3rd EDITION

CONCUSSION KiT

Understanding and Managing Concussion in Youth

Hôpital de Montréal pour enfants
Centre universitaire de santé McGill

Montreal Children's Hospital
McGill University Health Centre

TRAUMATOLOGIE TRAUMA

Thank you to **Andy Collins for Kids**
for generously sponsoring this publication.

All information in the KiT is based on the clinical experience and expertise of the Montreal Children's Hospital Trauma Centre, McGill University Health Centre.

It is in keeping with current research.

thechildren.com/concussions

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Note from the Editors

Concussions have been identified as a health issue of significant societal concern. As such, they are of great interest to the medical, sports, educational, and scientific communities.

Over the past 20 years Trauma Specialists at the Montreal Children's Hospital Trauma Centre, McGill University Health Centre have been leaders in this area, developing and implementing an innovative, comprehensive, proactive, inter-professional approach to the management of concussions in youth. The approach to care is in keeping with the most recent evidence and based on extensive clinical expertise.

The 3rd edition of the Concussion KiT once again provides us with an opportunity to combine our trauma knowledge and expertise with injury prevention strategies, and apply it to the composite life of a child or teen at school, play, and at home. The key messages conveyed in this Concussion KiT are: 1) recognize symptoms early on, 2) see a doctor to confirm diagnosis, 3) follow recommendations for a period of physical, cognitive and academic activity restrictions, 4) never play injured, and 5) only return to complete activity when symptom free and do so in a gradual manner.

We proudly present the 3rd edition of the Montreal Children's Hospital, Trauma Centre, McGill University Health Centre Concussion KiT. In it you will find:

- Information on the prevention, recognition, and management of concussions
- General Activity Management Plan
- Return to Learn Management Plan
- Return to Physical Activity/Sports Management Plan
- Recommendations for teachers and educators
- References

The prevention, recognition, and management of children and teens with a concussion is challenging and drawing the attention of many. Our KiT is therefore designed to provide important information to our target audience comprised of clinicians, teachers, educators, coaches, professional sporting associations, governing bodies, parents, patients, media and community organizations, so as to enhance their understanding, and thereby support the child or teen through their recovery.

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FACTS | A concussion...

- Can be caused by a blow or hit to the head, face, neck or body, or by acceleration/deceleration forces.
- Is not usually seen on regular clinical imaging. This explains why children and teens can be symptomatic and still have a normal CT scan or skull x-ray.
- Is the most common form of traumatic brain injury suffered by athletes, children and teens.
- May be accompanied by a loss of consciousness.
- May affect balance, reaction time and the way the child or teen may think and remember.
- Can result in a variety of symptoms that can appear immediately, hours later or over the following days.
- Means that the child or teen should be seen by a doctor to confirm diagnosis.

What Is a Concussion

- A concussion is a type of brain injury.
- A concussion is also referred to as a mild traumatic brain injury (MTBI).

COMMON CAUSES OF A CONCUSSION

FACT | Signs and symptoms

Signs and symptoms can arise over the first 24-48 hours. It is essential to observe the child or teen as they may under-report symptoms.

Recognizing a Concussion

› A concussion should be suspected in the presence of any of the following signs and symptoms after an injury:

SYMPTOMS REPORTED BY THE CHILD OR TEEN

- Headache.
- Nausea.
- Vomiting.
- Dizziness.
- Feeling dazed and confused.
- Memory problems.
- Poor balance or coordination.
- Drowsiness or fatigue.
- Irritability.
- Agitation.
- Double or blurred vision.
- Sensitivity to light, noise and motion.
- Not feeling right.

SIGNS OBSERVED BY OTHERS

- Confused/disoriented, does not know: time, place, activity.
- Cannot remember what happened before, during and/or after the injury.
- A brief loss of consciousness (knocked out).
- Easily distracted, difficulty with concentration, reduced attention.
- Not playing as well. Inappropriate playing behavior.
- Lacks coordination.
- Slow to answer questions or follow directions.
- Strange or inappropriate emotions (i.e. laughing, crying, getting angry easily).
- Blank stare.

