

# Three things a family physician can do about concussion.

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Vancouver, 31 octobre 2019



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## Affiliations / Conflict of interest

- \* Honorarium from Janssen, Talks on concussion (2016-2017)
- \* Consultant on concussion, Gouvernement du Québec (since 2014)
- \* Chair/member, Canadian Concussion Collaborative (since 2012)
- \* Chair, SEM program committee at the CFPC (since 2014)
- \* Professor, Faculty of Medicine, Université Laval



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## Objectives and plan:

Following this session, participants will be able to...

- \* Provide **initial assessment and counseling** for a patient that consults for a suspected concussion.
- \* Make a **medical recommendation about returning to an activity or sport at risk** of trauma following a concussion.
- \* Assess a patient that consults for **persistent symptoms** after sustaining a concussion.



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## Context: 2 recent statements involving the CFPC



2017

[http://www.cfpc.ca/Concussions\\_Position\\_Statement/](http://www.cfpc.ca/Concussions_Position_Statement/)



2019

<https://policybase.cma.ca/en/permalink/policy14023>

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## Key points from these statements...

- \* « Family physicians can contribute ... by working in conjunction with families, schools, sports organizations, employers and governments to educate, support and empower the implementation of proper concussion prevention, detection and management protocols. »

[http://www.cfpc.ca/Concussions\\_Position\\_Statement/](http://www.cfpc.ca/Concussions_Position_Statement/)

- \* « Concussion in Sport, Leisure, and Occupational Settings...

<https://policybase.cma.ca/en/permalink/policy14023>

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## Inspired by a recent CFP publication

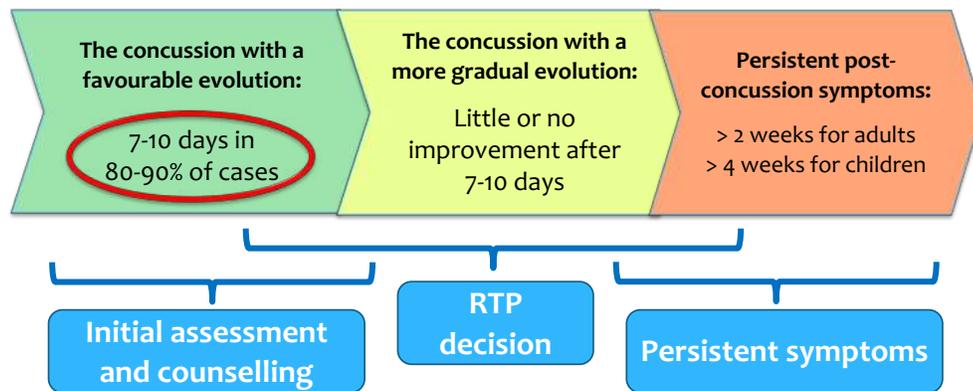
**Canadian Family Physician**  
**2019; 65: 198-199**

<https://www.cfp.ca/content/cfp/65/3/198.full.pdf>



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## Key FM visits vs evolution of concussion



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## Part 1: Initial assessment and counselling

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## Making the diagnosis of concussion

- \* Trauma (direct or indirect)
- \* No persistent focal neurological sign
- \* Signs and symptoms (with possible delay) that reflect functional impairment...
- \* No required sign or symptom (ex: loss of consciousness)
- \* Cannot be explained by other injury or condition:
  - \* Cervical spine injury
  - \* Peripheral vestibular dysfunction
  - \* Alcohol, drugs, medication, health conditions
- \* A diagnosis made by exclusion (no diagnostic test)...

McCrory P, et al. BJSM 2017; 51: 838–47

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## Step 1: Exclude the possibility of more severe TBI or other injury:

- \* SCAT5 red flags →
- \* Canadian CT head rule for adults
- \* PECARN for children

Normal cervical spine and neurological exam?



