Concussion Updates and Office Management for the Primary Care Provider

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Dr. Emelynn Fajardo has no financial conflicts of interest to disclose relevant to this activity.
Learning Objectives

- Discuss the most recent updates in concussion
  - The Consensus Statement on Concussions in Sport from the 5\textsuperscript{th} International Conference on Concussion in Sport, Berlin 2016

- Recognize the comorbidities commonly associated with patients that are likely to have a more protracted recovery course

- Review how to appropriately treat acute concussions, including return to learn and return to play
Concussion Definition

- TBI induced by biomechanical forces
- Rapid onset of short-lived impairment of neurological function that resolves spontaneously
  - Signs and symptoms may evolve over a number of minutes to hours
- Results in neuropathological changes, but clinical signs and symptoms represent functional disturbance rather than structural injury
- May or may not involve LOC and resolution typically follows a sequential course, but some cases may be prolonged
Concussion Signs and Symptoms

- Somatic, Cognitive, Emotional
- Physical signs (LOC, amnesia, neuro deficit)
- Balance impairment
- Behavioral changes
- Cognitive impairment
- Sleep/wake disturbance
Red Flag Signs

- Severe headache 10/10 or significant worsening
- LOC (especially >30 seconds)
- Seizures
- Change in MS: difficulty staying awake, increasing irritability, behavioral changes
- Vomiting
- Slurred speech
- Can’t recognize people or familiar places
- Spinal injury or pain
- Focal neurologic signs or paresthesia
Evaluation

- Onsite, office setting, UC or ED
- Emergency management principles
  - GCS <15
  - Spinal injury
  - Deteriorating MS
  - Progressive worsening or new neurologic signs
- SCAT 5, SAC, ACE, or other assessment tools
- Monitor for serial deterioration
- No RTP on day of injury
To CT or Not to CT?

![Raccoon Eyes](image1)

![Haemotympanum](image2)

![Battle's Sign](image3)

![Signs of Base of Skull Fracture](image4)
To CT or Not to CT?

Pediatric Head Trauma CT Decision Guide
Children younger than 2 years

- GCS < 15
- Palpable skull fracture
- AMS (agitation, somnolence, slow response, repetitive questioning)

**YES TO ANY**

- Scalp hematoma (excluding frontal)
- LOC > 5 seconds
- Not acting normally per parent
- Severe mechanism of injury
  - Fall > 3 ft
  - MVA w/ejection, rollover, or fatality
  - Bike/ped vs. vehicle w/o helmet
  - Struck by high-impact object

**Intermediate Risk – 0.9%**

**YES TO ANY**

Observation vs. CT using shared decision-making

- Clinical factors used to guide decision-making:
  - Multiple vs. isolated factors
  - Worsening findings during observation (AMS, headache, vomiting)
  - Physician experience
  - Parental preference
  - < 3 months old

**CT not indicated, Observe**

- Low Risk – < 0.02%

*ct-TBI: risk of clinically important TBI needing acute intervention, based on PECARN validated prediction rules
To CT or Not to CT?

Pediatric Head Trauma CT Decision Guide
Children 2 years and older

- GCS < 15
- Signs of basilar skull fracture
- AMS (agitation, somnolence, slow response, repetitive questions)

- Vomiting
- LOC
- Severe headache
- Severe mechanism of injury
  - Fall > 5 ft
  - MVA w/ejection, rollover, or fatality
  - Bike/ped vs. vehicle w/o helmet
  - Struck by high-impact object

Intermediate Risk – 0.8%

Observation vs. CT using shared decision-making

Clinical factors used to guide decision-making:
- Multiple vs. isolated factors
- Worsening findings during observation (AMS, headache, vomiting)
- Physician experience
- Parental preference

High Risk – 4.3% risk of ci-TBI*

Low Risk – < 0.05%

CT not indicated, Observe

*ci-TBI: risk of clinically important TBI needing acute intervention, based on PECARN validated prediction rules
Management of Concussions in the Primary Care Office
The Office Visit

- Initial evaluation in the office 24-48 hours from injury
- History
- Physical Exam: Neuro Exam, Balance, Vestibular/Oculomotor, Eye Convergence, Cerebellar Position Sense/Coordination, Cognitive
- Counseling: Education, Precautions, Accommodations
- Follow up in 1-2 weeks
- Referral to concussion specialist
Assessment Tools

