Guidelines for Diagnosing and Managing Pediatric Concussion

First edition, June 2014, v1.1

Recommendations for Health Care Professionals

CONCUSSIONS

- Headache
- Confusion
- Blurry Vision
- Sickness

I feel weird!

Ontario Neurotrauma Foundation
Fondation ontarienne de neurotraumatologie
This document is intended to guide health care professionals in diagnosing and managing pediatric—not adult—concussion. It is not for self-diagnosis or treatment. Parents and/or caregivers may bring it to the attention of their child/adolescent’s health care professionals.

The best knowledge available at the time of publication has informed the recommendations in this document. However, health care professionals should also use their own judgment, the preferences of their patients, and factors such as the availability of resources in their decisions.

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About the Ontario Neurotrauma Foundation
The Ontario Neurotrauma Foundation (ONF) is a health research organization that focuses on the practical application of research to improve the lives of people with an acquired brain injury or spinal cord injury, and the prevention of neurotrauma injuries. Through strategic research funding activity and the building of relationships with numerous partners and stakeholders, the ONF fosters, gathers and applies research knowledge to increase the effectiveness and use of prevention, and to improve the systems of care, outcomes, and quality of life of those who have sustained a neurotrauma injury. The Foundation receives its funding from the Government of Ontario.

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Cover image: courtesy of Dr. Mike Evans
Using These Guidelines

Target Users and Population

Primary users are

- family or emergency department physicians working in large centres and rural areas, whose patients have ready access to specialized care;
- physicians and health care professionals working in remote regions who have access to the Internet and whose patients have access to specialized care through telemedicine or other means; and
- other health care professionals (example: neuropsychologists, occupational and physical therapists) who play important roles in the management of concussion and persistent symptoms and in rehabilitation.

With these users in mind, we deliberately left out tools that take too long to administer or that are designed for specialists.

Secondary and tertiary users are parents/caregivers, schools and/or community sports organizations/centres. Although this document does not cover prevention, it includes key steps that these users will find helpful in identifying symptoms of concussion and managing recovery at home, school and play.

The target population is every child/adolescent aged 5 to 18 years who has or may have sustained a concussion in the previous month.

These guidelines do not apply to children under 5 years. Diagnosing concussion in children under five years is controversial because it relies heavily on the child’s ability to recognize and/or communicate his/her symptoms. Most preschoolers have not developed that capacity yet. As well, there are no validated tools for this age group.

These guidelines also do not apply to children/adolescents who have moderate-to-severe closed head injuries, moderate-to-severe developmental delays, neurological disorders, penetrating brain injuries or brain damage from other causes, such as injuries at birth or in infancy.

General Directions for Clinical Use

We expect that children/adolescents who have sustained a head injury will visit a health care professional soon after the incident for a primary assessment. In this scenario, health care professionals should:

- consider that children/adolescents may:
  - not be fully aware of their symptoms;
  - not be able to articulate their symptoms or describe their effects clearly;
  - respond differently compared to their pre-injury baseline;
• take into account any pre-existing physical and mental conditions/factors that might contribute to symptoms, and consider a broad differential diagnosis, if necessary;
• apply the recommendations in a stepwise fashion as appropriate in combination with their clinical judgment, expertise and the level of evidence that accompanies each recommendation.
• reassure parents/caregivers that symptoms resolve in a reasonable time in most cases;
• refer the child/adolescent to an appropriate specialist if symptoms do not resolve after one month.
• understand that the signs and symptoms of concussion are non-specific, and may have other origins.

Levels of Evidence

Levels of evidence are used to guide the reader as to the strength of the individual recommendation. There are many ways to grade levels of evidence. Some emphasize the quality of randomized clinical trials. However, because so few randomized clinical trials have studied pediatric concussion, we used a broader system to rank evidence that also emphasizes the strength of systematic reviews or large studies that may not involve interventions. In our system, A is the strongest level of evidence. The levels are defined as follows:

• A = Consistent, good-quality, patient-oriented evidence (example, at least one large randomized control trial, meta-analysis or systematic review with homogeneity, or large, high-quality, multi-centre cohort study);
• B = Inconsistent or limited-quality patient-oriented evidence (example: smaller cohort studies, case studies or control trials with limitations);
• C = Consensus, usual practice, opinion or weaker-level evidence.¹ ²

**Tipsheet for Health Care Professionals**

**In Advance (before the first activity)**

| Number | Evidence |
|--------|----------|---|
| 0.4    |          | B |
| Consider baseline neuro-cognitive testing if the child/adolescent plays high-risk sports—not as a general rule. | |

**On Presentation (what are the “red flags”?)**

<table>
<thead>
<tr>
<th>Number</th>
<th>Evidence</th>
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</tr>
</thead>
<tbody>
<tr>
<td>2.1</td>
<td>A/B</td>
<td>---</td>
</tr>
<tr>
<td>Assess and treat any physical, cognitive and neurological deficits.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.2</td>
<td>A</td>
<td>---</td>
</tr>
<tr>
<td>Determine the need for CT imaging.</td>
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<tr>
<td>2.3</td>
<td>B</td>
<td>---</td>
</tr>
<tr>
<td>Consider admission or prolonged observation if the child/adolescent shows “red flag” symptoms.</td>
<td></td>
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<tr>
<td>2.4</td>
<td>C</td>
<td>---</td>
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<tr>
<td>Treat acute headaches.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.5</td>
<td>B/C</td>
<td>---</td>
</tr>
<tr>
<td>Prescribe physical and cognitive rest.</td>
<td></td>
<td></td>
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<tr>
<td>2.6</td>
<td>B</td>
<td>---</td>
</tr>
<tr>
<td>Discharge the child/adolescent for observation at home under certain conditions.</td>
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</tbody>
</table>

**On Discharge (what do we tell parents and/or caregivers?)**

<table>
<thead>
<tr>
<th>Number</th>
<th>Evidence</th>
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</thead>
<tbody>
<tr>
<td>3.1</td>
<td>A/B</td>
<td>---</td>
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<tr>
<td>Provide verbal information and written handouts to the child/adolescent and the parents and/or caregivers.</td>
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<tr>
<td>3.1a</td>
<td>B</td>
<td>---</td>
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<tr>
<td>Inform on the expected course of recovery and return-to-learn/play.</td>
<td></td>
<td></td>
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<tr>
<td>3.1b</td>
<td>B</td>
<td>---</td>
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<tr>
<td>Advise on the risks and complications of re-injury, especially of persistent symptoms.</td>
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<tr>
<td>3.1c</td>
<td>C</td>
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<tr>
<td>Advise on managing sleep proactively.</td>
<td></td>
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<tr>
<td>3.1d</td>
<td>B</td>
<td>---</td>
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<tr>
<td>Advise on managing headaches.</td>
<td></td>
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<tr>
<td>3.1e</td>
<td>B</td>
<td>---</td>
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<tr>
<td>Advise on coping with fatigue.</td>
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<tr>
<td>3.1f</td>
<td>B</td>
<td>---</td>
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<tr>
<td>Advise on maintaining social networks and interactions.</td>
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<tr>
<td>3.1g</td>
<td>B</td>
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<tr>
<td>Advise on avoiding alcohol and other recreational drugs.</td>
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<tr>
<td>3.1h</td>
<td>B</td>
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<tr>
<td>Advise on avoiding driving during recovery.</td>
<td></td>
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<tr>
<td>3.1i</td>
<td>B/C</td>
<td>---</td>
</tr>
<tr>
<td>Advise on general monitoring, regular follow up with primary care or a sport medicine physician until symptoms disappear, and referral to specialized care after one month if symptoms persist.</td>
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</tbody>
</table>
## On Interim Assessment (when can the child/adolescent return to learn/play?)

<table>
<thead>
<tr>
<th>Number</th>
<th>Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.1</td>
<td>B/C</td>
</tr>
<tr>
<td>4.2</td>
<td>B/C</td>
</tr>
<tr>
<td>4.3</td>
<td>B/C</td>
</tr>
<tr>
<td>4.4</td>
<td>B</td>
</tr>
<tr>
<td>4.5</td>
<td>B</td>
</tr>
<tr>
<td>3.1</td>
<td>A/B</td>
</tr>
</tbody>
</table>

### Evidence:
- B/C: Both B and C evidence.
- B: B evidence.
- C: C evidence.
- A/B: A and B evidence.

### Tipsheet / List of Tools:
- **4.1**: Recommend that the child/adolescent follow a stepwise return-to-learn plan.
- **4.2**: Develop a return-to-learn program after acute symptoms have improved.
- **4.3**: Recommend additional assessment and accommodations if symptoms worsen or fail to improve.
- **4.4**: Develop a return-to-play program only after the child/adolescent has started his/her return-to-learn program.
- **4.5**: Refer any child/adolescent who has sustained multiple concussions to an expert in sport concussion to help with return-to-play decisions and/or retirement from contact sports.
- **3.1**: Provide verbal information and written handouts to the child/adolescent and the parents and/or caregivers.

## On Re-assessment after one month (what do we do next if the child/adolescent still has symptoms?)

<table>
<thead>
<tr>
<th>Number</th>
<th>Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.1</td>
<td>B</td>
</tr>
<tr>
<td>5.2</td>
<td>B</td>
</tr>
<tr>
<td>5.3</td>
<td>B</td>
</tr>
<tr>
<td>5.9</td>
<td>B</td>
</tr>
<tr>
<td>5.4a(i)</td>
<td>C</td>
</tr>
<tr>
<td>5.4a(ii)</td>
<td>B</td>
</tr>
<tr>
<td>5.4a(iii)</td>
<td>C</td>
</tr>
<tr>
<td>5.4a(iv)</td>
<td>C</td>
</tr>
<tr>
<td>5.4a(v)</td>
<td>C</td>
</tr>
<tr>
<td>5.4b(i)</td>
<td>B</td>
</tr>
<tr>
<td>5.4b(ii)</td>
<td>B</td>
</tr>
<tr>
<td>5.4b(iii)</td>
<td>C</td>
</tr>
<tr>
<td>5.4b(iv)</td>
<td>C</td>
</tr>
<tr>
<td>5.4b(v)</td>
<td>B</td>
</tr>
</tbody>
</table>

### Evidence:
- B: B evidence.
- C: C evidence.
### Chapter: Tipsheet

*Guidelines for Diagnosing and Managing Pediatric Concussion*

<table>
<thead>
<tr>
<th>Section</th>
<th>Task Description</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.4c(i)</td>
<td>Assess for persistent cognitive difficulties.</td>
<td>B</td>
</tr>
<tr>
<td>5.4c(ii)</td>
<td>Manage any cognitive impairments.</td>
<td>B</td>
</tr>
<tr>
<td>5.4d(i)</td>
<td>Assess for balance and vestibular impairments.</td>
<td>B</td>
</tr>
<tr>
<td>5.4d(ii)</td>
<td>Assess for benign positional vertigo.</td>
<td>B</td>
</tr>
<tr>
<td>5.4d(iii)</td>
<td>Refer for further assessment and treatment if balance and/or vestibular system are dysfunctional.</td>
<td>B</td>
</tr>
<tr>
<td>5.4e(i)</td>
<td>Assess ongoing vision dysfunctions.</td>
<td>B</td>
</tr>
<tr>
<td>5.4e(ii)</td>
<td>Refer children/adolescents who have changes in functional vision to a specialist.</td>
<td>B</td>
</tr>
<tr>
<td>5.4f(i)</td>
<td>Assess and manage persistent fatigue if it is a significant symptom.</td>
<td>B</td>
</tr>
<tr>
<td>5.4g(i)</td>
<td>Assess for existing and new mental health symptoms and disorders.</td>
<td>B</td>
</tr>
<tr>
<td>5.4g(ii)</td>
<td>Ask the child/adolescent and parents and/or caregivers to report on mood and feelings.</td>
<td>B</td>
</tr>
<tr>
<td>5.4g(iii)</td>
<td>Treat any mental health symptoms.</td>
<td>B</td>
</tr>
<tr>
<td>5.4g(iv)</td>
<td>Consider referring to a specialist with experience in pediatric mental health.</td>
<td>B</td>
</tr>
<tr>
<td>5.5</td>
<td>Recommend rehabilitation therapy to improve symptoms and mobility, as needed.</td>
<td>B</td>
</tr>
<tr>
<td>5.6</td>
<td>Consider a broad differential diagnosis.</td>
<td>C</td>
</tr>
<tr>
<td>5.7</td>
<td>Consider the need for specialized therapy if symptoms persist.</td>
<td>B</td>
</tr>
<tr>
<td>5.8</td>
<td>Work with the child/adolescent’s primary care professional, school and/or employer on accommodations to tasks or schedules.</td>
<td>B</td>
</tr>
<tr>
<td>3.1</td>
<td>Provide verbal information and written handouts to the child/adolescent and the parents and/or caregivers.</td>
<td>A/B</td>
</tr>
</tbody>
</table>
# Recommendations

## 0.4: Consider baseline neuro-cognitive testing if the child/adolescent plays high-risk sports—not as a general rule.

**When:** Before the child/adolescent plays a practice or match.

**Who:**
- Parents and/or caregivers.
- Health care professionals.
  - Example: family physicians, pediatricians, nurse-practitioners.
- School boards, community sports organizations/centres.

**How:** Contact a health care professional for referral to a qualified professional for a neuro-cognitive assessment.

**Why:**
- To provide baseline information on children/adolescents who play high-risk sports in case they sustain a concussion.
- To assist with return-to-play decisions.

**Level of evidence:** B.

## 2.1: Assess and treat any physical, cognitive and neurological deficits.

**When:** On presentation.

**Who:** Health care professionals.
- Example: Emergency Department physicians, family physicians, pediatricians, sport medicine physician, nurse-practitioners.

**How:**
- Take a history; do an examination and a cognitive screen, assess for persistent symptoms; review mental health. Use the following tools as appropriate.
  - **Tool 2.1:** Management of Acute Symptoms Algorithm.
  - **Tool 2.2:** Acute Concussion Evaluation (ACE).
  - **Tool 0.2:** ChildSCAT3 Sport Concussion Assessment Tool for Children aged 5-12 (symptom evaluation).
  - **Tool 1.1:** SCAT3 Sport Concussion Assessment Tool for Athletes aged 13+ (symptom evaluation).
  - **Tool 2.4:** Neurologic and Musculoskeletal Exam.
- Consider signs and symptoms in context with the child/adolescent’s normal performance, especially for those with learning and communication deficits, ADHD and/or physical disabilities.
- Find out if the child/adolescent plays high-risk sports and has had baseline neuro-cognitive testing (Recommendation 0.4 for parents and/or caregivers.)
- **Recommendation 5.1:** Assess any modifiers that may delay recovery.

**Why:**
- To start treatment immediately or decide on further tests.
• To prevent re-injury, the worsening of symptoms or a prolonged recovery.

Level of evidence: A for assess (ages 13+); B for treat.

### 2.2: Determine the need for CT imaging.

**When:** On presentation.

**Who:** Health care professionals.

- Example: Emergency Department physicians, family physicians, pediatricians, nurse-practitioners.

**How:** Use the following tools, as appropriate.

- **Tool 2.5:** PECARN Management Algorithm for Children After Head Trauma.
- **Tool 2.9:** Algorithm for the management of the pediatric patient >/= 2 years with minor head trauma.

**Why:** Most children/adolescents who have sustained a head injury do not need imaging. For those who do, a CT scan is the most appropriate technology in the acute setting to identify skull fractures and important lesions, such as hemorrhage.

Level of evidence: A.

### 2.3: Consider admission or prolonged observation if the child/adolescent shows “red flag” symptoms.

**When:** On presentation, after negative results of imaging.

**Who:** Health care professionals.

- Example: Emergency Department and other hospital-based physicians.

**How:** See Section D on “red flag” symptoms in the following tool.

- **Tool 2.2:** Acute Concussion Evaluation (ACE).

**Why:** To monitor the presence of other injuries that might negatively affect recovery.

Level of evidence: B.

### 2.4: Treat acute headaches.

**When:** On presentation.

**Who:** Health care professionals.

- Example: Emergency Department physicians, family physicians, pediatricians, nurse-practitioners.

**How:**

- Prescribe
  - acetaminophen or ibuprofen for children and adolescents;
  - acetaminophen, ibuprofen or naproxen for adolescents.
  - **Tool 5.6:** Approved Medications for Pediatric Indications.
  - **Tool 5.12:** General Considerations Regarding Pharmacotherapy.

- Rule out intracranial bleeds before prescribing NSAIDS.
- Avoid around-the-clock dosing to prevent a medication-overuse headache.

**Why:** To relieve acute symptoms.

Level of evidence: C.
2.5: Prescribe physical and cognitive rest.

When: On presentation.

Who: Health care professionals.
- Example: Emergency Department physicians, family physicians, pediatricians, nurse-practitioners.

How:
- Prescribe an initial 24-48 hour period of rest.
- Ask parents and/or caregivers to check for symptoms in 24-hour intervals.
- Note that there is evidence stating the need for physical and cognitive rest, but no clear answer as to the ideal duration. Extreme prolonged rest may delay recovery. Therefore, we offer tools for two approaches. Tools followed by “a” reflect a standard approach, those followed by “b” reflect a more conservative approach. Use clinical judgment.
  - Tool 0.4a: Parachute After a Concussion Guidelines for Return to Play.
  - Tool 0.4b: CanChild Return to Activity Guidelines for Children and Youth.
  - Tool 0.5a: ACE Post-Concussion Gradual Return to School.
  - Tool 0.5b: CanChild Return to School Guidelines for Children and Youth.
  - Tool 0.6: CanChild Activity Suggestions for Recovery Stages After Concussion.

Why:
- Physical and cognitive rest are the key initial strategies to manage concussion. Most people recover fully from concussion with physical and cognitive rest, although the recovery rate can be variable and unpredictable.

Level of evidence: B for need for rest; C for ideal duration of rest.

2.6: Discharge the child/adolescent for observation at home under certain conditions.

When: On presentation, after a period of observation without “red flag” symptoms.

Who: Health care professionals.
- Example: Emergency Department physicians, family physicians, pediatricians, nurse-practitioners.

How: Assess the child/adolescent for the following.
- Normal mental status (alertness/behaviour/cognition) with improving symptoms.
- No clinical risk factors indicating the need for a CT scan, or a normal result if a CT scan was done.
- No indicators for prolonged hospital observation, such as:
  - worsening symptoms;
  - persistent clinical symptoms (vomiting, severe headache, etc.);
  - bleeding disorders (use clinical judgment);
  - multi-system injuries (use clinical judgment);
  - comorbid symptoms (use clinical judgment).
- Recommendation 3.1: Provide verbal information and written handouts to the child/adolescent and the parents and/or caregivers.
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**Why:** Patients who meet these criteria can be discharged safely.

**Level of evidence:** B.

### 3.1: Provide verbal information and written handouts to the child/adolescent and the parents and/or caregivers.

**When:** On discharge, on interim evaluation, on re-evaluation.

**Who:** Health care professionals.

- Example: Emergency Department physicians, family physicians, pediatricians, nurse-practitioners, occupational and physical therapists, neuropsychologists.

**How:**

- Write a discharge note based on:
  - [Tool 3.1](#): Template Letter of Accommodation from Physician to School.
  - [Tool 4.4](#): Returning to School-based Activities After Concussion Care Plan.
- Apply recommendations in **On discharge**, as needed.

**Why:** Providing education and written instructions to patients, parents and/or caregivers leads to a better recovery.

**Level of evidence:** A for intensive educational program; B for written instructions.

### 3.1a: Inform on the expected course of recovery and return-to-learn/play.

**When:** On discharge, on interim evaluation, on re-evaluation.

**Who:** Health care professionals.

- Example: Emergency Department physicians, family physicians, pediatricians, nurse-practitioners, occupational and physical therapists, neuropsychologists.

**How:** Provide verbal information and written handouts.

- Lifestyle strategies and expectations. Note that tools followed by “a” reflect a standard approach, those followed by “b” reflect a more conservative approach. Use clinical judgment.
  - [Tool 0.4a](#): Parachute After a Concussion Guidelines for Return to Play.
  - [Tool 0.4b](#): CanChild Return to Activity Guidelines for Children and Youth.
  - [Tool 0.5a](#): ACE Post-Concussion Gradual Return to School.
  - [Tool 0.5b](#): CanChild Return to School Guidelines for Children and Youth.
  - [Tool 0.6](#): CanChild Activity Suggestions for Recovery Stages After Concussion.
  - [Tool 4.5](#): Return-to-school Information and Strategies.
- Anticipatory guidance:
  - Verbal reassurance:
    - that current symptoms are expected and common;
    - about expected positive recovery;
    - about the burden and distress in parents and/or caregivers of children/adolescents who have sustained a concussion.

**Why:** Parents and/or caregivers need to know that most patients recover fully from concussion even though the recovery rate is variable and unpredictable. However, some
children/adolescents still have symptoms at one month and beyond, and need to be monitored. Providing information reduces anxiety and helps set realistic expectations, promote recovery and prevent re-injury.

**Level of evidence:** B.

### 3.1b: Advise on the risks and complications of re-injury, especially of persistent symptoms.

**When:** On discharge, interim evaluation, on re-evaluation.

**Who:** Health care professionals.
- Example: Emergency Department physicians, family physicians, pediatricians, nurse-practitioners, occupational and physical therapists, neuropsychologists.

**How:**
- Advise parents and/or caregivers that the child/adolescent should avoid high speed and/or contact activities that may increase his/her risk of sustaining another concussion—especially during the recovery period.
- **Recommendation 4.5**: Refer any child/adolescent who has sustained multiple concussions to an expert in sport concussion to help with return-to-play decisions and/or retirement from contact sports.

**Why:** Returning to activity before the child/adolescent has recovered puts him/her at greater risk of sustaining another, more severe concussion.

**Level of evidence:** B.

### 3.1c: Advise on managing sleep proactively.

**When:** On discharge, on interim evaluation, on re-evaluation.

**Who:** Health care professionals.
- Example: Emergency Department physicians, family physicians, pediatricians, nurse-practitioners, occupational and physical therapists, neuropsychologists.

**How:** Provide verbal information and written handouts.
- **Tool 3.2**: Strategies to Promote Good Sleep and Alertness.

**Why:**
- Sleep disturbances are common symptoms of concussion, and need to be managed to ensure a timely recovery.
- Good sleep habits promote good health.

**Level of evidence:** C.

### 3.1d: Advise on managing headaches.

**When:** On discharge, on interim evaluation, on re-evaluation.

**Who:** Health care professionals.
- Example: Emergency Department physicians, family physicians, pediatricians, nurse-practitioners, neuropsychologists.

**How:** Provide written handout.
- **Tool 5.3**: pedMIDAS Headache Severity Tool for Children aged 4-18.
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Why:
- To relieve acute symptoms;
- To prevent the worsening of symptoms or prolonged recovery.

Level of evidence: B.

3.1e: Advise on coping with fatigue.

When: On discharge, on interim evaluation, on re-evaluation.

Who: Health care professionals.
- Example: Emergency Department physicians, family physicians, pediatricians, nurse-practitioners, occupational and physical therapists, neuropsychologists.