<http://bjsm.bmj.com/content/bjsports/early/2017/04/26/bjsports-2017-097506SCAT5.full.pdf>

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## STEP 2: Document symptoms to track recovery

- \* “The strongest and most consistent predictor of slower recovery from concussion is symptom severity in the initial few days after injury”.
- \* “The symptom checklist demonstrates clinical utility in tracking recovery”.

McCroly P, et al. *BJSM* 2017; 51: 838–47

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## Tool to document the evolution of symptoms

**STEP 2: SYMPTOM EVALUATION**

The athlete should be given the symptom form and asked to read this instruction carefully and then complete the symptom scale. For the baseline assessment, the athlete should rate their symptoms based on how they are currently feeling and for the post injury assessment the athlete should rate their symptoms at this point in time.

Please Check:  Baseline  Post-Injury

Please hand the form to the athlete

	None	Mild	Moderate	Severe
Headache	0	1	2	3
"Pressure in head"	0	1	2	3
Back Pain	0	1	2	3
Nausea or vomiting	0	1	2	3
Dizziness	0	1	2	3
Blurred vision	0	1	2	3
Balance problems	0	1	2	3
Sensitivity to light	0	1	2	3
Sensitivity to noise	0	1	2	3
Feeling slowed down	0	1	2	3
Feeling like "in a fog"	0	1	2	3
"Don't feel right"	0	1	2	3
Difficulty concentrating	0	1	2	3
Difficulty remembering	0	1	2	3
Fatigue or low energy	0	1	2	3
Confusion	0	1	2	3
Drowsiness	0	1	2	3
More emotional	0	1	2	3
Irritability	0	1	2	3
Sadness	0	1	2	3
Nervous or Anxious	0	1	2	3
Trouble falling asleep if appropriate				
Total number of symptoms:	14 / 8			
Symptom severity score:	54 / 18			
Do your symptoms get worse with physical activity?	Y / N			
Do your symptoms get worse with mental activity?	Y / N			
If 100% is feeling perfectly normal, what percent of normal do you feel?				

**SUGGESTION:** document **MAXIMAL** and **CURRENT** symptom number and score.

<http://bjsm.bmj.com/content/bjsports/early/2017/04/26/bjsports-2017-097506SCAT5.full.pdf>

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## Step 3: Initial counselling and follow-up

- \* Plan a follow-up visit 7 to 14 days later:
  - \* Will be used for RTP clearance in many cases
  - \* Will allow the early identification of possible persistent symptoms
- \* Use standardized recommendations for the initial 7-10 day period...

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## Canadian Guideline on Concussion in Sport

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

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

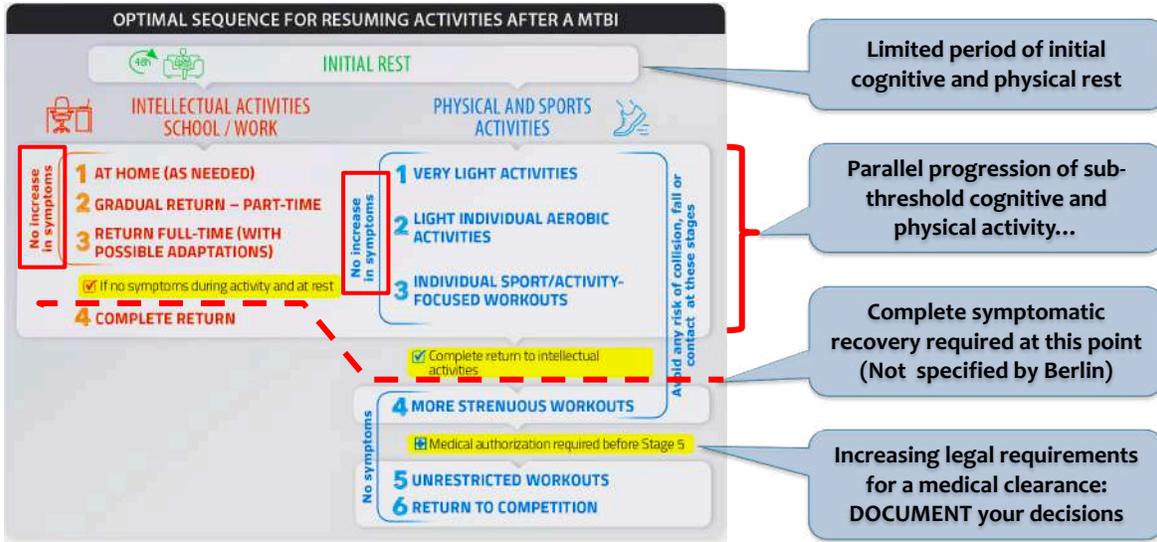
**4-step gradual return-to-school strategy**

