to avoid all recreational and organized sports or activities that could potentially place them at risk of another concussion or head injury. Starting on _________________ (date), I would ask that the patient be allowed to participate in school and low-risk physical activities as tolerated and only at a level that does not bring on or worsen their concussion symptoms. The above patient should not return to any full contact practices or games until the coach has been provided with a Medical Clearance Letter provided by a medical doctor or nurse practitioner in accordance with the Canadian Guideline on Concussion in Sport.

Other comments:

____________________________________________________________________________________

____________________________________________________________________________________

Thank-you very much in advance for your understanding.

Yours Sincerely,

Signature/print____________________________________________ M.D. / N.P. (circle appropriate designation)*

*In rural or northern regions, the Medical Assessment Letter may be completed by a nurse with pre-arranged access to a medical doctor or nurse practitioner. Forms completed by other licensed healthcare professionals should not otherwise be accepted.

We recommend that this document be provided to the athlete without charge.
Return-to-School Strategy

The following is an outline of the Return-to-School Strategy that should be used to help student-athletes, parents, and teachers to partner in allowing the athlete to make a gradual return to school activities. Depending on the severity and type of the symptoms present, student-athletes will progress through the following stages at different rates. If the student-athlete experiences new symptoms or worsening symptoms at any stage, they should go back to the previous stage.

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Sport-Specific Return-to-Sport Strategy

The following is an outline of the Return-to-Sport Strategy that should be used to help athletes, coaches, trainers, and medical professionals to partner in allowing the athlete to make a gradual return to sport activities. Activities should be tailored to create a sport-specific strategy that helps the athlete return to their respective sport.

An initial period of 24-48 hours of rest is recommended before starting their Sport-Specific Return-to-Sport Strategy. If the athlete experiences new symptoms or worsening symptoms at any stage, they should go back to the previous stage. It is important that youth and adult student-athletes return to full-time school activities before progressing to stage 5 and 6 of the Sport-Specific Return-to-Sport Strategy. It is also important that all athletes provide their coach with a Medical Clearance Letter prior to returning to full contact sport activities.

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Medical Clearance Letter

Date: __________________________

Athlete’s name: ______________________

To whom it may concern,

Athletes who are diagnosed with a concussion should be managed according to the Canadian Guideline on Concussion in Sport including the Return-to-School and Return-to-Sport Strategies (see page 2 of this letter). Accordingly, the above athlete has been medically cleared to participate in the following activities as tolerated effective the date stated above (please check all that apply):

☐ Symptom-limiting activity (cognitive and physical activities that don’t provoke symptoms)
☐ Light aerobic activity (Walking or stationary cycling at slow to medium pace. No resistance training)
☐ Sport-specific exercise (Running or skating drills. No head impact activities)
☐ Non-contact practice (Harder training drills, e.g. passing drills. May start progressive resistance training. Including gym class activities without a risk of contact, e.g. tennis, running, swimming)
☐ Full-contact practice (Including gym class activities with risk of contact and head impact, e.g. soccer, dodgeball, basketball)
☐ Full game play

What if symptoms recur? Any athlete who has been cleared for physical activities, gym class or non-contact practice, and who has a recurrence of symptoms, should immediately remove himself or herself from the activity and inform the teacher or coach. If the symptoms subside, the athlete may continue to participate in these activities as tolerated.

Athletes who have been cleared for full contact practice or game play must be able to participate in full-time school (or normal cognitive activity) as well as high intensity resistance and endurance exercise (including non-contact practice) without symptom recurrence. Any athlete who has been cleared for full-contact practice or full game play and has a recurrence of symptoms, should immediately remove himself or herself from play, inform their teacher or coach, and undergo Medical Assessment by a medical doctor or nurse practitioner before returning to full-contact practice or games.

Any athlete who returns to practices or games and sustains a new suspected concussion should be managed according to the Canadian Guideline on Concussion in Sport.

Other comments:

_______________________________________________________________________________________________

_______________________________________________________________________________________________

_______________________________________________________________________________________________

_______________________________________________________________________________________________

_______________________________________________________________________________________________

Thank-you very much in advance for your understanding.

Yours Sincerely,

Signature/print_________________________________________ M.D. / N.P. (circle appropriate designation)*

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**Concussion Recognition Tool 5 (CRT5)**

To help identify concussion in children, adolescents and adults

**RECOGNISE & REMOVE**

Head impact can be associated with serious and potentially fatal brain injuries. The Concussion Recognition Tool 5 (CRT5) is to be used for the identification of suspected concussion. It is not designed to diagnose concussion.

**STEP 1: RED FLAGS – CALL AN AMBULANCE**

If there is concern after an injury including whether ANY of the following signs are observed or complained, the player should be safely and immediately removed from play/game/activity. If no licensed healthcare professional is available, call an ambulance for urgent medical assessment:

- Neck pain or tenderness
- Double vision
- Weakness or tingling/burning in arms or legs
- Severe or increasing headache
- Severe or worsening confusion or disorientation
- Sensation of loss of consciousness
- Vomiting
- Severe or increasing restlessness, agitation or combative

Remember:

- In all cases, the basic principles of first aid (Airway, Breathing, Circulation) should be followed.
- Assessment for a spinal cord injury is critical.
- Do not attempt to move the player (other than required for airway support) unless trained to do so.
- Do not move players from a helmet or any other equipment unless trained to do so safely.

If there are no Red Flags, identification of possible concussion should proceed to the following steps:

**STEP 2: OBSERVABLE SIGNS**

Visual clues that suggest possible concussion include:

- Lying motionless on the playing surface
- Slow to get up after a direct or indirect impact to the head
- Disorientation or confusion, or an inability to respond appropriately to questions
- Blank or vacant look
- Balance, gait difficulties, motor incoordination, stumbling, slow, laboured movements
- Facial injury after head trauma

**STEP 3: SYMPTOMS**

- Headache
- "Pressure in head"
- Balance problems
- Nausea or vomiting
- Drowsiness
- Dizziness
- Blurred vision
- Sensitivity to light
- Sensitivity to noise
- Fatigue or low energy
- "Don’t feel right"
- More emotional
- More Irritable
- Sadness
- Nervous or anxious
- Neck Pain
- Difficulty concentrating
- Difficulty remembering
- Feeling slowed down
- Feeling like "in a fog"

**STEP 4: MEMORY ASSESSMENT**

(In athletes older than 12 years)

Failure to answer any of these questions (modified appropriately for each sport) correctly may suggest a concussion:

- "What venue are we at today?"
- "Which half is it now?"
- "Who scored last in this game?"
- "What team did you play last week/game?"
- "Did your team win the last game?"