Call 911 if the child or teen has a loss of consciousness, has trouble breathing, complains of weakness or numbness in limbs or is having a seizure. Presume neck injury, do not move.

FACT | **A concussion is a brain injury**

Recognize symptoms, see a doctor to confirm diagnosis, and never play injured!

Managing a Concussion

If you suspect a concussion

- Remove the child or teen from the activity and seek medical attention immediately.
- Make sure that parents or caregivers are aware of the injury.
- Do not leave the child or teen alone. Adult supervision is essential.
- Do not allow the child or teen to return to the current activity, game or practice. If uncertain, remove from play!

If the child or teen exhibits any of the following symptoms within 24-48 hours following the injury, even after medical consultation, he/she must go to an emergency department immediately

- **Loss or deterioration in level of consciousness.**
- **Worsening headache, especially if localized.**
- **Persistent vomiting.**
- **Behavioral changes (persistent irritability in younger children; increased agitation in teens).**
- **Excessive drowsiness (difficult to arouse).**
- **Difficulty in seeing, hearing, speaking or walking.**
- **Seizure.**
- **Confusion or disorientation (does not recognize people or places).**

What to Expect Following a Concussion

› The signs and symptoms following a concussion usually improve over a period of 2-4 weeks, but may occasionally last longer.

Symptoms frequently reported are: headaches, dizziness, nausea, sleep disturbances, fatigue, irritability, visual disturbances, sensitivity to light, sound and motion, difficulty with memory, concentration, attention span, or balance.

The child or teen may become more sensitive to rotating and spinning motions following a concussion. This is to be expected.

Repeated concussions may result in long-term consequences especially if the concussions are sustained within a short time period. If in this situation, further consultation with the MTBI Program – Concussion Clinic is recommended.

It is very important to **modify and manage physical, cognitive and academic activities until the child or teen is fully symptom-free**. This reduces the chance of developing persistent symptoms. The *General Activity Management Plan* will provide guidance on managing the child or teen's activity level.

If there is no improvement within 10 DAYS following the concussion, further consultation with the MTBI Program – Concussion Clinic is recommended. Please note: A referral from a doctor is required.

PLEASE CALL: 514-412-4400, EXTENSION 23310

FAX MEDICAL REFERRALS TO: 514-412-4254

RETURNING TO SCHOOL, PHYSICAL ACTIVITY/SPORTS AND LEISURE ACTIVITIES FOLLOWING A CONCUSSION

The goal during concussion recovery is to determine the appropriate level of cognitive and physical activities that will not worsen or provoke new symptoms.

Normalizing a child or teen's home and school life as soon as possible is key to maintaining their psychosocial well-being.

The following three management plans organized in progressive stages should be used to guide the post-concussion recovery.

GENERAL ACTIVITY MANAGEMENT PLAN
Pages 14–18

RETURN TO LEARN MANAGEMENT PLAN
Pages 20–29
Includes recommendations for teachers 

RETURN TO PHYSICAL ACTIVITY/SPORTS MANAGEMENT PLAN
Pages 31–33

Remember, until the child or teen is able to fully return to cognitive and academic activities without accommodations, a full return to sports is not permitted.

GENERAL ACTIVITY MANAGEMENT PLAN

STAGE 1 — VERY SYMPTOMATIC

Brief Physical and Cognitive Rest

PHYSICAL ACTIVITIES	✖ Don't play sports (observe or participate). ✖ Don't participate in active play at recess.
HOME AND LEISURE	✖ Don't watch TV. ✖ Don't play video games. ✖ Don't text (can talk on phone). ✖ Don't use computers and tablets. ✖ Don't participate in music lessons. ✖ Don't go to movies. ✖ Don't attend parties. ✖ Don't go to malls. ✖ Don't drive. ✖ Don't drink alcohol. ✖ Don't use drugs.
SCHOOL	✖ **DON'T ATTEND SCHOOL FOR THE FIRST 2 DAYS FOLLOWING THE CONCUSSION.** Upon return to school: Follow the *Return to Learn Management Plan* (p. 20).