**6-step gradual return-to-sport strategy**

<https://parachute.ca/en/professional-resource/concussion-collection/canadian-guideline-on-concussion-in-sport/>

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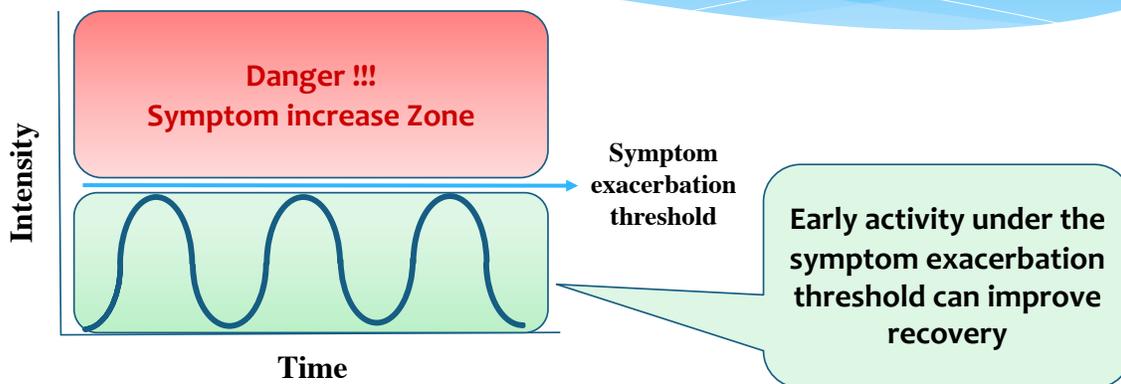
## An integrated visual presentation (INESSS, 2018)



[https://www.inesss.qc.ca/fileadmin/doc/INESSS/Rapports/Traumatologie/INESSS\\_pamphlet\\_Mild-traumatic-brain-injury.pdf](https://www.inesss.qc.ca/fileadmin/doc/INESSS/Rapports/Traumatologie/INESSS_pamphlet_Mild-traumatic-brain-injury.pdf)

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## The notion of « sub-threshold » or « symptom-limited » activity ».



Adapted from: Lisa Fisher, <http://fowlerkennedy.com/> and [www.sjhc.london.on.ca](http://www.sjhc.london.on.ca)

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**HOW TO MANAGE YOUR ENERGY AFTER A CONCUSSION**

You were recently diagnosed with a concussion? You need to take care of your brain!

Here are a couple tricks and tips to manage your physical and mental energy in the first few days following a concussion:

Picture your brain as a battery, but a battery that charges slowly and discharges rapidly. You need to manage energy. Prioritize important tasks and don't forget to rest!

**Alternate** (switch) between short periods of activity and rest.

**Schedule** tasks in short intervals.

**Complete** the work demanded by tasks at the start of the day.

**Alternate** between physical tasks, intellectual tasks and rest.

**Take** cognitive tasks one task at a time.

**Micro** breaks from 1 to 15 minutes (not to a lot of good sleep, do a breathing exercise or walk).

**Consider** micro-pauses.

Computers, tablets, phones... You may wish to communicate with friends or colleagues but **limiting** screen time (or if your symptoms get worse, avoid this) is a result of your screen or tablet use. **Activities might include:** watching videos & live light.

Limit visual and auditory stimuli.

Follow protocols.

Progressively return to physical and intellectual tasks.