Athletes with suspected concussion should:

- Not be left alone initially (at least for the first 1-2 hours).
- Not drink alcohol.
- Not use recreational/prescription drugs.
- Not be sent home by themselves. They need to be with a responsible adult.
- Not drive a motor vehicle until cleared to do so by a healthcare professional.

The CRT5 may be freely copied in its current form for distribution to individuals, teams, groups and organisations. Any revision and any reproduction in a digital form requires approval by the Concussion in Sport Group. It should not be altered in any way, rebranded or sold for commercial gain.
Sport Concussion Assessment Tool – 5th Edition (SCAT5)

- Available online: http://bjsm.bmj.com/content/bjsports/51/11/851.full.pdf

**WHAT IS THE SCAT5?**

The SCAT5 is a standardized tool for evaluating concussions designed for use by physicians and licensed healthcare professionals. The SCAT5 cannot be performed correctly in less than 10 minutes.

If you are not a physician or licensed healthcare professional, please use the Concussion Recognition Tool 5 (CRT5). The SCAT5 is to be used for evaluating athletes aged 13 years and older. For children aged 12 years or younger, please use the Child SCAT5.

Preseason SCAT5 baseline testing can be useful for interpreting post-injury test scores, but it is not required for that purpose. Detailed instructions for use of the SCAT5 are provided on page 7. Please read through these instructions carefully before testing the athlete. Brief verbal instructions for each test are given in italics. The only equipment required for the tester is a watch or timer.

This tool may be freely copied in its current form for distribution to individuals, teams, groups and organizations. It should not be altered in any way, re-branded or sold for commercial gain. Any revision, translation or reproduction in a digital form requires specific approval by the Concussion in Sport Group.

**Recognise and Remove**

A head impact by either a direct blow or indirect transmission of force can be associated with a serious and potentially fatal brain injury. If there are significant concerns, including any of the red flags listed in Box 1, then activation of emergency procedures and urgent transport to the nearest hospital should be arranged.

**Key points**

- Any athlete with suspected concussion should be REMOVED FROM PLAY, medically assessed and monitored for deterioration. No athlete diagnosed with concussion should be returned to play on the day of injury.
- If an athlete is suspected of having a concussion and medical personnel are not immediately available, the athlete should be referred to a medical facility for urgent assessment.
- Athletes with suspected concussion should not drink alcohol, use recreational drugs and should not drive a motor vehicle until cleared to do so by a medical professional.
- Concussion signs and symptoms evolve over time and it is important to consider repeat evaluation in the assessment of concussion.
- The diagnosis of a concussion is a clinical judgment, made by a medical professional. The SCAT5 should NOT be used by itself to make, or exclude, the diagnosis of concussion. An athlete may have a concussion even if their SCAT5 is “normal”.

**Remember:**

- The basic principles of first aid (danger, response, airway, breathing, circulation) should be followed.
- Do not attempt to move the athlete (other than that required for airway management) unless trained to do so.
- Assessment for a spinal cord injury is a critical part of the initial on-field assessment.
- Do not remove a helmet or any other equipment unless trained to do so safely.
IMMEDIATE OR ON-FIELD ASSESSMENT

The following elements should be assessed for all athletes who are suspected of having a concussion prior to proceeding to the neurocognitive assessment and ideally should be done on-field after the first aid / emergency care priorities are completed.

If any of the “Red Flags” or observable signs are noted after a direct or indirect blow to the head, the athlete should be immediately and safely removed from participation and evaluated by a physician or licensed healthcare professional.

Consideration of transportation to a medical facility should be at the discretion of the physician or licensed healthcare professional.

The GCS is important as a standard measure for all patients and can be done serially if necessary in the event of deterioration in conscious state. The Maddocks questions and cervical spine exam are critical steps of the immediate assessment; however, these do not need to be done serially.

STEP 1: RED FLAGS

RED FLAGS:
- Neck pain or tenderness
- Double vision
- Weakness or tingling/numbness in arms or legs
- Severe or increasing headache
- Seizure or convulsion
- Loss of consciousness
- Deteriorating conscious state
- Vomiting
- Increasingly restless, agitated or combative

STEP 2: OBSERVABLE SIGNS

Witnessed ☐ Observed on Video ☐

- Lying motionless on the playing surface
- Balance / gait difficulties / motor incoordination: stumbling, slow / laboured movements
- Orientation or confusion, or an inability to respond appropriately to questions
- Blurred or vacant look
- Facial injury after head trauma

STEP 3: MEMORY ASSESSMENT MADDOCKS QUESTIONS

1. Am going to ask you a few questions, please think carefully and give your best effort. First, tell me what happened?

   - Mark Y for correct answer / N for incorrect.
   - Where are we at today?
   - Which half is it now?
   - Who scored last in this match?
   - What team did you play last week / game?
   - Did your team win the last game?

   Note: Appropriate open specific questions may be substituted.

STEP 4: EXAMINATION

GLASGOW COMA SCALE (GCS)

Time of assessment

Date of assessment

Best eye response (E)

- New eye opening
- Eye opening in response to pain
- Eye opening to speech
- Eyes opening spontaneously

Best verbal response (V)

- No verbal response
- Incomprehensible sounds
- Inappropriate words
- Confused
- Oriented

Best motor response (M)

- No motor response
- Extremes to pain
- Abnormal flexion to pain
- Flaccid / withdraws to pain
- Locates limb
- Obey commands

Glasgow Coma Score (E + V + M)

CERVICAL SPINE ASSESSMENT

- Does the athlete report that their neck is pain free at rest?
- If there is NO neck pain at rest, does the athlete have a full range of ACTIVE pain-free movement?
- Is the limb strength and sensation normal?

In a patient who is not lucid or fully conscious, a cervical spine injury should be assumed until proven otherwise.
### OFFICE OR OFF-FIELD ASSESSMENT

Please note that the neurocognitive assessment should be done in a distraction-free environment with the athlete in a resting state.

### STEP 1: ATHLETE BACKGROUND

**Sport / team / school:**

**Date / time of injury:**

**Years of education completed:**

**Age:**

**Gender:** M / F / Other

**Dominant hand:** left / neither / right

**How many diagnosed concussions has the athlete had in the past?**

**When was the most recent concussion?**

**How long was the recovery (time to being cleared to play) from the most recent concussion?** (days)

**Has the athlete ever been:**

- Hospitalized for a head injury? Yes No
- Diagnosed / treated for headache disorder or migraines? Yes No
- Diagnosed with a learning disability / dyslexia? Yes No
- Diagnosed with ADD / ADHD? Yes No
- Diagnosed with depression, anxiety or other psychiatric disorder? Yes No

**Current medications? If yes, please list:**

---

### STEP 2: SYMPTOM EVALUATION

The athlete should be given the symptom form and asked to rate each symptom on a scale of 0-6, with 0 representing no symptoms and 6 representing severe symptoms. The lower the score, the fewer the symptoms. The form should be completed prior to the baseline assessment, and then again at the post-injury assessment.