Child SCAT5®
SPORT CONCUSSION ASSESSMENT TOOL
FOR CHILDREN AGES 5 TO 12 YEARS
FOR USE BY MEDICAL PROFESSIONALS ONLY

supported by

SCAT5®
SPORT CONCUSSION ASSESSMENT TOOL – 5TH EDITION
DEVELOPED BY THE CONCUSSION IN SPORT GROUP
FOR USE BY MEDICAL PROFESSIONALS ONLY

supported by
Assessment Tools
History

- Date, Mechanism, Location of impact
- LOC
- Amnesia
- Seizure Activity
- **Symptom Inventory**
- Risk Factors for Protracted Recovery
- Treatment or instructions received
- Symptom Triggers
Symptom inventory

<table>
<thead>
<tr>
<th>Symptom</th>
<th>None</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Headache</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>“Pressure in head”</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Neck pain</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Nausea or vomiting</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Dizziness</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Blurred vision</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Balance problems</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Sensitivity to light</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Sensitivity to noise</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Feeling slowed down</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Feeling “like in a fog”</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>“Don’t feel right”</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Difficulty concentrating</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Difficulty remembering</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Fatigue or low energy</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Confusion</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Drowsiness</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>More emotional</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Irritability</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Sadness</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Nervous or Anxious</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Trouble falling asleep (if applicable)</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

Total number of symptoms: 22
Symptom severity score: 132

Child Report

<table>
<thead>
<tr>
<th>Symptom</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>I have headaches</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I feel dizzy</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I feel like my brain is turning</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I feel like I’m going to faint</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I feel sick to my stomach</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>My whole body feels off</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I get tired easily</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I have trouble paying attention</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I get distract easily</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I have had sleepless nights</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I have problems remembering what people said</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I have problems following directions</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I’m less focused</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I get sun-blind</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I’m more irritable</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I have problems finding things</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I have trouble learning new things</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Total number of symptoms:</td>
<td>21</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Symptom severity score:</td>
<td>62</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Do your symptoms get worse with physical activity? Y N

Parent Report

<table>
<thead>
<tr>
<th>Symptom</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>The child:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feeling sad</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Feeling feeling that the brain is turning</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Feeling faint</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Feeling blurry</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Feeling numb</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Feeling like I’m going to faint</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

Total number of symptoms: 21
Symptom severity score: 62

Do your symptoms get worse with physical activity? Y N

Overall rating for child to answer:

<table>
<thead>
<tr>
<th>Rating</th>
<th>Very Had</th>
<th>Very Good</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 2 3 4 5 6 7 8 9</td>
<td>1 2 3 4 5 6 7 8 9</td>
<td></td>
</tr>
</tbody>
</table>

Overall rating for parent/teacher/coach/caregiver to answer:

<table>
<thead>
<tr>
<th>Rating</th>
<th>1 2 3 4 5 6 7 8 9</th>
<th>1 2 3 4 5 6 7 8 9</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 2 3 4 5 6 7 8 9</td>
<td>1 2 3 4 5 6 7 8 9</td>
<td></td>
</tr>
</tbody>
</table>

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Risk Factors for Protracted Recovery

- Symptom severity scores
- Prior Concussions
- Migraine Headaches
- Depression, Anxiety
- Oculomotor deficits
- Teenagers
- Females > Males
- Developmental Delays/Learning Problems
Physical Exam

- Focused Neurological Examination
  - Cranial Nerve Assessment
  - MMT, DTRs
- Head and Neck Examination
- Balance Assessment
- Vestibular/Oculomotor Exam
- Position Sense and Coordination
Goals of Physical Examination

- Rule out more serious neurologic injury
- Evaluate for spinal injury
- Establish current mental status
- Identify impairments for individualized treatment
Symptoms of head and neck injuries can overlap with concussion.

Consider imaging or referral to a specialist with concerns.
Balance Assessment

- **Balance Error Scoring System (BESS)**
  - Subjective Testing
  - Limited intra-and inter-rater reliability (0.74 and 0.57) \(^3\)
  - Limited test-retest reliability (0.67) \(^4\)
  - High false positive rate (42\%) \(^5\)
Objective Balance Assessment Tools

- Biodex, NeuroCom, Sway
Balance Assessments

- Balance returns to baseline by day 3-5
- Objective tests (force place system tests)
  - 2x detection rate for post concussion postural impairments over BESS
- Complex, limited mobility—not practical for most clinicians

Assess for improvements in balance between visits
Vestibular-Oculomotor Screening

- **Ocular dysfunction**
  - 40% of patients with TBI
  - Abnormal tracking, near point convergence, vergence, accommodation
  - Implications for return to classroom setting

