Returning to school following concussion

Pointers for family physicians from the *Living Guideline for Pediatric Concussion Care*

Jennifer Dawson PhD MSc Sharon Johnston MD LLM CCFP Stephanie McFarland MScOT OTReg(Ont)
Nick Reed PhD MScOT OTReg(Ont) Roger Zemek MD FRCPC

Family physicians play an important role in concussion care and are often the first point of contact that patients and families have with a medical professional after an injury. New evidence has changed the recommended management of concussions to include greater emphasis on returning to priority activities early and gradually, including school for students. All children and adolescents with suspected concussion require medical examination performed by a physician or nurse practitioner as soon as possible after an injury event.[1-3] Patients with symptoms that may be indicative of more serious head or brain injuries (*red flag* symptoms) should immediately go to the closest emergency department. However, for most patients, visiting their family physician is ideal, and family physicians are best situated to provide guidance to optimize recovery starting in the first 48 hours after an injury. Initial medical examination by a family physician includes taking a focused medical history and performing a physical examination to rule out serious pathology and to assess the need for imaging. This initial assessment should identify concussion symptoms and comorbidities that would benefit from early intervention, and it should identify patients who may benefit from early referrals to other specialists.[1,4]

All patients with a diagnosed concussion should be provided with information to help them manage their injuries and return to meaningful and important activities. Specify when to return to the physician (ie, newly injured patients should have a medical checkup within 1 to 2 weeks to monitor recovery), how long to rest, how to treat acute symptoms, what activities to avoid prior to medical clearance, when to return to school (and how), and when to return to other required or enjoyable activities.[1]

Recent updates to the *Living Guideline for Pediatric Concussion Care* emphasize that returning to school following concussion is an important part of recovery.[1] This international clinical practice guideline (of which N.R. and R.Z. are project co-leaders and J.D. is guideline developer on behalf of the PedsConcussion team) is updated as new research is published to provide those who diagnose and manage patients who have sustained concussions with up-to-date and evidence-based clinical care recommendations as well as patient education tools. The following tips should help family physicians get pediatric patients with concussions back to school as soon as is appropriate, thus ensuring these patients benefit from contact with peers, social support, and maintenance of regular routines.

How long should a patient rest after a concussion?

Patients should be encouraged to rest for the first 24 to 48 hours following acute injury. This is a period of relative rest to avoid exacerbating symptoms and to reduce risk of re-injury. Physically and cognitively demanding activities should be avoided. Complete avoidance of all stimuli, such as lying in a dark room, does not help recovery, and light activities around the house and gentle walking are permitted if tolerated. Resting for more than 24 to 48 hours is not recommended and can prolong time to recovery.[5,6] Gradual resumption of cognitive and safe physical activities (ie, activities that do not put one at risk of another concussion) improves recovery. These activities should be resumed even if the patient is still symptomatic, as long as symptoms can be tolerated. Any activity that poses a risk of contact, falling, or colliding should be avoided completely to prevent re-injury or more serious injury.

When should a patient return to school?

Patients should gradually return to in-person school environments—even if they are still experiencing symptoms after 24 to 48 hours of rest—as soon as they can tolerate participating in lower-stimulation school activities (eg, reading or having a conversation with 1 or 2 people for 30 to 45 minutes). Missing school for more than a week is not recommended.[1] It is appropriate for a patient to attend school with postconcussion symptoms as long as they receive accommodations that allow them to tolerate the school environment; however, it is reasonable for some patients to miss a few days of school following a concussion.[6] A gradual, step-wise return to school and a modified workload that considers individual learning and educational circumstances are strongly recommended (PedsConcussion has published a protocol to guide returning to school).[7] All school activities that may be associated with risks of collision or falling, high-speed activities, and full-contact sports should be avoided completely until medical clearance is obtained from a physician or nurse practitioner.

How can family physicians support returning to school?

Patient education. Provide written and verbal information regarding recovery from concussion, timing of returning to school, and timing of returning to activities. Emphasize resuming safe activities after the initial 24 to 48 hours of rest and avoiding high-risk activities.[7,8]

Referrals. At the initial medical assessment, identify and immediately refer all patients at high risk of prolonged recovery to an interdisciplinary concussion team for specialized care.[4,9,10] The Children's Hospital of Eastern Ontario Research Institute has published a risk score calculator for predicting persistent postconcussion problems in children and adolescents.[11] Children and adolescents for whom specialized interdisciplinary care is initiated within 7 days of sustaining a concussion tend to have better outcomes.[12] In addition, patients who are physically active prior to injury may benefit from referral to and assessment by an interdisciplinary concussion team as early as 2 to 3 days after injury to help make returning to physical activity and to school safe and optimal.[1] All patients who continue to experience symptoms beyond 4 weeks after acute injury should be referred to an interdisciplinary concussion team.[1]