**Please check: □ Baseline □ Post-Injury**

**Please hand the form to the athlete**

<table>
<thead>
<tr>
<th>Symptom</th>
<th>None</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Headache</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>&quot;Pressure in head&quot;</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Neck Pain</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Nausea or vomiting</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Dizziness</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Blurred vision</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Balance problems</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Sensitivity to light</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Sensitivity to noise</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Feeling slowed down</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Feeling &quot;foggy&quot;</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>&quot;Don't feel right&quot;</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Difficulty concentrating</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Difficulty remembering</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Fatigue or low energy</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Confusion</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Drowsiness</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>More emotional</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Irritability</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Sadness</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Nervous or Anxious</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Trouble falling asleep</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

**Total number of symptoms:**

**Symptom severity score:**

**Do your symptoms get worse with physical activity?** Y N

**Do your symptoms get worse with mental activity?** Y N

If 100% is feeling perfectly normal, what percent of normal do you feel? (Enter percentage)

If not 100%, why?

---

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**PARACHUTE | Canadian Guideline on Concussion in Sport**

### STEP 3: COGNITIVE SCREENING

**Standardised Assessment of Concussion (SAC)**

#### ORIENTATION

<table>
<thead>
<tr>
<th>Task</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>What month is it?</td>
<td>0</td>
</tr>
<tr>
<td>What is the date today?</td>
<td>1</td>
</tr>
<tr>
<td>What is the day of the week?</td>
<td>0</td>
</tr>
<tr>
<td>What year is it?</td>
<td>0</td>
</tr>
<tr>
<td>What time is it right now? (within 1 hour)</td>
<td>0</td>
</tr>
</tbody>
</table>

**Orientation score:** 5/5

#### IMMEDIATE MEMORY

The Immediate Memory component can be completed using the traditional 5-word per trial list or optionally using 10-words per trial to minimise any ceiling effect. All 3 trials must be administered irrespective of the number correct on the first trial. Administer at the rate of one word per second.

**List A:** Finger, Penny, Blanket, Lemon, Insect

**List B:** Candle, Paper, Sugar, Sandwich, Wagon

**List C:** Baby, Monkey, Perfume, Sunset, Train

**List D:** Elbow, Apple, Carpet, Saddle, Bubble

**List E:** Jacket, Arrow, Pepper, Cotton, Movie

**List F:** Butler, Honey, Mirror, Saddle, Anchor

**Immediate Memory Task:** F 5/5 + 10/10 = 15/15

**Score:** 15/15

**Time that last trial was completed:**

### CONCENTRATION

**DIGITS BACKWARDS**

Please circle the Digit list chosen (A, B, C, D, E, F). Administer at the rate of one digit per second reading DOWN the selected column.

I am going to read a string of numbers and when I am done, you repeat them back to me in reverse order of how I read them to you. For example, if I say 7-9-8, you would say 8-9-7.

#### Concentration Number Lists (selected)

<table>
<thead>
<tr>
<th>List</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Y</td>
<td>N</td>
<td>0</td>
</tr>
<tr>
<td>9-8-7</td>
<td>Y</td>
<td>N</td>
<td>0</td>
</tr>
<tr>
<td>8-9-6</td>
<td>Y</td>
<td>N</td>
<td>1</td>
</tr>
<tr>
<td>7-6-5</td>
<td>Y</td>
<td>N</td>
<td>0</td>
</tr>
<tr>
<td>6-5-4</td>
<td>Y</td>
<td>N</td>
<td>0</td>
</tr>
<tr>
<td>5-4-3</td>
<td>Y</td>
<td>N</td>
<td>0</td>
</tr>
<tr>
<td>4-3-2</td>
<td>Y</td>
<td>N</td>
<td>0</td>
</tr>
<tr>
<td>3-2-1</td>
<td>Y</td>
<td>N</td>
<td>0</td>
</tr>
<tr>
<td>2-1-0</td>
<td>Y</td>
<td>N</td>
<td>0</td>
</tr>
</tbody>
</table>

**Digits Score:** 15/15

### MONTHS IN REVERSE ORDER

Now tell me the months of the year in reverse order. Start with the last month and go backward.


**Score:** 0/1

**Concentration Total Score (Digits + Months):** 15/15
**STEP 4: NEUROLOGICAL SCREEN**

See the instruction sheet (page 7) for details of test administration and scoring of the tests.

- Can the patient read aloud (e.g. symptoms checklist) and follow instructions without difficulty?  
  - Y  
  - N

- Does the patient have a full range of pain-free peripheral joint movement?  
  - Y  
  - N

- Without moving their head or neck, can the patient look side to side and up and down without double vision?  
  - Y  
  - N

- Can the patient perform the finger nose coordination test normally?  
  - Y  
  - N

- Can the patient perform tandem gait normally?  
  - Y  
  - N

**BALANCE EXAMINATION**

*Modified Balance Error Scoring System (mBEES) testing*

- Which test was tested?  
  - (i.e. which is the non-dominant foot)  
  - [ ] Left  
  - [ ] Right

- Testing surface (hard floor, balance, etc.)

- Footwear (shoes, barefoot, braces, tape, etc.)

<table>
<thead>
<tr>
<th>Condition</th>
<th>Errors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Double leg stance</td>
<td>of 10</td>
</tr>
<tr>
<td>Single leg stance (non-dominant foot)</td>
<td>of 10</td>
</tr>
<tr>
<td>Tandem stance (non-dominant foot at the back)</td>
<td>of 10</td>
</tr>
<tr>
<td>Total Errors</td>
<td>of 30</td>
</tr>
</tbody>
</table>

**STEP 5: DELAYED RECALL:**

The delayed recall should be performed after 5 minutes have elapsed since the end of the Immediate Recall section. Score 1 pt. for each correct response.

Do you remember that list of words I read a few times earlier? Tell me as many words from the list as you can remember in any order:

---

Total number of words recalled accurately:  
- of 5  
- of 10

---

**STEP 6: DECISION**

Date and time of injury:

- If the athlete is known to you prior to their injury, are they different from their usual self?  
  - [ ] Yes  
  - [ ] No  
  - [ ] Unsure  
  - [ ] Not Applicable

- (If different, describe why in the clinical notes section)

- Concussion Diagnosed?  
  - [ ] Yes  
  - [ ] No  
  - [ ] Unsure  
  - [ ] Not Applicable

-- Re-testing, has the athlete improved?  
- If re-testing, has the athlete improved?  
  - [ ] Yes  
  - [ ] No  
  - [ ] Unsure  
  - [ ] Not Applicable

I am a physician or licensed healthcare professional and I have personally administered or supervised the administration of this SCAT5.