<https://aqmse.org/wp-content/uploads/2019/03/feuillecommotion-cerebralev1-en-1.pdf>

**A most relevant handout developed by the AQMSE!**

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**RETURN-TO-SPORT STRATEGY**

**Parachute Smart Hockey**

A concussion is a serious injury, but you can recover fully if your 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.

**In the Return-to-Sport Strategy:**

- Each stage is at least 24 hours.
- Advance on to the next stage when activities are tolerated without risk or worsening symptoms.
- According to Hockey Canada's Concussion Policy, if symptoms return during the return to play process, the player should return to stage 2 and be re-evaluated by a doctor.
- If symptoms return after medical clearance, follow up with a doctor for re-assessment.

**Stage 1: Symptom-bearing activities**  
After an initial period of rest of 24 to 48 hours, light cognitive and physical activity can begin, including the following: reading, watching TV, listening to music, walking, and light housework. You can start with daily activities, but avoid driving, alcohol, and possibly strenuous activities and sports activities at home.

**Stage 2: Light aerobic activity**  
Light aerobic, such as walking or stationary cycling, for 10 to 15 minutes. This action and intensity of the aerobic exercise can be gradually increased over time if symptoms do not occur. No new symptoms appear during the exercise or in the hours that follow. No resistance training or other heavy lifting.

**Stage 3: Individual sport-specific exercise with no contact**  
Activities such as running or skating may begin for 20 to 30 minutes. These should be no body contact or other jarring motions, such as high-speed sprints. No resistance training.

**Stage 4: Begin training drills with no contact**  
Add in more of changing drills, such as shooting and passing drills. These should be no physical contact at this stage. Where possible, give with a coach's assistance. If symptoms return, or talk on the field, stop to allow progressive resistance training if appropriate. Coaches can identify players returning to sport after concussion by ordering a "no-contact" game on field.

**Stage 5: Full contact practice**  
You should not proceed to this stage until you have received clearance from a doctor.

**Stage 6: Return to Sport**  
Full game play.

<https://parachute.ca/en/professional-resource/concussion-collection/concussion-protocol-resources-for-sport-organizations/>

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**Any question about initial assessment  
and counselling?**



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**Part 2:  
Making a return-to-play decision**

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## Step 1: Document successful progression through the gradual return to cognitive and physical activity strategies:

### Verification of recovery achievement:

- 1- Complete return to cognitive activities (including school) without restriction:
- 2- Non-contact training activities (see Step 4 on the back) completed successfully:
- 3- All signs and symptoms that led to the diagnosis of concussion have resolved and did not recur following the activities described in point 1 and 2 (see above):

YES

NO

Consider clearance only if the answer to these 3 basic questions is YES

<https://aqmse.org/wp-content/uploads/2019/02/aqmseautorisation-medicale-eng.pdf>

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## Step 2: Consider possible MODIFYING FACTORS and clinical assessment

### Additional (modifying) factors to consider when making a recommendation (non-exhaustive list of most frequent factors)

- Normal cervical and neurological assessment: if abnormal investigate accordingly. 
- History of concussion with one or more of the following characteristics:
  - Repeat concussion that occurs within a short time;
  - Repeat concussion that occurs with decreasing threshold of traumatic force;
  - Repeat concussion with a protracted recovery.
- Preexisting conditions: migraines, mental health conditions or learning disorders.
- Use of psychoactive or anticoagulant medication.
- The activity or sport being considered is associated with a very high risk of concussion or involves intentional hits to the head.
- Any doubt regarding the information obtained during assessment resulting from external or self-imposed pressure to RTS.

