Otolaryngology
Occupational Therapy
Rehabilitation
Neurology
Sports Medicine

Migraine Protocol
Nausea

Clinical standards are developed for
At high risk for recurrent concussion
Prior history of concussions
competitive sports or physical fine arts
depression

Service
Indication for Referral

Sports Medicine
High-level athletes
No improvement or poor improvement after 2-3 weeks
High risk for prolonged concussion

Acute Symptom Control***

For additional resources (i.e., symptom inventory
checklists, screening tools, Return to Play
algorithms, provider education, etc.)
see TCH Concussion Webpage

Inclusion Criteria
- Children 5 to 21 years of age with a suspected
concussion
- Glasgow Coma Scale score (GCS) ≥13
- Clinically significant Traumatic Brain Injury (i.e: Intracranial hemorrhage, Diffuse Axial Injury)
- Focal neurologic deficits
- Patients with traumatic injuries requiring hospital admission
- Suspicion of abuse

Exclusion Criteria
- GCS <13
- Migraine Protocol - 2nd Line

Nausea / Vomiting:

Exclusion Criteria
- Children 5 to 21 years of age with a suspected concussion
- Glasgow Coma Scale score (GCS) ≥13
- Clinically significant Traumatic Brain Injury (i.e: Intracranial hemorrhage, Diffuse Axial Injury)
- Focal neurologic deficits
- Patients with traumatic injuries requiring hospital admission
- Suspicion of abuse

Exclusion Criteria
- GCS <13
- Migraine Protocol - 2nd Line

Headache

NCADS, Tylenol - 1st Line
Migraine Protocol - 2nd Line

Discharge Criteria
- Symptoms controlled (including vomiting and pain)
- No injuries or medical conditions warranting admission or further evaluation
- Capable caretakers who can reliably observe the child and who can return for care if indicated

Follow up:
- Initial evaluation: 2-3 days with primary care provider
- Follow-up evaluations: q1-2 weeks
- See risk table for patients that may require further referral or consultation (see table****)

Discharge Education
Instruct caregivers to watch for potential warning signs
- Worsening headache
- Significant nausea and/or repeated vomiting
- Increased confusion, restlessness, or agitation
- Slurred speech, drowsiness, or inability to wake up
- Weakness, numbness of decreased coordination
- Loss of consciousness, convulsions or seizures

Cognitive rest
- Some patients require a 24-48 hour break from school after a concussion. Prolonged rest beyond the first 24-48 hours after a concussion is no longer routinely recommended and may be associated with a delayed recovery.
- Limit hand-held devices and video games if symptoms increase. This is especially important in patients with light sensitivity and oculomotor dysfunction.

Physical rest
- After an initial 24-48 hour rest, a progressive return to activities can be initiated if symptoms are improving.
- Patients may begin light physical activity (example: 20 minute walk) even if symptoms are present as long as the activity is tolerated and symptoms are not worsening.
- Children and adolescents should return to full school participation before they return to full athletic participation.
- Clearance will be needed by a provider prior to participation in organized, full-contact sports

Pain management
- 1st line – OTC pain meds (acetaminophen, ibuprofen, naproxen)
- 2nd line – prescription pain meds (NSAIDs): use of NSAIDs > 2 weeks for pain control beyond 3 consecutive weeks will likely evolve to medication overuse headache (another type of secondary headache that requires drug withdrawal).
- Use of prescription pain meds like synthetic spicides, tramadol, etc., is at the discretion of the physician, keeping in mind that severe headache or neck pain may indicate a diagnosis other than concussion.