How: Provide verbal information.
- Fatigue can come on suddenly or with minimum exertion.
- Parents and/or caregivers should try to identify the triggers of fatigue.

Why: To set expectations, and to help cope with symptoms.

Level of evidence: B.

3.1f: Advise on maintaining social networks and interactions.

When: On discharge, on interim evaluation, on re-evaluation.

Who:
- Health care professionals.
  - Example: Family physicians, pediatricians, nurse-practitioners, occupational and physical therapists, neuropsychologists.
- Qualified school-based professionals.
  - Example: teachers, guidance counsellors.

How: Encourage children/adolescents to participate in rewarding social activities; modified as needed.
- Identify these activities and suggest modifications, as appropriate.
- Note that children/adolescents who have persistent symptoms may be less able to participate in rewarding social activities.

Why:
- Reducing the risk of mental health issues and social isolation may promote recovery.
- Adolescents tend to have reduced social leisure activities one year after concussion.

Level of evidence: B.

3.1g: Advise on avoiding alcohol and other recreational drugs.

When: On discharge, on interim evaluation, on re-evaluation.

Who: Health care professionals.
- Example: Emergency Department physicians, family physicians, pediatricians, nurse-practitioners, occupational and physical therapists, neuropsychologists.

How: Provide verbal information.
- Children/adolescents should not consume alcohol and/or recreational drugs at all—especially after a concussion.
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**Why:**
- To prevent the child/adolescent from self-medicating and resorting to drugs to relieve symptoms.
- To avoid the negative effect on recovery of alcohol and recreational drugs.
- To avoid impaired judgment, which could lead to risky behaviour that causes further harm.

**Level of evidence:** B.

**3.1h: Advise on avoiding driving during recovery.**

**When:** On discharge, on interim evaluation, on re-evaluation.

**Who:** Health care professionals.

- Example: Emergency Department physicians, family physicians, pediatricians, nurse-practitioners, occupational and physical therapists, neuropsychologists.

**How:** Provide verbal information.

- Driving is a complex, coordinated process that requires vision, balance, reaction time, judgment, cognition and attention. Concussion may have affected some or all of these skills.

**Why:** Avoiding driving can prevent motor vehicle accidents and, therefore, injury to the adolescent or to others.

**Level of evidence:** B.

**3.1i: Advise on general monitoring, regular follow up with primary care or a sport medicine physician until symptoms disappear, and referral to specialized care after one month if symptoms persist.**

**When:** On discharge, interim evaluation, on re-evaluation.

**Who:** Health care professionals.

- Example: Emergency Department physicians, family physicians, pediatricians, nurse-practitioners, occupational and physical therapists, neuropsychologists.

**How:** Provide verbal information and written handouts. Tools followed by “a” reflect a standard approach, those followed by “b” reflect a more conservative approach. Use clinical judgment.

- **Tool 0.4a:** Parachute After a Concussion Guidelines for Return to Play.
- **Tool 0.4b:** CanChild Return to Activity Guidelines for Children and Youth.
- **Tool 0.5a:** ACE Post-Concussion Gradual Return to School.
- **Tool 0.5b:** CanChild Return to School Guidelines for Children and Youth.
- **Tool 0.6:** CanChild Activity Suggestions for Recovery Stages After Concussion.

**Why:** To monitor progress and promote recovery.

**Level of evidence:** B for need for rest; C for ideal duration of rest.
4.1: Recommend that the child/adolescent follow a stepwise return-to-learn plan.

When: On interim evaluation.

Who: Health care professionals.

- Example: Family physicians, pediatricians, nurse-practitioners, occupational and physical therapists, neuropsychologists.

How:

- Note that there is evidence stating the need for physical and cognitive rest, but no clear answer as to the ideal duration. Extreme prolonged rest may delay recovery. Therefore, we offer tools for two approaches. Tools followed by “a” reflect a standard approach, those followed by “b” reflect a more conservative approach. Use clinical judgment.
  - Tool 0.5a: ACE Post-Concussion Gradual Return to School.
  - Tool 0.5b: CanChild Return to School Guidelines for Children and Youth.

- Consider the following:
  - Within 72 hours of injury:
    - **Recommendation 2.5**: Prescribe physical and cognitive rest.
    - If symptom-free, recommend that the child/adolescent returns to academic and/or school related activities gradually, as tolerated and as long as symptoms do not reoccur.
    - If symptomatic, recommend that the child/adolescent does not attend school or participate in school-related activities at home.
  - 3-6 days after injury:
    - If symptom-free, recommend that the child/adolescent returns to academic and/or school related activities gradually, as tolerated and as long as symptoms do not reoccur.
    - If symptoms are improving but worsen with cognitive activity, recommend that the child/adolescent does not attend school and/or participate in school-related activities.
  - One week or more after injury:
    - If still symptomatic, develop individualized return-to-learn accommodations with gradually increasing course load and hours of attendance, as tolerated.
    - Recommend that parents and/or caregivers and the school establish accommodations and support for return-to-learn. Consider referring to an appropriate specialist.

Why:

- The health care professional must give permission for the child/adolescent to return to school because concussion may affect his/her ability to learn.
- It is reasonable for a child/adolescent to miss a day or two of school after concussion, regardless of symptoms. However, it is also important not to allow or encourage the child/adolescent to "settle into the habit" of missing school, which can create its own problems.
• The school setting provides beneficial contact with peers and social support.

Level of evidence: B for need for rest; C for ideal duration of rest.

4.2: Develop a return-to-learn program after acute symptoms have improved.

When: On interim evaluation, on re-evaluation.

Who:
• Health care professionals.
  o Example: Family physicians, pediatricians, nurse-practitioners, occupational and physical therapists, speech-language pathologists, neuropsychologists.
• Qualified school-based professionals.
  o Example: teachers.
• Parents and/or caregivers.

How:
• **Recommendation 2.1:** Assess and treat any physical, cognitive and neurological deficits.
• Re-assess weekly.
• Manage the gradual return to activity on a case-by-case basis. Recovery from concussion is highly variable.
• Begin a schedule of cognitive challenges mixed with rest periods, and monitor symptom response. Example: family engagement (lunch or dinner with family), general home activities (making a sandwich, walking the dog), 10-15 minutes of texting, 30 minutes TV show, 20 minutes of homework.
• Note that there is evidence stating the need for physical and cognitive rest, but no clear answer as to the ideal duration. Extreme prolonged rest may delay recovery. Therefore, we offer tools for two approaches. Tools followed by “a” reflect a standard approach, those followed by “b” reflect a more conservative approach. Use clinical judgment.
  o **Tool 0.5a:** ACE Post-Concussion Gradual Return to School.
  o **Tool 0.5b:** CanChild Return to School Guidelines for Children and Youth.
  o **Tool 4.3:** Academic Accommodations for Concussed Students.
  o **Tool 4.2:** Template Letter of Accommodation from School to Parents/Caregivers.
  o **Tool 4.4:** Returning to School-based Activities After Concussion Care Plan.
• Prioritize return-to-learn before return-to-work. For older teens who work, refer to the “Guidelines for Concussion/ Mild Traumatic Brain Injury and Persistent Symptoms Second Edition For Adults (18+ years of age).”

Why:
• Parents and/or caregivers need to know that most patients recover fully from concussion even though the recovery rate is variable and unpredictable.
• The key to the initial management of concussion is physical and cognitive rest, which allow symptoms to resolve.

Level of evidence: B for need for rest; C for ideal duration of rest.

Tipsheet / List of Tools
4.3: Recommend additional assessment and accommodations if symptoms worsen or fail to improve.

**When:** On interim evaluation, on re-evaluation.

**Who:**
- Health care professionals.
  - Example: Family physicians, pediatricians, nurse-practitioners, neuropsychologists, speech-language pathologists, occupational and physical therapists.
- Qualified school-based professionals.
  - Example: teachers.

**How:**
- Note that there is evidence stating the need for physical and cognitive rest, but no clear answer as to the ideal duration. Extreme prolonged rest may delay recovery. Therefore, we offer tools for two approaches. Tools followed by “a” reflect a standard approach, those followed by “b” reflect a more conservative approach. Use clinical judgment.
- Use the following tool to assess progress.
  - Tool 0.4a: Parachute After a Concussion Guidelines for Return to Play.
  - Tool 0.4b: CanChild Return to Activity Guidelines for Children and Youth.
- Develop an individual education plan (IEP) at school. Use the following tool.
- Repeat neuro-cognitive testing if the child/adolescent had a baseline done already.
- Consider referring to an appropriate specialist.

**Why:** To promote successful return to learn/play.

**Level of evidence:** B for need for rest; C for ideal duration of rest.

4.4: Develop a return-to-play program only after the child/adolescent has started his/her return-to-learn program.

**When:** On interim evaluation

**Who:**
- Health care professionals.
  - Example: Family physicians, pediatricians, nurse-practitioners, occupational and physical therapists, neuropsychologists.
- Qualified school-based professionals.
  - Example: teachers, coaches.

**How:**
- Note that there is evidence stating the need for physical and cognitive rest, but no clear answer as to the ideal duration. Extreme prolonged rest may delay recovery. Therefore, we offer tools for two approaches. Tools followed by “a” reflect a standard approach, those followed by “b” reflect a more conservative approach. Use clinical judgment.
  - Tool 0.4a: Parachute After a Concussion Guidelines for Return to Play.
  - Tool 0.4b: CanChild Return to Activity Guidelines for Children and Youth.
  - Tool 0.6: CanChild Activity Suggestions for Recovery Stages After Concussion.
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- **Tool 4.1**: OPHEA Documentation for a Diagnosed Concussion – Return to Learn/Return to Physical Activity Plan.
- **Tool 4.2**: Template Letter of Accommodation from School to Parents/Caregivers.
  - Base decisions regarding return-to-play on clinical judgment, expertise and symptoms.
  - **Why**:
    - To promote an optimal recovery. A gradual return to play is the best way to make sure that the child/adolescent remains symptom-free when he/she fully engages in sport.
    - **Level of evidence**: B for need for rest; C for ideal duration of rest.

4.5: Refer any child/adolescent who has sustained multiple concussions to an expert in sport concussion to help with return-to-play decisions and/or retirement from contact sports.

- **When**: On interim evaluation.
- **Who**: Health care professionals.
  - Example: Family physicians, pediatricians, nurse-practitioners, occupational and physical therapists, neuropsychologists.
- **How**: Refer to an appropriate specialist in concussion management (example: sport medicine physician, brain injury clinic, neurologist) who also has expertise in pediatrics.
  - **Why**:
    - Return-to-play decisions are more complicated in athletes who have sustained multiple concussions.
    - An expert in sport concussion can advise on other decisions surrounding return-to-play and/or retirement.
  - **Level of evidence**: B.

5.1: Assess any modifiers that may delay recovery.

- **When**: On presentation, on interim evaluation, on re-evaluation.
- **Who**: Health care professionals.
  - Example: Family physicians, pediatricians, nurse-practitioners, speech-language pathologists, occupational and physical therapists, neuropsychologists.
- **How**:
  - Use the following tool.
    - **Tool 2.3**: Modifiers for Concussion.
  - Assess for increased risk of persistent symptoms where:
    - there is a history of learning difficulties, behavioural problems or loss of consciousness;
    - the child/adolescent had an initial headache, nausea, vomiting or dizziness after the concussion.
  - **Why**: To customize management to the individual child/adolescent and promote recovery.
  - **Level of evidence**: B.
5.2: Make sure the child/adolescent is not taking any medication that might mask or modify the symptoms.

When: On presentation, on re-evaluation.
Who: Health care professionals.
- Example: Emergency Department physicians, family physicians, pediatricians, nurse-practitioners, neuropsychologists.

How: Ask whether the child/adolescent is taking prescribed or over-the-counter medications/supplements, and is drinking alcohol or taking recreational drugs.

Why:
- To avoid a premature return-to-play that might endanger the child/adolescent’s health.
- To determine if any medications or supplements are masking symptoms.
- To document anything that may require particular attention.

Level of evidence: B.

5.3: Assess, document and manage significant, prolonged complaints based on specific symptoms, etiology and the time since injury.

When: On re-evaluation.
Who: Health care professionals.
- Example: Family physicians, pediatricians, nurse-practitioners, speech-language pathologists, occupational and physical therapists, neuropsychologists.

How:
- Investigate all contributing factors and develop a management strategy.
  - Recommendation 2.1: Assess and treat any physical, cognitive and neurological deficits.
  - Tool 2.6: Management of Persistent Symptoms Algorithm.
  - Tool 5.13: Post-concussion Symptom Inventory for Children aged 5-7.
  - Tool 5.14: Post-concussion Symptom Inventory for Children aged 8-12.
  - Tool 5.15: Post-concussion Symptom Inventory Self-assessment, ages 13-18.
- Examine the child/adolescent based on symptoms described.
  - Tool 2.3: Modifiers for Concussion.
- Recommendations 5.4a, 5.4b, 5.4c, 5.4d, 5.4e, 5.4f, 5.4g, as needed.
- Order further investigations as needed.

Why: To identify and treat the underlying causes of persistent symptoms. Persistent symptoms can be non-specific and may mask or mimic symptoms of other conditions, such as depression, anxiety disorders and chronic pain.

Level of evidence: B.

5.4a(i): Place every child/adolescent on a program of sleep hygiene.

When: On re-evaluation.
Who: Health care professionals.
- Example: Family physicians, pediatricians, nurse-practitioners, occupational and physical therapists, neuropsychologists.
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How: Use the following tool.
  o Tool 3.2: Strategies to Promote Good Sleep and Alertness.
Why: Improving sleep may contribute to general recovery and alleviate symptoms such as mood, anxiety, pain, fatigue and cognitive problems, if these are present.
Level of evidence: C.

5.4a(ii): Screen for factors that may influence the child/adolescent’s sleep/wake cycle.
When: On re-evaluation.
Who: Health care professionals.
  • Example: Family physicians, pediatricians, nurse-practitioners, speech-language pathologists, occupational and physical therapists, neuropsychologists.
How: Ask about:
  • Other medical conditions (example: enlarged tonsils, obesity, obstruction, sleep related breathing disorders);
  • Other medications (especially stimulants);
  • Mood or anxiety disorders;
  • Early morning headaches (possible sleep apnea);
  • Unhealthy habits (lack of exercise, variable sleep-wake schedule, excessive napping, excessive time spent in bed, exercising close to bedtime).
Why: To identify factors that could be treated or changed to improve the child/adolescent’s sleep and recovery.
Level of evidence: B.

5.4a(iii): Consider non-pharmacological treatments to improve sleep.
When: On re-evaluation.
Who: Health care professionals.
  • Example: Family physicians, pediatricians, nurse-practitioners.
How:
  • Consider supplements of magnesium, melatonin and zinc, as needed.
  o Tool 5.6: Approved Medications for Pediatric Indications.
  • Consider referring to a cognitive behaviour specialist.
  • Consider acupuncture or mindfulness-based stress reduction therapy.
Why: To improve sleep and recovery without the use of medication that may have side-effects.
Level of evidence: C.

5.4a(iv): Consider prescribing medication on a short-term basis if sleep has not improved.
When: On re-evaluation.
Who: Health care professionals.
  • Example: Family physicians, pediatricians, nurse-practitioners.
How: Consider prescribing trazodone, zopiclone, as appropriate.
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- **Tool 5.6**: Approved Medications for Pediatric Indications.
- **Tool 5.12**: General Considerations Regarding Pharmacotherapy.

**Why**: To promote better sleep.

**Level of evidence**: C.

### 5.4a(v): Refer the child/adolescent to a pediatric sleep specialist if sleep has not improved.

**When**: On re-evaluation.

**Who**: Health care professionals.

- Example: Family physicians, pediatricians, nurse-practitioners, neuropsychologists.

**How**: Provide the names of specialists with experience in assessing concussion and in polysomnography (example: sleep study, Multiple Sleep Latency Test, Maintenance of Wakefulness Test).

**Why**: To resolve sleep disturbances and rule out possible sleep-related breathing disorders, nocturnal seizures, periodic limb movements or narcolepsy.

**Level of evidence**: C.

### 5.4b(i): Take a history of any headaches.

**When**: On re-evaluation.

**Who**: Health care professionals.

- Example: Family physicians, pediatricians, nurse-practitioners.

**How**:

- Use the following tools, as appropriate.
  - **Tool 2.8**: Assessment of Children and Adolescents with Headache.
  - **Tool 5.2**: Diagnostic Criteria for Headaches.
  - **Tool 5.3**: pedMIDAS Headache Severity Tool for Children aged 4-18.

- Ask about:
  - Family history of migraine;
  - Sleep habits/quality;
  - Family and friends;
  - Academic performance.

**Why**:

- To identify the subtype of headache that most closely resembles the symptoms.
- To identify the most appropriate treatment. Some post-traumatic headaches are unclassifiable.

**Level of evidence**: B.

### 5.4b(ii): Establish the degree and duration of the disability that the headaches cause.

**When**: On re-evaluation

**Who**: Health care professionals.

- Example: Family physicians, pediatricians, nurse-practitioners.
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How: Ask the child/adolescent or the parents and/or caregivers to record headaches that require medication.
   o Tool 5.3: pedMIDAS Headache Severity Tool for Children aged 4-18.
   o iHeadache: Free Headache and Migraine Diary App.

Why:
   • To document medication use and the frequency, severity and triggers of the headaches.
   • To identify the most appropriate treatment.
   • To establish a baseline against which to compare, and monitor the response to treatment.

Level of evidence: B.

5.4b(iii): Perform a neurological exam and a head/neck exam.

When: On re-evaluation.

Who: Health care professionals.
   • Example: Family physicians, pediatricians, nurse-practitioners.

How: Use the following tool.
   • Tool 2.4: Neurologic and Musculoskeletal Exam.

Why: To rule out other important pathologies and confirm the diagnosis.

Level of evidence: C.

5.4b(iv): Consider non-pharmacological, complementary and/or alternative medicine therapies for headache.

When: On re-evaluation.

Who: Health care professionals.
   • Example: Family physicians, pediatricians, nurse-practitioners, occupational and physical therapists, neuropsychologists.

How:
   • Tool 5.1: Management of Persistent Headache in Children Algorithm.
   • Tool 3.2: Strategies to Promote Good Sleep and Alertness.
   • Provide the following, as needed:
     o Names of specialists in, for example, relaxation therapy.
     o Names of massage therapists and acupuncturists/acupressurists (cervicogenic/tension).
   • Consider natural health products, such as vitamins (example: B2, riboflavin).

Why: To target the source of the headache and decrease symptoms without medication, particularly if the child/adolescent or the parents and/or caregivers are reluctant to use medication.

Level of evidence: C.
5.4b(v): Consider treating migraine headaches with prescription medication.

When: On re-evaluation.
Who: Health care professionals.
- Example: Family physicians, pediatricians, nurse-practitioners.
How:
- Prescribe medication, as needed.
  - Tool 5.1: Management of Persistent Headache in Children Algorithm.
  - Tool 5.6: Approved Medications for Pediatric Indications.
  - Tool 5.12: General Considerations Regarding Pharmacotherapy.
- Consider referring to a neurologist.
Why: To relieve symptoms.
Level of evidence: B.

5.4c(i): Assess for persistent cognitive difficulties.

When: On re-evaluation.
Who: Health care professionals.
- Example: Family physicians, pediatricians, nurse-practitioners, speech-language pathologists, occupational/physical therapists, neuropsychologists.
How:
- Use the following tool:
  - Tool 5.11: Screening Questions for Persistent Cognitive Difficulties.
- Consider referring to a pediatric neuropsychologist if the child/adolescent reports having a problem before the injury.
Why: To inform management of:
- return-to-learn and daily activities;
- potential persistent symptoms that should be monitored.
Level of evidence: B.

5.4c(ii): Manage any cognitive impairments.

When: On re-evaluation.
Who: Health care professionals.
- Example: Family physicians, pediatricians, nurse-practitioners, speech-language pathologists, neuropsychologists.
How:
- Inform parents and/or caregivers, schools and/or employers of accommodations needed to tasks or schedules.
  - Tool 3.1: Template Letter of Accommodation from Physician to School.
  - Tool 4.3: Academic Accommodations for Concussed Students.
  - Tool 4.5: Return-to-school Information and Strategies.
- Refer to a neuropsychologist if symptoms interfere with daily functioning.
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Why:
- To inform management of symptoms, return-to-learn and daily activities.
- To clarify the most appropriate treatment options and accommodations based on the child/adolescent’s characteristics.
- To promote cognitive recovery and avoid errors or setbacks at school or work.

Level of evidence: B.

5.4d(i): Assess for balance and vestibular impairments.

When: On re-evaluation.

Who: Health care professionals.
- Example: Family physicians, pediatricians, nurse-practitioners.

How:
- Perform a neurological exam.
  - Tool 2.4: Neurologic and Musculoskeletal Exam.
- Assess balance using the following tools, as appropriate.
  - Tool 0.2: ChildSCAT3 Sport Concussion Assessment Tool for Children aged 5-12 (balance examination).
  - Tool 1.1: SCAT3 Sport Concussion Assessment Tool for Athletes aged 13+ (balance examination).
- Use clinical judgment regarding age-appropriate level of skills.

Why: To find out which systems (visual reflexes, inner ear, musculoskeletal, nervous system or brain) might be contributing to dizziness, headaches and balance problems, if the child/adolescent has them.

Level of evidence: B. (for ages 13+).

5.4d(ii): Assess for benign positional vertigo.

When: On re-evaluation.

Who: Health care professionals.
- Example: Family physicians, pediatricians, nurse-practitioners.

How:
- Use the following tool.
  - Tool 5.4: Dix-Hallpike Manoeuvre and Particle Repositioning Manoeuvre.
- Perform a canalith repositioning manoeuvre if the result of the Dix-Hallpike manoeuvre is positive.

Why: Benign positional vertigo is a readily treatable cause of balance problems. The trauma that caused the concussion may have dislodged the canalith crystals (otoconia) in the inner ear. If this is the case, the repositioning manoeuvre may relieve symptoms related to dizziness.

Level of evidence: B.
5.4d(iii): Refer for further assessment and treatment if balance and/or vestibular system are dysfunctional.

When: On re-evaluation.
Who: Health care professionals.
  • Example: Family physicians, pediatricians, nurse-practitioners.
How:
  • Provide the name of an appropriate specialist, including an audiologist if the child/adolescent has auditory symptoms.
  • Refer children/adolescents with persistent vestibular symptoms to a physiotherapist.
Why: Vestibular rehabilitation may improve balance and mobility.
Level of evidence: B.

5.4e(i): Assess ongoing vision dysfunctions.

When: On re-evaluation.
Who: Health care professionals.
  • Example: Family physicians, pediatricians, nurse-practitioners.
How: Use the following tools.
  • Tool 2.4: Neurologic and Musculoskeletal Exam.
  • Tool 5.5: Initial Assessment of Cognitive Visual Impairment in Children.
Why: To prevent the worsening of symptoms or prolonged recovery.
Level of evidence: B.

5.4e(ii): Refer children/adolescents who have changes in functional vision to a specialist.