<https://aqmse.org/wp-content/uploads/2019/02/aqmseautorisation-medicale-eng.pdf>

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## Step 2.1 : modifying factors RELATED TO CONCUSSION

<b>Temporal</b>	<ul style="list-style-type: none"><li>• Repeat concussion that occurs within a short time (ex: same season)</li></ul>
<b>Threshold</b>	<ul style="list-style-type: none"><li>• Repeat concussion that occurs with decreasing threshold of traumatic force</li></ul>
<b>Recovery</b>	<ul style="list-style-type: none"><li>• Repeat concussion with a protracted recovery (ie: increasing duration of recovery period)</li></ul>

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## Step 2: concussion-related MODIFYING FACTORS

<b>Preexisting conditions:</b>	<ul style="list-style-type: none"><li>• Migraine</li><li>• Depression or other mental health disorders</li><li>• ADD / ADHD or Learning disabilities</li></ul>
<b>Sport and behaviour:</b>	<ul style="list-style-type: none"><li>• High-risk activity (combat sport)</li><li>• Sports with intentional hits to the head</li><li>• Dangerous style of play</li></ul>
<b>Medication:</b>	<ul style="list-style-type: none"><li>• Psychoactive drugs, anticoagulants</li></ul>
<b>Reliability of the information</b>	<ul style="list-style-type: none"><li>• Any doubt regarding the information obtained resulting from external or self-imposed pressure</li></ul>

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## Increasing legal requirements for medical clearance!

- \* An increasingly important requirement!
  - \* Berlin reiterates the need for a medical clearance before high risk activities such as hockey.
  - \* Recent legislation in Ontario and Manitoba
- \* Use a form that documents the criteria used and the information obtained.

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## Any question about making a return-to-play decision?



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## Part 3: Assessment in the presence of persistent symptoms



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## The Berlin definition of “persistent post-concussive symptoms”

- \* “Persistent concussion symptoms” has been defined as:
  - \* greater than 2 weeks for adults
  - \* greater than 4 weeks for children

McCroory P, et al. *BJSM* 2017; 51: 838–47

- \* In practice, if there is no obvious improvement towards recovery after 7-10 days, it is time to plan for a medical re-assessment.

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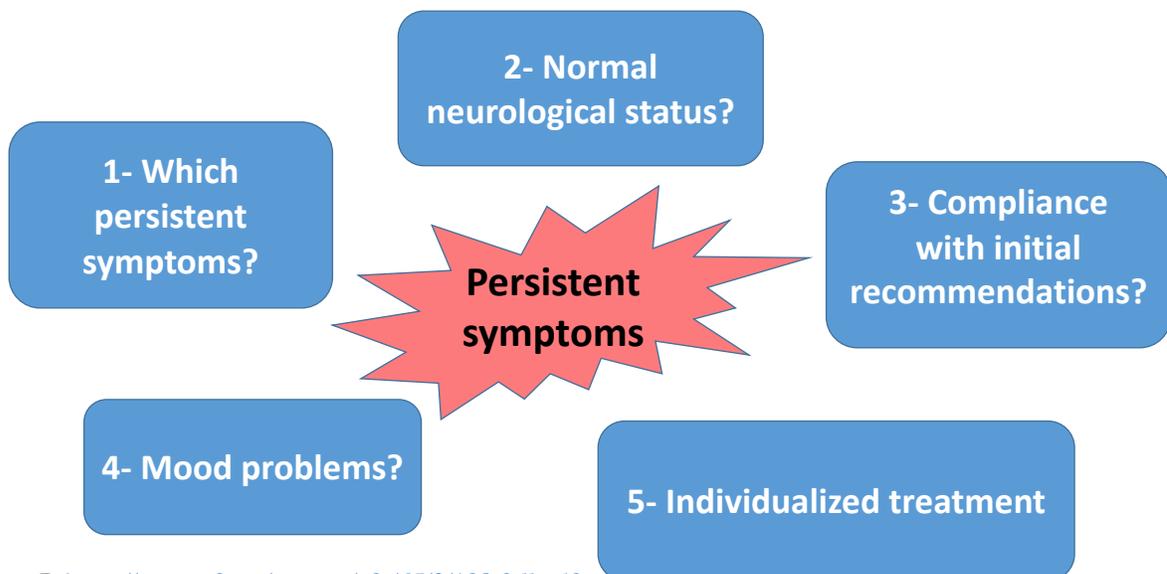
## Conditions associated with potentially efficient interventions according to Berlin...