Physiatry
- See TCH Concussion Webpage

Einstellung
- Please review Trauma Closed Head Injury Guideline by clicking here***
See algorithm for Pediatric Concussion Follow-Up

History and Physical
- Use a standardized evaluation tool if possible
- Examples: Age appropriate symptom inventory (e.g. PCSi-P, PCSi-15, PCSi-13-18) or Sideline Concussion Assessment Tool (SCAT)

Concussion Targeted History:
- Identify risk-factors that could suggest prolonged symptoms-
- Medical history: Neurologic disorder, mental health disorder
- Educational History: Learning disabilities/differences
- Concussion history: Multiple or prolonged concussions

Concussion signs/symptoms:
- Headaches, pressure in head, neck pain, nausea/vomiting, dizziness, blurred vision, balance problems, sensitivity to light, sensitivity to noise, feeling slowed down, feeling ‘in a fog’, ‘don't feel right’, difficulty concentrating, difficulty remembering, fatigue, low energy, confusion, drowsiness, more emotional, irritability, sadness, nervous/xious, trouble falling asleep

Concussion Targeted Physical exam:
- Full vital signs
- Assessment of pain using validated, age/developmental-appropriate pain scale
- Consider full GCS exam
- Neurologic Assessment (cranial nerves, motor, sensory, reflex, cerebellar, mental status)
- Specific evaluation for neck injury (Cervical tenderness and/or neck ROM)
- Evaluate balance (e.g. Romberg, Tandem gait, or BESS- Balance Error Scoring System)
- Consider Vision/Vestibular Evaluation (e.g. VOMS- Vestibular/Ocular-Motor Screening)

Acute Symptom Control***

Inclusion Criteria
- Prior history of concussions
- Lower cognitive ability / Learning Disabilities/Differences
- Underlying neurological or mental health disorder (i.e., depression, anxiety disorders, etc.)
- Family and social stressors
- At high risk for recurrent concussion, engaged in competitive sports or physical fine arts

Risk factors for patients who may require further referral/consultation:

Follow up after initial evaluation should be within
***
EC, UC or TCP
Child with acute head injury with low suspicion of clinically significant TBI or intracranial hemorrhage

**** Please review Trauma Closed Head Injury Guideline by clicking here***
See algorithm for Pediatric Concussion Follow-Up
### Progressive Return to Activities (Learning and Athletic)

**Example:**
Return to School/Activities Concussion Return to Learning Plan (Steps 1-5) and then Return to Athletics (Steps 6-10)

#### Step 1: Full Brain Rest
- Some patients require a 24-48 hour break from school after a concussion. Prolonged rest beyond the first 24-48 hours after a concussion is no longer routinely recommended and may be associated with a delayed recovery.
- **Academics:** No school, No reading.
- **Electronics:** No Screen Time (TV, iPad, Texting,...)
- **Activity:** Walking for up to 20 minutes if no increase in symptoms
- **No Competitive Sports or PE**
- Rest is the key at this level.

#### Step 2: Home Brain Rest
- **Academics:** No school. Light reading is okay. Light mental activities.
- **Electronics:** Must take a break for every 15 minutes of screen time.
- **Activity:** Walking for up to 20 minutes if no increase in symptoms
- **No competitive sports or PE**

#### Step 3: Half-Day of School
- **Academics:** 1/2 day of school.
- **Minimize Exams.** Extra time for assignments
- **Try to minimize busy work and focus on important concepts**
- **Schedule breaks when studying:** (example: 5 minute break for every 15 minutes of studying at home or study hall)
- **Electronics:** Take a short break for every 15 minutes of screen time, but try to minimize electronics. Stop if symptoms worsen.
- **Activity:** Walking for up to 20 minutes if no increase in symptoms
- **No competitive sports, PE, or band (rest or study instead of PE or band)**

#### Step 4: Full Day of School and Light Aerobic Activity (light/slow intensity)
- **Academics:** Full day of school.
- **Consider scheduled break at lunch and PE**
- **Minimize exams.** Extra time for assignments
- **Try to minimize busy work and focus on important concepts**
- **Electronics:** Take a short break for every 15 minutes of screen time, but try to minimize electronics. Stop if symptoms worsen.
- **Activity:** Walking for up to 20 minutes if no increase in symptoms (OK to do light aerobic exercise like jogging or exercise biking at this stage if tolerated)
- **No competitive sports, PE, or band (rest or study instead of PE or band)**