When: On re-evaluation.
Who: Health care professionals.
  • Example: Family physicians, pediatricians, nurse-practitioners.
How: Provide the names of neuro-ophthalmologists or neuro-optometrists.
Why: To provide a specialized level of care.
Level of evidence: B.

5.4f(i): Assess and manage persistent fatigue if it is a significant symptom.

When: On re-evaluation.
Who: Health care professionals.
  • Example: Family physicians, pediatricians, nurse-practitioners, occupational and physical therapists, neuropsychologists.
How:
  • Take a history of the symptoms.
  • Aim for a gradual increase in exercise/activity that matches improvement in symptoms.
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• Emphasize that spreading activities throughout the day helps patients achieve more, and that they should avoid doing too much at once.
  o Consider referring to an occupational therapist to learn energy-saving techniques.
• Encourage good sleep hygiene.
  o Tool 3.2: Strategies to Promote Good Sleep and Alertness.
• Encourage the child/adolescent to plan meaningful goals, record activity achievement, and identify patterns of fatigue by using a notebook or diary.
• Inform the child/adolescent and the parents and/or caregivers that fatigue can be worsened by low mood or stress.
• Provide verbal information on coping strategies for fatigue.

Why: To prevent the worsening of symptoms or a prolonged recovery.
Level of evidence: B.

5.4g(i): Assess for existing and new mental health symptoms and disorders.

When: On re-evaluation.

Who:
• Health care professionals.
  o Example: Family physicians, pediatricians, nurse-practitioners, neuropsychologists.
• Qualified school-based professionals.
  o Example: teachers.

How:
• Use the following tools, as appropriate.
  o Tool 2.7: HEADS-ED Tool for Monitoring Pediatric Mental Health in the ED.
    ▪ Interactive web version.
  o Tool 5.8: Mood and Feelings Questionnaire, Child Self-Report.
  o Tool 5.9: Mood and Feelings Questionnaire, Parent Report on Child.
  o Tool 5.10: Screen for Child Anxiety Related Disorders (SCARED).
• Ask about
  o Somatoform disorders.
  o Family functioning.
• Refer to a mental health specialist, as appropriate (use clinical judgment).

Why: Identifying common mental health disorders early could:
• prevent/mitigate additional persistent symptoms such as learning and behaviour problems;
• treat the mental health disorder itself, and prevent it from becoming a long-term problem.
Level of evidence: B.

Tipsheet / List of Tools
5.4g(ii): Ask the child/adolescent and parents and/or caregivers to report on mood and feelings.

**When:** On re-evaluation and on referral (repeatedly as needed).

**Who:**
- Health care professionals.
  - Example: Family physicians, pediatricians, nurse-practitioners, occupational and physical therapists, neuropsychologists.
- Qualified school-based professionals.
  - Example: teachers.

**How:** Ask the child/adolescent and parents and/or caregivers to complete the following, as appropriate.
- **Tool 5.8:** Mood and Feelings Questionnaire, Child Self-Report.
- **Tool 5.9:** Mood and Feelings Questionnaire, Parent Report on Child.

**Why:** Identifying common mental health disorders early could:
- assess the association of physical symptoms and restrictions to activity on mental health.
- treat the mental health disorder itself, and prevent it from becoming a long-term problem.

**Level of evidence:** B.

5.4g(iii): Treat any mental health symptoms.

**When:** On re-evaluation. When indicated throughout management based on symptoms and response to treatment.

**Who:** Health care professionals.
- Example: Family physicians, pediatricians, nurse-practitioners, occupational and physical therapists.

**How:**
- Base treatment on individual factors, patient preferences, severity of symptoms, co-morbidity.
  - **Tool 5.7:** Management of Persistent Mental Health Disorders Algorithm.
  - **Tool 5.6:** Approved Medications for Pediatric Indications.
  - **Tool 5.12:** General Considerations Regarding Pharmacotherapy.
- Consider referring to a local health care professional or to a specialist with experience in pediatric mental health if unable to manage.

**Why:** Identifying common mental health disorders early could:
- prevent/mitigate additional persistent symptoms such as learning and behaviour problems;
- treat the mental health disorder itself, and prevent it from becoming a long-term problem.

**Level of evidence:** B.
5.4g(iv): Consider referring to a specialist with experience in pediatric mental health.

**When**: On re-evaluation.

**Who**: Health care professionals.
- Example: Family physicians, pediatricians, nurse-practitioners, neuropsychologists, occupational and physical therapists.

**How**:
- Confirm that:
  - The symptoms are complex and/or severe.
  - Treatment in the first month after injury has not been effective.
  - Standard medications have failed or are contra-indicated.
  - Prominent/major risk factors may affect the course of recovery.
- Provide the name of a specialist with experience in pediatric mental health.
- Continue treating other symptoms.

**Why**: Identifying common mental health disorders early could:
- prevent/mitigate additional persistent symptoms such as learning and behaviour problems;
- treat the mental health disorder itself, and prevent it from becoming a long-term problem.

**Level of evidence**: B.

5.5: Recommend rehabilitation therapy to improve symptoms and mobility, as needed.

**When**: On re-evaluation.

**Who**: Health care professionals.
- Example: Family physicians, pediatricians, nurse-practitioners, occupational and physical therapists, neuropsychologists.

**How**: Provide the names of certified exercise physiologists or sport medicine physicians who have experience in concussion and return-to-play protocols.

**Why**:
- A gradual, closely supervised active rehabilitation program could improve the recovery of children/adolescents who are slow to return to full physical activity.
- Exercise promotes sleep, energy, mood and cognitive performance, and avoids the loss of fitness.

**Level of evidence**: B.

5.6: Consider a broad differential diagnosis.

**When**: On re-evaluation.

**Who**: Health care professionals.
- Example: Family physicians, pediatricians, nurse-practitioners, occupational and physical therapists, neuropsychologists.

**How**: In this order.
• Take a history.
  o Tool 2.6: Management of Persistent Symptoms Algorithm.

• Examine the child/adolescent based on symptoms.

• Review mental health, perform a post-concussive assessment and a cognitive screen.
  o Recommendation 5.4g(i): Assess for existing and new mental health symptoms and disorders.

Why: To identify and treat the underlying causes of persistent symptoms. Persistent symptoms can be non-specific and may mimic symptoms of other conditions such as depression, anxiety disorders and chronic pain.

Level of evidence: C.

5.7: Consider the need for specialized therapy if symptoms persist.

When: On re-evaluation.

Who: Health care professionals.
  • Example: Family physicians, pediatricians, nurse-practitioners, speech-language pathologists, occupational and physical therapists, neuropsychologists.

How: Refer the child/adolescent for specialty or multi-disciplinary assessments, according to his/her symptoms.
  • Recommendation 4.3: Recommend additional assessment and accommodations if symptoms worsen or fail to improve.
  • Recommendation 4.5: Refer any child/adolescent who has sustained multiple concussions to an expert in sport concussion to help with return-to-play decisions and/or retirement from contact sports.
  • Recommendation 5.4a(v): Refer the child/adolescent to a pediatric sleep specialist if sleep has not improved.
  • Recommendation 5.4d(iii): Refer for further assessment and treatment if balance and/or vestibular system are dysfunctional.
  • Recommendation 5.4e(ii): Refer children/adolescents who have changes in functional vision to a specialist.
  • Recommendation 5.4g(iv): Consider referring to a specialist with experience in pediatric mental health.
  • Recommendation 5.5: Recommend rehabilitation therapy to improve symptoms and mobility, as needed.

Why: To promote recovery and avoid the development of persistent symptoms.

Level of evidence: B.
5.8: Work with the child/adolescent’s primary care professional, school and/or employer regarding accommodations needed to tasks or schedules.

**When:** At home, in between evaluations.

**Who:**
- Parents and/or caregivers.
- Health care professionals.
  - Example: Family physicians, pediatricians, nurse-practitioners, occupational and physical therapists, neuropsychologists.
- Qualified school-based professionals.
  - Example: teachers, coaches.

**How:**
- Discuss Recommendation 4.3 on additional assessment and accommodations if symptoms fail to improve and Recommendation 5.4c(ii) on managing cognitive impairments with your primary care professional.
- Use the following tools, as appropriate.
  - Tool 4.2: Template Letter of Accommodation from School to Parents/Caregivers.
  - Tool 4.3: Academic Accommodations for Concussed Students.
  - Tool 4.4: Returning to School-based Activities After Concussion Care Plan.
  - Tool 4.5: Return-to-school Information and Strategies.

**Why:** To promote recovery and avoid the development of persistent symptoms.

**Level of evidence:** B.

5.9: Assess and treat any physical, cognitive and neurological deficits.

**When:** On re-evaluation.

**Who:** Health care professionals.
- Example: Emergency Department physicians, family physicians, pediatricians, nurse-practitioners, speech-language pathologists, occupational and physical therapists, neuropsychologists.

**How:**
- Take a history; do an examination and a cognitive screen, assess for persistent symptoms; review mental health. Use the following tools as appropriate.
  - Tool 2.3: Modifiers for Concussion.
  - Tool 2.4: Neurologic and Musculoskeletal Exam.
  - Tool 2.5: PECARN Management Algorithm for Children After Head Trauma.
  - Tool 2.7: HEADS-ED Tool for Monitoring Pediatric Mental Health in the ED.
    - Interactive web version.
  - Tool 2.8: Assessment of Children and Adolescents with Headache.
  - Tool 5.13: Post-concussion Symptom Inventory for Children aged 5-7.
  - Tool 5.14: Post-concussion Symptom Inventory for Children aged 8-12.
  - Tool 5.15: Post-concussion Symptom Inventory Self-assessment, ages 13-18.
Consider signs and symptoms in context with the child/adolescent’s normal performance, especially for those with learning and communication deficits, ADHD and/or physical disabilities.

Compare results of neuro-cognitive testing with the baseline, if a baseline was done (Recommendation 0.4 for parents and/or caregivers.)

Why:
- To continue treatment or decide on further action.
- To treat ongoing symptoms.

Level of evidence: B for treat.
Chapter: List of Tools

Guidelines for Diagnosing and Managing Pediatric Concussion

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*Guidelines for Diagnosing and Managing Pediatric Concussion*

**What is ChildSCAT3?**

The ChildSCAT3 is a standardized tool for evaluating injured children for concussion and can be used in children aged from 5 to 12 years. It supersedes the original SCAT and the SCAT2 published in 2005 and 2009, respectively. For older persons, aged 13 years and over, please use the SCAT5. The ChildSCAT3 is designed for use by medical professionals. If you are not qualified, please use the Sport Concussion Recognition Tool (SCRT) or list of tools. The ChildSCAT3 can be helpful for interpreting past injury test scores.

Specific instructions for use of the ChildSCAT3 are provided on page 3. If you are not familiar with the ChildSCAT3, please read those instructions carefully. This tool may be freely copied in its current form for distribution to individuals, teams, groups, and organizations. Any revision and any reproduction in a digital format require approval by Conscussion in Sport Group.

**NOTE:** The diagnosis of a concussion is a clinical judgment, ideally made by a medical professional. The ChildSCAT3 should not be used solely to make, or exclude, the diagnosis of concussion in the absence of clinical judgment. An athlete may have a concussion even if their ChildSCAT3 is “normal.”

**What is a concussion?**

A concussion is a disturbance in brain function caused by a direct or indirect force to the head. It results in a variety of non-specific signs and/or symptoms (like those listed below) and most often does not involve loss of consciousness. Concussion should be suspected in the presence of any one or more of the following:

- Symptoms (e.g., headache), or
- Physical signs (e.g., unsteadiness), or
- Impaired brain function (e.g., confusion) or
- Abnormal behavior (e.g., change in personality).

**SIDELINE ASSESSMENT**

Indications for Emergency Management

**NOTE:** A hit to the head can sometimes be associated with a more severe brain injury. If the concussed child displays any of the following, then do not proceed with the ChildSCAT3, instead activate emergency procedures and urgent transportation to the nearest hospital:

- Glasgow Coma Scale score less than 15
- Deteriorating mental status
- Potential spinal injury
- Progressive worsening symptoms or new neurologic signs
- Persistent vomiting
- Evidence of skull fracture
- Post traumatic seizures
- Coagulopathy
- History of previous injury (e.g., Shunt)
- Multiple injuries

**Glasgow coma scale (GCS)**

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
- Incomprehensible sounds
- Inappropriate words
- Confused
- Oriented

Best motor response (M)

- No motor response
- Extension to pain
- Abnormal flexion to pain
- Flaccid/Withdrawal to pain
- Localizes to pain
- Obey simple commands

Glasgow Coma score (E + V + M) of 15

GCS should be recorded for all athletes in case of subsequent deterioration.

**Potential signs of concussion?**

If any of the following signs are observed after a direct or indirect blow to the head, the child should stop participation, be evaluated by a medical professional and should not be permitted to return to sport the same day if a concussion is suspected:

- Any loss of consciousness
- “If so, how long?”
- Balance or motor incoordination (instability, slow/laboured movements, etc.)
- Disorientation or confusion (dyslipidemia, inability to respond appropriately to questions)
- Loss of memory
- “Is it, how long?”
- “Before or after the injury?”
- Blank or vacant look
- Visible facial injury in combination with any of the above:

**Sideline Assessment – child-Maddocks Score**

*“I am going to ask you a few questions, please listen carefully and give your best effort.”*

Modified Maddocks questions (1 point for each correct answer)

- Where are we at now? 0 1
- Is it before or after lunch? 0 1
- What did you last lesson/class? 0 1
- What is your teacher’s name? 0 1

child-Maddocks score

- 0 1 of 4

Any child with a suspected concussion should be REMOVED FROM PLAY, medically assessed and monitored for deterioration (i.e., should not be left alone). No child diagnosed with concussion should be returned to sports participation on the day of injury.

**BACKGROUND**

Name: Date/Time of injury:

Examiner: Date of Assessment:

Sport/team/school: Gender: M F

Age: Current school year/grade: left right neither

Dominant hand:

Mechanism of injury (“tell me what happened?”):

For Parent/carer to complete:

How many concussions has the child had in the past?

When was the most recent concussion?

How long was the recovery from the most recent concussion?

Has the child ever been hospitalized or had medical imaging done (CT or MRI) for a head injury?

Has the child ever been diagnosed with headaches or migraines?

Does the child have a learning disability, dyslexia, ADD/ADHD, secure disorder?

Has the child ever been diagnosed with depression, anxiety or other psychiatric disorder?

Has anyone in the family ever been diagnosed with any of these problems?

Is the child on any medications? If yes, please list:

Y N

**Tipsheet / List of Tools**
Tool 0.2: ChildSCAT3 Sport Concussion Assessment Tool for Children aged 5-12

Guidelines for Diagnosing and Managing Pediatric Concussion

Downloaded from bmj.com on March 10, 2014 - Published by group.bmj.com

SYMPTOM EVALUATION

Child report

Name: 

<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>Rare</th>
<th>Sometimes</th>
<th>Often</th>
</tr>
</thead>
<tbody>
<tr>
<td>I have trouble paying attention</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>I get distracted easily</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>I have a hard time concentrating</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>I have problems remembering what people tell me</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>I have problems following directions</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>I have trouble focusing</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>I get confused</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>I forget things</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>I have trouble finishing things</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>I have trouble seeing things out</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>I feel dizzy</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>I feel like the room is spinning</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>I feel like I'm going to faint</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Things are blurry when I look at them</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>I see double</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>I feel sick to my stomach</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>I get tired a lot</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>I get tired easily</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

Total number of symptoms (Maximum possible: 20)

Symptom severity score (Maximum possible: 20a x 3 = 60)

Parent report

The child

<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>Rare</th>
<th>Sometimes</th>
<th>Often</th>
</tr>
</thead>
<tbody>
<tr>
<td>Has trouble sustaining attention</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Is easily distracted</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Has difficulty concentrating</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Has problems remembering what he/she is told</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Has difficulty following directions</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Tends to daydream</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Gets confused</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Is forgetful</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Has difficulty completing tasks</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Has poor problem solving skills</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Has problems learning</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Has headaches</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Feels dizzy</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Has a feeling that the room is spinning</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Feels faint</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Has blurred vision</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Has double vision</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Experiences nausea</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Gets tired a lot</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Gets tired easily</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

Total number of symptoms (Maximum possible: 20)

Symptom severity score (Maximum possible: 20a x 3 = 60)

Cognitive & Physical Evaluation

Cognitive assessment

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

**Orientation:** (1 point for each correct answer)

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>What month is it?</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>What is the date today?</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>What is the day of the week?</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>What year is it?</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

Orientation score

Immediate memory

<table>
<thead>
<tr>
<th>List</th>
<th>Trial 1</th>
<th>Trial 2</th>
<th>Trial 3</th>
<th>Alternative word list</th>
</tr>
</thead>
<tbody>
<tr>
<td>willow</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>apple</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>carrot</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>saddle</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>bubble</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>waggon</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>iron</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>insect</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

Total immediate memory score total

Concentration: Digits Backward

<table>
<thead>
<tr>
<th>List</th>
<th>Trial 1</th>
<th>Alternative-digit list</th>
</tr>
</thead>
<tbody>
<tr>
<td>6-2</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>4-3</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>3-6</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>6-2</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>7-1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>5-3</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

Total of 5

Concentration: Days in Reverse Order (1 pt. for entire sequence correct)

Sunday-Saturday, Friday-Thursday-Wednesday-Tuesday-Monday

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
</tr>
</thead>
</table>

Concentration score

Neck Examination:

<table>
<thead>
<tr>
<th>Range of motion</th>
<th>Tenderness</th>
<th>Upper and lower limb sensory &amp; strength</th>
</tr>
</thead>
</table>

Findings:

Balance examination

Modified Balance Error Scoring System (BBESS) testing

<table>
<thead>
<tr>
<th>Left</th>
<th>Right</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>0</td>
<td>1</td>
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<td>0</td>
<td>1</td>
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<td>0</td>
<td>1</td>
</tr>
<tr>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

Condition

Double leg stance: Errors
Tandem stance non-dominant foot at back: Errors
Tandem gait: Time takes to complete ease of movement...

Coordination examination

Upper limb coordination

<table>
<thead>
<tr>
<th>Which arm was tested?</th>
<th>Left</th>
<th>Right</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

Coordination score

SAC Delayed Recall

Delayed recall score

Since signs and symptoms may evolve over time, it is important to consider repeat evaluation in the acute assessment of concussion.

Scoring on the ChildSCAT3 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.
Tool 0.2: ChildSCAT3 Sport Concussion Assessment Tool for Children aged 5-12

Guidelines for Diagnosing and Managing Pediatric Concussion

INSTRUCTIONS

Words in italics throughout the ChildSCAT3 are the instructions given to the child by the tester.

Sideline Assessment – child-Maddocks Score

To be completed on the sideline/near the playground, immediately following concussion. There is no requirement to repeat these questions at follow-up.

Symptom Scale

In situations where the symptom scale is being completed after exercise, it should still be done in a resting state, at least 15 minutes post-exercise.

On the day of injury:
- The child is to complete the Child Report, according to how he/she feels now.
- All on subsequent days:
  - The child is to complete the Child Report, according to how he/she feels today.
- And:
  - The parent/guardian is to complete the Parent Report, according to how the child has been over the previous 24 hours.

Standardized Assessment of Concussion – Child Version (SCATT-C)

Orientation

Ask each question on the score sheet. A correct answer for each question scores 1 point. If the child does not understand the question, give an incorrect answer, or no answer, then the score for that question is 0 points.

Immediate memory

“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.”

Trials 1 & 2:

1. “I am going to repeat the same list again. Repeat back as many words as you can remember in any order. If you said the words backwards, subtract 1 point.

Complete all 2 trials (3 total). Read the words at a rate of one per second. Score 1 pt. for each correct response. Total score equals sum across all 3 trials. Do not inform the child the delayed recall will be tested.

Concentration

Digits backward:

“I am going to read you a string of numbers and when I am done, repeat them back to me backwards, in reverse order of how you heard them. For example, if I say 4-3-2-1, you should say 1-2-3-4.”

If correct, go to next string length. If incorrect, repeat trial 2. One point possible for each string length. Stop after incorrect on both trials. The digits should be read at the rate of one per second.

Days in Reverse Order:

“No vital tell me the days of the week in reverse order. Start with Sunday and go backwards. So you say Sunday, Saturday, Friday.”

1 pt. for entire sequence correct.

Delayed recall:

The delayed recall should be performed after completion of the Balance and Co-ordination examination.

“Do you remember that list of words? Read it a few times earlier? Tell me as many words from the list as you can remember in any order.”

Girls each word correctly recalled. Total score equals number of words recalled.

Balance examination

These tasks are to be used by the person administering the ChildSCAT3, and each balance task should be demonstrated to the child. The child should then be asked to copy what the examiner demonstrates.

Modified Balance Error Scoring System (BESS) testing:

This balance testing is based on a modified version of the Balance Error Scoring System (BESS). A stop watch or watch with a second hand is required for this testing. This may reduce the valid testing.

(a) Double leg stance:

The feet should be shoulder-width apart. The child should stand with their feet together, with their hands on hips and eyes closed. The child should try to maintain stability in that position for 20 seconds. You should remind the child that they will be counting the number of times the child moves out of this position. You should start timing when the child is set and the eyes are closed.

(b) tandem stance:

Instruct the child to stand heel to toe, with the non-dominant foot in the back. Should be an easy posture for the child to stand on, and the child should stand with their feet together, with their hands on hips and eyes closed. You should remind the child that they will be counting the number of times the child moves out of this position. You should start timing when the child is set and the eyes are closed.

Balance testing – types of errors: Parts (a) and (b)

1. Hands lifted off hips creast
2. Opening eyes
3. Step, shuffle, or fall
4. Moving hips into ×3 degrees abduction
5. Lifting foot off of heel
6. Remaining out of test position > 5 sec

Each of the 20-second trials is scored by counting the errors, or deviations from the proper stance, accumulated by the child. The examiner begins counting errors only after the child has assumed the proper start position. The modified BESS is calculated by adding one error point for each error during the two 20-second tests. The maximum total number of errors for any single condition is 10. If a child commits multiple errors simultaneously, only one error is recorded but the child should quickly return to the testing position, and counting should resume once the subject is set. Children who are unable to maintain testing procedure for a minimum of five seconds at the start are assigned the highest possible score, ten, for that testing condition.

OPTION: For further assessment, the same 2 stance can be performed on a surface of medium density foam (e.g., approximately 50mm x40cm x10cm).

Tandem Gait

Use a clock (with a second hand) or stopwatch to measure the time taken to complete this task.

Introduction to the examiner: “Demonstrate the following to the child.”

The child is 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 50mm wide (sports tape). Three meters later, the same 10-degree and return to the starting point using the same gait. A total of 4 trials are done. The test is terminated when children commit 2 or more errors, at the discretion of the examiner.

Coordination examination

Finger-to-nose test (FTN) task:

The tester should demonstrate it to the child

“Tongue I am going to test your coordination now. Please sit comfortably on the chair with your eyes open and ask you child to hold your right index finger outstretched (shoulder height to 40 centimeters), and allow your fingers extended. When I give a start signal, I would like you to perform five successive fingers to nose repetitions using your index finger to touch the tip of the nose as quickly and accurately as possible.”

