Concussion is the most common cause of brain injury and is caused by a blow to the head, face, neck or body through sport, falling or accident. This sudden injury causes physiologic disruption which leads to neurologic signs and symptoms. Symptoms may develop immediately at time of injury or may be delayed in onset for hours, days or even longer post-injury.

**ASSESSMENT**

Perform standard history and physical exam (HPE). Assess for more severe injury. Include musculoskeletal evaluation, neurologic exam (movement, coordination, strength, sensation, reflexes, gait and balance), vision and vestibular assessment, and cognitive performance (memory, concentration, function).

Signs and symptoms may vary over time, and may be significantly different than a prior concussion’s effects.

<table>
<thead>
<tr>
<th>Physical</th>
<th>Cognitive</th>
<th>Emotional</th>
<th>Sleeping</th>
</tr>
</thead>
<tbody>
<tr>
<td>Headache</td>
<td>Feeling foggy</td>
<td>Irritable or fussy</td>
<td>Change in sleeping pattern</td>
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<td>Sensitivity to light</td>
<td>Feeling slow</td>
<td>Feeling more emotional, dysregulated, or anxious</td>
<td>Trouble falling asleep</td>
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<td>and/or sound</td>
<td>Memory issues</td>
<td></td>
<td>Trouble staying asleep</td>
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<tr>
<td>Nausea/vomiting</td>
<td>Unable to concentrate</td>
<td></td>
<td>Sleeping more than usual</td>
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<tr>
<td>Feeling tired/drowsy</td>
<td>Trouble thinking clearly</td>
<td></td>
<td>Sleeping less</td>
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<tr>
<td>Dizzy</td>
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<td>Loss of balance or</td>
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<td>trouble walking</td>
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<td>Ringing in ears</td>
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<td>Double or blurred vision</td>
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<td>Numbness or tingling</td>
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<td>Loss of consciousness</td>
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</tbody>
</table>

**HPE (HISTORY AND PHYSICAL EXAM) RED FLAGS**

If any of these red flags are present, emergent evaluation is warranted.
- Repeated vomiting
- Seizure-like episodes
- Severe or progressive headache
- Lethargy/difficult to arouse
- Passes out
- Weakness in arms or legs
- Difficulty recognizing people or places

**MANAGEMENT/TREATMENT**

If a concussion is recognized early and properly treated to limit severity and duration of symptoms, most patients recover within 1–3 months. Instruct patient to avoid further head trauma and pace return to activities (cognitive, physical and social, including school work) based on symptom tolerance. Recommend quality sleep, hydration and nutrition. Recommend Tylenol/ibuprofen intermittently for symptom management. Progressions should occur over several stages. Concussion symptoms may vary as the patient attempts to return to normal activities, but severity and frequency of symptoms should gradually improve. Advise patient to contact you if symptoms worsen or do not improve, or if new symptoms arise.

If you would like additional copies of this tool, or would like more information, please contact the Physician Outreach and Engagement team at Cincinnati Children’s.

If you have clinical questions or to make a referral, contact the Brain Health and Wellness team at 513-803-4323 (HEAD) or braininjury@cchmc.org.
Concussion/Traumatic Brain Injury

Inclusion Criteria

- Suspected brain injury
- Age 0–22 with history of trauma and signs/symptoms of possible concussion

Patient Presents

Standard Workup

- History of Present Illness
  - Concussion/recovery
  - Co-morbidities/conditions
  - Time since injury
- Family History
- Physical Exam

HPE (HISTORY AND PHYSICAL EXAM) RED FLAGS

- Repeated vomiting
- Seizure-like episodes
- Severe or progressive headache
- Lethargy/difficult to arouse
- Passes out
- Weakness in arms or legs
- Difficulty recognizing people or places

If any of these red flags are present, emergent evaluation is warranted

If no red flags are present, begin rehabilitative care:

- Early walking/return to daily activity as symptoms allow
- May begin physical activity progression when tolerating school and other daily activity
- Follow-up evaluations

Improvement evident

- Return to daily cognitive/social/physical activity
- Resolution of symptoms observed:
  - Return to normal daily and social activity
  - Physical activity program completed
- Investigate behaviors and complaints
- Consider additional treatment options:
  - Physical Therapy, Occupational Therapy, Vestibular Rehabilitation
  - Medications
- Adjust school/work accommodations if needed
- Consider addressing other co-morbidities as needed
- Consider referral to Cincinnati Children’s: Concussion/Head Injury/Brain Recovery After Injury (BRAIN) Health and Wellness Center

Discharge from care