- \* The Berlin consensus identified evidence for the following problems in the presence of persistent symptoms:
  - \* mood problems,
  - \* cervical spine problems,
  - \* autonomic system dysfunction,
  - \* vestibular dysfunction.

McCroory P, et al. BJSM 2017; 51: 838–47

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## Overview of reassessment for persistent symptoms:



Frémont P. <https://www.cfp.ca/content/cfp/65/3/198.full.pdf>

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## STEP 1: Which persistent symptoms?

- \* Use SYMPTOM SCALE to assess initial and current symptoms:
- \* Recovery :
  - \* Persistent symptoms or slower recovery?
- \* Qualitative nature of the symptoms that persist?

**STEP 2: SYMPTOM EVALUATION**

The athlete should be given the symptom form and asked to read the instructions carefully and then complete the symptom scale. For the baseline assessment, the athlete should rate the symptoms based on how he/she typically feels and for the post-injury assessment the athlete should rate their symptoms at the point in time.

Please Check:  Baseline  Post-injury

Please hand the form to the athlete

	None	Mild	Moderate	Severe		
Headache	0	1	2	3	4	5
"Pressure in head"	0	1	2	3	4	5
Neck Pain	0	1	2	3	4	5
Nausea or vomiting	0	1	2	3	4	5
Dizziness	0	1	2	3	4	5
Blurred vision	0	1	2	3	4	5
Balance problems	0	1	2	3	4	5
Sensitivity to light	0	1	2	3	4	5
Sensitivity to noise	0	1	2	3	4	5
Feeling slowed down	0	1	2	3	4	5
Feeling like "in a fog"	0	1	2	3	4	5
"Don't feel right"	0	1	2	3	4	5
Difficulty concentrating	0	1	2	3	4	5
Difficulty remembering	0	1	2	3	4	5
Fatigue or low energy	0	1	2	3	4	5
Confusion	0	1	2	3	4	5
Drowsiness	0	1	2	3	4	5
More emotional	0	1	2	3	4	5
Irritability	0	1	2	3	4	5
Sadness	0	1	2	3	4	5
Nervous or Anxious	0	1	2	3	4	5
Trouble falling asleep (if applicable)	0	1	2	3	4	5
Total number of symptoms:	14 / 8					of 20
Symptom severity score:	54 / 18					of 120
Do your symptoms get worse with physical activity?						Y N
Do your symptoms get worse with mental activity?						Y N
If 100% is feeling perfectly normal, what percent of normal do you feel?						

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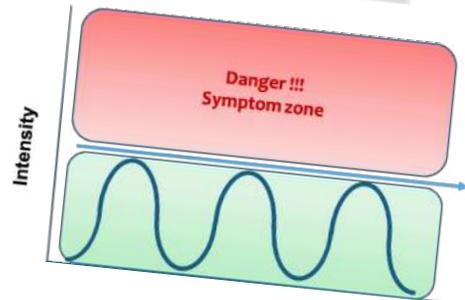
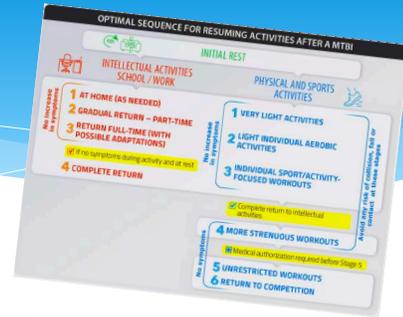
## Step 2: Normal neurological status?

- \* Normal neurological status?
  - \* Concussions are NOT associated with focal neurological abnormalities.
  - \* In the presence abnormal findings, investigate accordingly.

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## Step 3: Compliance with initial recommendations?

- \* Were the initial recommendations properly applied?
- \* Did activities result in repeated exacerbations of symptoms?



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## Step 4: Anxiety or mood problems?

- \* Anxious or depressive signs or symptoms?
  - \* Early anxious components are often present
  - \* Simple education about recovery can go a long way!
- \* Persistent functional impairment can result in mood problems that require treatment.