- **Vestibular dysfunction**
  - Dizziness, vertigo, altered balance
  - Associated with prolonged symptoms
  - Higher risk of PCS
  - More disability
## Vestibular-Oculomotor Screening

<table>
<thead>
<tr>
<th>Vestibular/Ocular Motor Test:</th>
<th>Not Tested</th>
<th>Headache 0-10</th>
<th>Dizziness 0-10</th>
<th>Nausea 0-10</th>
<th>Fogginess 0-10</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>BASELINE SYMPTOMS:</td>
<td>N/A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smooth Pursuits</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Saccades – Horizontal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Saccades – Vertical</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Convergence (Near Point)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(Near Point in cm): Measure 1:</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Measure 2:</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Measure 3:</td>
<td></td>
</tr>
<tr>
<td>VOR – Horizontal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VOR – Vertical</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Visual Motion Sensitivity Test</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Vestibular-Oculomotor Screening

- **Smooth Pursuits**: ability to follow a slow moving target
Vestibular-Oculomotor Screening

- **Saccades**: ability of the eyes to move quickly between targets
Vestibular-Oculomotor Screening

- **Vestibular-Ocular Reflex (VOR):** ability to stabilize gaze as head moves
Vestibular-Oculomotor Screening

- Visual Motion Sensitivity (VMS/VOR cancelation): ability to inhibit vestibular induced eye movement (stabilize gaze with head and target movement)
Vestibular-Oculomotor Screening

- **Convergence**: ability to view a target without double vision (abnormal $\geq 6$cm)
Position Sense and Coordination Tests

- **Finger to nose testing**: slowed, inaccurate movements
Cognitive Examination

- SCAT, SAC exams
  - Orientation, Immediate Memory, Concentration
- Neurocognitive Testing (ImPACT)
- Screening for psychiatric disorders
SCAT 5

**IMMEDIATE MEMORY**

The Immediate Memory component can be completed using the traditional 5-word per trial list or optionally using 10-words per trial to minimise any ceiling effect. All 3 trials must be administered irrespective of the number correct on the first trial. Administer at the rate of one word per second.

Please choose EITHER the 5 or 10 word list groups and circle the specific word list chosen for this test.

I am going to test your memory. I will read you a list of words and when I am done, repeat back as many words as you can remember, in any order. For Trials 2 & 3 I am going to repeat the same list again. Repeat back as many words as you can remember in any order, even if you said the word before.

<table>
<thead>
<tr>
<th>List</th>
<th>Alternate 5 word lists</th>
<th>Trial 1</th>
<th>Trial 2</th>
<th>Trial 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Finger, Penny, Blanket, Lemon, Insect</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>Candle, Paper, Sugar, Sandwich, Wagon</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>Baby, Monkey, Perfume, Sunset, Iron</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>Elbow, Apple, Carpet, Saddle, Bubble</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**CONCENTRATION DIGITS BACKWARDS**

Please circle the Digit list chosen (A, B, C, D, E, F). Administer at the rate of one digit per second reading DOWN the selected column.

I am going to read a string of numbers and when I am done, you repeat them back to me in reverse order of how I read them to you. For example, if I say 7-1-9, you would say 9-1-7.

<table>
<thead>
<tr>
<th>Concentration Number Lists (circle one)</th>
<th>List A</th>
<th>List B</th>
<th>List C</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-9-3</td>
<td>5-2-6</td>
<td>1-4-2</td>
<td>Y</td>
</tr>
<tr>
<td>6-2-9</td>
<td>4-1-5</td>
<td>6-5-8</td>
<td>Y</td>
</tr>
<tr>
<td>3-8-1-4</td>
<td>1-7-9-5</td>
<td>6-8-3-1</td>
<td>Y</td>
</tr>
<tr>
<td>3-2-7-9</td>
<td>4-9-6-8</td>
<td>3-4-8-1</td>
<td>Y</td>
</tr>
<tr>
<td>6-2-9-7-1</td>
<td>4-8-5-2-7</td>
<td>4-9-1-5-3</td>
<td>Y</td>
</tr>
<tr>
<td>1-5-2-8-6</td>
<td>6-1-8-4-3</td>
<td>6-8-2-5-1</td>
<td>Y</td>
</tr>
<tr>
<td>7-1-8-4-6-2</td>
<td>8-3-1-9-6-4</td>
<td>3-7-6-5-1-9</td>
<td>Y</td>
</tr>
<tr>
<td>5-3-9-1-4-8</td>
<td>7-2-4-8-5-6</td>
<td>9-2-6-5-1-4</td>
<td>Y</td>
</tr>
</tbody>
</table>
Counseling