Signature: ____________________________

Title: ________________________________

Registration number (if applicable): ____________________

Date: ________________________________

---

**SCORING ON THE SCAT5 SHOULD NOT BE USED AS A STAND-ALONE METHOD TO DIAGNOSE CONCUSSION, MEASURE RECOVERY OR MAKE DECISIONS ABOUT AN ATHLETE’S READINESS TO RETURN TO COMPETITION AFTER CONCUSSION.**

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![Image](https://example.com/concussion-in-sport-group)
CONCUSSION INJURY ADVICE
(To be given to the person monitoring the concussed athlete)

This patient has received an injury to the head. A careful medical examination has been carried out and no sign of any serious complications has been found. Recovery time is variable across individuals and the patient will need monitoring for a further period by a responsible adult. Your treating physician will provide guidance as to this timeframe.

If you notice any change in behaviour, vomiting, worsening headache, double vision or excessive drowsiness, please telephone your doctor or the nearest hospital emergency department immediately.

Other important points:
Initial rest: Limit physical activity to routine daily activities (avoid exercise, training, sports) and limit activities such as school, work, and screen time to a level that does not worsen symptoms.

1) Avoid alcohol
2) Avoid prescription or non-prescription drugs without medical supervision. Specifically:
   a) Avoid sleeping tablets
   b) Do not use aspirin, anti-inflammatory medication or stronger pain medications such as narcotics
3) Do not drive until cleared by a healthcare professional.
4) Return to play/sport requires clearance by a healthcare professional.

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Contact details or stamp

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INSTRUCTIONS

Words in *italics* throughout the SCATs are the instructions given to the athlete by the clinician.

**Symptom Scale**

The time frame for symptoms should be based on the type of test being administered. At baseline it is advantageous to assess how the athlete “typically” feels whereas once the acute/post-concussion stage it is best to ask how the athlete feels at the time of testing. The symptom scale should be completed by the athlete, not by the examiner. In situations where the symptom scale is being completed after exercise, it should be done in a resting state, generally by approximating his/her resting heart rate. For total number of symptoms, maximum possible is 22 except immediately post injury if sleep item is omitted, which then creates a maximum of 21.

For Symptom Severity score, add all scores in table, maximum possible is 22 x 6 = 132, except immediately post injury if sleep item is omitted, which then creates a maximum of 216.

**Immediate Memory**

The Immediate Memory component can be completed using the traditional 9-word per trial list or, optionally, using 10-words per trial. The literature suggests that the Immediate Memory has a notable ceiling effect when a 9-word list is used, however, when the ceiling is prominent, the examiner may wish to make the task more difficult by incorporating two 6-word groups for a total of 19 words per trial. In this case, the maximum score per trial is 19 with a total trial maximum of 50.

Choose one of the word lists (either 9 or 10). Then perform 3 trials of immediate memory using this list.

Complete all 3 trials regardless of score on previous trials.

1. “I am going to test your memory. I will read you a list of words and when I am done, repeat back as many words as you can remember in any order. The words must be read at a rate of one word per second.

   Trials 2 & 3 MUST be completed regardless of score on trial 1 & 2.

2. “I am going to test your memory. I will read you a list of words and when I am done, repeat back as many words as you can remember in any order, even if you used the word before.”

   Score 1 pt for each correct response. Total score equals sum across all 3 trials. Do NOT inform the athlete that delayed recall will be tested.

**Concentration**

**Digits backward**

Choose one column of digits from lists A, B, C, D, E, or F and administer those digits as follows:

Say: “I am going to read a string of numbers and when I am done, you repeat them back to me in reverse order of how I read them to you. For example, if I say 7-4-1, you would say 1-4-7.”

Begin with first 3 digit string.

If correct, circle “*” for correct and go to next string length. If incorrect, circle “X” for the first string length and read trial 2 in the same string length. One point possible for each string length. Stop after incorrect on both trials (2X’s) or a string length.

The digits should be read at the rate of one word per second.

**Months in reverse order**

“Now tell me the months of the year in reverse order. Start with the last month and go backward. So you’ll say December, November…”

Score 1 pt for entire sequence correct.

**Delayed Recall**

The delayed recall should be performed after 5 minutes have elapsed since the end of the Immediate Recall section.

“Do you remember that list of words I read you a few times earlier? If you do, as many words as you can remember in any order.”

Score 1 pt for each correct response.

**Modified Balance Error Scoring System (mBESS) Testing**

This balance testing is based on a modified version of the Balance Error Scoring System (BESS). A timing device is required for this testing.

Each of the 70-second trials is scored by counting the number of errors. The examiner will begin counting errors only after the athlete has assumed the proper start position. The modified BESS is calculated by adding one error point for each error during the first 30-second test. The maximum number of errors for any single condition is 10. If the athlete commits multiple errors simultaneously, only one error is recorded but the athlete should quickly return to the testing position, and counting should resume once the athlete is set. Athletes that are unable to maintain the testing procedure for a minimum of 5 seconds at the start are assigned the highest possible score, ten, for that testing condition.

**OPTION:** For further assessment, the same 3 stations can be performed on a surface of medium density foam (e.g., approximately 60cm x 40cm x 6cm).

**Balance testing – types of errors**

1. Hands lifted off iliac crest
2. Opening eyes
3. Step, stumble, or fall
4. Moving hips > 30 degrees abduction
5. Lifting foot or heel above ankle (if applicable), and remove any ankle taping (if applicable).

This test will consist of three twenty-second tests with different stations.

(a) Double leg stance:

   “The first stance is standing with your feet shoulder width apart, and with your eyes closed. You should try to maintain stability in that position for 20 seconds. I will count the number of times you move out of this position.

   If you stumble out of this position, open your eyes and return to the start position and continue balancing. I will start timing when you are set and have closed your eyes.”

(b) Single leg stance:

   “If you were to kick a ball, which foot would you use? This will be the dominant foot. Now stand on your non-dominant foot. The dominant leg should be held in approximately 30 degrees of hip flexion and 45 degrees of knee flexion. Again, you should try to maintain stability for 20 seconds with your hands on your hips and your eyes closed. I will be counting the number of times you move out of this position. If you stumble out of this position, open your eyes and return to the start position and continue balancing. I will start timing when you are set and have closed your eyes.”

