Management of Concussion/Mild Traumatic Brain Injury

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Disclosures

I am a full-time employee at The University of Tulsa

KSHA is providing an honorarium for my participation today

I am a Certified Brain Injury Specialist Trainer through the ACBIS/BIAA

No other financial or non-financial relationships to disclose
Learning Objectives

1. explain progression through return-to-activity protocols following mild traumatic brain injury
2. identify factors that place patients at risk for prolonged recovery following mild traumatic brain injury recovery
3. describe the role of the SLP in education, assessment, and treatment during typical and prolonged mild traumatic brain injury recovery
Review of concussion/mTBI
Does the term we use matter?

- Are they actually different?
- Communication across fields
- Impact on client and public perception
**Mild injury ≠ Mild effects**

- Remember that the severity of injury is largely classified based on initial presentation, not on effect.
- Similar presentation can have differential functional impact.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structural imaging</td>
<td>Normal</td>
<td>Normal or abnormal</td>
<td>Normal or abnormal</td>
</tr>
<tr>
<td>LOC</td>
<td>Up to 30 minutes</td>
<td>30 minutes up to 24 hours</td>
<td>24 hours or more</td>
</tr>
<tr>
<td>AOC</td>
<td>Up to 24 hours</td>
<td>&gt; 24 hours</td>
<td>&gt; 24 hours</td>
</tr>
<tr>
<td>PTA</td>
<td>0-1 day</td>
<td>Between 1-7 days</td>
<td>&gt;7 days</td>
</tr>
<tr>
<td>GCS</td>
<td>13-15</td>
<td>9-12</td>
<td>3-8</td>
</tr>
</tbody>
</table>

Concussion/Mild TBI by the numbers...

**CAUSES**
- Falls
- MVA
- Sports-related accidents
- Blast injuries
- Assaults

**INCIDENCE >1 MILLION PER YEAR**

- **UNKNOWN**
- **KNOWN**

- **Mild** 75%
- **Moderate - Severe** 25%

Recreated from BIAA, 2016
Identification of concussion/mTBI
Concussion indicators

<table>
<thead>
<tr>
<th>SIGNS OBSERVED</th>
<th>SYMPTOMS REPORTED</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Can’t recall events prior to or after a hit or fall</td>
<td>• Headache or “pressure” in head</td>
</tr>
<tr>
<td>• Appears dazed or stunned</td>
<td>• Nausea or vomiting</td>
</tr>
<tr>
<td>• Forgets an instruction, is confused about an assignment or position, or is</td>
<td>• Balance problems or dizziness, or double or blurry vision</td>
</tr>
<tr>
<td>unsure of the game, score, or opponent</td>
<td>• Bothered by light or noise</td>
</tr>
<tr>
<td>• Moves clumsily</td>
<td>• Feeling sluggish, hazy, foggy, or groggy</td>
</tr>
<tr>
<td>• Answers questions slowly</td>
<td>• Confusion, or concentration or memory problems</td>
</tr>
<tr>
<td>• Loses consciousness (even briefly...NOT REQUIRED!)</td>
<td>• Just not “feeling right,” or “feeling down”</td>
</tr>
<tr>
<td>• Shows mood, behavior, or personality changes</td>
<td></td>
</tr>
</tbody>
</table>
Seek additional medical care if...

- GCS<15 at initial assessment
- post-traumatic seizure (generalized or focal)
- focal neurological signs of a skull fracture
- loss of consciousness
- severe and persistent headache
- repeated vomiting (two or more occasions)
- post-traumatic amnesia >5 minutes
- retrograde amnesia >30 minutes
- high risk mechanism of injury (road traffic accident, significant fall)
- coagulopathy, whether drug-induced or otherwise.

SIGN, 2009
Diagnosis

Concussion remains a CLINICAL diagnosis.

Generally, assessment will consider factors such as cognition (orientation, attention, memory), vestibulo-ocular function, and symptoms.