Scoring: 5 correct repetitions in 4 seconds = 1

Note for testers: Children fail the test if they do not touch their nose, do not fully extend their elbow or do not perform five repetitions. Failure should be scored as 0.

References & Footnotes

1. This tool has been developed by a group of international experts at the 4th International Consensus meeting on Concussion in Sport held in Zurich, Switzerland in November 2012. All the full details of the conference outcomes and the authors of the tool are published in The British Journal of Sports Medicine, Protection 2013, Volume 47, Issue 5. The outcome paper will also be simultaneously co-published in new leading biomedical journals with the copyright held by the Concussion in Sport Group, to allow unrestricted distribution, providing no alterations are made.


CHILD ATHLETE INFORMATION

Any child suspected of having a concussion should be removed from play, and then seek medical evaluation. The child must NOT return to play or sport on the same day as the suspected concussion.

Signs to watch for
Problems could arise over the first 24-48 hours. The child should not be left alone and must go to a hospital at once if they develop any of the following:
- New Headache, or Headache gets worse
- Persistent or increasing neck pain
- Becomes drowsy or can't be woken up
- Can not recognize people or places
- Has Nausea or Vomiting
- Behaves unusually, seems confused, or is irritable
- Has any seizures (arms and/or legs jerk uncontrollably)
- Has weakness, numbness or tingling (arms, legs or face)
- Is unsteady walking or standing
- Has slurred speech
- Has difficulty understanding speech or directions.

Remember, it is better to be safe.
Always consult your doctor after a suspected concussion.

Return to school
Concussion may impact on the child's cognitive ability to learn at school. This must be considered, and medical clearance is required before the child may return to school. It is reasonable for a child to miss a day or two of school after concussion, but extended absence is uncommon. In some children, a graduated return to school program will need to be developed for the child. The child will progress through the return to school program provided there is no worsening of symptoms. If any particular activity worsens symptoms, the child will remain from that activity until it no longer causes symptoms worsening. Use of computers and internet should follow a similar graduated program, provided that it does not worsen symptoms. This program should include communication between the parents, teachers, and health professionals and will vary from child to child. The return to school program should consider:
- Extra time to complete assignments/tests
- Quiet room to complete assignments/tests
- Avoidance of noisy areas such as cafeterias, assembly halls, sporting events, music class, shop class, etc.
- Frequent breaks during class, homework, tests
- No more than one exam/day
- Shorter assignments
- Repetition/review
- Use of peer helper/tutor
- Reassurance from teachers that student will be supported through recovery through accommodations, work load reduction, alternate forms of testing
- Later start times, half days, or certain classes

CONCUSSION INJURY ADVICE FOR THE CHILD AND PARENTS/CARERS

To be given to the person monitoring the concussed child

This child has received an injury to the head. A careful medical examination has been carried out and no signs of any serious complications has been found. It is expected that recovery will be rapid, but the child should have monitoring 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 transport the child to hospital immediately.

Other important points:
- Following concussion, the child should rest for at least 24 hours.
- The child should avoid any computer, internet or electronic gaming activity if these activities make symptoms worse.
- The child should not be given any medications, including pain killers, unless prescribed by a medical practitioner.
- The child must not return to school until medically cleared.
- The child must not return to sport or play until medically cleared.

Clinic phone number

Patient’s name
Date/time of injury
Date/time of medical review
Treatin physician

Tipsheet / List of Tools

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Tool 0.4a: Parachute After a Concussion Guidelines for Return to Play

Guidelines for Diagnosing and Managing Pediatric Concussion

After a Concussion Guidelines for

RETURN TO PLAY

A CONCUSSION is a serious event, but you can recover fully from such an injury if the brain is given enough time to rest and recuperate. Returning to normal activities, including sport participation, is a step-wise process that requires patience, attention, and caution.

Each step must take a minimum of one day but could last longer, depending on the player and his or her specific situation.

STEP 1: No activity, only complete rest.
Limit school, work and tasks requiring concentration. Refrain from physical activity until symptoms are gone. Once symptoms are gone, a physician, preferably one with experience managing concussions, should be consulted before beginning a step-wise return to play process.

STEP 2: Light aerobic exercise.
Activities such as walking or stationary cycling. The player should be supervised by someone who can help monitor for symptoms and signs. No resistance training or weight lifting. The duration and intensity of the aerobic exercise can be gradually increased over time if no symptoms or signs return during the exercise or the next day.

Symptoms? Return to rest until symptoms have resolved. If symptoms persist, consult a physician.
No symptoms? Proceed to Step 3 the next day.

STEP 3: Sport specific activities.
Activities such as skating or throwing can begin at step 3. There should be no body contact or other jarring motions such as high speed stops or hitting a baseball with a bat.

Symptoms? Return to rest until symptoms have resolved. If symptoms persist, consult a physician.
No symptoms? Proceed to Step 4 the next day.

STEP 4: Begin Drills without body contact.
Symptoms? Return to rest until symptoms have resolved.
If symptoms persist, consult a physician.
No symptoms? The time needed to progress from non-contact exercise will vary with the severity of the concussion and with the player. Proceed to Step 5 only after medical clearance.

STEP 5: Begin drills with body contact.
Symptoms? Return to rest until symptoms have resolved.
If symptoms persist, consult a physician.
No symptoms? Proceed to Step 6 the next day.

STEP 6: Game play.

Parachute is bringing awareness to preventable injury and helping Canadians reduce their risk of injury and enjoy their lives in the fullest.

www.parachuteCanada.org

Tipsheet / List of Tools
RETURN TO PLAY GUIDELINES

NEVER RETURN TO PLAY IF YOU STILL HAVE SYMPTOMS!

A player who returns to active play before full recovery from the first concussion is at high risk of sustaining another concussion, with symptoms that may be increased and prolonged.

HOW LONG DOES THIS PROCESS TAKE?

These steps do not correspond to days! It may take many days to progress through one step, especially if the concussion is severe. As soon as symptoms appear, the player should return to rest until symptoms have resolved and wait at least one more day before attempting any activity.

The only way to heal a brain is to rest it.

HOW DO I FIND THE RIGHT DOCTOR?

When dealing with concussions, it is important to see a doctor who is knowledgeable in concussion management. This might include your physician or someone such as a sports medicine specialist. Your family doctor maybe required to submit a referral to see a specialist. Contact the Canadian Academy of Sport and Exercise Medicine (CASEM) to find a sports medical physician in your area. Visit www.casm-acms.org for more information. You can also refer your doctor to parachutecanada.org for more information.

WHO DO THESE GUIDELINES APPLY TO?

These guidelines were developed for children over the age of 10; those younger may require special guidelines, and more conservative treatment and care. Return to Play Guidelines should be at the discretion of the physician.

WHAT IF MY SYMPTOMS RETURN DURING THIS PROCESS?

Sometimes these steps can cause symptoms of a concussion to return. This means that the brain has not yet healed, and needs more rest. If any signs or symptoms return during the Return To Play process, they should stop the activity and rest until symptoms have resolved. The player must be re-evaluated by a physician before trying any activity again. Remember, symptoms may return later that day or the next, not necessarily during the activity!
Tool 0.4b: CanChild Return to Activity Guidelines for Children and Youth

Guidelines for Diagnosing and Managing Pediatric Concussion

Return to Activity Guidelines for Children & Youth

A concussion is a brain injury and must be taken seriously!

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Tool 0.4b: CanChild Return to Activity Guidelines for Children and Youth

Guidelines for Diagnosing and Managing Pediatric Concussion

Return to Activity Guidelines

These guidelines should be followed in discussion with a physician or brain injury clinician.

STEP 1: No Activity and Complete Rest
- NO physical activity or symptomatic
- Which symptom group are you in: BLUE, PURPLE, or GREEN? ➔

*Get clearance from a physician or brain injury clinician before beginning STEP 2.

STEP 2: Light Exercise
- NO resistance training or weight lifting
- 10-15 minutes light exercise, maximum twice a day e.g., walking, stationary cycling, light jogging, freestyle swimming

STEP 3: Individual Sport-Specific Activity
- NO body to head contact, spins, dives, jumps, high-speed slides, hitting a baseball with a bat, or other jointing motions
- 20-30 minutes general conditioning, maximum twice a day e.g., skating, running, throwing

STEP 4: Sport-Specific Practice with Team, NO CONTACT
- NO dribbling, passing the ball, blocking, and loneliness
- Begin activities with one other teammate and then by the end of this step progress to full team practice with NO contact e.g., ball drills, skating/ground drills, or other non-contact activities
- Begin resistance training and beginning level of sport-specific skills. Increase skill level over time.

*Get clearance from a physician or brain injury clinician before beginning STEPS 5 and 6.

STEP 5: Sport-Specific Practice with Team and CONTACT
- Participate in normal training activities. If symptoms return, you are ready to return to competition!

STEP 6: Return to Activity, Sport or Game Play

Which group are you in?

Choose your symptom group and follow the instructions below.

<table>
<thead>
<tr>
<th>SYMPTOM FREE WITHIN 1 WEEK</th>
<th>SYMPTOM FREE WITHIN 1 - 4 WEEKS</th>
<th>SYMPTOMATIC FOR MORE THAN 4 WEEKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rest for 1 more week after symptom free</td>
<td>Rest for 1 more week after symptom free</td>
<td>Begin STEP 2</td>
</tr>
<tr>
<td>Begin STEP 2</td>
<td>Begin STEP 2</td>
<td>Begin STEP 2</td>
</tr>
<tr>
<td>Take at least 24 hours for each step as you complete the rest of the guidelines</td>
<td>Take at least 1 week for each step as you complete the rest of the guidelines</td>
<td>Take at least 1 week for each step as you complete the rest of the guidelines</td>
</tr>
</tbody>
</table>

If symptoms return, rest for at least 24 hours and then go back to the previous step.

Overriding Recommendations for Return to Contact Sport

- If positive neuroimaging findings ➔ Take at least 3 months off from contact sport
- If 2 concussions in 3 months ➔ Take 6 months off from the time of the most recent injury
- If 0 or more concussions in 1 year ➔ Take 1 year off from the time of the most recent injury
- Discourage return from sport after 3 or more concussions, especially if symptoms are prolonged and affecting performance

But continue to exercise!

Also see the McMaster Return to School Guidelines

Concussion Facts

The biggest risk is going back to play before the brain heals and getting another concussion!

Higher risk of prolonged recovery with:
- Multiple concussions
- History of learning or behaviour problems
- History of migraines
- Symptoms of amnesia, fogliness or dizziness

Percentage of children who are symptom free is:
- 15 days: 25%
- 26 days: 50%
- 43 days: 75%
- 92 days: 90%

When they’re okay, return to play

When in doubt, sit them out

For more information, please visit www.canchild.ca

CONCLUSION

A concussion, also known as a mild traumatic brain injury (mTBI), changes the way the brain functions. An mTBI can be caused by a direct or indirect hit, blow or force to the head or body.

SYMPTOMS OF CONCUSSION

- Sleep disturbances or drowsiness
- Headache
- Nausea and vomiting
- Poor balance or coordination
- Dizziness
- Visual problems
- Sensitivity to light or noise
- Mentally foggy
- Difficulty concentrating/ remembering
- Irritability
- Sadness
- Nervousness

Symptoms should be evaluated daily to slow healing and recovery.

RED FLAG SYMPTOMS

If any of the following symptoms develop, go to the emergency department/seek further investigation immediately.
- Increased drowsiness or cannot be awakened
- Headaches worsen or neck pain
- Persistent vomiting
- Pupils are unequal in size
- Seizures
- Confusion or short-term memory loss
- Blurred/double vision, slurred speech or loss of motor function
- Change in behaviour (irritability, agitation or aggression)

Tipsheet / List of Tools
### Tool 0.5a: ACE Post-Concussion Gradual Return to School

**Guidelines for Diagnosing and Managing Pediatric Concussion**

#### ACE Post-Concussion Gradual Return to School

<table>
<thead>
<tr>
<th>Stage</th>
<th>Description</th>
<th>Activity Level</th>
<th>Criteria to Move to Next Stage</th>
<th>Date Criteria Met</th>
</tr>
</thead>
</table>
| 0     | No return, at home | **Day 1 - Maintain low level cognitive and physical activity. No prolonged concentration.**  
Cognitive Readiness Challenge: As symptoms improve, try reading or math challenge task for 10-30 minutes; assess for symptom increase. | To Move To Stage 1:  
(1) Student can sustain concentration for 30 minutes before significant symptom exacerbation,  
AND  
(2) Symptoms reduce or disappear with cognitive rest breaks* allowing return to activity. |                      |
| 1     | Return to School, Partial Day (1-3 hours) | Attend 1-3 classes, intersperse rest breaks.  
No tests or homework.  
Minimal expectations for productivity. | To Move To Stage 2:  
Symptom status improving, tolerates 4-6 hours of activity; 2-3 cognitive rest breaks built into school day. |                      |
| 2     | Full Day, Maximal Supports (required throughout day) | Attend most classes, with 2-3 rest breaks (20-30'), no tests.  
Minimal HW (< 80').  
Minimal-moderate expectations for productivity. | To Move To Stage 3:  
Symptom number & severity improving, needs 1-2 cognitive rest breaks built into school day. |                      |
| 3     | Return to Full Day, Moderate Supports (provided in response to symptoms during day) | Attend all classes with 1-2 rest breaks (20-30'); begin quizzes.  
Moderate HW (60-80')  
Moderate expectations for productivity.  
Design schedule for make-up work. | To Move To Stage 4:  
Continued symptom improvement, needs no more than 1 cognitive rest break per day |                      |
| 4     | Return to Full Day, Minimal Supports (Monitor final recovery) | Attend all classes with 0-1 rest breaks (20-30'); begin modified tests (breaks, extra time).  
HW (90'-)  
Moderate-moderate expectations for productivity. | To Move To Stage 5:  
No active symptoms, no exertional effects across the full school day. |                      |
| 5     | Full Return, No Supports Needed | Full class schedule, no rest breaks.  
Max. expectations for productivity.  
Begin to address make-up work. | N/A |                      |

*Cognitive rest break: a period during which the student refrains from academic or other cognitively demanding activities, including schoolwork, reading, TV/games, conversation. May involve a short nap or relaxation with eyes closed in a quiet setting.

G. Gioia (v1.2014)

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Tool 0.5b: CanChild Return to School Guidelines for Children and Youth

CONCUSSION MANAGEMENT

Return to School Guidelines for Children & Youth

A concussion is a brain injury and must be taken seriously!

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Tool 0.5b: CanChild Return to School Guidelines for Children and Youth

Guidelines for Diagnosing and Managing Pediatric Concussion

Return to School Guidelines

These stages are designed to strike a balance between the importance of returning to school and brain recovery. Work with your school to put these recommendations into place.

STAGE 1: Brain Rest - NO SCHOOL
- No school for at least one week
- Lots of cognitive rest (NO TV, video games, testing, reading)
- When symptom free, move to STAGE 2
- If symptoms persist past 2 weeks, move to STAGE 2

STAGE 2: Getting Ready to Go Back
- Begin gentle activity guided by symptoms (walking, 15 minutes of screen time twice daily, begin reading)
- When symptom free, move to STAGE 3
- If symptoms persist, stay in this stage for a maximum of 2 weeks and discuss moving to STAGE 3 with your physician or brain injury clinician

STAGE 3: Back to School/Modified Academics
- This stage may last for days or months depending on rate of recovery
- Go to bed early and get lots of sleep. Have a quiet restful space in school
- Academic Modifications:
  - Timetables/attendance: Start by going for one hour, half days, or every other day
  - Curriculum: Attend less stressful classes, no tests, homework in 15 minute blocks up to a maximum of 45 minutes daily
  - Environment: Preferential seating, avoid music classes, gym classes, cafeteria, baking the bus, carrying heavy books
  - Activities: Limitscreen/time into 15 minute blocks for up to 1 hour daily
- When symptom free, move to STAGE 4
- If symptoms persist past 4 weeks — A recovery individualized Education Plan (IEP) may be needed

STAGE 4: Nearly Normal Routines
- Back to full days of school, but can do less than 5 days a week if needed
- Complete as much homework as possible and a maximum of 1 test per week
- When symptom free, move to STAGE 5

STAGE 5: Fully Back to School
- Gradual return to normal routines including attendance, homework, tests and extracurricular activities

Concussion Facts

The biggest risk is going back to play before the brain heals and getting another concussion!

Percentage of children who are symptom free in:
- 15 days: 25%
- 26 days: 50%
- 45 days: 75%
- 92 days: 90%

Higher risk of prolonged recovery with:
- Multiple concussions
- History of learning or behaviour problems
- History of migraines
- Symptoms of amnesia, fogginess or dizziness

When they're okay return to play

Concussion: A concussion, also known as a mild traumatic brain injury (MTBI), changes the way the brain functions. An MTBI can be caused by a direct or indirect hit, blow or force to the head or body.

Symptoms of concussion:
- Sleep disturbances or drowsiness
- Headache
- Nausea and vomiting
- Poor balance or coordination
- Dizziness
- Visual problems
- Sensitivity to light or noise
- Mentally blurry
- Difficulty concentrating/ remembering
- Irritability
- Sadness
- Nervousness

Symptoms should be evaluated daily to show healing and recovery

Red flag symptoms:
If any of the following symptoms develop, go to the emergency department/seek further investigation immediately:
- Increased drowsiness or cannot be awakened
- Headaches worsen or neck pain
- Persistent vomiting
- Faints are unique in size
- Seizures
- Confusion or short-term memory loss
- Blurred/handicap vision, slurred speech or loss of motor function
- Change in behaviour (irritability, agitation or aggression)

Tipsheet / List of Tools
### Activity Suggestions for Recovery Stages After Concussion

<table>
<thead>
<tr>
<th>Toddler (0-4)</th>
<th>Child (5-10)</th>
<th>Stage 1 - Rest</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Crafts: colouring, drawing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Nap in favourite spot</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Parents can read stories</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Watch fish in an aquarium</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stage 2 - Light Activity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Bird watching</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Crafts: painting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Play in the Sand</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Play blocks, dolls, cars or small toys</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Supervised walking or crawling</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Stage 3 – Sport-specific Activity |
|   - Crawling |
|   - Walking |

| Stage 4 - Non-Contact Practice |
|   - Dance lessons |
|   - Swim lessons |

| Stage 1 - Rest |
|   - Basic board games (i.e. not monopoly) |
|   - Crafts: making bracelets, necklaces |
|   - Light gardening |
|   - Singing |
|   - Stargazing |
|   - Talk on phone |
|   - Talk to friends/family |

| Stage 2 - Light Activity |
|   - Challenging board games |
|   - Helping cook and bake |
|   - Listen to quiet music (no head phones) |
|   - Magazines |
|   - Puzzles |
|   - Billiards |
|   - Bocce ball/ Lawn bowling |
|   - Croquette |
|   - Fishing |
|   - Flying kites |
|   - Freestyle swimming |
|   - Frisbee |
|   - Helping cook and bake |
|   - Light jogging |
|   - Playing Catch |
|   - Walking |

| Stage 3 – Sport-Specific Activity |
|   - Ipod applications (no gaming) |
|   - Word searches |
|   - Air hockey or foosball |
|   - Biking |
|   - Dribbling, keep-ups and stick handling |
|   - Golf |
|   - Light badminton |
|   - Ping pong |
|   - Skating |
|   - Sprinklers and splash pads |
|   - Tag |
|   - Tai chikarate (non-contact) |
|   - Wii or Xbox Kinect games |

| Stage 4 – Non-contact Practice |
|   - Baseball/cricket |
|   - Basketball |
|   - Dance |
|   - Field hockey |
|   - Figure skating (no jumps) |
|   - Hockey drills |
|   - Soccer without heading |
|   - Slide and swing at playground |
|   - Squash |
|   - Tennis |
|   - Volleyball (no diving) |

**WARNING:** Perform activities ONLY if symptom free. If the symptoms appear during activity, STOP immediately.

## Tool 0.6: CanChild Activity Suggestions for Recovery Stages After Concussion

**Guidelines for Diagnosing and Managing Pediatric Concussion**

### Activity Suggestions for Recovery Stages After Concussion

#### Teenager (11+)

<table>
<thead>
<tr>
<th>Stage 1 - Rest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cellphone (no texting only calling)</td>
</tr>
<tr>
<td>Crafts: molding clay</td>
</tr>
<tr>
<td>Friends visit (one at a time)</td>
</tr>
<tr>
<td>Knitting and quilting</td>
</tr>
<tr>
<td>Listen to Audiobooks</td>
</tr>
<tr>
<td>Meditation</td>
</tr>
<tr>
<td>Nap</td>
</tr>
<tr>
<td>Photography</td>
</tr>
<tr>
<td>Scrapbooking</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Stage 2 – Light Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooking and baking</td>
</tr>
<tr>
<td>Crafts: origami, sculpting</td>
</tr>
<tr>
<td>Go to the beach</td>
</tr>
<tr>
<td>Listen to quiet music (no headphones)</td>
</tr>
<tr>
<td>Magazines</td>
</tr>
<tr>
<td>Poetry</td>
</tr>
<tr>
<td>Puzzles</td>
</tr>
<tr>
<td>Re-read familiar books</td>
</tr>
<tr>
<td>Archery</td>
</tr>
<tr>
<td>Billiards</td>
</tr>
<tr>
<td>Camping</td>
</tr>
<tr>
<td>Croquette</td>
</tr>
<tr>
<td>Darts</td>
</tr>
<tr>
<td>Fishing</td>
</tr>
<tr>
<td>Freestyle Swimming</td>
</tr>
<tr>
<td>Lawn bowling</td>
</tr>
<tr>
<td>Light Jogging</td>
</tr>
<tr>
<td>Playing catch</td>
</tr>
<tr>
<td>Stationary cycling</td>
</tr>
<tr>
<td>Walking</td>
</tr>
<tr>
<td>Yoga (no hot yoga)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Stage 3 - Sport-specific Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crosswords</td>
</tr>
<tr>
<td>Shopping at mall</td>
</tr>
<tr>
<td>Sudoku</td>
</tr>
<tr>
<td>Air hockey or foosball</td>
</tr>
<tr>
<td>Biking</td>
</tr>
<tr>
<td>Calisthenics (stability exercises)</td>
</tr>
<tr>
<td>Curling</td>
</tr>
<tr>
<td>Dribbling, keep-ups and stickhandling</td>
</tr>
<tr>
<td>Golf</td>
</tr>
<tr>
<td>Hiking/orienteering</td>
</tr>
<tr>
<td>Light badminton</td>
</tr>
<tr>
<td>Ping Pong</td>
</tr>
<tr>
<td>Running</td>
</tr>
<tr>
<td>Skating</td>
</tr>
<tr>
<td>Snorkeling</td>
</tr>
<tr>
<td>Tai chi/Karate</td>
</tr>
<tr>
<td>Wii or Xbox Kinect games</td>
</tr>
<tr>
<td>Volleyball (keep ups)</td>
</tr>
<tr>
<td>Windsurfing</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Stage 4 - Non-contact Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aerobics and plyometrics</td>
</tr>
<tr>
<td>Baseball/Cricket</td>
</tr>
<tr>
<td>Basketball</td>
</tr>
<tr>
<td>Canoeing/kayaking</td>
</tr>
<tr>
<td>Dance and Cheer (no stunts)</td>
</tr>
<tr>
<td>Figure Skating (no jumping)</td>
</tr>
<tr>
<td>Football Drills</td>
</tr>
<tr>
<td>Hockey Drills</td>
</tr>
<tr>
<td>Light Weight Training</td>
</tr>
<tr>
<td>Mountain/rock climbing</td>
</tr>
<tr>
<td>Non-Contact Soccer (no heading)</td>
</tr>
<tr>
<td>Pilates</td>
</tr>
<tr>
<td>Shadow boxing</td>
</tr>
<tr>
<td>Squash or Tennis</td>
</tr>
<tr>
<td>Track and Field</td>
</tr>
<tr>
<td>Volleyball (no diving)</td>
</tr>
</tbody>
</table>

**WARNING:** Preform activities ONLY if symptom free. If the symptoms appear during activity, STOP immediately.

Use suggestions in conjunction with CanChild concussion guidelines available at:


Reproduced with permission from CanChild.
Tool 1.1: SCAT3 Sport Concussion Assessment Tool for Athletes aged 13+

Guidelines for Diagnosing and Managing Pediatric Concussion

Tool 1.1: SCAT3 Sport Concussion Assessment Tool for Athletes aged 13+

What is the SCAT3?

