Concussion Diagnosis and Management Procedures

For a visual overview of the steps and role responsibilities in suspected and diagnosed concussions, see Chart 1 (pg 17-18).

CONTEXT

Recent research has made it clear that a concussion can have a significant impact on a child's cognitive and physical abilities. Without identification and proper management, a concussion can result in permanent brain damage and in rare occasions, even death.

Research also suggests that a child or youth who suffers a second concussion before he or she is symptom free from the first concussion is susceptible to a prolonged period of recovery, and possibly Second Impact Syndrome – a rare condition that causes rapid and severe brain swelling and often catastrophic results.

Facilitators and program staff play a crucial role in the identification of a suspected concussion as well as the ongoing monitoring and management of a child with a concussion. Awareness of the signs and symptoms of concussion and knowledge of how to properly manage a diagnosed concussion is critical in a child's recovery and is essential in helping to prevent the child from returning to learning or physical activities too soon and risking further complications. Ultimately, this awareness and knowledge could help contribute to the child's long-term health success.

CONCUSSION DEFINITION

A concussion:

- is a brain injury that causes changes in how the brain functions, leading to symptoms that can be physical (e.g., headache, dizziness), cognitive (e.g., difficulty concentrating or remembering), emotional/behavioural (e.g., depression, irritability) and/or related to sleep (e.g., drowsiness, difficulty falling asleep);
- may be caused either by a direct blow to the head, face or neck, or a blow to the body that transmits a force to the head that causes the brain to move rapidly within the skull;
- can occur even if there has been no loss of consciousness (in fact most concussions occur without a loss of consciousness); and,
- cannot normally be seen on X-rays, standard CT scans or MRIs.

CONCUSSION DIAGNOSIS

A concussion is a clinical diagnosis made by a medical doctor or nurse practitioner. It is critical that a child with a suspected concussion be examined by a medical doctor or nurse practitioner.

CONCUSSION COMMON SIGNS AND SYMPTOMS

Following a blow to the head, face or neck, or a blow to the body that transmits a force to the head, a concussion should be suspected in the presence of **any one or more** of the following signs or symptoms in TABLE 1.

Note:

- Signs and symptoms can appear immediately after the injury or may take hours or days to emerge.
- Signs and symptoms may be different for everyone.
- A child may be reluctant to report symptoms because of a fear that he/she will be removed from the activity, his/her status on a team or in a game could be jeopardized or participation could be impacted.
- It may be difficult for younger children (under the age of 10), children with special needs or children for whom English is not their first language to communicate how they are feeling.
- Signs for younger children (under the age of 10) may not be as obvious as in older children.

TABLE 1: Common Signs and Symptoms of a Concussion

Possible Signs Observed *A sign is something that will be observed by another person (e.g., parent/guardian, teacher, coach, supervisor, peer).*	**Possible Symptoms Reported** *A symptom is something the student will feel/report.*
Physical • vomiting • slurred speech • slowed reaction time • poor coordination or balance • blank stare/glassy-eyed/dazed or vacant look • decreased playing ability • loss of consciousness or lack of responsiveness • lying motionless on the ground or slow to get up • amnesia • seizure or convulsion • grabbing or clutching of head	**Physical** • headache • pressure in head • neck pain • feeling off/not right • ringing in the ears • seeing double or blurry/loss of vision • seeing stars, flashing lights • pain at physical site of injury • nausea/stomach ache/pain • balance problems or dizziness • fatigue or feeling tired • sensitivity to light or noise
Cognitive • difficulty concentrating • easily distracted • general confusion • cannot remember things that happened before and after the injury • does not know time, date, place, class, type of activity in which he/she was participating • slowed reaction time (e.g., answering questions or following directions)	**Cognitive** • difficulty concentrating or remembering • slowed down, fatigue or low energy • dazed or in a fog
Emotional/Behavioural • strange or inappropriate emotions (e.g., laughing, crying, getting angry easily)	**Emotional/Behavioural** • irritable, sad, more emotional than usual • nervous, anxious, depressed
Sleep Disturbance • drowsiness • insomnia	**Sleep Disturbance** • drowsy • sleeping more/less than usual • difficulty falling asleep

INITIAL RESPONSE: IDENTIFICATION

If a child receives a blow to the head, face or neck, or a blow to the body that transmits a force to the head that causes the brain to move rapidly within the skull, and as a result may have suffered a concussion, the individual (e.g., teacher/coach) responsible for that child must take immediate action as follows:

