THE SPEECH-LANGUAGE PATHOLOGIST’S ROLE IN CONCUSSION MANAGEMENT

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Learner Outcomes

By the end of this session, the participant will be able to:

■ Describe the neurological sequelae involved in concussive injury.

■ Identify three techniques for assessment of cognitive-linguistic changes after concussion.

■ Discuss the role of SLPs as members of an interdisciplinary concussion management team.
AGENDA

• Defining concussion
• The role of the SLP in concussion management
• Assessment and intervention
• What’s next
The Mechanism of Concussion: What happens to the brain?

New York Times
Concussion, defined:

- Complex multi-system event caused by a direct blow or jarring motion to the head or body
- Neurochemical and neurometabolic changes
- May or may not involve loss of consciousness
- Remarkable for rapid onset and spontaneous recovery, typically over a period of 7-14 days.
- In the initial stages, no structural damage may be evident on imaging studies.
“Any trauma induced alteration in mental status that may or may not include a loss of consciousness” (American Academy of Neurology, 1997)

- **Neurometabolic Cascade:** ionic fluxes that occur at the neuronal level after a cerebral concussion

- Immediately following injury, depolarization occurs due to the release of neurotransmitters and changes in neuronal chemistry.
Clinical symptoms and functional signs may involve changes in executive functions and academic abilities, e.g.,

- Impaired attention
- Delayed responses
- Deficits in visual and verbal memory function
- Auditory comprehension deficiencies
Post Concussion Syndrome

- About 25% of patients continue to experience physical and/or cognitive symptoms 6 months post-injury (Bazarian, et al., 1999)
- Early intervention post-injury can improve longer term outcomes (cf., Allen, 2007; Ponsford, et al., 2002)
Second Impact Syndrome

■ The circumstance of sustaining a second concussion prior to adequate resolution of injury symptoms experienced from the first concussion.

■ Exponentially worse in terms of potential damage

■ Typically seen in athletes <20 years old

■ Statistically rare, but remarkably serious

(Cantu, 2007; Salvatore & Sirmon-Fjordbak, 2011)
**Is a concussion the same thing as a mild TBI?**

- Depends on who you ask...
- Sequelae of symptoms
- Time to recovery
  - Concussions typically resolve in 7-14 days
  - Sustained cognitive deficits after that time may be more indicative of TBI
Prevalence

- 1.6 to 3.8 million sports/recreation-related head injuries occur in US each year; probably under-reported. (CDC, 2012)

- Estimated to involve an average of 10% of all athletes across sports

- Contact sports:
  - Football
  - Soccer
  - Hockey
Increased risk for brain injury:

- 5 – 10% of all students involved in sports
- Inexperience with contact sports
- Diverse presentation in strength, physical stature, aerobic conditioning, coordination
- Ongoing development of frontal lobes of the brain
Concussion occurs among school-aged children primarily in the context of sports-related activities, but also from any activity which involves a jarring motion of head or body.
What do SLPs need to know about concussion?
Speech-language pathologists (SLPs) have an emerging role in the management of sports-related concussion in school-aged populations.

Although the physical aspects of a concussive injury are more readily apparent, subtle deficits related to language function can have a significant impact on academic performance.

Scope of Practice and Code of Ethics

Interdisciplinary Treatment Teams
Cognitive and communicative deficits frequently seen after concussion:

- Word retrieval deficits and other aphasic-like symptoms
- Difficulty with processing speed and efficiency
- Distractibility
- Visual comprehension deficits
- Auditory comprehension dysfunction
- Problems with Executive Functions
Impact of concussion on academic function

- Student-athletes with concussions present with symptoms consistent with traumatic brain injury.

  - Decreased attention to task
  - Limited encoding, storage, and retrieval
  - Impaired problem solving
  - Poor impulse control

_Salvatore & Sirmon Fjordbak, 2011_
Impact of concussion on academic function

- Breakdown in logical sequencing
- Sensitivity to light or sound
- Increased fatigue
- Decreased tolerance for frustration
- Word retrieval issues
- **Impaired auditory comprehension for verbally-presented information**
SLPs and Concussion Management

SLPs are well-prepared to work with this population, because of the educational and clinical requirements for licensure and certification.
Acknowledging that approximately 90% of injuries will improve without intervention, the recommendation is to err on the side of caution, especially since the intervention can be innocuous and inexpensive, but the benefit is significant.
Federal regulations guarantee the provision of a free and appropriate education for all children in the least restrictive environment, including those who are demonstrating the need for special accommodations or services.

Eligibility for services
Assessment and Intervention

- **Baseline (pre-season) Assessment**
  - Cognitive-communicative function
  - Word retrieval
  - Auditory comprehension

- **Post-injury**
  - Serial re-assessment
  - Graduated and stepwise return to activity
  - Modifications in the classroom
Concussion Management

- Environment of decreased stimulation
- Limited physical exertion
- Reduction in visual input
- Diminished cognitive load

- Moderated level of stimulation $\rightarrow$ improved context for recovery
- Premature return $\rightarrow$ exacerbation of symptoms

- Lee, 2009
Stepwise return to play:

- No activity
  - Light return
    - Sport-specific return
      - Non-contact drills
        - Full contact drills
          - Game play
Concussion Management

Stepwise return to academic function:

- No academic activity
  - Shortened school days
    - Decreased homework
      - Extra time on exams
        - Multiple rest breaks
          - Return to full academic load
How else can SLPs be involved in this process?
Prevention of concussion

- Education of parents, school personnel, policy-makers on concussion issues such as:
  - Concussion mechanism and the post-concussion neurophysiological and cognitive-communicative sequelae.
  - Importance of utilization of appropriate sports equipment and awareness of safe habits in practice and play.
Prevention is a recognized and integral part of the scope of practice for SLPs (ASHA, 2007).

Approaches to prevention of concussion have addressed isolated issues (e.g., helmet laws).

There are few comprehensive approaches to this public health question.
Typical models of prevention
- Primary, secondary and tertiary
- involving a chronological sequence

Inadequate for describing the multidimensional complexity of concussion prevention

The traditional linear and sequential models of prevention fall short in describing the inter-connected involvement of prevention of concussion.

(Lo & Sirmon-Taylor, 2014).
SLP as Advocate

- Understanding and use of evidence-based practice
- Psychometric assessment knowledge and skills
- Clinical expertise in neurological dysfunction
- Experience in diagnosis and intervention
- Competence in provision of services in schools
- Understanding of regulatory policies.
Advocacy

- Scope of Practice issue
- Individual level
- Organizational level
- Legislation and policy level
What is happening at the governmental level regarding concussion management?

- National trends in state laws
  - Pre-concussion policy
  - Post-concussion policy
  - Patterns of diffusion
- In your state
- At the federal level
What happens next?

- Improved sports equipment/rule changes
- Cultural influences
- Concussion in the military population
- Epidemiology of concussion in the elderly
- Ongoing research
Some concluding thoughts...

- Speech-language pathologists have a clear role as members of concussion management teams.
- SLPs have expertise and experience in diagnosis and treatment with this population.
- SLPs can contribute to the efforts targeting prevention, advocacy, and policy.
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