The SCAT3 is a standardized tool for evaluating injured athletes for concussion and can be used in athletes aged 13 years and older. It supersedes the original SCAT and the SCAT2 published in 2005 and 2009, respectively. For younger persons, ages 12 and under, please use the Child SCAT3. The SCAT3 is designed for use by medical professionals. If you are not qualified, please use the Sport Concussion Recognition Tool. Pre-season baseline testing with the SCAT3 can be helpful for interpreting post-injury test scores.

Specific instructions for use of the SCAT3 are provided on page 3. If you are not familiar with the SCAT3, please read through these instructions carefully. This tool may be freely copied in its current form for distribution to individuals, teams, groups and organizations. Any revision or any reproduction in digital form requires approval by the Concussion in Sport Group.

NOTE: The diagnosis of a concussion is a clinical judgment, ideally made by a medical professional. The SCAT3 should not be used solely to make, or exclude, the diagnosis of concussion in the absence of clinical judgement. An athlete may have a concussion even if their SCAT3 is “normal”.

What is a concussion?

A concussion is a disturbance in brain function caused by a direct or indirect force to the head. It results in a variety of non-specific signs and/or symptoms (some examples listed below) and most often does not involve loss of consciousness. Concussion should be suspected in the presence of any one or more of the following:
- Symptoms (e.g., headache), or
- Physical signs (e.g., unsteadiness), or
- Impaired brain function (e.g. confusion) or
- Abnormal behaviour (e.g., change in personality).

SIDELINE ASSESSMENT

Indications for Emergency Management

NOTE: A hit to the head can sometimes be associated with a more serious brain injury. Any of the following warrants consideration of actualizing emergency procedures and urgent transportation to the nearest hospital:
- Glasgow Coma score less than 15
- Deteriorating mental status
- Potential spinal injury
- Progressive, worrisome symptoms or new neurologic signs

Potential signs of concussion?

If any of the following signs are observed after a direct or indirect blow to the head, the athlete should stop participation, be evaluated by a medical professional and should not be permitted to return to sport the same day if a concussion is suspected.

Any loss of consciousness?
- “If so, how long?”
- Balance or motor incoordination (stumbles, slow/abnormal movements, etc.)
- Disorientation or confusion (ability to respond appropriately to questions)
- Loss of memory:
  - “If so, how long?”
  - Blank or vacant look
  - Visible facial injury in combination with any of the above

Glasgow Coma scale (GCS)

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
- Incomprehensible sounds
- Inappropriate words
- Confused
- Oriented

Best motor response (M)
- No motor response
- Extension to pain
- Abnormal flexion to pain
- Flexion/Withdrawal to pain
- Localizes to pain
- Obey's commands

Glasgow Coma score (E + V + M) of 15

Maddocks Score:

“I am going to ask you a few questions, please listen carefully and give your best effort.”

Modified Maddocks questions (1 point for each correct answer)

What venue are we at today? 0 1
Which half is it now? 0 1
Who scored last in this match? 0 1
What team did you play last week/game? 0 1
Did your team win the last game? 0 1

Maddocks score of 5

Maddocks score is validated for sideline diagnosis of concussion only and is not used for serial testing.

Notes: Mechanism of injury (“tell me what happened?”):

Any athlete with a suspected concussion should be REMOVED FROM PLAY, medically assessed, monitored for deterioration (i.e., should not be left alone) and should not drive a motor vehicle until cleared to do so by a medical professional. No athlete diagnosed with concussion should be returned to sports participation on the day of injury.

Tipsheet / List of Tools
Tool 1.1: SCAT3 Sport Concussion Assessment Tool for Athletes aged 13+

Guidelines for Diagnosing and Managing Pediatric Concussion

SCAT3 to be done in resting state. Best done 10 or more minutes post exercise.

**SYMPTOM EVALUATION**

**How do you feel?**

"You should score yourself on the following symptoms, based on how you feel now."

<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 like &quot;in a fog&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>Loss of awareness</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>
<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>
</tbody>
</table>

**Total number of symptoms (Maximum possible 12)**

**Symptom severity score (Maximum possible 10)**

Do the symptoms get worse with physical activity? Y N
Do the symptoms get worse with mental activity? Y N

**Overall rating:** If you know the athlete well prior to the injury, how different is the athlete acting compared to how he/she/they usually act? Y N

**SAC Delayed Recall**

Delayed recall score

---

Tipsheet / List of Tools
Tool 1.1: SCAT3 Sport Concussion Assessment Tool for Athletes aged 13+
Guidelines for Diagnosing and Managing Pediatric Concussion

INSTRUCTIONS

Words in italics throughout the SCAT3 are the instructions given to the athlete by the tester.

Symptom Scale

"You should check yourself on the following symptoms, based on how you feel now."

To be completed by the athlete, in situations where the symptom scale is being completed post-exercise, it should still be done in a resting state, at least 15 minutes post exercise.

For total number of symptoms, maximum possible is 22.
For Symptom severity score, add all scores in table, maximum possible 22 to 132.

SAC4

Immediate Memory

"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.

Trials 2 & 3:"

"I am going to test your ability to recall a string of digits. I will read the digits at a rate of one per second. Do not repeat back what you hear, if you want to record the digits."

Concentration

Digits backward

"I am going to read you a string of numbers and when I am done, you repeat them back to me backwards, in reverse order of how I read them to you. For example, if I say 7-3-9, you would say 9-7-3."

If correct, stop at next string length. If incorrect, read trial 2. Point one correct for each string length. Stop after incorrect on both trials. The digits should be read at the rate of one digit per second.

Balance Examination

Balance testing – types of errors

1. Hands lifted off flat creast
2. Opening eyes
3. Step, stumble, or fall
4. Moving hip into >30 degrees abduction
5. Lifting forefoot or heel
6. Remaining out of test position for >5 sec

Each of the 20-second trials is scored by counting the errors, or deviations from the proper stance, accumulated by the athlete. The examiner will begin counting errors only after the individual has assumed the proper start position. The modified BESS is calculated by adding one error point for each error during the three 20-second tests. The maximum total number of errors for any single condition is 10. If a 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 index is set. Subjects that are unable to maintain the testing procedure for a minimum of five seconds at the start are assigned the highest possible scores, ten, for that testing condition.

OPTION: For further assessment, the same 3 trials can be performed on a surface of medium-diameter foam (e.g., approximately 50cm x 40cm x 6cm).

Tandem Gait5

Participants are instructed to stand with their feet together behind a starting line (the test is best done with footwear removed). They then walk in a forward direction as quickly and as accurately as possible along a 3-meter wide (sports turf), 5 meter line with an alternating foot first-to-ear-then-ear gait ensuring that they approximate their heel and toe on each step. Once they cross the 3-meter line, the examiner adds 15 degrees and returns to the starting position using the same gait. A total of 4 trials are done and the best time is retained. Athletes should complete the test in 34 seconds. Athletes fail the test if they step off the line, have a separation between their heel and toe, or if they touch or grab the examiner or an object. In this case, the time is not recorded and the test repeated, if appropriate.

Coordination Examination

Upper limb coordination

Finger-to-nose (FNT) task

"I am going to test your coordination now. Please sit comfortably on the chair with your eyes open and your arm (other arm or both arms) hinged at 90 degrees and fingers extended (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 five successive finger-to-nose repetitions, using your index finger to touch the tip of your nose, and then return to the starting position, as quickly and as accurately as possible."
Tool 2.1: Management of Acute Symptoms Algorithm

Complete pre-injury history, physical examination and psychosocial evaluation

Clarify the symptoms: somatic, cognitive, behavioural (see Sidebar)

Evaluate and treat potential contributing factors (such as current medical conditions, mental health difficulties and associated injuries)

Provide early interventions

Determine treatment plan

Sidebar: Symptom Attributes
- Duration
- Onset and triggers
- Location
- Previous episodes
- Intensity and impact
- Previous treatment and response
- Patient’s perception of symptom
- Impact on functioning

Recommendation 3.1: Provide verbal information and written handouts

Recommendation 4.1: Is the child/adolescent following a stepwise return-to-learn plan?

No

Start symptom-based treatment (pharmacotherapy, psycho-therapy, physiotherapy, occupational therapy)

Follow up and reassess at one month

Yes

Recommendation 2.1: Assess and treat any physical, cognitive and neurological deficits

Recommendation 2.2: Determine the need for CT imaging

Recommendation 2.3: Consider admission or prolonged observation if the child/adolescent shows “red flag” symptoms

Recommendation 2.4: Treat any headaches

Recommendation 2.5: Prescribe physical and cognitive rest

Follow up as needed and encourage return to daily activity:
- Recommendation 4.2: return to learn
- Recommendation 4.3: further assessment
- Recommendation 4.4: return to play

Adapted from Department of Veterans Affairs, Department of Defense. VA/DoD clinical practice guideline for management of concussion/mild traumatic brain injury (mTBI). Washington (DC): Department of Veteran Affairs, Department of Defense; 2009 Apr. 112 p.
Tool 2.2: Acute Concussion Evaluation (ACE)

**Guidelines for Diagnosing and Managing Pediatric Concussion**

### A. Injury Characteristics

Date/Time of Injury: 

**Reported:** __Patient__ __Parent__ __Spouse__ __Other__

1. Injury Description

- Is there evidence of a forceful blow to the head (direct or indirect)? __Yes__ __No__ __Unknown__
- Is there evidence of intracranial injury or skull fracture? __Yes__ __No__ __Unknown__
- Location of Impact: Frontal __Lft Temporal __Rt Temporal __Lft Parietal __Rt Parietal __Occipital __Neck __Indirect Force __Other__

2. Cause: __MVC__ __Pedestrian-MVC__ __Fall__ __Assault__ __Sports (specify)__ __Other__

3. Amnesia Before (Retrolgrade) Are there any events just BEFORE the injury that your person has no memory of (even brief)? __Yes__ __No__ __Duration__

4. Amnesia After (Anterograde) Are there any events just AFTER the injury that your person has no memory of (even brief)? __Yes__ __No__ __Duration__

5. Loss of Consciousness: Did your person lose consciousness? __Yes__ __No__ __Duration__

6. Early Signs: __Appears dazed or stunned__ __Is confused about events__ __Answers questions slowly__ __Repeats Questions__ __Forgetful (recent info)__

7. Seizures: Were seizures observed? __No__ __Yes__ __Detail__

### B. Symptom Check List

*Since the injury, has the person experienced any of these symptoms any more than usual today or in the past day? Indicate presence of each symptom (0=No, 1=Yes).*

<table>
<thead>
<tr>
<th><strong>PHYSICAL (10)</strong></th>
<th><strong>COGNITIVE (4)</strong></th>
<th><strong>SLEEP (4)</strong></th>
<th><strong>SLEEP Total (0-4)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Headache</td>
<td>0 1</td>
<td>Feeling mentally foggy</td>
<td>0 1</td>
</tr>
<tr>
<td>Nausea</td>
<td>0 1</td>
<td>Feeling slowed down</td>
<td>0 1</td>
</tr>
<tr>
<td>Vomiting</td>
<td>0 1</td>
<td>Difficulty concentrating</td>
<td>0 1</td>
</tr>
<tr>
<td>Balance problems</td>
<td>0 1</td>
<td>Difficulty remembering</td>
<td>0 1</td>
</tr>
<tr>
<td>Dizziness</td>
<td>0 1</td>
<td>COGNITIVE Total (0-4)</td>
<td>0 1</td>
</tr>
<tr>
<td>Visual problems</td>
<td>0 1</td>
<td>EMOTIONAL (4)</td>
<td>0 1</td>
</tr>
<tr>
<td>Fatigue</td>
<td>0 1</td>
<td>Irritability</td>
<td>0 1</td>
</tr>
<tr>
<td>Sensitivity to light</td>
<td>0 1</td>
<td>Sadness</td>
<td>0 1</td>
</tr>
<tr>
<td>Sensitivity to noise</td>
<td>0 1</td>
<td>More emotional</td>
<td>0 1</td>
</tr>
<tr>
<td>Numbness/Tingling</td>
<td>0 1</td>
<td>Nervousness</td>
<td>0 1</td>
</tr>
<tr>
<td><strong>PHYSICAL Total (0-10)</strong></td>
<td><strong>EMOTIONAL Total (0-4)</strong></td>
<td><strong>(Add Physical, Cognitive, Emotional, Sleep totals)</strong></td>
<td><strong>Total Symptom Score (0-25)</strong></td>
</tr>
</tbody>
</table>

### C. Risk Factors for Protracted Recovery

- Concussion History? Y ____ N __
- Headache History? Y ____ N __
- Developmental History? Y ____ N __
- Psychiatric History? Y ____ N __

- Previous # 1 2 3 4 5 6+
- Days __ Weeks __ Months __ Years __
- Prior treatment for headache
- History of migraine headache __ Personal__ __Family__
- Appearance-Deficit/ Hyperactivity Disorder __ Attention Deficit/Hyperactivity Disorder__
- Sleep disorder __ Other development disorder__
- Other psychiatric disorder __ Other psychiatric disorder__

List other comorbid medical disorders or medication usage (e.g., hypothyroidism, seizures).

### D. Red Flags for Acute Emergency Management

- Seizures
- Disorientation
- Impaired consciousness
- Focal neurologic signs or weakness
- *Unstable condition requiring ED evaluation*

### E. Diagnosis (ICD):

- __Concussion w/o LOC 850.0__ __Concussion w/ LOC 850.1__ __Concussion (Unspecified) 850.9__ __Other (854)__
- __No diagnosis__

### F. Follow-Up Action Plan

Complete ACE Care Plan and provide copy to patient/family.

- __No Follow-Up Needed__
- __Physician/Clinician Office Monitoring: Date of next follow-up__

- __Referral:
  - Neuropsychological Testing
  - Physician: Neurology __Neurosurgery__ __Sports Medicine__ __Physiatrist__ __Psychiatrist__ __Other__
  - Emergency Department__

ACE Completed by: ____________________________

*This form is part of the "Head Up: Brain Injury in Your Practice" tool kit developed by the Centers for Disease Control and Prevention (CDC).*
Tool 2.2: Acute Concussion Evaluation (ACE)

Guidelines for Diagnosing and Managing Pediatric Concussion

A concussion (or mild traumatic brain injury (MTBI)) is a complex pathophysiologic process affecting the brain, induced by traumatic biomechanical forces secondary to direct or indirect forces to the head. Disturbance of brain function is related to neuroendocrine dysfunction, rather than structural injury, and is typically associated with normal structural neuroimaging findings (i.e., CT scan, MRI). Concussion may or may not involve a loss of consciousness (LOC). Concussion results in a constellation of physical, cognitive, emotional, and sleep-related symptoms. Symptoms may last from several minutes to days, weeks, months or even longer in some cases.

ACE Instructions

The ACE is intended to provide an evidence-based clinical protocol to conduct an initial evaluation and diagnosis of patients (both children and adults) with known or suspected MTBI. The research evidence documenting the importance of these components in the evaluation of an MTBI is provided in the reference list.

A. Injury Characteristics:

1. Obtain description of the injury – how injury occurred, type of force, location on the head or body (if force transmitted to head). Different biomechanics of injury may result in different symptom patterns (e.g., occipital blow may result in visual changes, balance difficulties).
2. Indicate the cause of injury. Greater forces associated with the trauma are likely to result in more severe presentation of symptoms.
3.4. Amnesia: Amnesia is defined as the failure to form new memories. Determine whether amnesia has occurred and attempt to determine length of time of memory dysfunction – before (retrograde) and after (anterograde) injury. Even seconds to minutes of memory loss can be predictive of outcome. Recent research has indicated that amnesia may be up to 4-10 times more predictive of symptoms and cognitive deficits following concussion than is LOC (less than 1 minute).
5. Loss of consciousness (LOC) – If occurs, determine length of LOC.
6. Early signs: Ask the individuals who know the patient (parent, spouse, friend, etc) about specific signs of the concussion that may have been observed. These signs are typically observed early after the injury.
7. Inquire whether seizures were observed or not.

B. Symptom Checklist

1. Ask patient (and/or parent, if child) to report presence of the four categories of symptoms since injury. It is important to assess all listed symptoms as different parts of the brain control different functions. One or all symptoms may be present depending upon mechanisms of injury. Record “1” for Yes or “0” for No for their presence or absence, respectively.
2. For all symptoms, indicate presence of symptoms experienced within the past 24 hours. Since symptoms can be present premorbidly at baseline (e.g., inattention, headaches, sleep, sadness), it is important to assess change from their usual presentation.
3. Scoring: Sum total number of symptoms present per area, and sum all four areas into Total Symptom Score (score range 0-22). (Note: most sleep symptoms are only applicable after a night has passed since the injury. Drowsiness may be present on the day of injury.) If symptoms are new and present, there is no lower limit symptom score. Any score > 0 indicates positive symptom history.
4. Exertion: Inquire whether any symptoms worsen with physical activity (e.g., running, climbing stairs, bike riding) and/or cognitive (e.g. academic studies, multi-tasking at work, reading or other tasks requiring focused concentration) exertion. Clinicians should be aware that symptoms will typically worsen or re-emerge with exertion, indicating incomplete recovery. Over-exertion may protract recovery.
5. Overall Rating: Determine how the person is acting from their usual self. Circle “0” (Normal) to “6” (Very Different).

C. Risk Factors for Protracted Recovery: Assess the following risk factors as possible complicating factors in the recovery process.

1. Concussion history: Assess the number and date(s) of prior concussions, the duration of symptoms for each injury, and whether less biomechanical forces resulted in mTBI. Research indicates that cognitive and symptom effects of concussion may be cumulative, especially if there is minimal duration of time between injuries and less biomechanical force results in subsequent concussion (which may indicate incomplete recovery from initial trauma).8,9
2. Headache history: Assess personal and/or family history of diagnosis/treatment for headaches. Research indicates headache (migraine in particular) can result in protracted recovery from concussion.8,9
3. Developmental history: Assess history of learning disabilities, Attention-Deficit/Hyperactivity Disorder or other developmental disorders. Research indicates that these are more common in those with a longer period of recovery with these conditions.10-13
4. Psychiatric history: Assess for history of depression/mood disorder, anxiety, and/or sleep disorder.7,14

D. Red Flags: The patient should be carefully observed over the first 24-48 hours for these serious signs. Red flags are to be assessed as possible signs of deteriorating neurological functioning. Any positive report should prompt strong consideration of referral for emergency medical evaluation (e.g. CT scan to rule out intracranial bleed or other structural pathology).14

E. Diagnosis: The following CDC diagnostic codes may be applicable.

850.0 (Concussion, with no loss of consciousness) – Positive injury description with evidence of forcible direct/indirect blow to the head (A1a); plus evidence of active symptoms (B) of any type and number related to the trauma (Total Symptom Score >0); no evidence of LOC (A5), skull fracture or intracranial injury (A1b).
850.1 (Concussion, with brief loss of consciousness < 1 hour) – Positive injury description with evidence of forcible direct/indirect blow to the head (A1a); plus evidence of active symptoms (B) of any type and number related to the trauma (Total Symptom Score >0); positive evidence of LOC (A5), skull fracture or intracranial injury (A1b).
850.9 (Concussion, unspecified) – Positive injury description with evidence of forcible direct/indirect blow to the head (A1a); plus evidence of active symptoms (B) of any type and number related to the trauma (Total Symptom Score >0); undetermined injury details; unclear evidence of LOC (A5), no skull fracture or intracranial injury.

Other Diagnoses – If the patient presents with a positive injury description and associated symptoms, but additional evidence of intracranial injury (A1b) such as from neuroimaging, a moderate TBI and the diagnostic category of IS4 (intracranial injury) should be considered.

F. Follow-Up Action Plan: Develop a follow-up plan of action for symptomatic patients. The physician/clinician may decide to (1) monitor the patient in the office or (2) refer them to a specialist. Serial evaluation of the concussion is critical as symptoms may resolve, worsen, or ebb and flow depending upon many factors (e.g., cognitive/physical exertion, comorbidities). Referral to a specialist can be particularly valuable to help manage certain aspects of the patient’s condition. (Physician/Clinician should also complete the ACE Care Plan included in this tool kit.)

1. Physician/Clinician serial monitoring – Particularly appropriate if number and severity of symptoms are steadily decreasing over time and/or fully resolve within 3-5 days. If steady reduction is not evident, referral to a specialist is warranted.
2. Referral to a specialist – Appropriate if symptom reduction is not evident in 3-5 days, or sooner if symptom profile is concerning in type/severity.
   - Neurocognitive Testing can provide valuable information to help assess a patient’s brain function and impairment and assist with treatment planning, such as return to play decisions.
   - Physical Evaluation is particularly relevant for medical evaluation and management of concussion. It is also critical for evaluating and managing focal neurologic, sensory, vestibular, and motor concerns. It may be useful for medication management (e.g., headaches, sleep disturbance, depression) if post-concussive problems persist.