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## Step 5: Individualize treatment

- \* Cervical spine problem
  - \* Cervicogenic headache
  - \* Other cervical symptoms
- \* Oculo-motor and vestibular problems
- \* Autonomic dysfunction
  - \* Physical work or exercise intolerance?

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## Oculo-vestibular screening

- \* Look for potential oculo-vestibular cluster of symptoms:
  - \* Typical increase of symptoms in 3D visual analysis (ex: driving, riding a bike)
- \* Signs:
  - \* You can integrate some simple screening tests in your assessment...

How do you feel?  
 \*You should score yourself on the following symptoms, based on how you feel now.\*

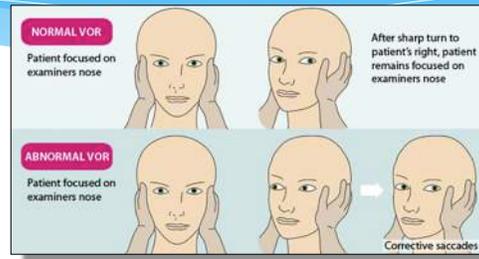
	none	mild	moderate	severe			
Headache	0	1	2	3	4	5	6
"Pressure in head"	0	1	2	3	4	5	6
Neck Pain	0	1	2	3	4	5	6
Nausea or vomiting	0	1	2	3	4	5	6
Dizziness	0	1	2	3	4	5	6
Blurred vision	0	1	2	3	4	5	6
Balance problems	0	1	2	3	4	5	6
Sensitivity to light	0	1	2	3	4	5	6
Sensitivity to noise	0	1	2	3	4	5	6
Feeling slowed down	0	1	2	3	4	5	6
Feeling like "in a fog"	0	1	2	3	4	5	6
"Don't feel right"	0	1	2	3	4	5	6
Difficulty concentrating	0	1	2	3	4	5	6
Difficulty remembering	0	1	2	3	4	5	6
Fatigue or low energy	0	1	2	3	4	5	6
Confusion	0	1	2	3	4	5	6
Drowsiness	0	1	2	3	4	5	6
Trouble falling asleep	0	1	2	3	4	5	6
Mood emotional	0	1	2	3	4	5	6
Irritability	0	1	2	3	4	5	6
Sadness	0	1	2	3	4	5	6
Nervous or Anxious	0	1	2	3	4	5	6

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## Examples of oculo-vestibular screening tests with good sensitivity

### \* Saccade test:

- \* Doctor generates sudden movement.
- \* Positive if a correction saccade is present.



### \* Active horizontal oculo-vestibular test:

- \* Active R and L rotations (20-30°) fixing a static target about 1 meter away.
- \* Positive if symptoms increase.



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## One key study about cervical and vestibular rehabilitation following concussions.

**BJSM**

### Cervicovestibular rehabilitation in sport-related concussion: a randomised controlled trial

Kathryn J Schneider, Willem H Meeuwisse, Alberto Nettel-Aguirre, Karen Barlow, Lara Boyd, Jian Kang and Carolyn A Emery

*Br J Sports Med* 2014 48: 1294-1298 originally published online May 22, 2014

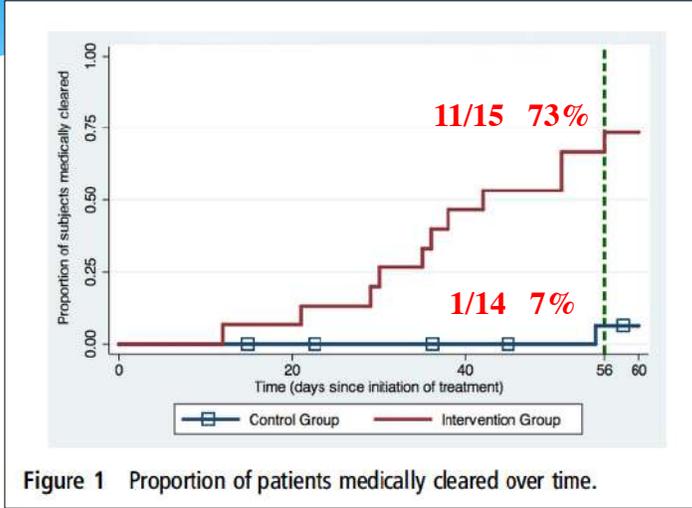
31 patients with persistent symptoms (on average > 6 weeks) of dizziness, neck pain and/or headaches

Postural education, ROM exercises, initial rest followed by a protocol of graded exertion ALONE.