Returning to school and to physical activity should happen in parallel. Family physicians should assess postconcussion deficits to offer appropriate guidance on gradually returning to physical activity in or outside of school. Patients may benefit substantially from opportunities for light aerobic exercise within the school environment to improve physical, cognitive, and emotional symptoms in the classroom setting, as long as activities are designed to limit risk of injury.[13,14] Walking, jogging, and non-contact active games are suggested after the initial period of rest and if symptoms can be tolerated. Participation in recess or modified physical education activities may be permitted if risks of head or body contact or of getting hit by a ball or other object can be avoided. For example, shooting on a basketball net may be acceptable while playing in a 3-on-3 basketball game may not be.

Identification of pre-existing factors. Consider other factors that may complicate physical, cognitive, or emotional symptom presentation and the patient's ability to return to school. Early identification and management of moderate to severe mental health symptoms through counselling and lifestyle modification—and, if appropriate, medication—are important. Children and adolescents who experience a concussion have higher rates of mental health conditions in the subsequent decade.[15]

Medical follow-up. At the initial medical assessment, schedule a medical follow-up with the family physician or nurse practitioner for 1 to 2 weeks after the acute injury. This follow-up should include a focused physical examination and an update on progress with returning to school and to activity.

Academic support. Share academic adjustment suggestions when the concussion is diagnosed.[16] The patient or caregiver should be advised to reach out to the school right away to identify a point person who is responsible for supporting students after a concussion. Accommodations must focus on supporting participation without exacerbating symptoms (rather than avoidance until the child or adolescent is symptom-free) and consider pre-existing or current educational circumstances.[17,18] Adjust accommodations as needed to match abilities and challenges. Examples of accommodations include the following:

- Allow for gradual exposure to various activities within the classroom and school setting, including screen time; complete avoidance of screen use, lights, smart boards, assemblies, music, and safe physical activity is not recommended in the long-term.
- Focus on essential learning priorities and eliminate non-essential or less essential missed work.
- Allow the student to complete (or partially complete) schoolwork and more challenging assignments.
- Adjust evaluations and expectations to accommodate concussion symptoms.
- Over time, most students should not rely on going home to manage symptoms and should be encouraged to find appropriate places at school for breaks if needed.
- Virtual schooling during concussion recovery may allow a student more control over stimulation, pacing, and scheduling; however, heavy screen time or visual burden can be more tiring, diminishes peer interactions, and may result in more support being needed to return to a regular schedule.
- A printable template of a letter to a patient's school with suggestions for academic support is available from PedsConcussion.[19]

Monitoring recovery and medical clearance

Medical clearance to return to school is not required following a concussion, nor is a return-to-school note from a physician. Patients should be advised that if symptoms worsen or red flag symptoms emerge, an urgent assessment is required. Although children and adolescents can engage in gradual and individualized return-to-school and return-to-sport processes in parallel, a child or adolescent should be completely back to school—including writing tests and not requiring any academic supports that were related to their concussion—before medical clearance to return to full-contact sport and game play is granted.[1]

Conclusion

Evidence for best practices for concussion care has transformed return-to-school recommendations over the past 5 years. Past advice related to resting and staying home from school until symptoms subside is no longer recommended and may lead to prolonged recovery.[13] A return-to-school approach focused on functioning (eg, what the patient can do safely) rather than strict symptom monitoring is recommended to individualize care with consideration of the child's or adolescent's pre-injury and current learning needs, along with

Table 1. PedsConcussion resources

RESOURCE	LINK
Living Guideline for Pediatric Concussion Care[1]	**https://pedsconcussion.com**
Living Guideline Return to Activity, Sports, School, and Work Protocol[7]	**https://pedsconcussion.com/return-to-school-activity-protocols/**
Post-concussion Information Sheet[8]	**https://pedsconcussion.com/tool-2-6-post-concussion-information-sheet/**
Letter to School Template[19]	**https://pedsconcussion.com/template-for-concussion-teams-letter-to-the-child-adolescents-school/**

overall health and well-being. Ensuring that up-to-date and evidence-based clinical practice recommendations are implemented will enable each child and adolescent to have the safest recovery and best outcome following concussion. The *Living Guideline for Pediatric Concussion Care* is produced by PedsConcussion, a collaboration that includes an expert panel of more than 45 clinicians and researchers from across North America.[1] The experts review new research as it is published to ensure that the collaboration's clinical practice guidelines shared with health care professionals are informed by the latest research evidence. PedsConcussion guideline recommendations, clinical algorithms, and patient handouts are listed in **Table 1**[1,7,8,19] and are freely available from **https://pedsconcussion.com/**.