Reproduced with permission from Gerard Gioia, PhD, et al.
### Tool 2.3: Modifiers for Concussion

#### Guidelines for Diagnosing and Managing Pediatric Concussion

**Tool 2.3: Modifiers for Concussion**

<table>
<thead>
<tr>
<th>Factors</th>
<th>Modifier</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Symptoms</strong></td>
<td>• Number</td>
</tr>
<tr>
<td></td>
<td>• Duration (more than 10 days)</td>
</tr>
<tr>
<td></td>
<td>• Severity</td>
</tr>
<tr>
<td><strong>Signs</strong></td>
<td>Prolonged loss of consciousness (more than 1 min), amnesia</td>
</tr>
<tr>
<td><strong>Sequelae</strong></td>
<td>Concussive convulsions</td>
</tr>
<tr>
<td><strong>Temporal</strong></td>
<td>• Frequency (repeated concussions over time)</td>
</tr>
<tr>
<td></td>
<td>• Timing (injuries close together in time)</td>
</tr>
<tr>
<td></td>
<td>• “Recency” (recent concussion/TBI)</td>
</tr>
<tr>
<td><strong>Threshold</strong></td>
<td>Repeated concussions with progressively less impact force or slower recovery after each successive concussion</td>
</tr>
<tr>
<td><strong>Co- and Pre-morbidities</strong></td>
<td>• Cervical strain/whiplash-associated disorder</td>
</tr>
<tr>
<td></td>
<td>• Chronic fatigue</td>
</tr>
<tr>
<td></td>
<td>• Chronic pain syndrome</td>
</tr>
<tr>
<td></td>
<td>• Depression or other mental health disorders</td>
</tr>
<tr>
<td></td>
<td>• Learning disabilities and attention-deficit hyperactive disorder</td>
</tr>
<tr>
<td></td>
<td>• Major depressive disorder</td>
</tr>
<tr>
<td></td>
<td>• Malingering</td>
</tr>
<tr>
<td></td>
<td>• Migraine</td>
</tr>
<tr>
<td></td>
<td>• Pain</td>
</tr>
<tr>
<td></td>
<td>• Post-traumatic headache</td>
</tr>
<tr>
<td></td>
<td>• Primary sleep disorder; for example, obstructive sleep apnea</td>
</tr>
<tr>
<td></td>
<td>• Somatoform disorder/factitious disorder</td>
</tr>
<tr>
<td></td>
<td>• Substance abuse or polypharmacy</td>
</tr>
<tr>
<td><strong>Medication</strong></td>
<td>Psychoactive drugs, anticoagulants</td>
</tr>
<tr>
<td><strong>Behaviour</strong></td>
<td>Dangerous style of play</td>
</tr>
<tr>
<td><strong>Sport</strong></td>
<td>• High-risk activity</td>
</tr>
<tr>
<td></td>
<td>• Contact and collision sport</td>
</tr>
<tr>
<td></td>
<td>• High sporting level</td>
</tr>
</tbody>
</table>

Reproduced with permission from BMJ Publishing Group Ltd.
Tool 2.4: Neurologic and Musculoskeletal Exam

Perform a neurologic exam and musculoskeletal exam including cervical spine examination:

- Examine the head/scalp for swelling, ecchymosis, tenderness, numbness or stepoffs.
- Look for battle sign, raccoon eyes, rhinorrhea, otorrhea, hemotympanum.
- Examine the cervical spine for range of motion and focal areas of tenderness, spasm, hypertonicity.
- Examine the temporo-mandibular joint (TMJ) for range of opening, tenderness, dislocation.
- Apply Recommendation 5.4c(i) on assessing for cognitive difficulties.
- Examine the cranial nerves for check for vision dysfunction:
  - cranial nerve 2 (assess visual fields to confrontation and symmetry and reactivity of pupils; ensure there is no optic edema);
  - cranial nerves 3, 4, 6 (check for abnormalities in eye movements, diplopia, nystagmus);
  - cranial nerve 7 (check the muscles of facial expression).
- Conduct a motor screen to check for drift in the pronator, asymmetrical weakness and symmetry of reflexes.
- Conduct a sensory exam to check that bilateral tactile stimuli are not extinct.
- Assess coordination by evaluating Romberg, finger-to-nose movements, gait and tandem gait.
- Refer for appropriate imaging and to an appropriate specialist if you find any focal abnormalities.

Adapted from “Guidelines for Concussion/ Mild Traumatic Brain Injury and Persistent Symptoms Second Edition For Adults (18+ years of age).” Reproduced with permission from the Ontario Neurotrauma Foundation.
Tool 2.5: PECARN Management Algorithm for Children After Head Trauma

Guidelines for Diagnosing and Managing Pediatric Concussion

Tool 2.6: Management of Persistent Symptoms Algorithm

Guidelines for Diagnosing and Managing Pediatric Concussion

**Tool 2.6: Management of Persistent Symptoms Algorithm**

**Child/adolescent diagnosed with concussion has persistent symptoms at one month, and is not responding to initial treatment. Remind patient it is normal for symptoms to persist.**

**Are there complicating health-related or contextual factors?**

- **Yes**
  - **Recommendation 4.3:** Recommend additional assessment and accommodations if symptoms worsen or fail to improve.
  - **Recommendation 5.7:** Consider the need for specialized therapy if symptoms persist.

- **No**
  - **Sidebar: Psychosocial Evaluation**
    - Support system
    - Mental health history
    - Comorbid conditions (such as chronic pain, mood/stress/personality disorder)
    - Substance use disorder
    - Absence from school or academic difficulties

**Have symptoms and functional status improved? Ask parents/caregivers to help describe symptoms.**

- **Yes**
  - Monitor symptoms and co-morbid conditions.
    - **Recommendation 5.1:** Assess any modifiers that may delay recovery.

- **No**
  - Start return to learn/play. Start at **Recommendation 4.1.** Manage pain to avoid influencing other symptoms.

**Any mental health disorders diagnoses established? (such as depression, anxiety)**

- **Yes**
  - Manage co-morbidity.
    - **Recommendation 5.4g:** Consider referring to a specialist with experience in pediatric mental health.

- **No**
  - Any persistent symptoms (physical, cognitive, emotional)? Start at **Recommendation 5.1.**

**Any persistent symptoms (physical, cognitive, emotional)? Start at** **Recommendation 5.1.**

- **Yes**
  - Assess and treat persistent headache, **Tool 5.1:** Management of Persistent Headache in Children Algorithm.

- **No**
  - Evaluate the need for educational assistance and an individual education plan (IEP).

Follow up and reassess regularly.

---

Adapted from Department of Veterans Affairs, Department of Defense. VA/DoD clinical practice guideline for management of concussion/mild traumatic brain injury (mTBI). Washington (DC): Department of Veterans Affairs, Department of Defense; 2009 Apr. 112 p.

**Tipsheet / List of Tools**
### HEADS-ED

#### Patient Profile

<table>
<thead>
<tr>
<th></th>
<th>0 No action needed</th>
<th>1 Needs action but not immediate</th>
<th>2 Needs immediate action</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Home</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Example: How does your family get along with each other?</td>
<td>○ Supportive</td>
<td>○ Conflicts</td>
<td>○ Chaotic / dysfunctional</td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Example: How is your school attendance? How are your grades?</td>
<td>○ On track</td>
<td>○ Grades dropping / absenteeism</td>
<td>○ Failing / not attending school</td>
</tr>
<tr>
<td><strong>Activities</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Example: What are your relationships like with your friends?</td>
<td>○ No change</td>
<td>○ Reduced / peer conflicts</td>
<td>○ Fully withdrawn / significant peer conflicts</td>
</tr>
<tr>
<td><strong>Drugs &amp; alcohol</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Example: How often are you using drugs or alcohol?</td>
<td>○ None or infrequent</td>
<td>○ Occasional</td>
<td>○ Frequent / daily</td>
</tr>
<tr>
<td><strong>Suicidality</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Example: Do you have any thoughts of wanting to kill yourself?</td>
<td>○ No thoughts</td>
<td>○ Ideation</td>
<td>○ Plan or gesture</td>
</tr>
<tr>
<td><strong>Emotions, behaviours, thought disturbance</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Example: How have you been feeling lately?</td>
<td>○ Mildly anxious / sad / acting out</td>
<td>○ Moderately anxious / sad / acting out</td>
<td>○ Significantly distressed / unable to function / out of control / bizarre thoughts</td>
</tr>
<tr>
<td><strong>Discharge resources</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Example: Do you have any help or are you waiting to receive help (counselling etc) ?</td>
<td>○ Ongoing / well connected</td>
<td>○ Some / not meeting needs</td>
<td>○ None / on waitlist / non-compliant</td>
</tr>
</tbody>
</table>

**Notes:**

---


Reproduced with permission from the American Academy of Pediatrics.
Tool 2.8: Assessment of Children and Adolescents with Headache

General Headache Questions

- Do you have more than one type of headache? If so, describe them.
- When did the headache start?
- How long does the headache last?
- Describe the pain? What does the headache feel like?
- Is the pain mild, moderate or severe?
  - How painful is the headache on a scale of 1 to 10: 1 being very mild pain and 10 being the worst pain (this question is age-dependent).
- Where does it hurt exactly?
- Does the pain start in one place, then spread?
- How often do you get headaches?
- Do you have any symptoms immediately before the headache or pain starts?
- Do you have any of the following symptoms with the headache?
  - Nausea, vomiting, change in vision?
  - Weakness, tingling or pins-and-needles in your arms or legs?
  - Neck pain or stiffness?
  - Dizziness? If yes, do you feel like the room is spinning or moving? Or do you feel like you are moving or spinning?
- Does anything trigger your headaches (examples: skipped meals, poor sleep, stress, bright lights or loud sounds)?
- Does anything make the headache better?
- Does anything make the headache worse?
- Are your headaches getting more painful and more frequent? Less painful and less frequent? Or staying about the same?

Red Flags

- Do the headaches wake you up at night?
- Do you get headaches first thing in the morning?
- Does the headache get worse if you change position (example: stand up or sit down)?
- Does straining make the headache worse?

Functional Impact of headaches

- Tool 5.3: pedMIDAS Headache Severity Tool for Children aged 4-18.

Management

- What do you do to treat your headache?
- What medications do you use to treat the headache?
  - For each medication, how much do you take? What do you use it for? What effect does it have?
  - If you only take the medication for headache, how often do you use it?
  - If you take the medication daily to prevent headaches, how long have you been taking it for?
Other information

• Do you have a previous history of headaches?
  o If so, what was the diagnosis of these headaches?
  o Please describe these headaches.
  o Are these different than your current headaches?
• Is there a family history of headaches?

Reproduced from permission from Ryan Hung, MD (Neurology, Pediatrics), Holland Bloorview Kids Rehabilitation Hospital.
Tool 2.9: Algorithm for the management of the pediatric patient $\geq 2$ years with minor head trauma

**Guidelines for Diagnosing and Managing Pediatric Concussion**

**Tool 2.9: Algorithm for the management of the pediatric patient $\geq 2$ years with minor head trauma**

Dear (teacher’s name)

_______________________________ (student’s name) was diagnosed with a concussion on ____________ (date). We take this opportunity to let you know what to expect during the recovery period.

Children/adolescents recover from concussion at varying rates. It can take several weeks—sometimes a lot longer—for the brain to heal. Immediately after the concussion, it is essential for the brain to rest. Heavy concentration, memorization, studying, etc. can slow the brain’s healing process. Cognitive fatigue is also a major concern.

Please identify a “point person” within the school environment (example: guidance counsellor, home room teacher, vice principal, etc.) who can help the student implement a return-to-learn plan, communicate it to teachers/school staff involved in the student’s activities, and modify it as needed.

Please follow these accommodations (physician to strike through those not needed) until the student is symptom-free:

• No:
  o physical activity other than walking;
  o tests or major assignments;

• Provide
  o hard copies of notes and other course content;
  o rest periods during the day as needed;
  o extra time to return assignments;

• Limit/avoid:
  o school work;
  o watching movies in dark room;
  o computer work;
  o loud noises;
  o school assemblies;
  o gym class
  o sports/activities with risk of contact (soccer, dodgeball, football, etc.).

Please be aware of signs and symptoms the student may display:

• decreased short term memory;
• decreased attention span;
• slower processing speed;
• irritability;
Tool 3.1: Template Letter of Accommodation from Physician to School

Guidelines for Diagnosing and Managing Pediatric Concussion

- fatigue;
- severe headaches;
- photo/audio sensitivity.

In the classroom, these signs might present as difficulty paying attention, difficulty following lessons, difficulty in noisy/busy classrooms and environments.

The parents and family physician will monitor the recovery and inform the school as accommodations need to be added/removed to support the student’s recovery.

Thank you for your help and understanding.

Thank you,

Parent’s Name/Phone #:
Physician’s Name/Phone #:

Adapted with permission from the authors: Sinclair Elder AJ, Kadel R, O’Keefe EK. Headin’ for Healin’ Teacher’s Letter. Colorado Springs, CO: University of Colorado, Colorado
Tool 3.2: Strategies to Promote Good Sleep and Alertness

Healthy Habits
Make sure the child/adolescent:

- maintains the same bed and wake times every day throughout the year (including summer). Try to maintain them throughout the weekend as well; however, if this is not possible, try to keep them within one hour of weekday bed and wake times.
- has a fixed bed time routine: a warm bath about one hour before bed may help to facilitate sleep. (Note: taking a warm bath too close to bed time may raise body temperature, which can delay sleep.)
- turns off the computer and electronic devices including cell phones, at least 30 minutes before bed time.
- takes naps based on the amount of time post-concussion and the severity of daytime sleepiness (not on fatigue). In the first few hours/days after concussion, increased sleep and need for naps are a natural part of the recovery process and should not be limited. Consult a physician or emergency department if the child/adolescent is not easily awoken in the first few hours or days after concussion. After this acute period, those who have night-time sleep issues should avoid naps to promote night-time sleep and gradual return to activity.
- limits naps to once a day, ideally before 3 pm and for 30 minutes maximum, if he/she is very sleepy during the day and cannot avoid them.
- naps in bed, not in another room or in front of the TV, etc.

Nutrition, Exercise and Lifestyle
Make sure the child/adolescent:

- avoids caffeine (coffee, tea, chocolate, some over-the-counter medications) within 4-6 hours of bed time.
- avoids energy drinks and alcohol altogether.
- avoids eating heavy meals late in the evening.
- avoids sugar four hours before bed time. Try a bed time snack containing proteins.
- has enough magnesium, iron and Vitamin B in his/her diet. Adequate vitamin and mineral intake is important to help the body produce melatonin, which promotes sleep.
- does 30-60 minutes of vigorous exercise a day, when tolerated and medically indicated, and at least two hours before bed time. Exercise during the two hours before bed time can delay sleep while regular exercise earlier in the day can promote sleep.
- gets some natural light during the day, especially in the morning.
- gets 15-30 minutes of quiet time after periods of cognitive activity, if he/she has significant cognitive fatigue (not sleepiness) during the day. Ideally, quiet time should be in an environment with natural light and no electronic devices. This can also promote night time sleep.
- avoids loud music with a strong beat before bed time in favour of music that promotes relaxation—if he/she is used to listening to music before bed.
Sleeping Environment
Make sure the child/adolescent
- has a dark, cool and comfortable sleeping area.
- removes all sources of light in the bedroom while sleeping.
- opens the curtains and has natural light immediately upon wakening.
- keeps the bedroom clean, tidy and quiet. Neutral or natural sounds can help to block out distracting sounds.
- reserves the bed and bedroom for sleep, and does other activities (reading, watching TV, using internet, playing games) in another room. Ideally, there should be no electronic equipment in the bedroom. If this is unavoidable, make sure that all computers, tablets, cell phones, etc. are turned off or in “sleep” mode.
- turns any digital clocks with numbers that light up away from the bed during sleep.

Adapted with permission from the authors: Catherine Wiseman-Hakes (Holland Bloorview Kids Rehabilitation Hospital, Toronto, and U of Toronto), Marie-Christine Ouellet (U Laval) and Simon Beaulieu-Bonneau (U Laval).
Appendix C-4
Documentation for a Diagnosed Concussion - Return to Learn/Return to Physical Activity Plan

This form is to be used by parents/guardians to communicate their child’s/ward’s progress through the plan and is to be used with “Appendix C-1 - Concussion Management Procedures: Return to Learn and Return to Physical Activity”.

The Return to Learn/Return to Physical Activity Plan is a combined approach. Step 2a - Return to Learn must be completed prior to the student returning to physical activity. Each step must take a minimum of 24 hours (Note: Step 2b - Return to Learn and Step 2 - Return to Physical Activity occur concurrently).

Step 1 - Return to Learn/Return to Physical Activity

- **Completed at home.**
- **Cognitive Rest** - includes limiting activities that require concentration and attention (e.g., reading, texting, television, computer, video/electronic games).
- **Physical Rest** - includes restricting recreational/leisure and competitive physical activities.

☐ My child/ward has completed Step 1 of the Return to Learn/Return to Physical Activity Plan (cognitive and physical rest at home) and his/her **symptoms have shown improvement**. My child/ward will proceed to Step 2a - Return to Learn.

☐ My child/ward has completed Step 1 of the Return to Learn/Return to Physical Activity Plan (cognitive and physical rest at home) and is **symptom free**. My child/ward will proceed directly to Step 2b - Return to Learn and Step 2 - Return to Physical Activity.

Parent/Guardian signature: __________________________________________

Date: ______________________

Comments:
______________________________________________________________
______________________________________________________________

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Step 2a - Return to Learn

- Student returns to school.
- Requires individualized classroom strategies and/or approaches which gradually increase cognitive activity.
- Physical rest- includes restricting recreational/leisure and competitive physical activities.

☐ My child/ward has been receiving individualized classroom strategies and/or approaches and is **symptom free**. My child/ward will proceed to Step 2b - Return to Learn and Step 2 - Return to Physical Activity.

Parent/Guardian signature: ____________________________
Date: ______________________
Comments:
____________________________________________________________________________
____________________________________________________________________________

Step 2b - Return to Learn

- Student returns to regular learning activities at school.

Step 2 - Return to Physical Activity

- Student can participate in individual light aerobic physical activity only.
- Student continues with regular learning activities.

☐ My child/ward is symptom free after participating in light aerobic physical activity. My child/ward will proceed to Step 3 - Return to Physical Activity.

☐ Appendix C-4 will be returned to the teacher to record progress through Steps 3 and 4.

Parent/Guardian signature: ____________________________
Date: ______________________
Comments:
____________________________________________________________________________
____________________________________________________________________________
Step 3 - Return to Physical Activity

- Student may begin individual sport-specific physical activity only.

Step 4 - Return to Physical Activity

- Student may begin activities where there is no body contact (e.g., dance, badminton); light resistance/weight training; non-contact practice; and non-contact sport-specific drills.

☐ Student has successfully completed Steps 3 and 4 and is symptom free.

☐ Appendix C-4 will be returned to parent/guardian to obtain medical doctor/nurse practitioner diagnosis and signature.

Teacher signature: ________________________________

Medical Examination

☐ I, ________________________________ (medical doctor/nurse practitioner name) have examined ________________________________ (student name) and confirm he/she continues to be symptom free and is able to return to regular physical education class/intramural activities/interschool activities in non-contact sports and full training/practices for contact sports.

Medical Doctor/Nurse Practitioner Signature: ________________________________

Date: __________________

Comments:

________________________________________________________________________

Step 5 - Return to Physical Activity

- Student may resume regular physical education/intramural activities/interschool activities in non-contact sports and full training/practices for contact sports.

Step 6 - Return to Physical Activity

- Student may resume full participation in contact sports with no restrictions.
Tool 4.1: OPHEA Documentation for a Diagnosed Concussion – Return to Learn/Return to Physical Activity Plan

Guidelines for Diagnosing and Managing Pediatric Concussion

Ontario Physical Education Safety Guidelines

Appendix C-4 - Documentation for a Diagnosed Concussion - Return to Learn/Return to Physical Activity Plan

Return of Symptoms

☐ My child/ward has experienced a return of concussion signs and/or symptoms and has been examined by a medical doctor/nurse practitioner, who has advised a return to:
  • Step __________ of the Return to Learn/Return to Physical Activity Plan

Parent/Guardian signature: ________________________________

Date: ____________________

Comments: ____________________________________________

_______________________________________________________

Reprinted with permission from OPHEA, [Ontario Physical Education Safety Guidelines, 2013].
Tool 4.2: Template Letter of Accommodation from School to Parents/Caregivers

Dear (parents’ names),

We are happy to hear that your child is feeling well enough to start the return-to-learn process after his/her concussion. To make sure teachers and staff are prepared, we would like your insight on the following symptoms. Please check the answers that best fit your child.

Fatigue
My child ☐ tires easily ☐ has the normal amount of energy.  
My child has the most energy in the ☐ morning ☐ afternoon ☐ evening.

Behaviour
My child ☐ is easily frustrated ☐ isn’t easily frustrated.  
My child has been acting ☐ the same ☐ different compared to before concussion.

Memory
My child’s memory seems ☐ fine ☐ impaired.

Cognition
My child seems to be able to understand complex thoughts and ideas. ☐ Yes ☐ No  
My child is able to read for ☐ less than ½ hour ☐ ½ to 1 hour ☐ more than 1 hour.  
My child can handle different technologies (example: TV, computers). ☐ Yes ☐ No  
My child can complete some homework. ☐ Yes ☐ No

Stamina
My child makes it through a day without a period of rest. ☐ Yes ☐ No

Social
My child is becoming isolated or has different friends than before the concussion. ☐ Yes ☐ No  
My child can handle noisy/busy environments. ☐ Yes ☐ No

Awareness
My child feels like there is nothing wrong with him/her after the concussion. ☐ Yes ☐ No  
My child understands that there have been changes and would like help. ☐ Yes ☐ No

Please elaborate on any other changes you’ve noticed in your child. We want to be ready to support your child’s return-to-learn process and make accommodations to ensure success.