These can include sideline/bedside measures, or more extensive neurocognitive testing that compares to norms or to patient’s own baseline.
Management of typical concussion/mTBI
general principles for early concussion management

- Brief period of cognitive and physical rest
- Advancing activity slowly and systematically
- Serial assessment of symptoms
  - With symptom monitoring before and during increase in activity (avoiding symptom exacerbation)
Physical and cognitive rest

To avoid catastrophic re-injury

To avoid placing increased demands on a system that needs to heal/restore metabolic balance

To avoid symptom exacerbation

To minimize symptom duration?

Current recommendation:

BRIEF physical and cognitive rest during acute time period (24-48 hours) post concussion.

Banks & Salvatore, 2019
Symptom Checklists

Several similar versions

Rate on a scale from 0-6 (none-severe)

Cover Physical, Cognitive, Sleep, and Psychological/Emotional components

Sum to make a Total Symptom Score

McCrory et al., 2016
Education and counseling

Education and counseling
- Basics of a mild TBI
- Warning signs
- Expected symptoms and trajectory (including emphasizing likelihood of full recovery)
- Management of cognitive and physical activity/rest
- Return to activity plan
- Clinical management plan (and role of other team members)

Even brief interventions can improve recovery (especially as measured by symptom duration)
- Informational booklet for kids; Ponsford, 2011
- Telephone counseling/education for adults; Bell et al., 2008
- Example resource from CDC

Brown et al., 2014
Graduated return to activity
Importance of an interdisciplinary team
Concussion subtypes

UPMC

http://rethinkconcussions.upmc.com/2016/10/concussion-clinical-trajectories/
### Overlap in symptoms

<table>
<thead>
<tr>
<th></th>
<th>Concussion</th>
<th>Stress</th>
<th>Anxiety</th>
<th>Depression</th>
<th>PTSD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Headaches</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drowsiness</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Irritability</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depression</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poor memory</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attention/Concentration</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fatigue</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poor sleep</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nausea</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Worry</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dizziness/Loss of balance</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Impaired hearing</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blurred vision</td>
<td>X</td>
<td></td>
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</tbody>
</table>
“What does an SLP have to do with concussion?”
Roles of the SLP

- Education and counseling
- Monitoring recovery and guiding return to activity
- Recommending environmental modifications/work and school-based adjustments
- Assessment and treatment for individuals with persistent concerns
- A model of increased involvement in early management, especially in collegiate environment

Brown et al., 2014
Return to school/work

- Total rest
- Light mental activity (with maximal accommodations)
- Part-time school/work (with moderate accommodations)
- Part-time school/work (with minimal accommodations)
- Full-time school/work (without accommodations)

Halstead, 2013
Symptom management

Avoiding symptom exacerbation
Reduce impairment/increase participation
Maximize functioning on patient-centered goals
Environmental modifications/
Work and school-based adjustments

Should be symptom-specific

Should be re-evaluated as recovery continues

Note: These may require specific education regarding when/how to implement

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Sample adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Headache</td>
<td>Reduction of aggravating stimuli (e.g., working in quieter or darker space, reduced screen time)</td>
</tr>
<tr>
<td>Difficulty concentrating</td>
<td>Extra time for tasks</td>
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<tr>
<td></td>
<td>Prioritization of activities</td>
</tr>
<tr>
<td>Difficulty remembering</td>
<td>Written notes from meetings</td>
</tr>
<tr>
<td>Fatigue</td>
<td>Frequent breaks, consider mental exertion</td>
</tr>
</tbody>
</table>
Return to play

- Symptom-limited activity
- Light aerobic exercise
- Sport specific exercise
- Non-contact training
- Full contact practice
- Return to play

McCrory et al., 2016
Recovery in 7-10 days?