Unconscious Child (or where there was any loss of consciousness)

- Stop the activity immediately – assume there is a concussion.
- Initiate Emergency Action Plan and call 911. Do not move the child.
- Assume there is a possible neck injury and, only if trained, immobilize the child before emergency medical services arrive.
    - Do not remove athletic equipment (e.g., helmet) unless there is difficulty breathing.
- Stay with the child until emergency medical services arrive.
- Contact the child's parent/guardian (or emergency contact) to inform them of the incident and that emergency medical services have been contacted.
- Monitor and document any changes (i.e., physical, cognitive, emotional/behavioural) in the child.
    - Refer to injury report form for documentation procedures.
- If the child regains consciousness, encourage him/her to remain calm and to lie still. Do not administer medication (unless the child requires medication for other conditions – e.g., insulin for a child with diabetes).

Conscious Student

- Stop the activity immediately.
- Initiate Emergency Action Plan.
- When the child can be safely moved, remove him/her from the current activity or game.
- Conduct an initial concussion assessment of the child (i.e., using "Appendix C-2 - Tool to Identify a Suspected Concussion"):

If sign(s) are observed and/or symptom(s) are reported and/or the child fails the Quick Memory Function Assessment (see Appendix C-2):

Leader Response

- A concussion should be suspected – do not allow the child to return to play in the activity, game or practice that day even if the child states that he/she is feeling better.
- Contact the child's parent/guardian (or emergency contact) to inform them:
  - of the incident;
  - that they need to come and pick up the child; and,
  - that the child needs to be examined by a medical doctor or nurse practitioner as soon as possible that day.
- Monitor and document any changes (i.e., physical, cognitive, emotional/behavioural) in the child. If any signs or symptoms worsen, call 911. Refer to injury report form for documentation procedures.
- Do not administer medication (unless the child requires medication for other conditions – e.g., insulin for a child with diabetes).
- Stay with the child until her/his parent/guardian (or emergency contact) arrives. The child must not leave the premises without parent/guardian (or emergency contact) supervision.

Information to be provided to Parent/Guardian

- Parent/Guardian must be:
    - provided with a copy of "Appendix C-2 – Tool to Identify a Suspected Concussion" signed by the Leader;
    - informed that the child needs to be examined by a medical doctor or nurse practitioner as soon as possible that day; and,
    - informed that they need to communicate to the Program Coordinator the results of the medical examination (i.e., the child does not have a diagnosed concussion or the child has a diagnosed concussion) prior to the child returning to the program
        - If **no** concussion is diagnosed: the child may resume regular learning and physical activities.
        - If a concussion is diagnosed: the child follows a medically supervised, individualized and gradual Return to Physical Activity Plan.

If signs are NOT Observed, symptoms are NOT reported AND the child passes the Quick Memory Function Assessment (C-2):

Leader response:

- A concussion is not suspected - the child may return to physical activity.
- However the child's parent/guardian (or emergency contact) must be contacted and informed of the incident.

Information to be provided to Parent/Guardian

- Parent/Guardian must be:
    - provided with a copy of "Appendix C-2 - Tool to Identify a Suspected Concussion" signed by the leader; and,
    - informed that:
        - signs and symptoms may not appear immediately and may take hours or days to emerge;
        - the child should be monitored for 24-48 hours following the incident; and,
        - if any signs or symptoms emerge, the child needs to be examined by a medical doctor or nurse practitioner as soon as possible that day.

Responsibilities of the Program Coordinator

Once a child has been identified as having a suspected concussion, the Program Coordinator must:

- inform all program staff (e.g., leaders, coaches) and volunteers who work with the child of the suspected concussion; and,
- indicate that the child shall not participate in any learning or physical activities until the parent/guardian communicates the results of the medical examination (i.e., the child does not have a diagnosed concussion or the child has a diagnosed concussion) to the Program Coordinator by returning a note signed and dated by the parent/guardian).

Once the parent/guardian has informed the Program Coordinator of the results of the medical examination, the Program Coordinator must:

- inform all program staff (e.g., leaders, coaches) and volunteers who work with the student of the diagnosis; and,
- file written documentation (e.g. parent's note) of the results of the medical examination.