#### Step 5: Full Academics (become a fully functional normal student)
- **Academics:** Full day of school.
- **Full Exams and assignments**
- **Electronics:** No restrictions
- **Activity:** Walking for up to 20 minutes if no increase in symptoms (OK to do light aerobic exercise like jogging or exercise biking at this stage if tolerated)
- **No competitive sports.**
- **May start a return to competitive Athletics after completing this step**

**Note:** Usually the patient needs a normal exam and symptoms back to baseline before progressing to steps 6-10 (Return to Athletics Progression)

#### Step 6: High Aerobic Activities (high/higher intensity)
- Light aerobic exercise such as walking, jogging, or stationary cycling.
- No resistance training.

#### Step 7: Heavy Aerobic/Weights Activities
- Sport specific exercise (e.g. Running/sprinting). May start progressive addition of resistance training at this step.

#### Step 8: Non-contact practice
- Progress to non-contact training drills.
- Examples:
  - Passing drills in soccer or football
  - Jumping in cheerleading (no tumbling or flying)

#### Step 9: Full contact practice
- Full contact practice after medical clearance (not until cleared by a provider)

#### Step 10: Game play and full participation

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### Symptoms Specific Treatments

- **Light Sensitivity:** Sun glasses, decrease brightness of computer screen
- **Noise:** Quiet environment, noise canceling headphones/ear buds
- **Fatigue:** Frequent breaks, mild physical activities (walks, stretch breaks), sleep hygiene
- **Symptoms exacerbation with school work:** Extra time for tests, less repetitive work (focus on concepts), consider blue light glasses for screens
- **Symptoms worsen with reading:** Decrease reading assignments (books on tape), pre-printed notes, larger print, reading glasses
- **School Anxiety:** Clear expectations for when work is due, access resources in the school if available
- **Depressed mood:** Get help early (Counseling, psychologist/psychiatry teams), consider depression screening

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**Academic Accommodations**

- **No school, ½ days, vs Full days**
- **Testing vs no testing**
- **Academic accommodations examples:** Extra time for exams/ quizzes, reduced workload, pre-printed notes, focus on core concepts

  **Note:** Try to avoid prolonged school absences
- **Consider having a pre-designed letter for academic accommodations**

**Sample Note for Accommodations (designed for EPIC):**

I saw and evaluated @NAME@ for concussion. I am requesting accommodations for school due to the injury. For recovery from post-concussive symptoms, cognitive rest is needed in this case. My recommendations would be the following:

**School Time**
- Full Days as tolerated
- Half Days as tolerated
- No school and may return on ___ for half days

**Academic Accommodations**

- **Postpone Examinations**
  - No more than ___ exams a week
- **Unlimited time on tests/assignments**
- **Reduced work load (1/2 of the usual load)**
- **Obtain notes for class from peers or have pre-printed notes/handouts**
- **Make up missed assignments gradually**

**Athletics**

- **(before progressive to athletic participation, the patient's symptoms should be back to baseline and he/she should be cleared academically)**
- **No PE, gym, or athletics.**
- **Cleared to start a progressive return to activities under supervision**
  - Light Aerobic
  - Heavy Aerobic/Weights
  - Non-contact practice
  - Full contact practice
  - Game play/Full participation
- **Full clearance for PE/Sports/Activities**

I would like to continue to follow @NAME@ until the concussion symptoms and post-concussive symptoms are resolved. I appreciate your assistance as @FNAME@ returns to school and activities. Thank you.
References


Clinical Standards Preparation

This clinical standard was prepared by the Evidence-Based Outcomes Center (EBOC) team in collaboration with content experts at Texas Children's Hospital. Development of this clinical standard supports the TCH Quality and Patient Safety Program initiative to promote clinical standards and outcomes that build a culture of quality and safety within the organization.

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No relevant financial or intellectual conflicts to report.