(c) Tandem stance:

   “Now stand heel-to-toe with your non-dominant foot in back. Your weight should be evenly distributed across both feet. Again, you should try to maintain stability for 20 seconds with your hands on your hips and your eyes closed. I will be counting the number of times you move out of this position. If you stumble out of this position, open your eyes and return to the start position and continue balancing. I will start timing when you are set and have closed your eyes.”

**Tandem Gait**

Participants are instructed to stand with their feet together behind a starting line (the test is best done with footwear removed). Then, they walk in a forward direction as quickly and as accurately as possible along a 3-meter wide (sports tape) 3 meter line with an alternate foot heel-to-toe gait ensuring that they approximate their heel and toe on each step. Once they cross the end of the line, they turn 180 degrees and return to the starting point using the same gait. Athletes fail the test if they step off the line, have a separation between their heel and toe, or if they touch or grasp the examiner or an object.

**Finger to Nose**

“I am going to test your coordination now. Please sit comfortably on the chair with your eyes open and your arm (either right or left) outstretched (shoulder flexed to 90 degrees and elbow and fingers extended), pointing in front of you. When I give a start signal, I would like you to perform successive finger to nose repetitions using your index finger to touch the tip of the nose, and then return to the starting position, as quickly and as accurately as possible.”

**References**


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CONCUSSION INFORMATION

Any athlete suspected of having a concussion should be removed from play and seek medical evaluation.

Signs to watch for
Problems could arise over the first 24-48 hours. The athlete should not be left alone and must go to a hospital at once if they experience:

- Worsening headache
- Drowsiness or inability to be awakened
- Inability to recognize people or places
- Seizures (arms and legs jerk uncontrollably)
- Weakness or numbness in arms or legs
- Unsteadiness on their feet
- Unusual behavior or confusion or irritable
- Slurred speech

Consult your physician or licensed healthcare professional after a suspected concussion. Remember, it is better to be safe.

Rest & Rehabilitation
After a concussion, the athlete should have physical rest and relative cognitive rest for a few days to allow their symptoms to improve. In most cases, after no more than a few days of rest, the athlete should gradually increase their daily activity level as long as their symptoms do not worsen.

Once the athlete is able to complete their usual daily activities without concussion-related symptoms, the second step of the return to play/sport progression can be started. The athlete should not return to play/sport until their concussion-related symptoms have resolved and the athlete has successfully returned to all school/learning activities.

When returning to play/sport, the athlete should follow a stepwise, medically managed exercise progression, with increasing amounts of exercise. For example:

Graduated Return to Sport Strategy

<table>
<thead>
<tr>
<th>Exercise step</th>
<th>Functional exercise at each step</th>
<th>Goal of each step</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Symptom-limited activity</td>
<td>Daily activities that do not provoke symptoms.</td>
<td>Gradual reintroduction of work/school activities.</td>
</tr>
<tr>
<td>2. Light aerobic exercise</td>
<td>Walking or stationary cycling at slow to medium pace. No resistance training.</td>
<td>Increase heart rate.</td>
</tr>
<tr>
<td>3. Sport specific exercise</td>
<td>Running or sliding drills. No high impact activities.</td>
<td>Add movement.</td>
</tr>
<tr>
<td>4. Non contact training drills</td>
<td>Hitter training drills, e.g., passing drills. May start progressive resistance training.</td>
<td>Exercise, coordination, and increased thinking.</td>
</tr>
<tr>
<td>5. Full contact practice</td>
<td>Following medical clearance, participate in normal training activities.</td>
<td>Restore confidence and assess functional skills by coaching staff.</td>
</tr>
<tr>
<td>6. Return to play/sport</td>
<td>Normal game play.</td>
<td>Gradual return to typical activities.</td>
</tr>
</tbody>
</table>

Graduated Return to School Strategy

Concussion may affect the ability to learn at school. The athlete may need to miss a few days of school after a concussion. When going back to school, some athletes may need to go back gradually and may need to have some changes made to their schedule so that concussion symptoms do not get worse. If a particular activity makes symptoms worse, then the athlete should stop that activity and rest until symptoms get better. It is important that the healthcare provider, parents, caregivers and teachers talk to each other so that everyone knows what the plan is for the athlete to go back to school.

Note: If mental activity does not cause any symptoms, the athlete may be able to skip step 2 and return to school part-time before doing school activities at home first.

<table>
<thead>
<tr>
<th>Mental Activity</th>
<th>Activity at each step</th>
<th>Goal of each step</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Daily activities that do not give the athlete symptoms</td>
<td>Typical activities that the athlete does during the day as long as they do not increase symptoms (e.g., reading, texting, screen time). Begin with 8-10 minutes at a time and gradually build up.</td>
<td>Gradual return to typical activities.</td>
</tr>
<tr>
<td>2. School activities</td>
<td>Homework, reading or other cognitive activities outside of the classroom.</td>
<td>Increase tolerance to cognitive work.</td>
</tr>
<tr>
<td>3. Return to school part-time</td>
<td>Gradual introduction of school work. Need to start with a partial school day or with increased breaks during the day.</td>
<td>Increase academic activities.</td>
</tr>
<tr>
<td>4. Return to school full-time</td>
<td>Gradually progress school activities until a full day can be tolerated.</td>
<td>Return to full academic activities and catch up on missed work.</td>
</tr>
</tbody>
</table>

If the athlete continues to have symptoms with mental activity, some other accommodations that can help with return to school may include:

- Starting school later, only going for half days, or going only to certain classes
- More time to finish assignments/tests
- Quiet room to finish assignments/tests
- Not going to noisy places like the cafeteria, assembly hall, sporting events, music class, shop class, etc.
- Taking lots of breaks during class, homework, tests
- No more than one exam/day
- Shorter assignments
- Repetition/memory cues
- Use of a student helper/tutor
- Reassurance from teachers that the child will be supported while getting better

The athlete should not go back to sports until they are back to school/learning, without symptoms getting significantly worse and no longer needing any changes to their schedule.

Written clearance should be provided by a healthcare professional before return to play/sport as directed by local laws and regulations.

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Child Sport Concussion Assessment Tool – 5th Edition (Child SCAT5)

- Available online: http://bjsm.bmj.com/content/bjsports/51/11/862.full.pdf

WHAT IS THE CHILD SCAT5?

The Child SCAT5 is a standardized tool for evaluating concussions designed for use by physicians and licensed healthcare professionals.

If you are not a physician or licensed healthcare professional, please use the Concussion Recognition Tool 5 (CRT5). The Child SCAT5 is to be used for evaluating Children aged 5 to 12 years. For athletes aged 13 years and older, please use the SCAT5.