DOCUMENTATION OF MEDICAL EXAMINATION:

Prior to a child with a suspected concussion returning to program, the parent/guardian must communicate the results of the medical examination (i.e., child does not have a diagnosed concussion or the child has a diagnosed concussion) to the Program Coordinator by returning a note signed and dated by the parent/guardian.

- If no concussion is diagnosed: the child may resume regular learning and physical activities.
- If a concussion is diagnosed: the child follows a medically supervised, individualized and gradual Return to Activity Plan. The parent/guardian must inform the child's school of the diagnosis. Each school board has a Return to Learn/Return to Physical Activity protocol and it is imperative that the school administration take the lead in implementing the return to activity process.

Return to Activity Plan

A child with a diagnosed concussion needs to follow a medically supervised, individualized and gradual Return to Physical Activity Plan. A child with a diagnosed concussion must be symptom free prior to returning to regular activities. The return to activity process follows an internationally recognized graduated stepwise approach.

Collaborative Team Approach:

It is critical to a child's recovery that the Return to Activity Plan be developed through a collaborative team approach. Led by the Parents/Guardians, the team should include:

- the concussed child;
- her/his parents/guardians;
- school staff;
- program staff and volunteers who work with the child – in all community programs; and,
- the medical doctor or nurse practitioner.

Ongoing communication and monitoring by all members of the team is essential for the successful recovery of the child.

Completion of the Steps within the Plan:

The steps of the Return to Activity Plan may occur at home or at school as the program setting is typically short term.

The collaborative team must ensure that steps 1-4 of the Return to Activity Plan are completed. As such, written documentation from a medical doctor or nurse practitioner that indicates the child is symptom free and able to return to full participation in physical activity must be provided by the child's parent/guardian to the Program Coordinator and to the School Principal and kept on file (e.g., in the student's OSR).

It is important to note:

- Cognitive or physical activities can cause a child's symptoms to reappear.
- Steps are not days – each step must take a minimum of 24 hours and the length of time needed to complete each step will vary based on the severity of the concussion and the child.
- The signs and symptoms of a concussion often last for 7 – 10 days, but may last longer in children and adolescents.

Step 1 – Return to Activity

The child does not attend school or programs during Step 1.

The most important treatment for concussion is rest (i.e., cognitive and physical).

- 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.

Step 1 continues for a minimum of 24 hours and until:

- the child's symptoms begin to improve; **OR,**
- the child is symptom free;

as determined by the parents/guardians and the concussed child.

Parent/Guardian:

Before the child can return to programming, the parent/guardian must communicate to the program coordinator that:

- the child is **symptom free** (and the child will proceed directly to Step 2b – Return to Learn and Step 2 – Return to Physical Activity).

The child can only return to the program when they are symptom free as confirmed by the parent/guardian in a written note and signed off by documentation of medical examination.

Program staff will work with school staff and the parent/guardian to ensure the safety of the child.

The remaining steps in the plan are outlined below as recorded from the Ministry of Education.

Return to Learn – Designated School Staff Lead:

The designated school staff lead will monitor the child's progress through the Return to Learn/Return to Physical Activity Plan. This may include identification of the child's symptoms and how he/she responds to various activities in order to develop and/or modify appropriate strategies and approaches that meet the changing needs of the child.

Step 2a – Return to Learn

A child with symptoms that are improving, but who is not yet symptom free, may return to school and begin Step 2a – Return to Learn.

During this step, the child requires individualized classroom strategies and/or approaches to return to learning activities - these will need to be adjusted as recovery occurs (see Table 2 - Return to Learn Strategies). At this step, the child's cognitive activity should be increased slowly (both at school and at home), since the concussion may still affect his/her academic performance. Cognitive activities can cause a child's concussion symptoms to reappear or worsen.

It is important for the designated school staff lead, in consultation with other members of the collaborative team, to identify the child's symptoms and how he/she responds to various learning activities in order to develop appropriate strategies and/or approaches that meet the needs of the child. School staff and volunteers who work with the child need to be aware of the possible difficulties (i.e., cognitive, emotional/behavioural) a child may encounter when returning to learning activities following a concussion. These difficulties may be subtle and temporary, but may significantly impact a child's performance.

Note: "Compared to older students, elementary school children are more likely to complain of physical problems or misbehave in response to cognitive overload, fatigue, and other concussion symptoms."[5]

Parent/Guardian:

Must communicate to the school principal that the child is symptom free before the child can proceed to Step 2b – Return to Learn and Step 2 – Return to Physical Activity.