Development Process

This clinical standard was developed using the process outlined in the EBOC Manual. The literature appraisal documents the following steps:

1. Review Preparation
   - PICO questions established
   - Evidence search confirmed with content experts

2. Review of Existing External Guidelines
   - Guideline on the Diagnosis and Management of Mild Traumatic Brain Injury Among Children
   - ED Clinical Pathway for Evaluation/Treatment of Acute Head Trauma
   - Concussion Clinical Care Guideline/Pathway
   - Guidelines for Diagnosing and Managing Pediatric Concussion

3. Literature Review of Relevant Evidence
   - Searched: PubMed, CINAHL, Cochrane

4. Critically Analyze the Evidence
   - Little to no available evidence; recommendations adopted or adapted from the CDC Pediatric mTBI Guideline

5. Summarize the Evidence
   - Materials used in the development of the clinical standard, literature appraisal, and any order sets are maintained in a mild traumatic brain injury evidence-based review manual within EBOC.

Evaluating the Quality of the Evidence

Published clinical guidelines were evaluated for this review using the AGREE II criteria. The summary of these guidelines are included in the literature appraisal. AGREE II criteria evaluate Guideline Scope and Purpose, Stakeholder Involvement, Rigor of Development, Clarity and Presentation, Applicability, and Editorial Independence using a 4-point Likert scale. The higher the score, the more comprehensive the guideline.

This clinical standard specifically summarizes the evidence in support of or against specific interventions and identifies where evidence is lacking/inconclusive. The following categories describe how research findings provide support for treatment interventions.

“Evidence Supports” provides evidence to support an intervention
“Evidence Against” provides evidence against an intervention.
“Evidence Lacking/Inconclusive” indicates there is insufficient evidence to support or refute an intervention and no conclusion can be drawn from the evidence.

The GRADE criteria were utilized to evaluate the body of evidence used to make practice recommendations. The table below defines how the quality of the evidence is rated and how a strong versus weak recommendation is established. The literature appraisal reflects the critical points of evidence.

<table>
<thead>
<tr>
<th>Recommendation</th>
<th>Quality Type of Evidence</th>
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<tr>
<td>STRONG</td>
<td>Desirable effects clearly outweigh undesirable effects or vice versa</td>
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<tr>
<td>WEAK</td>
<td>Desirable effects closely balanced with undesirable effects</td>
</tr>
<tr>
<td>HIGH</td>
<td>Evidence from well-performed RCTs or exceptionally strong evidence from unbiased observational studies</td>
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<tr>
<td>MODERATE</td>
<td>Evidence from RCTs with important limitations (e.g., inconsistent results, methodological flaws, indirect evidence, or imprecise results) or unusually strong evidence from unbiased observational studies</td>
</tr>
<tr>
<td>LOW</td>
<td>Evidence for at least 1 critical outcome from observational studies, RCTs with serious flaws or indirect evidence</td>
</tr>
<tr>
<td>VERY LOW</td>
<td>Evidence for at least 1 critical outcome from unsystematic clinical observations or very indirect evidence</td>
</tr>
</tbody>
</table>

Recommendations

Practice recommendations were directed by the existing evidence and consensus amongst the content experts. Patient and family preferences were included when possible. The Content Expert Team and EBOC team remain aware of the controversies in the diagnosis/management of mild traumatic brain injury in children. When evidence is lacking, options in care are provided in the clinical standard and the accompanying order sets (if applicable).

Approval Process

Clinical standards are reviewed and approved by hospital committees as deemed appropriate for its intended use. Clinical standards are reviewed as necessary within EBOC at Texas Children’s Hospital. Content Expert Teams are involved with every review and update.

Disclaimer

Practice recommendations are based upon the evidence available at the time the clinical standard was developed. Clinical standards (guidelines, summaries, or pathways) do not set out the standard of care and are not intended to be used to dictate a course of care. Each physician/practitioner must use his or her independent judgment in the management of any specific patient and is responsible, in consultation with the patient and/or the patient’s family, to make the ultimate judgment regarding care.

Version History

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