- Take short leisurely walks up to 10-15 minutes as tolerated.
- Refresh in the pool (no laps/diving/jumping).

- Cook and bake.
- Play board games.
- Listen to relaxing music.
- Do arts and crafts.
- Socialize with friends at home.
- Read (limit the duration to a maximum of 15 minutes).

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SYMPTOM MANAGEMENT

- Acetaminophen and/or ibuprofen can be taken regularly for 3-5 days as needed. Ibuprofen should not be taken within the first 24 hours following the injury unless otherwise advised by your doctor. **Check labels for dosage instructions and warnings.** If still needed after 3-5 days, **reduce** to no more than **3 doses per week**. If in doubt, consult your pediatrician, family doctor or local clinic.
- Drink water regularly (dehydration has been noted to trigger headaches).
- Sleep 8-10 hours per day.
- Don't skip meals.
- If headache is constant and debilitating, return to the Emergency Department for headache management.

ONCE SYMPTOMS BEGIN TO IMPROVE (WITHIN APPROXIMATELY 2 DAYS), MOVE TO **STAGE 2**

STAGE 2 — LESS SYMPTOMATIC

Able to Participate in Activities at Own Pace Within Symptom-Limits

PHYSICAL ACTIVITIES	Don't play sports (observe or participate). Don't participate in active play at recess.
HOME AND LEISURE	Don't play video games. Don't attend music lessons. Don't go to movies. Don't attend parties. Don't go to malls.
SCHOOL	Refer to the guidelines in **STAGE 2** of the *Return to Learn Management Plan* (p. 20).

- Take short leisurely walks up to 15-20 minutes as tolerated.
- Refresh in the pool (no laps/diving/jumping).
- **IF TOLERATED**
  May begin **STEP 1** of the *Return to Physical Activity/Sports Management Plan* (p. 32). Do not progress to step 2 until symptom free.

- Watch TV for 30 minutes. If symptoms do not increase or appear during or after, can increase time over the next few days.
- Read for short periods (10-15 min) up to 3 times/day. If symptoms do not increase or appear during or after, may increase as tolerated.
- Use computer and text for short periods (10-15 min) up to 3 times/day. If symptoms do not increase or appear during or after, may increase as tolerated.

Do not engage in the above activities one after the other. Allow adequate time between activities for symptom assessment.

If unable to accomplish the above at 10 days post-concussion, call the MTBI Program – Concussion Clinic, 514-412-4400 extension 23310.

See the *Return to Learn Management Plan* (p. 21) for recommendations on a progressive return to academic workload.

SYMPTOM MANAGEMENT

- In addition to the recommendations from **STAGE 1**: Consult a doctor if significant sleeping difficulties are experienced.

ADDITIONAL RECOMMENDATIONS FOR TEENS

- No parties or movies as the excessive noise and light may provoke headaches or other symptoms
- Avoid driving until symptoms have resolved.
- Absolutely no energy drinks, alcohol or drugs.

ONCE SYMPTOMS HAVE COMPLETELY RESOLVED FOR A FEW DAYS, MOVE TO **STAGE 3**

STAGE 3 — CONCUSSION SYMPTOMS HAVE COMPLETELY RESOLVED FOR A FEW DAYS

Gradual Return to Testing and Physical Activities

PHYSICAL ACTIVITIES	Progressive return to sports and physical activities using the *Return to Physical Activity/Sports Management Plan* (p. 32).
HOME AND LEISURE	Resume regular daily activities.
SCHOOL	Progressive return to exams as per **STAGE 3** of the *Return to Learn Management Plan* (p. 28).

FACT | Managing a concussion

Follow the recommendations in each stage to promote recovery.

