TRANSLATING EMERGENCY KNOWLEDGE FOR KIDS

Concussion

Concussion is a traumatic brain injury[1] resulting from acceleration/deceleration forces from a direct blow to the head, face, neck or elsewhere on the body with an 'impulsive' force transmitted to the head. Loss of consciousness and/or amnesia are not required to make the diagnosis.

This document is adapted from Zemek R, Reed N, Dawson J, et al. "Living Guideline for Pediatric Concussion Care." The original resource and all tools in this document can be found at pedsconcussion.com

Symptoms

- Physical/somatic symptoms may include headache, nausea, vomiting, loss of balance and dizziness.
- Cognitive symptoms may include feeling in a 'fog', difficulty concentrating/remembering, amnesia, irritability and confusion.
- There can also be emotional (anxiety, depression) changes, behavioural issues and sleep disturbance.

Initial Assessment[2]

HISTORY AND PHYSICAL EXAMINATION[3]

- Record the acute event, symptoms (initial and ongoing), past medical history (concussion, migraine, ADHD/learning disorders), medications, social history.
- Assess Glasgow Coma Scale (GCS), balance (Balance Error Scoring System), HEENT, neck, neurological exam including gait, Romberg's testing, vestibular-ocular exam (training video for the vestibular-ocular exam).
- Use Living Guideline PedsConcussion Physical Examination resource.

DETERMINE NEED FOR NEUROIMAGING

- Order head and/or neck CT if a clinically important intracranial or cervical spine injury is suspected using PECARN (head), PECARN (cervical spine) and/or CATCH 2 rule. [4,5,6]
- Head CTs and MRIs are not used routinely as imaging results are NORMAL in concussion.

DETERMINE RISK OF PERSISTING SYMPTOMS AFTER CONCUSSION (PSAC)[7]

- Assess risk of symptoms lasting one month or longer using 5P risk score (see Table 1) to aid in counseling.
- Patients are considered low risk for persistent symptoms if their score is 0-3, moderate risk if their score is 4-8 and high risk if their score is 9-12.
- Refer those with 5P risk score ≥ 5 and those in competitive sports and/or with pre-existing mental health conditions to a medically supervised interdisciplinary concussion team for early intervention, if available. Otherwise, primary care provider should coordinate referrals (e.g., physiotherapy, occupational therapy, mental health) for ongoing rehabilitation, as required.

Table 1: Persisting Symptoms after Concussion Risk Factors: 5P Risk Score

PSAC Risk Factor	Categories	PTS
Age (years)	5-7	0
	8-12	1
	13-18	2
Sex	Male	0
	Female	2
Duration of Prior Concussion	No Prior or <1 week	0
	≥1 week	1
Personal History of Migraine	No	0
	Yes	1
Answers Questions Slowly	No	0
	Yes	1
Tandem Stance Errors	0-3	0
	≥4 or unable to do test	1
Headache	No	0
	Yes	1
Sensitivity to Noise	No	0
	Yes	1
Fatigue	No	0
	Yes	2

Patient Disposition

- After assessing the need for neuroimaging, strongly consider admission or prolonged ED observation for patients with increasing or persistent confusion/irritability, worsening headache, persistent vomiting, ongoing seizures, focal neurologic symptoms/signs, prolonged altered level of consciousness, history of bleeding disorder and/or multisystem injuries.
- Discharge patients with normal mental status and improving symptoms, no risk factors indicating need for CT scan (or normal CT scan, if performed) and no indications for prolonged hospital observation/admission.

Concussion Management After Discharge

- Provide patients/caregivers with handouts outlining Return-to-School and Return-to-Activity protocols. Provide written instructions on when to return to ED/primary care provider.

- If required, use printable Medical Assessment Letter to document the injury and assessment.
- Counsel gentle activities around the house, including social interactions and light walking (if tolerated) for the first **24-48 hours** post-injury and physical and cognitive relative rest (if needed). Complete rest for more than 24-48 hours may negatively impact recovery.[2]
- Recommend that physical and cognitive activity be started 24-48 hours after acute concussion, increasing the intensity gradually as part of the initial treatment. Activities that pose no/low risk of reinjury should be resumed even if mild residual symptoms are present.
- Screentime should be minimized in the first 48 hours after injury. After 48 hours, screentime may be gradually resumed and increased according to symptom tolerance as the child/adolescent recovers.[10]
- Most children recover within 2-4 weeks, although 30% may have persistent symptoms after 1 month.[9]
- Recommend medical follow-up 1-2 weeks following the injury or earlier if symptoms worsen. Initiating clinical care early (within 8 days) is associated with improved recovery times.[7]

RETURN TO SCHOOL

- Medical clearance is not required to return to school. Gradual return to school (Return-to-School Steps) should be encouraged as soon as possible, even if symptoms are still present. Prolonging the return to school may be detrimental to recovery. Complete absence from school for more than one week is not recommended.
- Children with concussion should return to school after a short break (**24-48 hours** at most) and as soon as they can tolerate academic activities with adequate accommodations in place. Any school-related activity that has a risk of reinjury should be avoided until medically cleared.

RETURN TO ACTIVITY[1,2]

- Resume physical activities by **24-48 hours** post-injury (at most). Gradually increase the intensity of aerobic activity as part of the initial treatment for acute concussion using a step-wise Return-to-Activity protocol.
- Start with 'light-intensity' aerobic exercise, progressing to 'moderate-intensity' aerobic exercise, and continue to increase the intensity over time as symptoms are tolerated. Mild exacerbation of symptoms is common; suggest taking a break from the activity if increase in symptoms is more than mild/brief or the symptoms cannot be tolerated.[1,2]
- Avoid contact sports/activities that risk reinjury until:
  1) full return to school without concussion-related academic accommodations **AND**
  2) medical clearance for full-contact sport and high-risk activities
- Written determination of medical clearance should be provided before unrestricted return to sport as directed by local laws and/or sporting regulations.
- Patients experiencing concussion-related symptoms *after* medical clearance should return to their health care provider for reassessment with a goal of full resolution of symptoms with exertion before engaging in high-risk activities.

SYMPTOMATIC TREATMENT

- Counsel regarding the importance of hydration and sleep hygiene. Melatonin can be considered for difficulty sleeping.
- Use NSAIDs and/or acetaminophen PRN for headache during the first few days post-injury.
- Recommend physiotherapy for cervicogenic headache and/or vestibular therapy for dizziness, vertigo, or visual changes.
- Counsel families and primary care provider that early Cognitive Behavioural Therapy for emotional and behavioural symptoms is important for optimal recovery.
- The use of sunglasses, ear plugs and/or noise-cancelling headphones may also be helpful as short-term aids.

Scan or click the QR code to learn more and to see a full list of references and development team members

Disclaimer: The purpose of this document is to provide healthcare professionals with key facts and recommendations for the diagnosis and treatment of concussion in children in the emergency department. The TREKK Network is not liable for any damages, claims, liabilities, costs or obligations arising from the use of this document including loss or damages arising from any claims made by a third party. **THIS DOCUMENT IS SUBJECT TO FULL DISCLAIMER HERE: https://trekk.ca/terms-of-use/**

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