Dr Jennifer Dawson is Research Associate at the Children's Hospital of Eastern Ontario Research Institute in Ottawa, Ont. **Dr Sharon Johnston** is Associate Vice-President for Research at the Institut du Savoir Montfort in Ottawa and Clinician Researcher in the Department of Family Medicine at the University of Ottawa. **Stephanie McFarland** is Clinical Lead and an occupational therapist in pediatric concussion and brain injury at Holland Bloorview Kids Rehabilitation Hospital in Toronto, Ont. **Dr Nick Reed** is Associate Professor in the Department of Occupational Science and Occupational Therapy at the University of Toronto and Canada Research Chair (Tier 2) in Pediatric Concussion. **Dr Roger Zemek** is Professor in the Department of Pediatrics and Emergency Medicine and Clinical Research Chair in Pediatric Concussion at the University of Ottawa and Director of the Clinical Research Unit at the Children's Hospital of Eastern Ontario.

Competing interests

Dr Sharon Johnston reports current or past competitively funded research grants from the Canadian Institutes of Health Research (CIHR), the Public Health Agency of Canada, the Foundation for Advancing Family Medicine, the Canadian Medical Association, the Ontario Neurotrauma Foundation, the Ontario Ministry of Health, the University of Ottawa Brain and Mind Research Institute, the Institut du Savoir Montfort, and the Ontario SPOR Support Unit. She is a co-founder and minority shareholder of 360 Concussion Care, an interdisciplinary concussion clinic. **Stephanie McFarland** reports that she volunteers as an expert panel member on the *Living Guideline for Pediatric Concussion Care* (PedsConcussion) team. **Dr Nick Reed** reports grants from the CIHR and Special Olympics Canada, and he holds a Canada Research Chair (Tier 2) in Pediatric Concussion. He is a co-investigator in a multicentre study funded by the National Football League Scientific Advisory Board but does not receive financial support. He is an executive board member for the International Paediatric Brain Injury Society. He is a minority shareholder in 360 Concussion Care. **Dr Roger Zemek** reports current or past competitively funded research grants from the CIHR, the National Institutes of Health, Health Canada, the Ontario Neurotrauma Foundation, the Ontario Ministry of Health, the Physician Services Incorporated Foundation, the Children's Hospital of Eastern Ontario Foundation, the University of Ottawa Brain and Mind Research Institute, the Ontario Brain Institute, the Ontario SPOR Support Unit, and the National Football League Scientific Advisory Board. He holds the Clinical Research Chair in Pediatric Concussion from the University of Ottawa and he is on the advisory board for Parachute Canada (a non-profit injury prevention charity) and the board of directors of the North American Brain Injury Society (volunteer unpaid). He is a co-founder, Scientific Director, and a minority shareholder of 360 Concussion Care.

Correspondence
Dr Roger Zemek; email **rzemek@cheo.on.ca**

The opinions expressed in commentaries are those of the authors. Publication does not imply endorsement by the College of Family Physicians of Canada