Majority with clinical recovery within 1 month
- Note that this does not necessarily correspond with return to physiological baseline (Kamins et al., 2017; Lim et al., 2019)

Factors to consider (Iverson et al., 2017)
- Age
- Sex/gender
- Early injury burden (i.e., symptoms and cognition)
- Premorbid mental health concerns (e.g., depression, substance abuse)
- Litigation (Karr et al., 2014)
- Previous concussions (?)
- ADHD/learning disabilities (?)
- Migraine history (?)
Persistent symptoms following concussion

Often considered persistent at 3 months

Some movement away from term “post-concussive syndrome”

May be related to brain changes?

Attention and memory issues most common cognitive symptoms, but can be accompanied by other somatic and psychological symptoms

”Good old days” bias?

Sohlberg & Ledbetter, 2016
SLP role: persistent cognitive symptoms

PRACTICE PATTERNS
SLP practice patterns

2002 study of SLPs in NC and IL working with individuals with mTBI (Duff, Proctor, & Haley, 2002)
- Surveyed those in non-school settings
- Found SLPs felt they lacked the skill needed for appropriate counseling
- Many were using in appropriate assessment tools (e.g., aphasia tests) and many were not addressing common cognitive deficits

2015 study of school SLPs (Duff and Stuck, 2015)
- Found SLPs had inaccurate knowledge about concussion, were unfamiliar with concussion-related terminology
- Only a minority of SLPs reported working with individuals with concussion
- Many were using in appropriate assessment tools and not addressing cognitive deficits
Current practice patterns

2019 study of SLPs working in out-patient clinics (Williams-Butler & Cantu, 2019)

- Identified from SIG 2
- All included patient education
- Problems persist with selection of diagnostic tools
  - Screeners (e.g., RBANS)
  - Language-focused assessment tools (e.g., BDAE)
- Most common focus of intervention
  - Attention building
  - Executive function building
  - Return-to-work accommodations
SLP role: persistent cognitive symptoms
Assessment

Goal is to determine functional impact and set plan for rehabilitation (Hardin & Kelly, 2019)

Include both self-report and functional, performance-based measures

Consider effort testing

Two helpful articles to drive tool selection for SLPs:
- Hardin & Kelly, 2019
- Krug & Turkstra, 2015
Team members/referrals

Athletic Trainer
Audiology/Vestibular
Occupational Therapy
Optometry/Ophthalmology
Physical Therapy
Physicians
Psychology/Neuropsychology
Special Educators

Kane, Diaz, & Moore, 2019; Vidal et al., 2012; Ketcham et al., 2017; The Management of Concussion-mild Traumatic Brain Injury Working Group, 2016
SLP role: persistent cognitive symptoms
General management

• Educating patients regarding breakdowns
• Identifying barriers and ways to compensate
• Promoting generalization of strategies and skills
• Considering other factors that might impact cognition
• Expecting short-term therapy

Cornis-Pop et al., 2012
Evidence-based interventions

Education

Environmental modifications

Metacognitive strategy training

Direct attention training

Compensatory strategies for memory (internal and external)

Assistive technology training

Building cognitive endurance

Cornis-Pop et al., 2012; Sohlberg & Ledbetter, 2016
Ending treatment

When patients have returned to baseline

When patients have generalized strategies to support successful participation

When patients need to prioritize other interventions

When a plan is established to re-engage if a change in situation occurs
Miami University Concussion Management Program: an expanded role for the SLP

Primary members of the team:
- AT
- SLP
- Team Physician
- Athlete

SLP involved in the following:
- Education (pre and post injury)
- Baseline neurocognitive and symptom assessment
  - COWAT, Grooved Pegboard, King-Devick, BESS, ImPACT, PCRS
- Postconcussion neurocognitive and symptom assessment (within ~2 days)
- Academic accommodations, recommendations, and strategies (including sharing information with faculty)
- Rehabilitation

Knollman Porter, Constantinidou, & Hutchinson Marrona, 2014; Knollman-Porter, Constantinidou, Beardslee, & Dailey, 2019
References


References