Preseason Child SCAT5 baseline testing can be useful for interpreting post-injury test scores, but not required for that purpose. Detailed instructions for use of the Child SCAT5 are provided on page 7. Please read through these instructions carefully before testing the athlete. Brief verbal instructions for each test are given in italics. The only equipment required for the tester is a watch or timer.

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Recognise and Remove

A head impact by either a direct blow or indirect transmission of force can be associated with a serious and potentially fatal brain injury. If there are significant concerns, including any of the red flags listed in Box 1, then activation of emergency procedures and urgent transport to the nearest hospital should be arranged.

Key points:

- Any athlete with suspected concussion should be REMOVED FROM PLAY, medically assessed and monitored for deterioration. No athlete diagnosed with concussion should be returned to play on the day of injury.
- If the child is suspected of having a concussion and medical personnel are not immediately available, the child should be referred to a medical facility for urgent assessment.
- Concussion signs and symptoms evolve over time and it is important to consider repeat evaluation in the assessment of concussion.
- The diagnosis of a concussion is a clinical judgment, made by a medical professional. The Child SCAT5 should NOT be used by itself to make, or exclude, the diagnosis of concussion. An athlete may have a concussion even if their Child SCAT5 is “normal”.

Remember:

- The basic principles of first aid (danger, response, airway, breathing, circulation) should be followed.
- Do not attempt to move the athlete (other than that required for airway management) unless trained to do so.
- Assessment for a spinal cord injury is a critical part of the initial on-field assessment.
- Do not remove a helmet or any other equipment unless trained to do so safely.
IMMEDIATE OR ON-FIELD ASSESSMENT

The following elements should be assessed for all athletes who are suspected of having a concussion prior to proceeding to the neurocognitive assessment and ideally should be done on-field after the first first aid/emergency care priorities are completed.

If any of the “Red Flags” or observable signs are noted after a direct or indirect blow to the head, the athlete should be immediately and safely removed from participation and evaluated by a physician or licensed healthcare professional.

Consideration of transportation to a medical facility should be at the discretion of the physician or licensed healthcare professional.

The GCS is important as a standard measure for all patients and can be done serially if necessary in the event of deterioration in conscious state. The cervical spine exam is a critical step of the immediate assessment, however, it does not need to be done serially.

STEP 1: RED FLAGS

RED FLAGS:
- Neck pain or tenderness
- Double vision
- Weakness or tingling/numbness in arms or legs
- Severe or Increasing headache
- Seizure or convulsion
- Loss of consciousness
- Deteriorating conscious state
- Vomiting
- Increasingly restless, agitated or combative

STEP 2: OBSERVABLE SIGNS

Witnessed □ Observed on Video □

Lying motionless on the playing surface Y N

Balance / gait difficulties / motor incoordination / stumbling, slow / labored movements Y N

Disorientation or confusion, or an inability to respond appropriately to questions Y N

Blank or vacant look Y N

Facial injury after head trauma Y N

STEP 3: EXAMINATION

GLASGOW COMA SCALE (GCS)²

<table>
<thead>
<tr>
<th>Time of assessment</th>
<th>Date of assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Best eye response (E)
- No eye opening
- Eye opening in response to pain
- Eye opening to speech
- Eyes opening spontaneously

Best verbal response (V)
- No verbal response

<table>
<thead>
<tr>
<th>Incomprehensible sounds</th>
<th>2</th>
<th>2</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inappropriate words</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Confused</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Oriented</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>

Best motor response (M)
- No motor response
- Extremities to pain
- Abnormal reflex to pain
- Fasciculations
- Unilateral paresis
- Obey commands

Glasgow Coma score (E + V + M)

CERVICAL SPINE ASSESSMENT

Does the athlete report that their neck is pain-free at rest? Y N

If there is WO neck pain at rest, does the athlete have a full range of ACTIVE, pain-free movement? Y N

Is the limb strength and sensation normal? Y N

OFFICE OR OFFFIELD ASSESSMENT

STEP 1: ATHLETE BACKGROUND

Please note that the neurocognitive assessment should be done in a distraction-free environment with the athlete in a resting state.

Sport / team / school

Date / time of injury

Years of education completed

Age

Gender: M / F / Other

Dominant hand: left / neither / right

How many diagnosed concussions has the athlete had in the past?...

When was the most recent concussion?...

How long was the recovery (time to being cleared to play) from the most recent concussion? (days)

Has the athlete ever been:
- Hospitalized for a head injury? Yes No
- Diagnosed / treated for headache disorder or migraine? Yes No
- Diagnosed with a learning disability / dyslexia? Yes No
- Diagnosed with ADHD / ADD? Yes No
- Diagnosed with depression, anxiety or other psychiatric disorder? Yes No

Current medications? If yes, please list.

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STEP 2: SYMPTOM EVALUATION

The athlete should be given the symptom form and asked to read this instruction paragraph out loud then complete the symptom scale. For the baseline assessment, the athlete should rate how the symptoms appeared at baseline and the athlete should rate how the symptoms appear at this point in time.

To be done in a resting state
Please Check: ☐ Baseline ☐ Post-Injury

Child Report

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Not at all</th>
<th>A little</th>
<th>Moderately</th>
<th>Very Often</th>
</tr>
</thead>
<tbody>
<tr>
<td>Headaches</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>Feel dizzy</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>Feel like the room is spinning</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>Feel like I'm going to faint</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
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<tr>
<td>Things are blurry when I look at them</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>Feel sick to my stomach</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>My neck hurts</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>I get tired a lot</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>I get tired easily</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>I have trouble paying attention</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>I get distracted easily</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>I have a hard time concentrating</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>I have problems remembering what people tell me</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
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<tr>
<td>I have problems following directions</td>
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<td>I’m daydreaming too much</td>
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<td>0 1 2 3</td>
<td>0 1 2 3</td>
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<tr>
<td>I forget things</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>I have problems finishing things</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>I have trouble figuring things out</td>
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<tr>
<td>It’s hard for me to learn new things</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
</tr>
</tbody>
</table>

Total number of symptoms: of 21
Symptom severity score: of 63

Do the symptoms get worse with physical activity? Y N
Do the symptoms get worse with trying to think? Y N

Overall rating for child to answer:

On a scale of 0 to 10 (where 10 is normal, how do you feel now? 0 1 2 3 4 5 6 7 8 9 10
If not 10, in what way do you feel different?

Parent Report

The child:

<table>
<thead>
<tr>
<th>Symptom</th>
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</tbody>
</table>

Total number of symptoms: of 21
Symptom severity score: of 63

Do the symptoms get worse with physical activity? Y N
Do the symptoms get worse with trying to think? Y N

Overall rating for parent/teacher/coach/carer to answer

On a scale of 0 to 10 (where 10 is normal), how do you rate the child now?