TABLE 2: Return to Learn Strategies/Approaches[4]

COGNITIVE DIFFICULTIES		
Post Concussion Symptoms	**Impact on Student's Learning**	**Potential Strategies and/or Approaches**
Headache and Fatigue	Difficulty concentrating, paying attention or multitasking	• ensure instructions are clear (e.g., simplify directions, have the student repeat directions back to the teacher) • allow the student to have frequent breaks, or return to school gradually (e.g., 1-2 hours, half-days, late starts) • keep distractions to a minimum (e.g., move the student away from bright lights or noisy areas) • limit materials on the student's desk or in their work area to avoid distractions • provide alternative assessment opportunities (e.g., give tests orally, allow the student to dictate responses to tests or assignments, provide access to technology)
Difficulty remembering or processing speed	Difficulty retaining new information, remembering instructions, accessing learned information	• provide a daily organizer and prioritize tasks • provide visual aids/cues and/or advance organizers (e.g., visual cueing, non-verbal signs) • divide larger assignments/assessments into smaller tasks • provide the student with a copy of class notes • provide access to technology • repeat instructions • provide alternative methods for the student to demonstrate mastery
Difficulty paying attention/ concentrating	Limited/short-term focus on schoolwork Difficulty maintaining a regular academic workload or keeping pace with work demands	• coordinate assignments and projects among all teachers • use a planner/organizer to manage and record daily/weekly homework and assignments • reduce and/or prioritize homework, assignments and projects • extend deadlines or break down tasks • facilitate the use of a peer note taker • provide alternate assignments and/or tests • check frequently for comprehension • consider limiting tests to one per day and student may need extra time or a quiet environment

[4] Adapted from Davis GA, Purcell LK. The evaluation and management of acute concussion differs in young children. Br J Sports Med. Published Online First 23 April 2013 doi:10.1136/bjsports-2012-092132

EMOTIONAL/BEHAVIOURAL DIFFICULTIES		
Post Concussion Symptoms	**Impact on Student's Learning**	**Potential Strategies and/or Approaches**
Anxiety	Decreased attention/concentration Overexertion to avoid falling behind	• inform the student of any changes in the daily timetable/schedule • adjust the student's timetable/schedule as needed to avoid fatigue (e.g., 1-2 hours/periods, half-days, full-days) • build in more frequent breaks during the school day • provide the student with preparation time to respond to questions
Irritable or Frustrated	Inappropriate or impulsive behaviour during class	• encourage teachers to use consistent strategies and approaches • acknowledge and empathize with the student's frustration, anger or emotional outburst if and as they occur • reinforce positive behaviour • provide structure and consistency on a daily basis • prepare the student for change and transitions • set reasonable expectations • anticipate and remove the student from a problem situation (without characterizing it as punishment)
Light/Noise Sensitivity	Difficulties working in classroom environment (e.g., lights, noise, etc.)	• arrange strategic seating (e.g., move the student away from window or talkative peers, proximity to the teacher or peer support, quiet setting) • where possible provide access to special lighting (e.g., task lighting, darker room) • minimize background noise • provide alternative settings (e.g., alternative work space, study carrel) • avoid noisy crowded environments such as assemblies and hallways during high traffic times • allow the student to eat lunch in a quiet area with a few friends • where possible provide ear plugs/headphones, sunglasses
Depression/ Withdrawal	Withdrawal from participation in school activities or friends	• build time into class/school day for socialization with peers • partner student with a "buddy" for assignments or activities

Step 2b – Return to Learn (occurs concurrently with Step 2 – Return to Physical Activity)

A child who:

- has progressed through Step 2a – Return to Learn and is now symptom free may proceed to Step 2b – Return to Learn; or,
- becomes symptom free soon after the concussion may begin at Step 2b – Return to Learn (and may return to school if previously at Step 1).

At this step, the child begins regular learning activities without any individualized classroom strategies and/or approaches.

- This step occurs concurrently with Step 2 – Return to Physical Activity.

Note: Since concussion symptoms can reoccur during cognitive and physical activities, students at Step 2b – Return to Learn or any of the following return to physical activity steps must continue to be closely monitored by the designated school staff lead and collaborative team for the return of any concussion symptoms and/or a deterioration of work habits and performance.

