

Head Injury

The vast majority of pediatric head injury cases are mild, require no therapy and leave no long-term sequelae. However, it is important to identify individuals at risk for significant injury and those who require close evaluation and intervention. Acute head injury leading to traumatic brain injury (TBI) is an important cause of morbidity and mortality in childhood within developed countries, and a common presentation to the emergency department.

COMMON CAUSES

The most common causes of acute head injury in pediatric patients presenting to Canadian EDs:

- Falls
- Sport-related injuries
- Being hit on the head by an object/colliding with an object
- Injuries involving bicycles
- Injuries involving motor vehicles



CLINICAL MANIFESTATIONS

- Headache
- Nausea & vomiting
- Loss of consciousness
- Impaired level of consciousness, disorientation or confusion
- Amnesia
- Blurred vision
- Seizures

Increased signs of concern for a traumatic brain injury include:

- Palpable skull fracture
- Signs of basilar skull fracture (raccoon eyes, hemotympanum)
- Occipital, parietal, or temporal scalp hematoma
- Increasing lethargy and decreasing LOC

CLASSIFICATION OF SEVERITY

- Mild TBI: GCS 14 - 15
- Moderate TBI: GCS 9 - 13
- Severe TBI: GCS ≤ 8

Most pediatric patients presenting for medical assessment for possible head injury have a minor TBI. Patients with moderate or severe TBI are more likely to have intracranial pathology and require admission for either supportive care or specific treatment. Pediatric patients with TBI more commonly develop a pattern of diffuse axonal injury and secondary cerebral edema, compared with adults.



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IMAGING

The need and timing of neuroimaging requires balancing the clinical benefit with the risk of radiation exposure and potential need for sedation. There have been a number of clinical prediction rules that have been developed to help aid clinicians in deciding appropriate candidates for imaging. These rules involve some combination of variables based on mechanism, signs and symptoms on initial assessment, or status after a period of observation. The most commonly used rules are the PECARN Rules.

- [Pediatric Emergency Care Applied Research Network \(PECARN\) Rules](#)

In the case of severe head trauma (GCS < 8) the transport team should be contacted as soon as possible. Transfer to a tertiary pediatric facility should not be delayed for CT imaging unless indicated by transport/accepting physician. Prioritization should be on stabilization and early transfer to optimize outcomes.

MANAGEMENT

- **Mild head injury in asymptomatic patients** without severe mechanism can be discharged home with instructions on what to watch for and when to return to the ED
- **Mild head injury with increased risk factors** such as headache, vomiting, loss of consciousness at the time of the event or severe mechanism should receive a period of clinical observation (4-6 hours). If symptoms improve, patient can be discharged home. If symptoms persist, consider CT scan or admission to hospital for observation
- **Moderate head injury:** consider CT, admission for close observation (neurovitals q1-2h). The decision to transport to a tertiary facility should be individualized and dependent on clinical judgement, local resources and discussed with the pediatric trauma team.
- **Severe head injury:** CT once the patient is stabilized which may include intubation. The main goal of treatment of TBI is to prevent secondary brain injury by maintaining cerebral perfusion while minimizing increased intracranial pressure
 - Avoid hypoxia and hypotension with effective airway and hemodynamic support. These factors contribute most to secondary brain injury
 - Continuous monitoring of vital signs and end tidal CO₂ if possible
 - Elevate the head of the bed 30 degrees with head and neck midline
 - Provide sedation and analgesia as needed
 - Maintain normal core temperature, normoglycemia and normocapnia (EtCO₂ 35-40)
 - Correction of coagulopathy

If signs of cerebral herniation noted (progressive obtundation, unilateral pupillary dilatation & Cushing's triad) EMERGENT reduction of intracranial pressure required:

- Hyperventilation
- Hyperosmolar agents (3% Normal Saline, Mannitol)
- Airway protection
- Potential need for neurosurgical intervention

TREKK Bottomline Recommendations



[Severe Head Trauma](#)

TREKK Bottomline Recommendations



[Concussion](#)

The Atlantic TREKK Roadshow is putting together a schedule for 2027 and we may be coming to a site near you. Please email eleanor.fitzpatrick@iwk.nshealth.ca for more information.

Comfort Corner



C - Comfort, A - Ask, R - Relax, D - Distract



CARD™ is an evidence-based framework that supports health care providers, educators, patients and their families prepare for needle procedures such as vaccinations, blood work and intravenous catheterization.. The CARD system also provides strategies that can aid in coping before and during needle procedures. The protocol includes resources such as videos, handouts and activities that use a 4E model (Education, Environment, Engagement and Evaluation). All components contribute to better pain care and work better when they are integrated together. The CARD system has been proven to reduce stress-related reactions, such as fear, pain, dizziness and fainting during vaccination and other needle procedures. Find supports for community or hospital-based procedures. Always remember to:

- Reinforce learning, prepare and practice in order to set patients up for success
- Support choices, when possible, give patients a job or choice in distraction technique
- Praise and celebrate what went well, focus on the positives

CARD™ is available in English and [French](#).

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References

- CPS (2025). *Management of the Pediatric Patient with Acute Head Trauma*. <https://cps.ca/en/documents/position/acute-head-trauma#ref3>
- RCH (2021). *Clinical Practice Guidelines: Head Injury*. https://www.rch.org.au/clinicalguide/guideline_index/Head_injury/
- TREKK (2022). *Bottomline Recommendations: Acute Head Trauma*. https://cms.trekk.ca/wp-content/uploads/2023/11/2025_04_07-SevereHeadInjuryBLR_FINAL_v3.1.pdf

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