STAGE 1 — VERY SYMPTOMATIC

Brief Physical and Cognitive Rest

	✖	✔
ATTENDANCE	**DON'T ATTEND SCHOOL FOR THE FIRST 2 DAYS FOLLOWING THE CONCUSSION.**	Follow the *General Activity Management Plan* (p. 14).

STAGE 2 — LESS SYMPTOMATIC

Able to Participate at Their Own Pace Within Symptom-Limits

	✖
ATTENDANCE	Don't partake in music lessons or drama classes. Don't participate in sports and physical education class (observing or participating). Don't partake in active play at recess, lunch break and after school.
TESTING	Don't write exams, tests, quizzes. Don't partake in oral presentations for the first few days.

ONCE SYMPTOMS BEGIN TO IMPROVE, MOVE TO **STAGE 2**

RETURN TO SCHOOL ON DAY 3 AFTER THE CONCUSSION FOR 1 OR 2 HALF DAYS.

- **IF TOLERATED:**
  Increase to full days with breaks.
- **IF NOT TOLERATED:**
  No school for another 2 days. Then retry half days. If there is no improvement within 10 days following the concussion, call the MTBI Program – Concussion Clinic 514-412-4400 extension 23310.

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Continued on next page

STAGE 2 (continued)

WORKLOAD	✖ Don't do homework for the first few days. ✖ Don't encourage tutoring or catch up sessions for the first few days.
NOTE TAKING	✖ Don't take notes if it causes symptoms to increase.
BREAKS	✖ Don't frequent noisy and over-stimulating environments (for example: cafeteria, hallway, gymnasium).
READING AND SCREENS	✖ Don't look at/focus on smart boards for the first few days. ✖ Don't use computers/tablets for the first few days. ✖ Don't read if it causes headaches.

ONCE ATTENDING FULL DAYS:

- Begin homework for periods of 15 minutes up to 3 times/day. Increase sessions by 5-10 minutes as tolerated (if symptoms develop or increase, stop, rest and retry later for a shorter period of time).
- Keep up to date with course material. Review work for short periods.

- Attend class and listen for the first few days. Then, begin and continue note taking as long as symptoms don't increase.

- Find a quiet place to eat.
- Go to the library to rest (no homework).
- Leave the class 5 minutes before it ends to avoid hallway noise and congestion.
- Continue to take breaks as needed to help manage symptoms.

- Wear sunglasses or a cap in class if sensitive to light.
- Use audiobooks; have someone read to you.
- Limit reading to school work and not for pleasure for 15 -30 minute intervals. Increase as tolerated.
- Request a paper version of the assignment and/or homework.
- Begin school screen time for 15-30 minute intervals and increase as tolerated.

ONCE SYMPTOMS HAVE COMPLETELY RESOLVED, MOVE TO **STAGE 3**

STAGE 2 (continued)

	RECOMMENDATIONS FOR TEACHERS
ATTENDANCE	✓ Allow the student to take: breaks as needed, shortened day, abbreviated class, late start or early departure. ✓ Allow the student to bring a water bottle to class.
TESTING	✓ Base grades on pre-injury work for formal evaluation. ✓ Once attending full days, the student may do an oral presentation if previously prepared. Allow the student to read the text.
WORKLOAD	✓ Provide additional time to submit homework, projects, and assignments. ✓ Reduce workload.
NOTE TAKING	✓ Provide the student with lecture notes/outlines ahead of time. ✓ Allow the student to photocopy notes from another student.
BREAKS	✓ Allow the student to take a scheduled break in the morning and in the afternoon. ✓ Allow the student to alternate classes (one class on / one class off).
READING AND SCREENS	✓ Allow the use of audiobooks. ✓ Allow someone else to read to the student. ✓ Allow the student to wear sunglasses or a cap in class if sensitive to light. ✓ Allow the student preferential seating (back of the class if sensitive to screen or away from window if sensitive to light).

- Allow the student to take analgesics for headache management if consent has been given.

- Allow the student to do work at home at their own pace for marks in lieu of formal testing.

