



A 'knock on the noggin'

Kevin Gordon MD MS¹, Minh T Do PhD², Wendy Thompson MSc², Steven McFall MSc², Brett Taylor MD MH¹

A 14-year-old mountain biker is brought by his parents to a local emergency care centre with a 5 cm facial laceration and a headache. He had been biking on one of the local trails alone and is a bit vague about the nature of the injury; "I must have fallen and cut myself on a rock". He called his father on his cell phone at the time and arranged to meet him at the trailhead. He was wearing a helmet that was inspected by his father, which sustained no apparent impact.

His Glasgow Coma Scale score is 15, and other than occasional yawning and apparent reduced attention, he seems fine. He is a bit tender over his right shoulder, and his jersey is dirty on this side.

After cleaning and suturing the wound, he is discharged home.

Learning points

- A high index of suspicion for concussion is always warranted. Not all head injuries involve brain injury (1), but enough do that it is always wise to consider this possibility.
- Concussion, a functional injury, accounts for most minor brain injuries. Only a few acutely injured children have structural abnormalities on imaging (2), and a subset may require neurosurgical intervention (2).
- Concussion may be quite subtle in presentation, particularly within the first 24 h (3). During the initial assessment, if there remains any doubt about the patient's clinical status, choose to remove the patient from activity. 'If in doubt, sit them out'.

Over the next two days, he complained about a persistent headache, which felt worse when he climbed the stairs, and was not relieved with ibuprofen. He has been very irritable with his two younger siblings, finding them too loud. He called from school, complaining that his headache was markedly worse during math class, and he asked to come home, where he promptly fell asleep. His mother had him complete the symptom score of the Sport Concussion Assessment Tool 2 (SCAT2) (4), which she had downloaded from the Internet. He endorses 12/22 symptoms for a total score of 34/132. She is concerned and brings him to the evening clinic. He says he does not feel right.

His general physical examination is normal, as is most of his formal neurological examination. Of note, he walks slowly, appears unsteady at times and has difficulty with tandem gait backwards with eyes open.

Learning points

- The evaluation of concussion symptoms with the Sport Concussion Assessment Tool 2 (4) is recommended.
- A diagnosis of concussion is made with the appearance of symptoms (physical, emotional/behavioural, cognitive and sleep) following brain trauma (either direct or transmitted) (5) after alternative diagnoses have been considered.
- The current cornerstone of concussion management is physical and cognitive rest, until symptoms resolve (6). However, implementation is challenging, because rest is not easy for adolescents and even more problematic for younger children.

The patient returns two weeks later, stating he has been headache-free for five days. He is attending school full-time as an honour-level student. His physical examination appears to be normal.

Learning points

- Most adolescents' concussions will resolve within several days (6), and 95% within three weeks (7).
- Because of the difficulty determining when concussions are 'over' (8) and concern about children and adolescents' vulnerability to brain injury, many agree on an asymptomatic period of several days before initiating return to play (6).
- Once medically cleared, a stepwise return to play exertional protocol should be followed with at least one day per step (5).
- In February 2012, a CPSP one-time survey showed that Canadian paediatricians frequently encounter patients with concussions. They use heterogeneous criteria to determine when patients become asymptomatic and variable return to play duration. More research and education are needed to ensure optimal management of concussions in the paediatric population.

Recommended reading

Purcell LK; Canadian Paediatric Society, Healthy Active Living and Sports Medicine Committee. Evaluation and management of children and adolescents with sports-related concussion. *Paediatr Child Health* 2012;17(1):31-4. <www.cps.ca/en/documents/position/concussion-evaluation-management> (Accessed February 2, 2013)

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¹Dalhousie University, Halifax, Nova Scotia; ²Injury Section, Health Surveillance and Epidemiology Division, Centre for Chronic Disease Prevention and Control, Public Health Agency of Canada, Ottawa, Ontario

Correspondence: Canadian Paediatric Surveillance Program, 2305 St Laurent Boulevard, Ottawa, Ontario K1G 4J8.

Telephone 613-526-9397 ext 239, fax 613-526-3332, e-mail cpsp@cps.ca

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