If not 10, in what way do you feel different?
**STEP 3: COGNITIVE SCREENING**

**Standardized Assessment of Concussion - Child Version (SAC-C)**

**IMMEDIATE MEMORY**

The immediate Memory component can be completed using the traditional 5-word per trial list or optionally using 10-words per trial to minimize any ceiling effects. All 3 trials must be administered irrespective of the number correct on the first trial. Administer at the rate of one word per second.

Please choose **EITHER** the 5 or 10 word list groups and circle the specific word list chosen for this test.

I am going to test your memory. I will read you a list of words and when I am done, repeat back as many words as you can remember, in any order. For Trials 4 & 5, I am going to repeat the same list again. Repeat back as many words as you can remember in any order, even if you said the word before.

<table>
<thead>
<tr>
<th>List</th>
<th>Alternate 5 word lists</th>
<th>Score (of 5)</th>
<th>Trial 1</th>
<th>Trial 2</th>
<th>Trial 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Finger Penny Blanket Lemon Insect</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>Candle Paper Sugar Sandwich Wagon</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>Baby Monkey Perfume Sunset Iran</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>Elbow Apple Curved Cushion Bubble</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>Jacket Arrow Pepper Cotton Movie</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>Boiler Honey Mirror Soldier Anchor</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Immediate Memory Score:** of 15

**Time that last trial was completed:**

<table>
<thead>
<tr>
<th>List</th>
<th>Alternate 10 word lists</th>
<th>Score (of 10)</th>
<th>Trial 1</th>
<th>Trial 2</th>
<th>Trial 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>G</td>
<td>Finger Penny Blanket Lemon Insect</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H</td>
<td>Candle Paper Sugar Sandwich Wagon</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>Baby Monkey Perfume Sunset Iran</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>J</td>
<td>Elbow Apple Curved Cushion Bubble</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>K</td>
<td>Jacket Arrow Pepper Cotton Movie</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L</td>
<td>Boiler Honey Mirror Soldier Anchor</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Immediate Memory Score:** of 30

**Time that last trial was completed:**

**CONCENTRATION**

**DIGITS BACKWARDS**

Please circle the Digit list chosen (A, B, C, D, E, F). Administer at the rate of one digit per second reading **DOWN** the selected column.

I am going to read a string of numbers and when I am done, you repeat them back to me in reverse order of how I read them to you. For example, if I say 7-1-5, you would say 5-1-7.

<table>
<thead>
<tr>
<th>Concentration Number Lists (uncircled)</th>
</tr>
</thead>
<tbody>
<tr>
<td>List A</td>
</tr>
<tr>
<td>5-0</td>
</tr>
<tr>
<td>4-1</td>
</tr>
<tr>
<td>3-0</td>
</tr>
<tr>
<td>2-0</td>
</tr>
<tr>
<td>1-0</td>
</tr>
<tr>
<td>0-0</td>
</tr>
<tr>
<td>9-0</td>
</tr>
<tr>
<td>8-0</td>
</tr>
<tr>
<td>7-0</td>
</tr>
<tr>
<td>6-0</td>
</tr>
<tr>
<td>5-0</td>
</tr>
<tr>
<td>4-0</td>
</tr>
<tr>
<td>3-0</td>
</tr>
<tr>
<td>2-0</td>
</tr>
</tbody>
</table>

**Digits Score:** of 5

**DAYS IN REVERSE ORDER**

Now write the days of the week in reverse order. Start with the last day and go backward. As you skip Sunday, Saturday, or ahead:

Sunday Saturday Friday Thursday Wednesday Tuesday Monday

**Days Score:** of 3

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**STEP 4: NEUROLOGICAL SCREEN**

See the instruction sheet (page 7) for details of test administration and scoring of the tests.

- Can the patient read aloud (e.g., symptom checking) and follow instructions without difficulty?  
  - Y  
  - N
- Does the patient have a full range of pain-free HREBT spinal-sagittal movements?  
  - Y  
  - N
- Without moving their head or neck, can the patient look side to side and up and down without double vision?  
  - Y  
  - N
- Can the patient perform the finger-nose coordination test normally?  
  - Y  
  - N
- Can the patient perform tandem gait normally?  
  - Y  
  - N

**BALANCE EXAMINATION**

Modified Balance Error Scoring System (BESS) testing

- Which foot was tested (i.e., which is the non-dominant foot)?  
  - Left  
  - Right
- Tracking surface (hard floor, field, etc.)  
  -  
- Footwear (shoes, barefoot, braces, tape, etc.)  
  -  
- Condition Errors
  - Double leg stance of 10
  - Single leg stance (non-dominant foot, 10–12 yrs only) of 10
  - Tandem stance (non-dominant foot at back) of 10
- Total Errors  

**STEP 5: DELAYED RECALL:**

The delayed recall should be performed after 5 minutes have elapsed since the end of the Immediate Recall section. Score 1 pt. for each correct response.

Do you remember that list of words I read a few times earlier? Tell me as many words from the list as you can remember in any order.

Please record each word correctly recalled. Total score equals number of words recalled.

**STEP 6: DECISION**

**SCORING ON THE CHILD SCAT5 SHOULD NOT BE USED AS A STAND-ALONE METHOD TO DIAGNOSE CONCUSSION, MEASURE RECOVERY OR MAKE DECISIONS ABOUT AN ATHLETE'S READINESS TO RETURN TO COMPETITION AFTER CONCUSSION.**

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For the Neurological Screen (page 5), if the child cannot read, ask him/her to describe what they see in this picture.

**CLINICAL NOTES:**


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**Concussion injury advice for the child and parents/caregivers**

*(To be given to the person monitoring the concussed child)*

This child has had an injury to the head and needs to be carefully watched for the next 24 hours by a responsible adult.

If you notice any change in behavior, vomiting, dizziness, worsening headache, double vision or excessive drowsiness, please call an ambulance to take the child to hospital immediately.

Other important points:

- Following concussion, the child should rest for at least 24 hours.
- The child should not use a computer, internet or play video games if these activities make symptoms worse.
- The child should not be given any medications, including pain killers, unless prescribed by a medical doctor.
- The child should not go back to school until symptoms are improving.
- The child should not go back to sport or play until a doctor gives permission.

---

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INSTRUCTIONS

Words in italics throughout the Child SCATS are the instructions given to the athlete by the clinician.

Symptom Scale
In situations where the symptom scale is being completed after exercise, it should still be done in a resting state, at least 10 minutes post-exercise.

- The child is to complete the child SCATS, according to how he/she feels today.
- The parent/carer is to complete the Parent SCATS according to how the child has been over the previous week.