- Allow the student to work at their own pace in order to keep up with essential course material only.

- Allow the student to record lectures.
- Offer to assign a homework buddy.

- Allow the student to leave class early in order to avoid hallway noise and congestion.
- Allow the student to eat in a quiet area.
- Allow the student to wear earplugs.

- Provide a paper version of the assignment and/or homework.
- Allow the student to begin reading for 15-30 minute intervals and to increase as tolerated.
- Allow the student to begin school screen time for 15-30 minute intervals, increase as tolerated.

ONCE SYMPTOMS HAVE COMPLETELY RESOLVED, MOVE TO **STAGE 3**

STAGE 2 (continued)

UNDERSTANDING THE ACADEMIC RESTRICTIONS

ATTENDANCE

- Returning to learn too early can significantly increase symptoms in a concussed student and impede recovery.
- Avoiding drama and music lessons helps to reduce stimulation.
- Adequate breaks will facilitate the student's return to learn.
- It is important to normalize and resume academic activities within symptom tolerance.
- Limiting physical activities (such as: in physical education class and at recess) will reduce the student's risk of re-injury.

TESTING

- Testing may increase headaches, mental fatigue and stress. Furthermore, grades may not be reflective of the student's actual ability.

WORKLOAD

- A concussed student may require additional time to complete assignments due to decreased processing speed and concentration.
- A student's anxiety surrounding missed work can be reduced by allowing the student to work at their own pace.

NOTE TAKING

- A concussed student may have impaired multitasking abilities.
- Eye and head movement during note taking may provoke headaches, dizziness and fatigue.

BREAKS

- Overstimulating environments and prolonged periods of concentration may increase and/or provoke symptoms.

READING AND SCREENS

- A concussed student may find it difficult to tolerate reading from screens due to the lighting and/or eye strain. As symptoms resolve, the student's tolerance should increase.

ONCE SYMPTOMS HAVE COMPLETELY RESOLVED, MOVE TO **STAGE 3**

FACT | Recovery

It is important to manage activities in order to promote recovery.

STAGE 3 — CONCUSSION SYMPTOMS HAVE COMPLETELY RESOLVED FOR A FEW DAYS

Gradual Return to Testing and Physical Activities

	✗	✓
ATTENDANCE	**NO RESTRICTIONS.**	✓ **SHOULD ALREADY BE ATTENDING FULL DAY OF CLASSES.** ✓ Resume music and drama lessons. ✓ Begin the *Return to Physical Activity/ Sports Guidelines* (p. 31).
TESTING	See recommendations for teachers.	✓ Gradually resume testing.
WORKLOAD	No restrictions.	✓ Resume regular workload.
NOTE TAKING	No restrictions.	✓ Resume regular note taking in class.
BREAKS	No restrictions.	✓ Resume regular school schedule.
READING AND SCREENS	No restrictions.	✓ Resume regular classroom schedule.

RECOMMENDATIONS FOR TEACHERS

No restrictions.

Most students will require these accommodations for a period of 2 weeks:

- Coordinate tests/exams and workload amongst the student's teachers.
- Provide the student with a progressive test/exam schedule.
- Allow additional time to complete tests/exams.
- Allow testing across multiple sessions.
- Opt for open book/take home tests when possible.
- Reformat from free response to multiple choice.
- Offer testing in a quiet environment.
- Reduce the length of tests/exams.
- Allow 1-2 days between tests/exams.
- Allow breaks as needed.

No restrictions.

No restrictions.

No restrictions.

No restrictions.

UNDERSTANDING THE ACADEMIC RESTRICTIONS

ATTENDANCE

- The student has recovered. No accommodations are required. The student must follow the *Return to Physical Activity/Sports Guidelines* (p.31) provided before resuming physical education class.

TESTING

- The student has recovered and is ready to resume a gradual return to testing.

WORKLOAD

- The student needs to become up to date with missed homework, assignments and current class material.