- If, at any time, concussion signs and/or symptoms return and/or deterioration of work habits or performance occur, the student must be examined by a medical doctor or nurse practitioner.
- The parent/guardian must communicate the results and the appropriate step to resume the Return to Learn/Return to Physical Activity Plan to the school principal (e.g., see "Appendix C-4 - Documentation for a Diagnosed Concussion – Return to Learn/Return to Physical Activity Plan") before the student can return to school.

Step 2 – Return to Physical Activity

Activity: Individual light aerobic physical activity only (e.g., walking, swimming or stationary cycling keeping intensity below 70% of maximum permitted heart rate)

Restrictions: No resistance or weight training. No competition (including practices, scrimmages). No participation with equipment or with other students. No drills. No body contact.

Objective: To increase heart rate

Parent/Guardian:

Must report back to the school principal (e.g., see "Appendix C-4 - Documentation for a Diagnosed Concussion – Return to Learn/Return to Physical Activity Plan") that the student continues to be symptom free in order for the student to proceed to Step 3.

Step 3 – Return to Physical Activity

Activity: Individual sport-specific physical activity only (e.g., running drills in soccer, skating drills in hockey, shooting drills in basketball)

Restrictions: No resistance/weight training. No competition (including practices, scrimmages). No body contact, no head impact activities (e.g., heading a ball in soccer) or other jarring motions (e.g., high speed stops, hitting a baseball with a bat).

Objective: To add movement

Step 4 – Return to Physical Activity

Activity: Activities where there is no body contact (e.g., dance, badminton). Progressive resistance training may be started. Non-contact practice and progression to more complex training drills (e.g., passing drills in football and ice hockey).

Restrictions: No activities that involve body contact, head impact (e.g., heading the ball in soccer) or other jarring motions (e.g., high speed stops, hitting a baseball with a bat)

Objective: To increase exercise, coordination and cognitive load

Teacher:

Communicates with parents/guardians that the student has successfully completed Steps 3 and 4 (see "Appendix C-4 - Documentation for a Diagnosed Concussion – Return to Learn/Return to Physical Activity Plan")

Parent/Guardian:

Must provide the school principal with written documentation from a medical doctor or nurse practitioner (e.g., completed "Appendix C-4 - Documentation for a Diagnosed Concussion – Return to Learn/Return to Physical Activity Plan") that indicates the student is symptom free and able to return to full participation in physical activity in order for the student to proceed to Step 5 – Return to Physical Activity.

School Principal:

Written documentation (e.g., "Appendix C-4 - Documentation for a Diagnosed Concussion – Return to Learn/Return to Physical Activity Plan") is then filed (e.g., in the student's OSR) by the school principal.

Step 5 – Return to Physical Activity

Activity: Full participation in regular physical education/intramural/interschool activities in non-contact sports. Full training/practices for contact sports.

Restrictions: No competition (e.g., games, meets, events) that involve body contact