For Total number of symptoms, maximum possible = 21
For Symptom severity score, add all scores in table, maximum possible = 21 x 3 = 63

Standardized Assessment of Concussion Child Version (SAC-C)

Immediate Memory
Choose one of the 5-word lists. Then perform 3 trials of immediate memory using this list.

Complete all 3 trials regardless of score on previous trials.

Example: "I am going to say a memory word. I am going to say a list of words and when I am done, repeat back as many words as you can remember, in any order.

Score 1 pt. for each correct response. Total score equals sum across all 3 trials. Do not inform the athlete that delayed recall will be tested.

Concentration
Choose one column only, from List A, B, C, D, or E, and administer those digits as follows:

"I am going to read you some numbers and when I am done, you say them back to me, backwards, in reverse order of how you read them to you. For example, if I say 74, you would say 47." If correct, circle "Y" for correct and go to next string length. If incorrect, circle "N" for incorrect string length and read trial 1 in the same string length. One point possible for each string length. Stop after incorrect on both (2) Ks in the string length. The digits should be read at the rate of one per second.

Days of the week in reverse order
"Now tell me the days of the week in reverse order. Start with Sunday and go backward. So you say Sunday, Saturday... Do you get it?" 1 pt. for entire sequence correct

Delayed Recall
The delayed recall should be performed after at least 5 minutes have elapsed since the conclusion of the Immediate Recall section.

Circle the word correctly recalled. Total score equals number of words recalled.

Neurological Screen

Reading
The child is asked to read a paragraph of text from the instructions in the Child SCATS. For children who cannot read, they are asked to describe what they see in a photograph or picture, such as that on page 6 of the Child SCATS.

Modified Balance Error Scoring System (mBESS) testing

These instructions are to be read by the person administering the Child SCATS, and each balance task should be demonstrated to the child. The child should then be asked to copy what the examiner demonstrated.

Each of the 20-second trials is scored by counting the number of errors. The error is counted if they are not touch their noses, do not fully extend their elbows or do not perform five repetitions.

References
CONCUSSION INFORMATION

If you think you or a teammate has a concussion, tell your coach/trainer/parent right away so that you can be taken out of the game. You or your teammate should be seen by a doctor as soon as possible. You or your teammate should not go back to play/sport that day.

Signs to watch for

Problems can happen over the first 24-48 hours. You or your teammate should not be left alone and must go to a hospital right away if any of the following happens:

- New headache, or headache gets worse
- Neck pain that gets worse
- Becomes sleepy/drunk or can't be woken up
- Cannot recognize people or places
- Feeling sick to your stomach or vomiting
- Has weakness, numbness or tingling (arms, legs or face)
- Acting weird/strange, seems/feels confused, or is inattentive
- In an unsteady walking or standing
- Talking is slurred
- Has any seizures (arms and/or legs jerk uncontrollably)
- Cannot understand what someone is saying or directions

Consult your physician or licensed healthcare professional after a suspected concussion. Remember, it is better to be safe.

Graduated Return to Sport Strategy

After a concussion, the child should rest physically and mentally for a few days to allow symptoms to get better. In most cases, after a few days of rest, they can gradually increase their daily activity level as long as symptoms don't get worse. Once they are able to do their usual daily activities without symptoms, the child should gradually increase exercise steps, guided by the healthcare professional (see below).

The athlete should not return to play/sport the day of injury.

NOTE: An initial period of a few days of both cognitive ("thinking") and physical rest is recommended before beginning the Return to Sport progression.

<table>
<thead>
<tr>
<th>Exercise step</th>
<th>Functional exercise at each step</th>
<th>Goal of each step</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Symptom-limited activity</td>
<td>Daily activities that do not provoke symptoms.</td>
<td>Gradual reintroduction of work/school activities.</td>
</tr>
<tr>
<td>2. Light aerobic exercise</td>
<td>Walking or stationary cycling at slow to medium pace. No resistance training.</td>
<td>Increase heart rate.</td>
</tr>
<tr>
<td>4. Non-contact training drills</td>
<td>Harder training drills, e.g., passing drills. May start progressive resistance training.</td>
<td>Exercise, coordination, and increased thinking.</td>
</tr>
<tr>
<td>5. Full contact practice</td>
<td>Following medical clearance, participate in normal training activities.</td>
<td>Restore confidence and assess functional skills by coaching staff.</td>
</tr>
<tr>
<td>6. Return to play/sport</td>
<td>Normal game play.</td>
<td></td>
</tr>
</tbody>
</table>

Graduated Return to School Strategy

Concussion may affect the ability to learn at school. The child may need to miss a few days of school after a concussion, but the child's doctor should help them get back to school after a few days. When going back to school, some children may need to go back gradually and may need to have some changes made to their schedule so that concussion symptoms don't get any worse. If a particular activity makes symptoms a lot worse, then the child should stop that activity and rest until symptoms get better. To make sure the child can go back to school without problems, it is important that the health care provider, parents/caregivers and teachers talk to each other so that everyone knows what the plan is for the child to go back to school.

Note: If mental activity does not cause any symptoms, the child may be able to return to school part-time without doing school activities at home first.

<table>
<thead>
<tr>
<th>Mental Activity</th>
<th>Activity at each step</th>
<th>Goal of each step</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Daily activities that do not give the child symptoms</td>
<td>Typical activities that the child does during the day as long as they do not increase symptoms (e.g. reading, texting, screen time). Start with 5-15 minutes a day and gradually build up.</td>
<td>Gradual return to typical activities.</td>
</tr>
<tr>
<td>2. School activities</td>
<td>Homework, reading or other cognitive activities outside of the classroom.</td>
<td>Increase tolerance to cognitive work.</td>
</tr>
<tr>
<td>3. Return to school part-time</td>
<td>Gradual introduction of school work. May need to start with a partial school day or increased breaks during the day.</td>
<td>Increase academic activities.</td>
</tr>
<tr>
<td>4. Return to school full-time</td>
<td>Gradually progress school activities until a full day can be tolerated.</td>
<td>Return to full academic activities and catch up on missed work.</td>
</tr>
</tbody>
</table>

If the child continues to have symptoms with mental activity, some other things can be done to help with return to school may include:

- Starting school later, only going for half days, or going only to certain classes
- Talking less or breaks during class, homework, tests
- More time to finish assignments/tests
- No more than one exam/day
- Quiet room to finish assignments/tests
- Repetition/memory cues
- Not going to noisy areas like the cafeteria, assembly halls, sporting events, music class, shop class, etc.
- Use of a student helper/tutor
- Reassurance from teachers that the child will be supported while getting better

The child should not go back to sports until they are back to school/learning, without symptoms getting significantly worse and no longer needing any changes to their schedule.

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