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Where does the Speech-Language Pathologist fit in concussion management?

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DISCLOSURE

Miriam Carroll-Alfano is employed by Saint Xavier University and receives a salary. She received financial compensation from Speech-Pathology.com for this presentation.

Miriam Carroll-Alfano does not have any nonfinancial relationships to disclose.
LEARNING OUTCOMES

After this course, participants will be able to:

- Define concussion and differentiate concussion from other traumatic brain injuries.
- Name the symptoms of concussion and their consequences.
- Identify the role of the Speech-Language Pathologist in the prevention, assessment and treatment of concussion.
- Name tools for assessment and treatment that can be used with persons who have sustained a concussion.

OUTLINE

- Introduction
- What is a concussion?
- Signs & Symptoms of concussion & their consequences
- Medical treatment & Referral
- Role of the SLP in Prevention
- Role of the SLP in Assessment
- Role of the SLP in Treatment
- Summary, Q & A
Introduction

BACKGROUND

- The CDC has estimated that between 1.6-3.8 million concussions occur annually as a result of participation in sporting and recreational activities (2015).
- Difficult to pinpoint the exact number of concussions annually due to the various ways a person may seek treatment.
  - Emergency Room
  - Physician Office
  - Athletic Trainer
  - Unreported?
- (Kerr et al., 2014, Miyashita, Timpson, Frye, & Gloecker, 2013)
BACKGROUND

Concussion has become a leading interest amongst healthcare professionals, as well as the general public.
- Increasing coverage by the media and awareness campaigns promoting education and safety (McClain, 2015).

Concussion in young people has become increasingly concerning:
- During childhood, there is a different physiological response to head trauma due to ongoing cognitive maturation through the teen years (McCrory et al., 2005).

CONCUSSION & THE LAW

MS passed concussion law July 2014
CONCUSSION & THE LAW

- All 50 states and Washington D.C. have passed concussion laws; however, there is great variability among these laws.
  - Specific guidelines may be required, recommended, or neither.
  - Who evaluates the student with concussion (physician, trained health care professional or no specification).
  - Require schools to provide students with information about concussion (43 states).
  - Require coaches to receive education to help them recognize a concussion (39 states).
  - Require education for parents/guardians (46 states).
  - Requires accommodations for students who have sustained a concussion (only 6 states).


What is a Concussion
TERMINOLOGY

Concussion:
- This term is commonly used in sports medicine, as well as by the general public.
- A concussion is an injury on the Traumatic Brain Injury Continuum.

Mild Traumatic Brain Injury (MTBI):
- This term used in general medicine.

These terms are often used interchangeably.

WHO DEFINITION OF MTBI

- An acute brain injury, resulting from mechanical energy to the head from external physical forces.
- Clinical identification includes:
  1. Confusion or disorientation.
  2. Loss of consciousness for 30 minutes or less.
  3. Post traumatic amnesia for less than 24 hours.
  4. Other transient neurological abnormalities.

Carroll, L. J., et al. Journal Rehabilitation Medicine, 2004 (43) 113-125
DEFINITION OF CONCUSSION

International Symposia on Concussion in Sport defines concussion as a complex pathophysiological process affecting the brain, induced by traumatic biomechanical forces.

- May be caused by direct blow to the head, face, neck or elsewhere on the body which results in a force transmitted to the head.
- Results in rapid onset of short lived impairment of neurologic function that resolves spontaneously.
- The acute clinical symptoms reflect a functional disturbance rather than a structural injury.
- Results in a graded set of clinical symptoms that may or may not involve loss of consciousness.
- No abnormality seen on standard structural neuroimaging studies.

McCrory et al., 2013

THE BRAIN

Protected by the skull, meninges, and ventricles which produce cerebrospinal fluid.

[Image of the brain with labels: Skull, Meninges, Brain, Fluid between the meninges, Spinal cord, Ventricles (fluid filled).]
CONCUSSIVE INJURY

- Following a concussion, the brain undergoes a multilayered neurometabolic cascade of events.
  - Indiscriminant release of neurotransmitters.
  - Na+K+ pump works overtime.
  - Decreased cerebral blood flow.
  - Increase in glucose consumption (Wright, 2014)
- Diffuse axonal injuries occur throughout the brain caused by rapid acceleration/deceleration of the head.
- Results in temporary neuronal dysfunction rather than permanent cell death.
- Usually no evidence on CT/MRI scans because there is no bleeding (blood vessels are more durable than axons).