Objective: To restore confidence and assess functional skills by teacher/coach

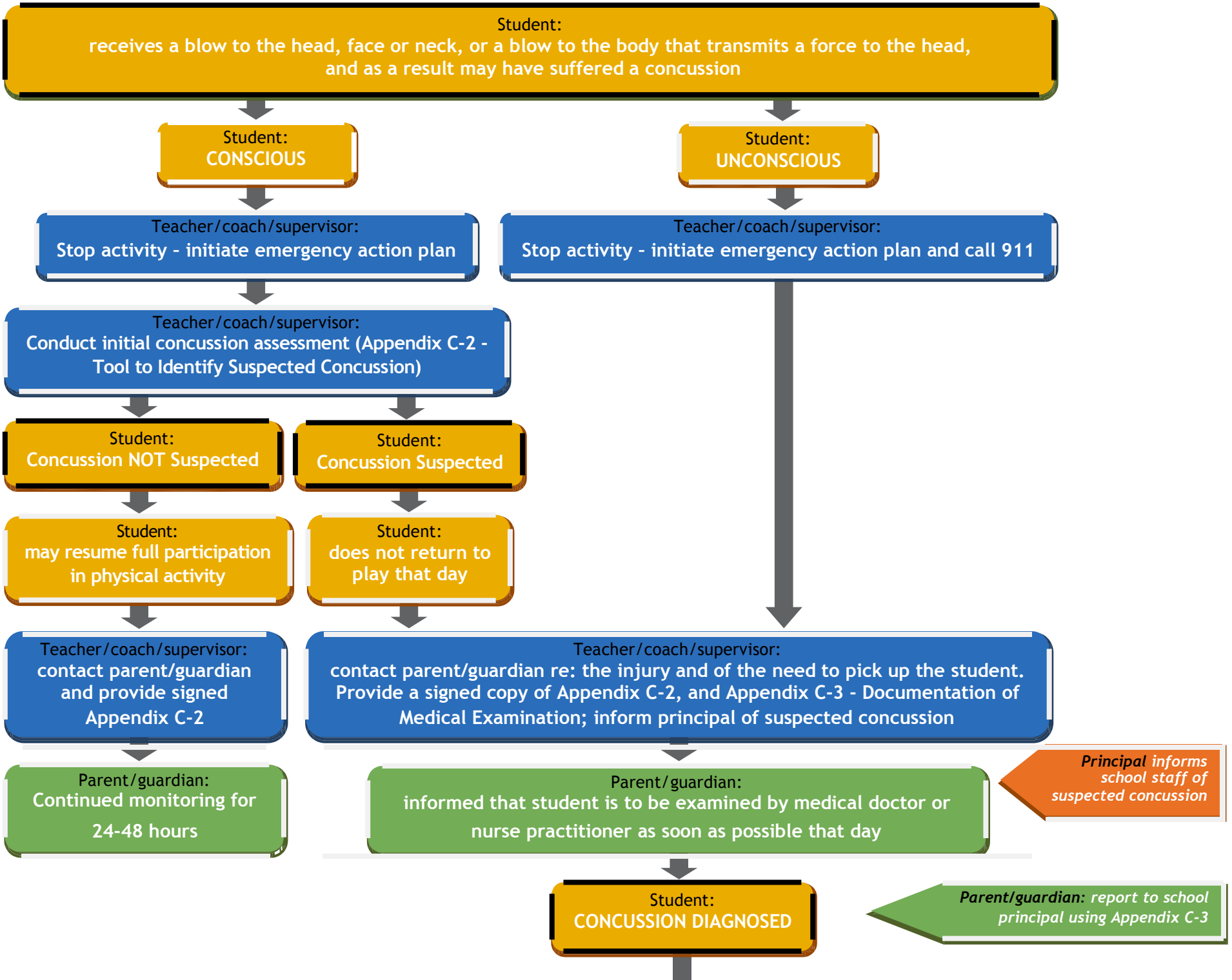
Step 6 – Return to Physical Activity (Contact sports only)