Important: The Brain Needs Time to Heal

- A complete recovery following a concussion is essential before returning to full physical activity/sports/competition.
- Continuing to play sports or other recreational activities while experiencing symptoms may result in a longer recovery.
- Experiencing a repeat concussion prior to fully recovering from the signs and symptoms of the previous one may result in a rare condition known as second impact syndrome, in which severe and rapid brain swelling usually results in a catastrophic outcome.

Returning to Physical Activity/Sports Following a Concussion

› If you have sustained a concussion, it is recommended to follow these steps before fully returning to physical activity/sports.

At this point, you have reached STAGE 3 of the *General Activity Management Plan*.

- You have completed your recommended period of activity restrictions.
- You have been symptom-free for a few days, or have been advised by a doctor or a concussion specialist and are ready to start the following progressive steps (p. 32).
- Written authorization may be requested prior to a return to full activity/competition.

RETURN TO PHYSICAL ACTIVITY/SPORTS MANAGEMENT PLAN

STEP 1

Light general conditioning exercises.

50% EFFORT

- **NO CONTACT.**
- Begin with a warm up (stretching and flexibility) for 10-15 minutes.
- Start a cardio workout of 15-20 minutes which can include: stationary bicycle, elliptical, treadmill, fast paced walking, light jog, rowing or swimming.

If already completed during STAGE 2 of the *General Activity Management Plan* (p. 16) then begin at STEP 2.

STEP 2

General conditioning and sport specific skill work done individually.

50-60% EFFORT

- **NO CONTACT.**
- Begin with a warm up (stretching and flexibility) for 10-15 minutes.
- Increase intensity and duration of cardio workout to 20-30 minutes.
- Begin sport specific skill work within the workout, but no spins, dives or jumps.

STEP 3

General conditioning, skill work done with a team-mate.

75% EFFORT

- **NO CONTACT.**
- Increase duration of session to 60 minutes. Begin resistance training including neck and core strengthening exercises.
- Continue practicing sport specific individual skills.
- Begin general shooting, kicking or passing drills with a partner.
- Start beginner level spins, dives and jumps.

There should be approximately 24 hours or longer in between each step. If any symptoms return at any time, stop working out. Rest until you are symptom-free for 24 hours, then return to the previous step. If symptoms do not resolve or get worse, seek the expertise of a doctor or concussion specialist.

STEP 4

General conditioning, skill work and team drills.

75-90% EFFORT

- **NO CONTACT. NO SCRIMMAGES.**
- Resume pre-injury duration of practice and team drills.
- Increase resistance training and skill work specific to the sport/activity.
- Gradually increase skill level of spins, dives and jumps.

Progress to STEP 5 only following full return to cognitive and academic activities without accommodations.

STEP 5

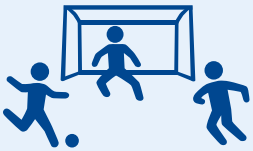
Full practice with body contact.

90-100% EFFORT

- **CONTACT. SCRIMMAGES.**
- Participate in a full practice. If completed with no symptoms, discuss returning to activity with the coach.

Do not progress until the following is achieved:

- Coaches make sure that the child or teen has regained his/her pre-injury skill-level.
- The child or teen is confident in his/her ability to return to activity.



STEP 6

100% EFFORT

RETURN TO FULL ACTIVITY/COMPETITION.

PREVENTION TIPS

- Wear appropriate standardized, sport/activity specific protective equipment. Make sure it fits.
- Inspect protective head gear regularly and replace it according to the manufacturer's recommendations.
- Verify other appropriate protective equipment (e.g. mouth guard).
- Wearing a helmet decreases the severity of brain injuries.
- Physical preparation, proper conditioning and skill training is fundamental.
- Participate in activities that are appropriate for age and skill level.
- Fair play which includes teamwork, sportsmanship, respecting the rules and zero tolerance of violence is essential.
- Verify environmental factors such as the condition of playing fields, ice surfaces, and other sports venues.

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