The intervention group also received cervical spine and vestibular rehabilitation.

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# Results



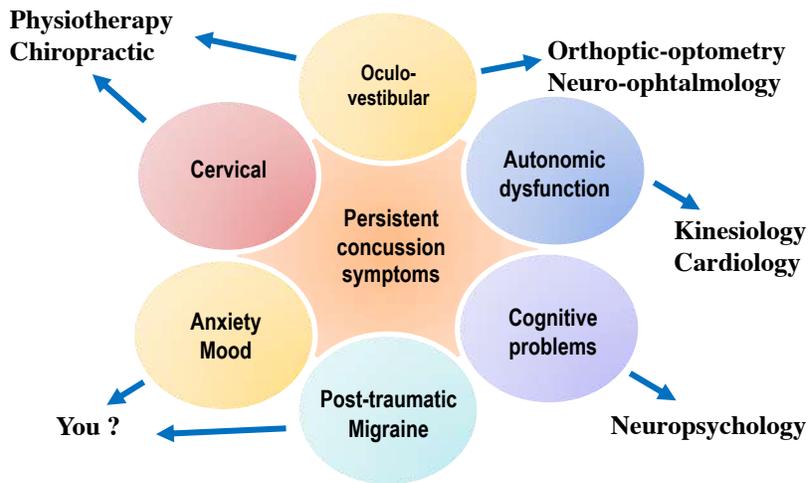
10x more RTP after 3 months;  
3.91 x more RTP even with  
intention to treat analysis  
(95% CI 1.34 to 11.34)

Figure 1 Proportion of patients medically cleared over time.

Schneider et coll. BJSM 2014; 48 (17): 1294-8

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## Targeted or multidisciplinary referral?

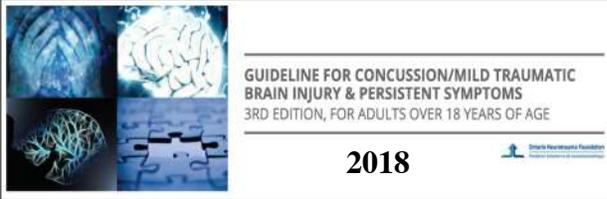


“Concussion clinics”  
SHOULD provide the  
combined expertise  
of multiple  
disciplines !!!

Adapted from Collins et al. 2014

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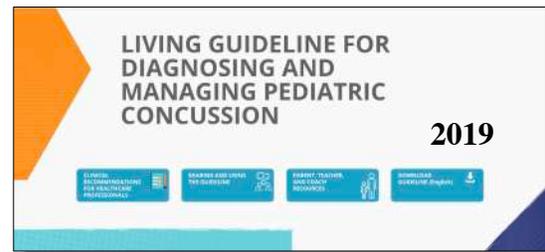
## Key resources for concussion with persistent symptoms



<https://braininjuryguidelines.org/concussion/>



Ontario Neurotrauma Foundation  
Fondation ontarienne de neurotraumatologie



<https://braininjuryguidelines.org/pediatricconcussion/>

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## Last comment...

**The knowledge and skills necessary to manage the vast majority of concussions are 100% achievable by family physicians!**

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Thank you!!!



[Pierre.fremont@fmed.ulaval.ca](mailto:Pierre.fremont@fmed.ulaval.ca)

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- ▶ FMF app
- ▶ [Fmf.cfpc.ca](http://Fmf.cfpc.ca)

Session #: **104**

Session Name: **Three Things a Family**

**Physician Can Do About Concussions**

YOUR FEEDBACK IS IMPORTANT TO US!

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