Sincerely,
(school contact person’s name)
Telephone/email ____________________________________________

Reproduced with permission from Vermont’s Student Athletes and Concussion: Return to Learn and Return to Play Toolkit, www.biavt.org.
**Tool 4.3: Academic Accommodations for Concussed Students**

**Guidelines for Diagnosing and Managing Pediatric Concussion**

### Tool 4.3: Academic Accommodations for Concussed Students

<table>
<thead>
<tr>
<th>Persistent Symptom</th>
<th>Effect of attending school</th>
<th>Accommodation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Headache</td>
<td>Difficulty concentrating</td>
<td>Frequent breaks, quiet area, hydration</td>
</tr>
<tr>
<td>Fatigue</td>
<td>Decreased attention, concentration</td>
<td>Frequent breaks, shortened day, only certain classes</td>
</tr>
<tr>
<td>Photophobia/phonophobia</td>
<td>Worsening symptoms (headache)</td>
<td>Sunglasses, ear plugs or headphones, avoid noisy areas (cafeterias, assemblies, sport events, music class), limit computer work</td>
</tr>
<tr>
<td>Anxiety</td>
<td>Decreased attention or concentration, overexertion to avoid falling behind</td>
<td>Reassurance and support from teachers about accommodations, reduced workload</td>
</tr>
<tr>
<td>Difficulty concentrating</td>
<td>Limited focus on school work</td>
<td>Shorter assignments, decreased workload, frequent breaks, having someone read aloud, more time to complete assignments and tests, quiet area to complete work</td>
</tr>
<tr>
<td>Difficulty remembering</td>
<td>Difficulty retaining new information, remembering instructions, accessing learned information</td>
<td>Written instructions, smaller amounts to learn, repetition</td>
</tr>
</tbody>
</table>

Tool 4.4: Returning to School-based Activities After Concussion Care Plan

General Care Plan:

- **Orange**: Preparing to return to school – gentle activity at home (e.g., light walking, begin reading, minimal screen time of 15 minutes twice per day etc.)
- **Yellow**: Back to school with modified schedule – gradual progression of time spent at school (e.g., 1 hour of class time to start and progress to half day/every other day; attend less stressful classes etc.)
- **Green**: Back to school with full schedule – attend all classes every day

Additional School Support Recommendations:

- Contact person at school who can be responsible for relaying information between student/student’s family and teachers, and who can assist in scaling back/modifying school supports as needed
- Extra check-in meetings provided with teachers/guidance counselors in order to monitor progress and determine the need for more/less supports and modifications
- No homework
- Overall class work/homework load reduced with gradual resumption as per the student’s ability to handle increased demands and extra time provided (homework and class work load be prioritized collaboratively between the student and school personnel)
- No testing
- Testing completed in a quiet, distraction free environment with extra time provided in order to allow for cognitive rest breaks; no more than one test per day
- Student not asked to do all missed work, and extra help given to get student caught back up
- Excused from class for ‘rest breaks’ in a quiet room to avoid physical and cognitive exertion and to manage increased symptoms (regularly scheduled and/or when symptoms increase)
- Preferential seating provided to allow for decreased distractions and closer teacher monitoring (e.g. closer to teacher/board, away from window, away from door, away from disruptive classmates etc.)
- Access to a model peer’s or teacher’s notes allowed and/or access to pre-printed class notes to help with planning and attention
- Avoid attending and participating in physical education and band/music activities (these classes can be used as rest breaks)
- Eat lunch in a quiet, distraction free area with 2-3 friends
- Avoid carrying heavy textbooks. To avoid extraneous physical exertion, have an extra copy of class textbooks in classes to limit need to carry books to and from school/classes

**All recommended supports/accommodations are to be used on an as needed basis and can be modified as per the student’s ability to better handle the cognitive and physical demands of the school environment (improved post-concussion symptoms). Continued communication between the school, the student and the student’s family is encouraged to best meet the needs of the student and to develop a plan for successful return to school-based activities.**

Other comments: _____________________________________________________________________
____________________________________________________________________________________________
____________________________________________________________________________________________
____________________________________________________________________________________________
**

Completed by: __________________________ Date: __________________________

Reproduced with permission from Nick Reed, Holland Bloorview.
Tool 4.5: Return-to-school Information and Strategies

Concussion (also known as mild traumatic brain injury) and related symptoms can result in difficulties returning to school for many students.

Trying to complete school work and learn before the brain has recovered from a concussion “overuses” the brain at a time when it needs all its energy to recover. The brain needs proper rest to recover from a concussion.

Limiting exertion (physical and mental) until post-concussive symptoms have resolved and then gradually increasing activity as tolerated (no symptoms reappear) is highly recommended.

Most students will have difficulty with concentration, memory and processing speed – all can negatively affect how one learns and perform at school.

When returning to school, modifications can be made in order to limit physical and mental exertion and allow the student to best return to full school activities and performance.

Common Post-concussive Symptoms

<table>
<thead>
<tr>
<th>Physical</th>
<th>Thinking (Cognitive)</th>
<th>Behavioural or Emotional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Headaches</td>
<td>Slowed thinking</td>
<td>Irritability or grouchiness</td>
</tr>
<tr>
<td>Sick to stomach or vomiting</td>
<td>Trouble paying attention</td>
<td>Easily upset or frustrated</td>
</tr>
<tr>
<td>Dizziness or balance problems</td>
<td>Difficulty remembering</td>
<td>Nervousness</td>
</tr>
<tr>
<td>Low energy or being run down</td>
<td>Acting like &quot;in a fog&quot;</td>
<td>Sadness</td>
</tr>
<tr>
<td>Trouble with vision/seeing</td>
<td>Easily confused</td>
<td>Acting without thinking</td>
</tr>
<tr>
<td>Bothered by light or noise</td>
<td>School performance worsens</td>
<td>Any other personality change</td>
</tr>
<tr>
<td>Sleeping problems</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Modified from: [http://www.thechildrenshospital.org/conditions/rehab/concussion/school_staff.aspx](http://www.thechildrenshospital.org/conditions/rehab/concussion/school_staff.aspx)

What can be done to help with the return-to-school process?

Before returning to school

- The student should not return to school until post-concussive symptoms have cleared (e.g. headaches, nausea etc.) or they begin to tolerate extended periods of thinking and activity.
- Students should limit reading, using computers, playing video games and texting, if these activities worsen symptoms.
- Students should not exercise or take part in sports or gym class until a health care professional has evaluated and cleared them.
- Walking or taking the bus to school (avoid noise, busy environments and exercise)—have parents drive the student to school if possible.
- Once symptoms have cleared/improved, students can begin brief periods of reading or studying. If symptoms return, they should stop the activity and rest. They can return to school for gradually increasing periods of time when they can tolerate a couple of hours of thinking.
On returning to school

- It is important that the student has a contact person at the school who can relay information from the student, student’s family and the student’s health care team related to the student’s injury (e.g. severity, necessary accommodations etc.) to the student’s course teachers. This can be a school guidance counsellor or nurse (if available). Students should check in with this contact person at the school daily in order to scale back or change school modifications as required.
- If students experience post-concussive symptoms (e.g. headache, nausea, dizziness etc.) while in the classroom, they should go to the nurses office to rest and skip the next period of class. If symptoms occur again in the next period, after resting, they should return home.
- If a student can only handle attending classes part-time, an effort should be made to attend core classes over non-core classes and to avoid missing the same classes repeatedly.

Test Taking

- If a student attempts to write a test while suffering from post-concussive symptoms, their symptoms may worsen, recovery may be extended and their performance on the test will not be a true measure of what they know.
- Strategies:
  - If possible, tests may be delayed until the student is no longer experiencing post-concussive symptoms
  - Test taking should be spaced out and limited to no more than one test per day to avoid over exertion of the brain and reduce cognitively demanding tasks
  - Students can be provided extra time to complete the test
  - Tests can be written in a separate room free of distraction

Assignments and Homework

- If possible, due dates for assignments and homework can be flexible, where extra time to complete tasks may be provided
- Pre-printed copies of class notes can help the student who has difficulty planning or paying attention after their concussion
- Access to a model peer’s notes or teacher’s note can be helpful
- Some students may benefit from peer support, tutoring or private meetings with the classroom teacher for help with school work, organization and test preparation

Physical Activity/Gym Class

- All physical activity should be avoided initially
- Student are to complete a medically supervised gradual return-to-play protocol and obtain medical clearance from their primary provider prior to returning to physical activity
Summary of General and Specific Return-to-School Supports

<table>
<thead>
<tr>
<th>Possible General Support</th>
<th>Possible Specific Classroom-based Supports</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Re-integration into school occurs gradually (e.g., student returns part-time before building up to a full schedule)</td>
<td>• Tests put off until recovery complete</td>
</tr>
<tr>
<td>• Student not asked to do all missed work, and extra help given to get student caught back up</td>
<td>• Extra time given to complete tests</td>
</tr>
<tr>
<td>• Extra check-in meetings provided with teacher</td>
<td>• Flexibility allowed for assignment due dates</td>
</tr>
<tr>
<td>• Rest time or breaks provided during the day</td>
<td>• Preferential seating provided to allow for closer teacher monitoring and decreased distractions</td>
</tr>
<tr>
<td>• Overall homework and class work load reduced</td>
<td>• Access to a model peer’s or teacher’s notes allowed</td>
</tr>
<tr>
<td>• Cognitively demanding in-school tasks reduced (e.g., no more than one test each day)</td>
<td></td>
</tr>
</tbody>
</table>

Modified from: http://www.thechildrenshospital.org/conditions/rehab/concussion/school_staff.aspx

References:

Reproduced with permission from Nick Reed, Holland Bloorview.
Tool 5.1: Management of Persistent Headache in Children Algorithm

**Pharmacological Treatment**

<table>
<thead>
<tr>
<th>Tension/Unclassified</th>
<th>Migrainous</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Over-the-counter NSAIDs*</td>
<td>- NSAIDs (example: ibuprofen) or acetylsalicylic acid (if &gt;12 years)*</td>
</tr>
<tr>
<td>- Acetylsalicylic acid (if &gt;12 years)*</td>
<td>- Metochlorpromide or prochlorperazine</td>
</tr>
<tr>
<td></td>
<td>- Triptan class** (example: almotriptan, sumatriptan, rizatriptanetc.)</td>
</tr>
</tbody>
</table>

**Non-pharmacological**

- Recommendation 5.4b(iv): Consider non-pharmacological complementary and/or alternative medical therapies for headache

**Prophylactic Treatment**

- Assess triggers, consider medication that also treat comorbidities.
- **Medication** (flunarizine, beta blockers, TCAs)
- **Anti-epileptic drugs** (divalproex, topiramate)
- Screen for depression and anxiety
- Consider cognitive behavioural therapy

**Tipsheet / List of Tools**

Adapted from Guidelines for Concussion/ Mild Traumatic Brain Injury and Persistent Symptoms Second Edition For Adults
Tool 5.2: Diagnostic Criteria for Headaches

1.1 Migraine Without Aura

Diagnostic Criteria
- A. At least five attacks fulfilling criteria B–D.
- B. Headache attacks lasting 4-72 hours (untreated or unsuccessfully treated).
- C. Headache has at least two of the following four characteristics:
  - unilateral location;
  - pulsating quality;
  - moderate or severe pain intensity;
  - aggravation by or causing avoidance of routine physical activity (e.g. walking or climbing stairs).
- D. During headache at least one of the following:
  - nausea and/or vomiting;
  - photophobia and phonophobia.
- E. Not better accounted for by another ICHD-3 diagnosis.

2.2 Frequent Episodic Tension-type Headache

Diagnostic Criteria
- A. At least 10 episodes of headache occurring on 1-14 days per month on average for >3 months (12 and <180 days per year) and fulfilling criteria B-D.
- B. Lasting from 30 minutes to 7 days.
- C. At least two of the following four characteristics:
  - bilateral location;
  - pressing or tightening (non-pulsating) quality;
  - mild or moderate intensity;
  - not aggravated by routine physical activity such as walking or climbing stairs.
- D. Both of the following:
  - no nausea or vomiting;
  - no more than one of photophobia or phonophobia.
- E. Not better accounted for by another ICHD-3 diagnosis.

4.7 Primary stabbing headache

Diagnostic Criteria
- A. Head pain occurring spontaneously as a single stab or series of stabs and fulfilling criteria B–D.
5.1. Acute Headache Attributed to Traumatic Injury to the Head

Diagnostic Criteria

• A. Any headache fulfilling criteria C and D.
• B. Traumatic injury to the head has occurred.
• C. Headache is reported to have developed within 7 days after one of the following:
  ▪ the injury to the head;
  ▪ regaining of consciousness following the injury to the head;
  ▪ discontinuation of medication(s) that impair ability to sense or report headache following the injury to the head.
• D. Either of the following:
  ▪ headache has resolved within 3 months after the injury to the head;
  ▪ headache has not yet resolved but 3 months have not yet passed since the injury to the head.
• E. Not better accounted for by another ICHD-3 diagnosis.

5.1.2 Acute Post-traumatic Headache Attributed to Mild Traumatic Injury to the Head

Diagnostic Criteria

• Headache fulfilling criteria for 5.1 Acute headache attributed to traumatic injury to the head.
• Injury to the head fulfilling both of the following:
  ▪ associated with none of the following:
    ▪ loss of consciousness for > 30 minutes;
    ▪ Glasgow Coma Scale (GCS) score < 13;
    ▪ post-traumatic amnesia lasting > 24 hours;
    ▪ altered level of awareness for > 24 hours i) imaging evidence of a traumatic head injury such as intracranial haemorrhage and/or brain contusion.
  ▪ associated, immediately following the head injury, with one or more of the following symptoms and/or signs:
    ▪ transient confusion, disorientation or impaired consciousness;
    ▪ loss of memory for events immediately before or after the head injury;
    ▪ two or more other symptoms suggestive of mild traumatic brain injury: nausea, vomiting, visual disturbances, dizziness and/or vertigo, impaired memory and/or concentration.

5.2 Persistent Headache Attributed to Traumatic Injury to the Head

Diagnostic Criteria

• A. Any headache fulfilling criteria C and D.
• B. Traumatic injury to the head has occurred.
• C. Headache is reported to have developed within 7 days after one of the following:
  o the injury to the head;
  o regaining of consciousness following the injury to the head;
  o discontinuation of medication(s) that impair ability to sense or report headache following the injury to the head.
• D. Headache persists for > 3 months after the injury to the head.
• E. Not better accounted for by another ICHD-3 diagnosis.

5.2.1 Persistent Headache Attributed to Mild Traumatic Injury to the Head

Diagnostic Criteria
• Headache fulfilling criteria for 5.2 Persistent headache attributed to traumatic injury to the head.
• Head injury fulfilling both of the following:
  o associated with none of the following:
    ▪ loss of consciousness for > 30 minutes;
    ▪ Glasgow Coma Scale (GCS) score < 13;
    ▪ post-traumatic amnesia lasting > 24 hours;
    ▪ altered level of awareness for > 24 hours;
    ▪ imaging evidence of a traumatic head injury such as intracranial haemorrhage and/or brain contusion.
  o associated, immediately following the head injury, with one or more of the following symptoms and/or signs:
    ▪ transient confusion, disorientation or impaired consciousness;
    ▪ loss of memory for events immediately before or after the head injury;
    ▪ two or more other symptoms suggestive of mild traumatic brain injury: nausea, vomiting, visual disturbances, dizziness and/or vertigo, impaired memory and/or concentration.

8.2 Medication-overuse Headache

Diagnostic Criteria
• Headache occurring on 15 days per month in a patient with a pre-existing headache disorder.
• Regular overuse for > 3 months of one or more drugs that can be taken for acute and/or symptomatic treatment of headache.
• Not better accounted for by another ICHD-3 diagnosis.

13.4 Occipital Neuralgia

Diagnostic Criteria
• A. Unilateral or bilateral pain fulfilling criteria B-E.
• B. Pain is located in the distribution of the greater, lesser and/or third occipital nerves.
• C. Pain has two of the following characteristics:
  o recurring in paroxysmal attacks lasting from a few seconds to minutes;
  o severe intensity;
  o shooting, stabbing or sharp in quality.
• D. Pain is associated with both of the following:
  o dysaesthesia and/or allodynia apparent during innocuous stimulation of the scalp and/or hair
  o either or both of the following:
    o tenderness over the affected nerve branches;
    o trigger points at the emergence of the greater occipital nerve or in the area of distribution of C2.
• E. Pain is eased temporarily by local anaesthetic block of the affected nerve.
• F. Not better accounted for by another ICHD-3 diagnosis.

*Cephalagia 33(9) 629–808. International Headache Society 2013, adapted with permission from SAGE Publications Ltd.*
Tool 5.3: pedMIDAS Headache Severity Tool for Children aged 4-18

Guidelines for Diagnosing and Managing Pediatric Concussion

Tool 5.3: pedMIDAS Headache Severity Tool for Children aged 4-18

PedMIDAS

Headache Disability.

The following questions try to assess how much the headaches are affecting day-to-day activity. Your answers should be based on the last three months. There are no “right” or “wrong” answers so please put down your best guess.

1. How many full school days of school were missed in the last 3 months due to headaches?

2. How many partial days of school were missed in the last 3 months due to headaches (do not include full days counted in the first question)?

3. How many days in the last 3 months did you function at less than half your ability in school because of a headache (do not include days counted in the first two questions)?

4. How many days were you not able to do things at home (i.e., chores, homework, etc.) due to a headache?

5. How many days did you not participate in other activities due to headaches (i.e., play, go out, sports, etc.)?

6. How many days did you participate in these activities, but functioned at less than half your ability (do not include days counted in the 5th question)?

Total PedMIDAS Score

Headache Frequency

Headache Severity

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<table>
<thead>
<tr>
<th>PedMIDAS Score Range</th>
<th>Disability Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 10</td>
<td>Little to none</td>
</tr>
<tr>
<td>11 to 30</td>
<td>Mild</td>
</tr>
<tr>
<td>31 to 50</td>
<td>Moderate</td>
</tr>
<tr>
<td>Greater than 50</td>
<td>Severe</td>
</tr>
</tbody>
</table>

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**Tool 5.4: Dix-Hallpike Manoeuvre and Particle Repositioning Manoeuvre**

Reprinted from Parnes LS, Agrawal SK, Atlas J. Diagnosis and management of benign paroxysmal positional vertigo (BPPV). Canadian Medical Association Journal. 2003;169:681-693, Figure 6 & 7. © Canadian Medical Association 2003. This work is protected by copyright and the making of this copy was with the permission of the Canadian Medical Association Journal (www.cmaj.ca) and Access Copyright. Any alteration of its content or further copying in any form whatsoever is strictly prohibited unless otherwise permitted by law.
Tool 5.5: Initial Assessment of Cognitive Visual Impairment in Children

Guidelines for Diagnosing and Managing Pediatric Concussion

Tool 5.5: Initial Assessment of Cognitive Visual Impairment in Children

- Does your child have difficulty walking down stairs?
- Does your child have difficulty seeing things which are moving quickly, such as small animals?
- Does your child have difficulty seeing something which is pointed out in the distance?
- Does your child have difficulty locating an item of clothing in a pile of clothes?
- Does your child find copying words or drawings time-consuming and difficult?

Adapted from Pediatric Ophthalmology and Strabismus by Creig S. Hoyt and David Taylor 4th edition, with permission from Elsevier.
## Tool 5.6: Approved Medications for Pediatric Indications

**Guidelines for Diagnosing and Managing Pediatric Concussion**

### Tool 5.6: Approved Medications for Pediatric Indications†

<table>
<thead>
<tr>
<th>Drug</th>
<th>Health Canada approval</th>
<th>FDA approval</th>
<th>Dosage#</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ibuprofen</td>
<td>Pediatric patients for mild to moderate pain. Antipyretic</td>
<td>Pediatric patients for inflammatory disorders. Mild to moderate pain, and pain for ages &gt; 6 months.</td>
<td>5–10 mg/kg/dose orally every 6–8h as needed (maximum 600 mg/dose or 40 mg/kg/day)</td>
</tr>
<tr>
<td>Naproxen</td>
<td>Children ≥ 2 years of age: 1) osteoarthritis, ankylosing spondylitis, juvenile rheumatoid arthritis 2) aches/pains and mild to moderate pain due to sprains/strains 3) primary dysmenorrhea</td>
<td>&gt; 2 years of age for analgesia, inflammatory disease</td>
<td>5 mg/kg/dose orally q8–12h as needed Orally every 12h as needed, maximum 500 mg/dose, 1,000 mg/day (usual adult dose: 250–500 mg)</td>
</tr>
<tr>
<td>Acetaminophen</td>
<td>Treatment of mild/moderate pain and fever. All ages</td>
<td>All ages for mild to moderate pain and fever</td>
<td>10–15 mg/kg/dose orally/rectal suppository every 4h as needed (maximum 75 mg/kg/day or 4,000 mg/day)</td>
</tr>
<tr>
<td>Acetylsalicylic Acid</td>
<td>Fever/pain, reduction of platelet aggregation No age restrictions specified</td>
<td>Pain, fever, inflammation, Kawasaki disease. No age restrictions specified</td>
<td>Juvenile rheumatoid arthritis: 60–100 mg/kg/day Antithrombotic: 3–5 mg/kg/day</td>
</tr>
<tr>
<td>Amitriptyline</td>
<td>None</td>
<td>None</td>
<td>Chronic pain: 0.1 mg/kg, increase as needed to 0.5–2 mg/kg</td>
</tr>
<tr>
<td>Gabapentin/ Pregabalin</td>
<td>Gabapentin: None Pregabalin: None</td>
<td>&gt; 12 years for partial seizures, 3–12 years for treatment of partial seizures</td>
<td>2–5 mg/kg/dose orally three times a day (initial dosing) (maximum 60 mg/kg/day to a maximum of 3,600 mg/day)</td>
</tr>
<tr>
<td>Metoclopramide</td>
<td>Pediatric patients for delayed gastric emptying associated with subacute/chronic gastritis or following vagotomy, pyloroplasty and other surgical procedures. Small bowel intubation. Diagnostic radiology. Preoperatively to reduce narcotic induced postop vomiting</td>
<td>Patients for intubation of small intestine, gastro-esophageal reflux, postoperative nausea and vomiting, chemotherapy induced emesis.</td>
<td>0.1-0.2 mg/kg/dose orally/IV every 6–8h as needed (initial maximum 10 mg/dose)</td>
</tr>
<tr>
<td>Prochlorperazine</td>
<td>≥ 2 years for 1)psychotic episodes 2) nausea and vomiting due to chemoreceptor trigger zone stimulation 3) relief of excessive anxiety</td>
<td>≥ 2 years or children &gt; 9 kg for nonsurgical nausea and vomiting, ≥ 2 years for psychosis</td>
<td>Antiemetic: 0.4 mg/kg/day Psychosis: 2.5 mg orally increase as needed to 20 mg/day</td>
</tr>
<tr>
<td>Drug</td>
<td>Health Canada approval</td>
<td>FDA approval</td>
<td>Dosage#</td>
</tr>
<tr>
<td>------------------------------</td>
<td>------------------------</td>
<td>---------------------------------------</td>
<td>----------------------------------------------</td>
</tr>
<tr>
<td>Triptan (example: rizatriptan, sumatriptan)</td>
<td>None</td>
<td>Sumatriptan: None</td>
<td>Rizatriptan: &lt; 40 kg: 5 mg/24 hours, &gt; 40 kg 10 mg/24 hours</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rizatriptan: &gt; 6 years of age</td>
<td></td>
</tr>
<tr>
<td>Beta blockers–Propranolol</td>
<td>Propranol: No age specified for patients for hypertension/arrhythmias, migraine prophylaxis, thyrotoxicosis. None for concussions</td>
<td>None. Adult-approved indications only: hypertension, migraine prophylaxis, arrhythmias</td>
<td>Hypertension: 0.5–4 mg/kg/day</td>
</tr>
<tr>
<td>Valproic Acid</td>
<td>Yes. Children and adults for epilepsy</td>
<td>Yes. Children and adults for epilepsy</td>
<td>15 mg/kg/day increasing each week as needed up to 30–60 mg/kg/day divided three to four times per day.</td>
</tr>
<tr>
<td>Topiramate</td>
<td>Monotherapy for the treatment of adults and children 6 years and older with newly diagnosed epilepsy. Adjunct therapy for adults and children 2 years and older with epilepsy who are not controlled satisfactorily with conventional therapy.</td>
<td>Anti-convulsant (≥ 2 years) Prevention of migraine headaches (≥ 12 years)</td>
<td>2–16 yrs: initial dose: 1-3 mg/kg/day orally, increase every 1-2 weeks by 1-3 mg/kg/day divided twice per day. Maintenance dose 5–9 mg/kg/day divided twice per day. &gt; 17 yrs. 50 mg daily. Increase each week by 50 mg/day. Max dose 600 mg/day</td>
</tr>
<tr>
<td>Trazodone and Zopiclone</td>
<td>Trazodone: None</td>
<td>Trazodone: None</td>
<td></td>
</tr>
<tr>
<td>Magnesium Oxide</td>
<td>Classified as a natural health product. For hypomagnesemia/dietary supplement. No age restrictions.</td>
<td>Magnesium supplement. No age restriction.</td>
<td>20–40 mg/kg/day</td>
</tr>
<tr>
<td>Melatonin</td>
<td>None</td>
<td>None</td>
<td>0.5–3 mg every night at bedtime (Max. 12 mg)</td>
</tr>
<tr>
<td>Zinc</td>
<td>Zinc is in multivitamin/mineral supplements, which are approved by Health Canada.</td>
<td>Treatment and prevention of zinc deficiency states.</td>
<td>Recommended dietary allowance: infants 5 mg/day, 1–10 yrs:10 mg/day, &gt; 11 years: 12–15 mg/day</td>
</tr>
<tr>
<td>Fluoxetine</td>
<td>None</td>
<td>Major depressive disorder (≥8 years) Obsessive compulsive disorder (≥ 7 years)</td>
<td>Major depressive disorder: 10–20 mg/day Obsessive compulsive disorder: 10–30 mg/day. Up to 60 mg/day in higher weight children/adolescents</td>
</tr>
<tr>
<td>Sertraline</td>
<td>None</td>
<td>Obsessive compulsive disorder (≥ 6 years)</td>
<td>6–12 years: 25 mg daily, increase as needed to max of 200 mg/day. 13–17 years: 50 mg/day, increase as needed to 200 mg</td>
</tr>
<tr>
<td>Drug</td>
<td>Health Canada approval</td>
<td>FDA approval</td>
<td>Dosage#</td>
</tr>
<tr>
<td>--------------</td>
<td>------------------------</td>
<td>-------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Fluvoxamine</td>
<td>None</td>
<td>Obsessive compulsive disorder (≥ 8 years)</td>
<td>8–17 years: 25 mg daily, increase as needed to max of 200 mg in 8-11 years and 300 mg/day in adolescents</td>
</tr>
<tr>
<td>Paroxetine</td>
<td>None</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>Citalopram</td>
<td>None</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>Escitalopram</td>
<td>None</td>
<td>Major depressive disorder (≥ 12 years; acute and maintenance treatment)</td>
<td>10 mg daily, increase as needed to max of 20 mg</td>
</tr>
</tbody>
</table>

† Use clinical judgment and discretion at all times when prescribing medication.