- Education, Precautions, Accommodations
  - Warning signs and symptoms
  - When to seek emergent care
  - “Rest” and avoidance of common triggers
  - No sports or physical activity
  - Recovery expectations
  - Prevention of further injury
  - Return to Learn
  - Return to Play
Return to Learn

- Recommendations based on patient/parent reports, symptoms triggers, physical exam findings

DEAR SCHOOL STAFF:

This letter offers input from a healthcare provider with experience in treating concussion, a type of traumatic brain injury. This letter was created to help school professionals and parents support students returning to school after a concussion. You can use these recommendations to make decisions about support for your student based on his or her specific needs. This letter is not intended to create a 504 Plan or an IEP unless school professionals determine that one is needed. Most students will only need short-term support as they recover from a concussion. A strong relationship between the healthcare provider, the school, and the parents will help your student recover and return to school.

_________________________________________ was seen for a concussion on ____________

Student Name

Date

in ___________________________ office or clinic.

Healthcare Provider’s Name

cdc.gov/traumaticbraininjury/index.html
Is excused from school for ____________ days.

Return to school with the following changes until his or her symptoms improve.

(NOTE: Making short-term changes to a student’s daily school activities can help him or her return to a regular routine more quickly. As the student begins to feel better, you can slowly remove these changes.)

Based on the student’s symptoms, please make the short-term changes checked below:

- No physical activity during recess
- No physical education (PE) class
- No after school sports
- Shorten school day
- Later school start time
- Reduce the amount of homework
- Postpone classroom tests or standardized testing
- Provide extended time to complete school work, homework, or take tests
- Provide written notes for school lessons and assignments (when possible)
- Allow for a quiet place to take rest breaks throughout the day
- Lessen the amount of screen time for the student, such as on computers, tablets, etc.
- Give ibuprofen or acetaminophen to help with headaches (as needed)
- Allow the student to wear sunglasses, earplugs, or headphones if bothered by light or noise
- Other: ________________________________
Gradual Return to Play

- After 24-48 hours may gradually become more active
- Stay below symptom-exacerbation thresholds
- Formal return to play protocols for return to sports
## Return to Play Protocol

<table>
<thead>
<tr>
<th>Stage</th>
<th>Aim</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Symptom-limited activity</td>
<td>Daily activities that do not provoke symptoms</td>
</tr>
<tr>
<td>2</td>
<td>Light aerobic exercise</td>
<td>Walking or stationary cycling at slow to medium pace. No resistance training</td>
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<tr>
<td>3</td>
<td>Sport-specific exercise</td>
<td>Running or skating drills. No head impact activities</td>
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<tr>
<td>4</td>
<td>Non-contact training drills</td>
<td>Harder training drills, eg, passing drills. May start progressive resistance training</td>
</tr>
<tr>
<td>5</td>
<td>Full contact practice</td>
<td>Following medical clearance, participate in normal training activities</td>
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</tbody>
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Consequences for premature RTP

- Prolonged recovery, Post Concussion Syndrome
- Permanent or prolonged neurological, psychological, behavioral, cognitive issues
- Second Impact Syndrome
- Chronic Traumatic Encephalopathy
WE'RE TAKING THE ISSUE OF CONCUSSIONS VERY SERIOUSLY NOW.
Concussion Legislation

- Varies by state
- Training for coaches
- Education for parent and athlete
- Return to play restrictions
- Medical clearance
- Specification of type of provider issuing clearance
Specialist Referral

- Risk factors for prolonged recovery
- Worsening symptoms
- Difficulty returning to school
- Prolonged recovery (adults >2 weeks; children >4 weeks)
- Neuropsychiatric testing (ImPACT)
- Clearance
Updates and Recommendations

- BRIEF period of rest in the acute phase (24-48hrs) recommended
- No return to sport until returned to school, but early introduction of symptom limited activity is appropriate
- Psychological, cervical, vestibular rehabilitation, sub-symptom threshold exercise may facilitate recovery
- Helmet based or other sensor systems used to dx or assess concussion NOT supported
Updates and Recommendations

- Baseline and post injury testing NOT mandatory; conservative RTP approach more appropriate
- Advanced neuroimaging, fluid biomarker, genetic testing not validated
- Limited evidence to support pharmacotherapy
Summary

- **Acute management**
  - Referral to Emergency Room

- **Office Management**
  - History, identification of risk factors
  - Counseling

- **Return to Learn Plan**
  - Brief rest period
  - Identification of triggers, personalized plan

- **Return to Play Protocol**

- **Referral to Specialist**
Questions
References