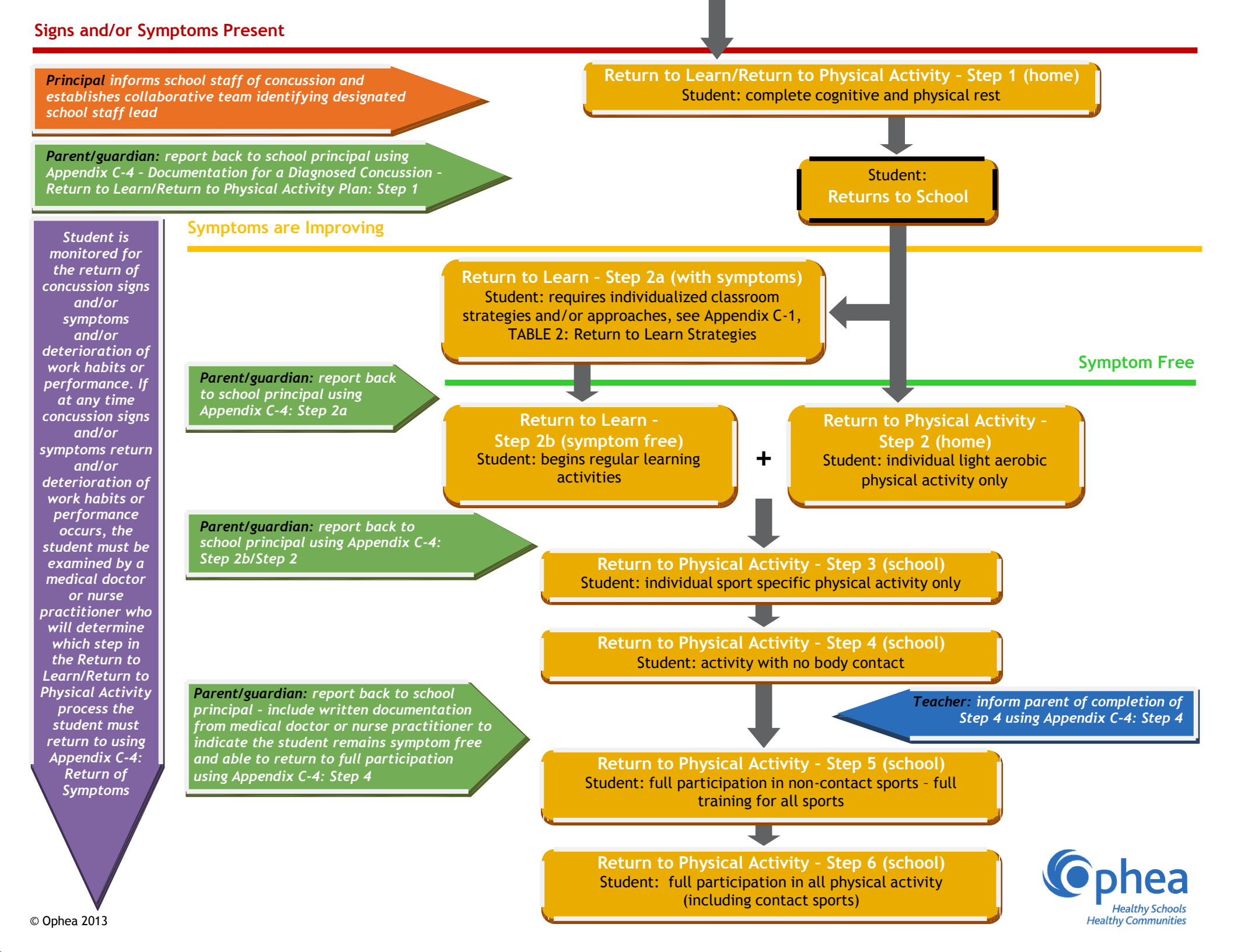
Activity: Full participation in contact sports

Restrictions: None

Please find below a visual overview of the steps and role responsibilities in suspected and diagnosed concussions as prepared by the Ministry of Education. To print the chart, set the **Page range** to pages 18-19. Set the **Page scaling** to "Fit to printable area" for best results. The chart will print on two 8.5" x 11" sheets. For a single-page, electronic 11" x 17" version of the chart, please email safety@ophea.net.

CHART 1: Steps and Responsibilities in Suspected and Diagnosed Concussions




Signs and/or Symptoms Present
Principal informs school staff of concussion and establishes collaborative team identifying designated school staff lead
Parent/guardian: report back to school principal using Appendix C-4 - Documentation for a Diagnosed Concussion - Return to Learn/Return to Physical Activity Plan: Step 1
Return to Learn/Return to Physical Activity - Step 1 (home)
Student: complete cognitive and physical rest
Student: Returns to School
Symptoms are Improving
Return to Learn - Step 2a (with symptoms)
Student: requires individualized classroom strategies and/or approaches, see Appendix C-1, TABLE 2: Return to Learn Strategies
Symptom Free
Parent/guardian: report back to school principal using Appendix C-4: Step 2a
Return to Learn - Step 2b (symptom free)
Student: begins regular learning activities
+
Return to Physical Activity - Step 2 (home)
Student: individual light aerobic physical activity only
Parent/guardian: report back to school principal using Appendix C-4: Step 2b/Step 2
Return to Physical Activity - Step 3 (school)
Student: individual sport specific physical activity only
Return to Physical Activity - Step 4 (school)
Student: activity with no body contact
Teacher: inform parent of completion of Step 4 using Appendix C-4: Step 4
Parent/guardian: report back to school principal - include written documentation from medical doctor or nurse practitioner to indicate the student remains symptom free and able to return to full participation using Appendix C-4: Step 4
Return to Physical Activity - Step 5 (school)
Student: full participation in non-contact sports - full training for all sports
Return to Physical Activity - Step 6 (school)
Student: full participation in all physical activity (including contact sports)
Student is monitored for the return of concussion signs and/or symptoms and/or deterioration of work habits or performance. If at any time concussion signs and/or symptoms return and/or deterioration of work habits or performance occurs, the student must be examined by a medical doctor or nurse practitioner who will determine which step in the Return to Learn/Return to Physical Activity process the student must return to using Appendix C-4: Return of Symptoms
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