Tool 5.7: Management of Persistent Mental Health Disorders Algorithm

Guidelines for Diagnosing and Managing Pediatric Concussion

Tool 5.7: Management of Persistent Mental Health Disorders Algorithm

If Mild/Moderate
Consider management by local health care professional

General Measures:
- Support and psycho-education: proper sleep hygiene, good diet, regular social and physical activity
- Psychosocial Interventions
- Evidence-based Psychotherapy: Cognitive-behavioural therapy (CBT)
- Other Psychotherapy Interventions:
- Depending on availability

Was the treatment successful?
(minimum 8-10 sessions, symptoms not worsening)

If Severe
Consider combination of pharmacological and non-pharmacological therapy
Consider referring to psychologist or psychiatrist, as needed

Non-pharmacological Treatment
- General Measures
- Psychosocial Interventions
- Evidence-based Psychotherapy
- Cognitive-behavioural therapy (CBT)
- Other Psychotherapy Interventions:
- Depending on availability

Pharmacological Treatment
- Anxiety/Mood Disorders
  SSRI
- PTSD
  SSRI
- PTSD and Sleep Disorder
  Trazadone, mirtazapine, prazosin

Was the treatment successful?

Anxiety/Mood Disorders/PTSD
SSRI

PTSD and Sleep Disruption
Trazadone, mirtazapine, prazosin
or refer to psychiatrist

Monitor symptoms and continue therapy

Refer to a psychologist or psychiatrist

Adapted from Guidelines for Concussion/Mild Traumatic Brain Injury and Persistent Symptoms, Second Edition
Tool 5.8: Mood and Feelings Questionnaire, Child Self-Report

MOOD AND FEELINGS QUESTIONNAIRE: Short Version

This form is about how you might have been feeling or acting recently.

For each question, please check (✓) how you have been feeling or acting in the past two weeks.

If a sentence was not true about you, check NOT TRUE.
If a sentence was only sometimes true, check SOMETIMES.
If a sentence was true about you most of the time, check TRUE.

Score the MFQ as follows:
NOT TRUE = 0
SOMETIMES = 1
TRUE = 2

To code, please use a checkmark (✓) for each statement.

<table>
<thead>
<tr>
<th>Statement</th>
<th>NOT TRUE</th>
<th>SOMETIMES</th>
<th>TRUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I felt miserable or unhappy.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. I didn’t enjoy anything at all.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. I felt so tired I just sat around and did nothing.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. I was very restless.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. I felt I was no good anymore.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. I cried a lot.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. I found it hard to think properly or concentrate.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. I hated myself.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. I was a bad person.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. I felt lonely.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. I thought nobody really loved me.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. I thought I could never be as good as other kids.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. I did everything wrong.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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Reproduced with permission from Sharp, Carla; Goodyer, Ian M; Croudace, Tim J.
**MOOD AND FEELINGS QUESTIONNAIRE: Short Version**

This form is about how your child might have been feeling or acting **recently**.

For each question, please check (✓) how s/he has been feeling or acting **in the past two weeks**.

If a sentence was not true about your child, check NOT TRUE.
If a sentence was only sometimes true, check SOMETIMES.
If a sentence was true about your child most of the time, check TRUE.

**Score the MFQ as follows:**
NOT TRUE = 0
SOMETIMES = 1
TRUE = 2

<table>
<thead>
<tr>
<th>To code, please use a checkmark (✓) for each statement.</th>
<th>NOT TRUE</th>
<th>SOME TIMES</th>
<th>TRUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. S/he felt miserable or unhappy.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. S/he didn’t enjoy anything at all.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. S/he felt so tired that s/he just sat around and did nothing.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. S/he was very restless.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. S/he felt s/he was no good anymore.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. S/he cried a lot.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. S/he found it hard to think properly or concentrate.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. S/he hated him/herself.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. S/he felt s/he was a bad person.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. S/he felt lonely.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. S/he thought nobody really loved him/her.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. S/he thought s/he could never be as good as other kids.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. S/he felt s/he did everything wrong.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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Tool 5.10: Screen for Child Anxiety Related Disorders (SCARED)

**Screen for Child Anxiety Related Disorders (SCARED)**

**CHILD Version**—Page 1 of 2 (to be filled out by the CHILD)

Developed by Boris Birmaher, M.D., Sunneeta Khetarpal, M.D., Marlene Cully, M.Ed., David Brent, M.D., and Sandra McKenzie, Ph.D., Western Psychiatric Institute and Clinic, University of Pittsburgh (October, 1995). E-mail: birmaherb@upmc.edu


Name: ___________________________ Date: ___________________________

**Directions:**

Below is a list of sentences that describe how people feel. Read each phrase and decide if it is “Not True or Hardly Ever True” or “Somewhat True or Sometimes True” or “Very True or Often True” for you. Then, for each sentence, fill in one circle that corresponds to the response that seems to describe you for the last 3 months.

<table>
<thead>
<tr>
<th></th>
<th>0 Not True or Hardly Ever True</th>
<th>1 Somewhat True or Sometimes True</th>
<th>2 Very True or Often True</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. When I feel frightened, it is hard to breathe</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>2. I get headaches when I am at school.</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>3. I don’t like to be with people I don’t know well.</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>4. I get scared if I sleep away from home.</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>5. I worry about other people liking me.</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>6. When I get frightened, I feel like passing out.</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>7. I am nervous.</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>8. I follow my mother or father wherever they go.</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>9. People tell me that I look nervous.</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>10. I feel nervous with people I don’t know well.</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>11. I get stomachaches at school.</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>12. When I get frightened, I feel like I am going crazy.</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>13. I worry about sleeping alone.</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>14. I worry about being as good as other kids.</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>15. When I get frightened, I feel like things are not real.</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>16. I have nightmares about something bad happening to my parents.</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>17. I worry about going to school.</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>18. When I get frightened, my heart beats fast.</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>19. I get shaky.</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>20. I have nightmares about something bad happening to me.</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
</tbody>
</table>

---

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**Tipsheet / List of Tools**
### Screen for Child Anxiety Related Disorders (SCARED)  
**CHILD Version**—Page 2 of 2 (to be filled out by the CHILD)

<table>
<thead>
<tr>
<th></th>
<th>0 Not True or Hardly Ever True</th>
<th>1 Somewhat True or Sometimes True</th>
<th>2 Very True or Often True</th>
</tr>
</thead>
<tbody>
<tr>
<td>21. I worry about things working out for me.</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>22. When I get frightened, I sweat a lot.</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>23. I am a worrier.</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>24. I get really frightened for no reason at all.</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>25. I am afraid to be alone in the house.</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>26. It is hard for me to talk with people I don’t know well.</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>27. When I get frightened, I feel like I am choking.</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>28. People tell me that I worry too much.</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>29. I don’t like to be away from my family.</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>30. I am afraid of having anxiety (or panic) attacks.</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>31. I worry that something bad might happen to my parents.</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>32. I feel shy with people I don’t know well.</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>33. I worry about what is going to happen in the future.</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>34. When I get frightened, I feel like throwing up.</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>35. I worry about how well I do things.</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>36. I am scared to go to school.</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>37. I worry about things that have already happened.</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>38. When I get frightened, I feel dizzy.</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>39. I feel nervous when I am with other children or adults and I have to do something while they watch me (for example: read aloud, speak, play a game, play a sport).</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>40. I feel nervous when I am going to parties, dances, or any place where there will be people that I don’t know well.</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>41. I am shy.</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
</tbody>
</table>

**SCORING:**

A total score of ≥ 25 may indicate the presence of an *Anxiety Disorder*. Scores higher than 30 are more specific.

A score of 7 for items 1, 6, 9, 12, 15, 18, 19, 22, 24, 27, 30, 34, 38 may indicate *Panic Disorder* or *Significant Somatic Symptoms*  

A score of 9 for items 5, 7, 14, 21, 23, 28, 33, 35, 37 may indicate *Generalized Anxiety Disorder*  

A score of 8 for items 4, 8, 13, 16, 20, 25, 29, 31 may indicate *Separation Anxiety SOC*.  

A score of 8 for items 3, 10, 26, 32, 39, 40, 41 may indicate *Social Anxiety Disorder*.  

A score of 3 for items 2, 11, 17, 36 may indicate *Significant School Avoidance*.  

For children ages 8 to 11, it is recommended that the clinician explain all questions, or have the child answer the questionnaire sitting with an adult in case they have any questions.

The SCARED is available at no cost at [www.wpic.pitt.edu/research/tools](http://www.wpic.pitt.edu/research/tools) and assessments, or at [www.pediatric.bipolar.pitt.edu](http://www.pediatric.bipolar.pitt.edu) under instruments.

March 27, 2012

Adapted with permission from Boris Birmaher, M.D., Suneeta Khetarpal, M.D., Marlene Cully, M.Ed., David Brent, M.D., and Sandra McKenzie, Ph.D., Western Psychiatric Institute and Clinic, University of Pittsburgh (October, 1995). E-mail: birmaherb@upmc.edu.
**Tool 5.11: Screening Questions for Persistent Cognitive Problems**

**Instructions:** We would like to know if you (your child) is/are having any of these problems since their injury. Next, we would like to know if these problems were present before the injury. Then, if there is a problem, tell us how much of a problem this has been.

<table>
<thead>
<tr>
<th>Problem Area: Is the child/adolescent having problems?</th>
<th>Is this a problem for the child/adolescent now? If yes, how much?</th>
<th>Was this a problem before the concussion? If yes, how much?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Paying attention/concentrating</td>
<td>No/Yes</td>
<td>No/Yes</td>
</tr>
<tr>
<td></td>
<td>Mild/Moderate/Severe</td>
<td>Mild/Moderate/Severe</td>
</tr>
<tr>
<td>2. Short-term memory (example: forgetting what you were just told)</td>
<td>No/Yes</td>
<td>No/Yes</td>
</tr>
<tr>
<td></td>
<td>Mild/Moderate/Severe</td>
<td>Mild/Moderate/Severe</td>
</tr>
<tr>
<td>3. Learning new information (example: school material)</td>
<td>No/Yes</td>
<td>No/Yes</td>
</tr>
<tr>
<td></td>
<td>Mild/Moderate/Severe</td>
<td>Mild/Moderate/Severe</td>
</tr>
<tr>
<td>4. Recalling learned information from memory</td>
<td>No/Yes</td>
<td>No/Yes</td>
</tr>
<tr>
<td></td>
<td>Mild/Moderate/Severe</td>
<td>Mild/Moderate/Severe</td>
</tr>
<tr>
<td>5. Organizing work or materials</td>
<td>No/Yes</td>
<td>No/Yes</td>
</tr>
<tr>
<td></td>
<td>Mild/Moderate/Severe</td>
<td>Mild/Moderate/Severe</td>
</tr>
<tr>
<td>School performance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Reading</td>
<td>No/Yes</td>
<td>No/Yes</td>
</tr>
<tr>
<td></td>
<td>Mild/Moderate/Severe</td>
<td>Mild/Moderate/Severe</td>
</tr>
<tr>
<td>7. Math</td>
<td>No/Yes</td>
<td>No/Yes</td>
</tr>
<tr>
<td></td>
<td>Mild/Moderate/Severe</td>
<td>Mild/Moderate/Severe</td>
</tr>
<tr>
<td>8. Writing</td>
<td>No/Yes</td>
<td>No/Yes</td>
</tr>
<tr>
<td></td>
<td>Mild/Moderate/Severe</td>
<td>Mild/Moderate/Severe</td>
</tr>
<tr>
<td>9. Declining grades</td>
<td>No/Yes</td>
<td>No/Yes</td>
</tr>
<tr>
<td></td>
<td>Mild/Moderate/Severe</td>
<td>Mild/Moderate/Severe</td>
</tr>
</tbody>
</table>

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Tool 5.12: General Considerations Regarding Pharmacotherapy

Guidelines for Diagnosing and Managing Pediatric Concussion

Tool 5.12: General Considerations Regarding Pharmacotherapy

- Address significant psycho-social difficulties (for example, major family/caregiver conflict, other environmental issues) before starting treatment.
- Review current medications, including over-the-counter medicines and supplements, before starting treatment. If possible, minimize or withdraw agents that may exacerbate or maintain symptoms.
- Change only one medication at a time.
- Target drug therapy to specific symptoms (example: dysphoria, anxiety, mood swings, irritability, fatigue, sleep, headache and pain), and monitor during the course of treatment.
- Choose therapies that minimize the impact of adverse effects on awakening, cognition, sleep and motor coordination, as well as on seizure threshold-domains in which children/adolescents with concussion may already be compromised.
- Start at the lowest effective dose and titrate slowly upwards, monitoring tolerability and clinical response, and also aiming for adequate dose and duration. Treatment often fails because either are insufficient. At times, you may have to prescribe the maximum tolerated doses.
- Aim to use a single agent to alleviate several symptoms. However, as individual symptoms may not show a coupled response to treatment, you may have to try a combination of strategies.
- Offer limited quantities of medications to those at a higher risk of suicide.
- Continue successful pharmacotherapy for at least six months, preferably 9 to 12 months for SSRIs, before tapering off on a trial basis.
- Use a specific SSRI as first-line treatment for mood and anxiety syndromes. Avoid using benzodiazepines as first-line therapy for anxiety.
- Follow up regularly.

Adapted from Silver JM, Arciniegas DB, Yudovsky SC. Psychopharmacology. In: Silver JM, Arciniegas DB, Yudovsky SC, eds. Adapted with permission from the Textbook of Traumatic Brain Injury, (Copyright ©2005). American Psychiatric Association. All Rights Reserved.
## Tool 5.13: Post-concussion Symptom Inventory for Children aged 5-7

### Guidelines for Diagnosing and Managing Pediatric Concussion

**Post-Concussion Assessment 1 2 3 4 5 6**

**Post-Concussion Symptom Inventory for Children (PCSI-C)**  
**Version 5-7 Years Pre and Post-Injury (Interview Form)**

**Name:** ________________  
**Today’s date:** ____________

**Birthdate:** ________________  
**Age:** _____  
**Grade:** _______

**Instructions:** We would like to know if you have had any of these symptoms before your injury. Next, we would like to know if these symptoms have changed after your injury.

I am going to ask you to tell me about your symptom at two points in time - Before the Injury and Yesterday / Today. Interviewer: Please circle only one answer.

<table>
<thead>
<tr>
<th></th>
<th>0 = No</th>
<th>1 = A little</th>
<th>2 = A lot</th>
<th>Before the Injury/Pre-Injury</th>
<th>Current Symptoms/Yesterday and Today</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Have you had headaches? Has your head hurt?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>Have you felt sick to your stomach or like you were going to throw up?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>Have you felt like you might fall when you walk, run or stand?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>Have you felt dizzy? (like things around you were spinning or moving)</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>Have you felt more tired than usual?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>6</td>
<td>Have bright lights bothered you more than usual? (like when you were in the sunlight, when you looked at lights, or watched TV)</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>7</td>
<td>Have loud noises bothered you more than usual? (like when people were talking, when you heard sounds, watched TV, or listened to loud music)</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>8</td>
<td>Have you felt grumpy? (like you were in a bad mood)</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>9</td>
<td>Have you felt sad?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>10</td>
<td>Have you felt nervous or worried?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>11</td>
<td>Has it been hard for you to pay attention to what you are doing? (like homework or chores, listening to someone, or playing a game)</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>12</td>
<td>Has it been hard for you to remember things? (like things you heard or saw or places you have gone)</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>13</td>
<td>Have things looked fuzzy or blurry?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>14</td>
<td>Do you feel “different” than usual?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>

**Author/Developed by:** Gioia, Janusz, Sady, Vaughan, Schneider, & Natale. 2012.  
**Reproduced with permission from Maegan D. Sady, Christopher G. Vaughan, Gerard A. Gioia 2014.**
Tool 5.14: Post-concussion Symptom Inventory for Children aged 8-12

Guidelines for Diagnosing and Managing Pediatric Concussion

Post-Concussion Symptom Inventory for Children (PCSI-C)
Version 8 to 12

| Name: ____________________ | Today's date: _____ | Birthdate: _____ | Age: _____ | Grade: _____ |

Instructions: We would like to know if you have had any of these symptoms before your injury. Next, we would like to know if these symptoms have changed after your injury. Please rate the symptom at two points in time—before the injury/pre-injury and current symptoms/yesterday and today.

Please answer all the items the best that you can. Do not skip any items. Circle the number to tell us how much of a problem this symptom has been for you.

<table>
<thead>
<tr>
<th>0 = No</th>
<th>1 = A little</th>
<th>2 = A lot</th>
<th>Before the Injury/Pre-Injury</th>
<th>Current Symptoms/Yesterday and Today</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
<td>0</td>
<td>1</td>
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<td>17</td>
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<td>0</td>
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</tr>
<tr>
<td>18</td>
<td></td>
<td></td>
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</table>

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**Tool 5.15: Post-concussion Symptom Inventory Self-assessment, ages 13-18**

*Guidelines for Diagnosing and Managing Pediatric Concussion*

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**Post-Concussion Symptom Inventory (PCSII)**

**Self-Report Assessment Form**

**Pre and Post-Injury Report**

**Ages 13-18**

**Patient Name:** __________________________

**Birthday:** __________________________

**Today's date:** __________

**Age:** __________

**Instructions:** We would like to know if you have had any of these symptoms before your injury. Next, we would like to know if these symptoms have changed after your injury. Please rate the symptom at two points in time: Before the Injury/Pre-Injury and Currently.

Please answer all the items the best that you can. Do not skip any items. Circle the number to tell us how much of a problem this symptom has been for you.

*0 = Not a problem   3 = Moderate problem   6 = Severe problem*

<table>
<thead>
<tr>
<th></th>
<th>Before the Injury/ Pre-Injury</th>
<th>Current Symptoms/ Yesterday and Today</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Headache</td>
<td>0 1 2 3 4 5 6</td>
</tr>
<tr>
<td>2</td>
<td>Nausea</td>
<td>0 1 2 3 4 5 6</td>
</tr>
<tr>
<td>3</td>
<td>Balance problems</td>
<td>0 1 2 3 4 5 6</td>
</tr>
<tr>
<td>4</td>
<td>Dizziness</td>
<td>0 1 2 3 4 5 6</td>
</tr>
<tr>
<td>5</td>
<td>Fatigue</td>
<td>0 1 2 3 4 5 6</td>
</tr>
<tr>
<td>6</td>
<td>Drowsiness</td>
<td>0 1 2 3 4 5 6</td>
</tr>
<tr>
<td>7</td>
<td>Sensitivity to light</td>
<td>0 1 2 3 4 5 6</td>
</tr>
<tr>
<td>8</td>
<td>Sensitivity to noise</td>
<td>0 1 2 3 4 5 6</td>
</tr>
<tr>
<td>9</td>
<td>Irritability</td>
<td>0 1 2 3 4 5 6</td>
</tr>
<tr>
<td>10</td>
<td>Sadness</td>
<td>0 1 2 3 4 5 6</td>
</tr>
<tr>
<td>11</td>
<td>Nervousness</td>
<td>0 1 2 3 4 5 6</td>
</tr>
<tr>
<td>12</td>
<td>Feeling more emotional</td>
<td>0 1 2 3 4 5 6</td>
</tr>
<tr>
<td>13</td>
<td>Feeling slowed down</td>
<td>0 1 2 3 4 5 6</td>
</tr>
<tr>
<td>14</td>
<td>Feeling mentally “foggy”</td>
<td>0 1 2 3 4 5 6</td>
</tr>
<tr>
<td>15</td>
<td>Difficulty concentrating</td>
<td>0 1 2 3 4 5 6</td>
</tr>
<tr>
<td>16</td>
<td>Difficulty remembering</td>
<td>0 1 2 3 4 5 6</td>
</tr>
<tr>
<td>17</td>
<td>Visual problems (double vision, blurring)</td>
<td>0 1 2 3 4 5 6</td>
</tr>
<tr>
<td>18</td>
<td>Get confused with directions or tasks</td>
<td>0 1 2 3 4 5 6</td>
</tr>
<tr>
<td>19</td>
<td>Move in a clumsy manner</td>
<td>0 1 2 3 4 5 6</td>
</tr>
<tr>
<td>20</td>
<td>Answer questions more slowly than usual</td>
<td>0 1 2 3 4 5 6</td>
</tr>
</tbody>
</table>

**In general, to what degree do you feel “differently” than before the injury (not feeling like yourself)?**

<table>
<thead>
<tr>
<th></th>
<th>No Difference</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>Major Difference</th>
</tr>
</thead>
</table>

*Circle your rating with “0” indicating “Normal” (No Difference) and “4” indicating “Very Different” (Major Difference).*

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**Tipsheet / List of Tools**