References

1. Reed N, Zemek R, Dawson J, Ledoux AA, Provvidenza C, Paniccia M, et al. *Living guideline for pediatric concussion care*. PedsConcussion; 2022. Available from: **https://pedsconcussion.com**. Accessed 2023 May 1.
2. Lumba-Brown A, Yeates KO, Sarmiento K, Breiding MJ, Haegerich TM, Gioia GA, et al. Centers for Disease Control and Prevention guideline on the diagnosis and management of mild traumatic brain injury among children. *JAMA Pediatr* 2018;172(11):e182853. Epub 2018 Nov 5. Erratum in: *JAMA Pediatr* 2018;172(11):1104.
3. McCrory P, Meeuwisse W, Dvořák J, Aubry M, Bailes J, Broglio S, et al. Consensus statement on concussion in sport—the 5th international conference on concussion in sport held in Berlin, October 2016. *Br J Sports Med* 2017;51(11):838-47. Epub 2017 Apr 26.
4. Zemek R, Barrowman N, Freedman SB, Gravel J, Gagnon I, McGahern C, et al. Clinical risk score for persistent postconcussion symptoms among children with acute concussion in the ED. *JAMA* 2016;315(10):1014-25. Erratum in: *JAMA* 2016;315(23):2624.
5. DeMatteo C, Bednar ED, Randall S, Falla K. Effectiveness of return to activity and return to school protocols for children postconcussion: a systematic review. *BMJ Open Sport Exerc Med* 2020;6(1):e000667.
6. Thomas DG, Apps JN, Hoffmann RG, McCrea M, Hammeke T. Benefits of strict rest after acute concussion: a randomized controlled trial. *Pediatrics* 2015;135(2):213-23. Epub 2015 Jan 5.
7. *Living guideline return to activity, sports, school, and work protocol*. PedsConcussion; 2022. Available from: **https://pedsconcussion.com/return-to-school-activity-protocols/**. Accessed 2023 May 2.
8. *Post-concussion information sheet*. PedsConcussion; 2022. Available from: **https://pedsconcussion.com/tool-2-6-post-concussion-information-sheet/**. Accessed 2023 May 2.
9. Haider MN, Cunningham A, Darling S, Suffoletto HN, Freitas MS, Jain RK, et al. Derivation of the Buffalo Concussion Physical Examination risk of delayed recovery (RDR) score to identify children at risk for persistent postconcussive symptoms. *Br J Sports Med* 2021;55(24):1427-33. Epub 2021 Sep 11.
10. Howell DR, Zemek R, Brilliant AN, Mannix RC, Master CL, Meehan WP 3rd. Identifying persistent postconcussion symptom risk in a pediatric sports medicine clinic. *Am J Sports Med* 2018;46(13):3254-61. Epub 2018 Sep 28.
11. *Score calculator*. Ottawa, ON: Children's Hospital of Eastern Ontario Research Institute; 2017. Available from: **https://www.5pconcussion.com/en/scorecalculator**. Accessed 2023 May 2.
12. Kontos AP, Jorgensen-Wagers K, Trbovich AM, Ernst N, Emami K, Gillie B, et al. Association of time since injury to the first clinic visit with recovery following concussion. *JAMA Neurol* 2020;77(4):435-40.
13. Ledoux AA, Barrowman N, Bijelić V, Borghese MM, Davis A, Reid S, et al. Is early activity resumption after paediatric concussion safe and does it reduce symptom burden at 2 weeks post injury? The Pediatric Concussion Assessment of Rest and Exertion (PedCARE) multicentre randomised clinical trial. *Br J Sports Med* 2022;56(5):271-8. Epub 2021 Nov 26.
14. Leddy JJ, Master CL, Mannix R, Wiebe DJ, Grady MF, Meehan WP, et al. Early targeted heart rate aerobic exercise versus placebo stretching for sport-related concussion in adolescents: a randomised controlled trial. *Lancet Child Adolesc Health* 2021;5(11):792-9. Epub 2021 Oct 1.
15. Ledoux AA, Webster RJ, Clarke AE, Fell DB, Knight BD, Gardner W, et al. Risk of mental health problems in children and youths following concussion. *JAMA Netw Open* 2022;5(3):e221235.
16. Master CL, Curry AE, Pfeiffer MR, Metzger KB, Kessler RS, Haarbauer-Krupa J, et al. Characteristics of concussion in elementary school-aged children: implications for clinical management. *J Pediatr* 2020;223:128-35. Epub 2020 Jun 4.
17. Takagi-Stewart J, Johnson AM, Smith MB, Wang J, Marcynyszyn LA, Zatzick DF, et al. Physician recommended school accommodations and student outcomes following a mild traumatic brain injury among youth with persistent post-concussive symptoms. *NeuroRehabilitation* 2022;50(4):467-76.
18. Mallory KD, Saly L, Hickling A, Colquhoun H, Kroshus E, Reed N. Concussion education in the school setting: a scoping review. *J Sch Health* 2022;92(6):605-18. Epub 2022 Mar 8.
19. *Letter to school template: accommodation at school for patients with concussion*. PedsConcussion; 2022. Available from: **https://pedsconcussion.com/template-for-concussion-teams-letter-to-the-child-adolescents-school/**. Accessed 2023 May 12.

This article is eligible for Mainpro+ certified Self-Learning credits.
To earn credits, go to **https://www.cfp.ca** and click on the Mainpro+ link.
This article has been peer reviewed.
Can Fam Physician 2023;69:382-4, 386. DOI: 10.46747/cfp.6906382
La traduction en français de cet article se trouve à **https://www.cfp.ca** dans la table des matières du numéro **de juin 2023** à la **page e120**.