TEMPORARY NEURONAL DYSFUNCTION

Structure of a Typical Neuron

http://training.seer.cancer.gov/anatomy/nervous/tissue.html
COMPARING TRAUMATIC BRAIN INJURY

- MTBI/Concussion
  - Results from diffuse axonal injuries and metabolic dysfunction caused by rapid acceleration/deceleration of the head.
  - Usually no evidence on CT/MRI scans.
  - Temporary neuronal dysfunction.

- Moderate/Severe TBI
  - Bleeding/swelling, along with diffuse axonal injuries and metabolic dysfunction.
  - Evidence on CT/MRI scans.
  - Permanent cell damage and death.

CAUSES OF CONCUSSION

- Sports-Related Injuries
- Falls
- Motor Vehicle Accidents
- Assault
- Struck by/against

Children account for approximately 65% of concussions.
Only patients seeking treatment in the emergency room or hospital are tracked, so the number of concussions that occur may be much higher than we realize.

Centers for Disease Control, January 2014
SIGN S & SYMPTOMS OF CONCUSSION

Signs and Symptoms of concussive injuries fall into three distinct categories:

- Physical
- Cognitive
- Behavioral
**PHYSICAL SIGNS & SYMPTOMS**
- Chronic Pain/Usually Headache*
- Dizziness *
- Lethargy
- Fatigue/Reduced stamina
- Nausea
- Vomiting

- Blurred vision
- Double vision
- Hypersensitivity to light
- Tinnitus
- Sleep disturbances (excessive sleeping or insomnia)

* Most common symptoms

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**COGNITIVE SIGNS & SYMPTOMS**
- Memory impairment *
- Decreased attention
- Decreased concentration
- Perceptual disturbances
- Communication disorders
- Poor executive functioning
- Disorientation
- Word-retrieval difficulty

* Most common symptom
BEHAVIORAL SIGNS & SYMPTOMS

- Depression *
- Irritability, anger
- Disinhibition
- Emotional lability
- Increased anxiety

* Most common symptom

RISK FACTORS AFFECTING RECOVERY

- History of previous concussion/head injury
- Gender
- Neurological/psychiatric problems
- Learning difficulties
- Age at time of injury
- Among adults
  - Old age at time of injury
  - Lower levels of educational achievement

Elbin, Covassin, Gallion, & Kontos (2015)
POST-CONCUSSIVE SYNDROME

- Most people who sustain concussion recover quickly and fully within a few days or weeks (CDC, 2015).
- Subgroup of people who experience persistent physical, cognitive and/or behavioral symptoms.
- WHO International Classification of Disease (ICD-10), PCS is 3 or more of the following symptoms lasting 3 weeks or more:
  - Headache, dizziness, fatigue, irritability, insomnia, concentration difficulty, or memory difficulty. (Leddy et al., 2012)

CONSEQUENCES

- Physical, cognitive and behavioral symptoms can have a detrimental affect on return to normal activities.
- Headaches
  - Headaches are the most common complaint following PCS (Blume, 2015).
  - Pain can lead to nausea, vomiting, difficulty concentrating, changes in mood.
- Fatigue
  - Overwhelming lack of energy.
  - Commonly reported after mild TBI (Carroll et al., 2004)
  - Barrier to treatment, return to work and school (Hicks, Larkins, & Purdy, 2011).
CONSEQUENCES

- Depression
  - Decreased social interaction.
  - Loss of interest in activities.

- Visual difficulties
  - Decreased ability to see computers, boards, presented material.

- Attention difficulties
  - Difficulty concentrating in class.
  - Difficulty taking tests.

- Memory difficulties
  - Difficulty learning new information.
  - Difficulty recalling information.

(Halstead et al, 2013)

Medical Treatments & Referral
MEDICAL INTERVENTION

Assessments
- CT/MRI
- Assessment tools
  - Acute Concussion Evaluation (ACE)
  - Medical Symptom Validity Test (MVST)
  - Mini Mental State Exam (MMSE)

Treatments
- Medical treatments/Rest
  - Pain
  - Depression/Anxiety
  - Vision
  - Sleep
- Phases of treatments, depending on type and number of symptoms.

Physical and cognitive rest is the most common treatment for concussion. (Wright, 2014, CDC, 2015)
- Time off from school or work.
- No cognitive activities. (reading, homework)
- No visually stimulating activities. (computer, video games, TV)

Period of cognitive and physical rest is beneficial in treating concussion-related symptoms (Moser, Glatts, & Schatz, 2012, Moser et al., 2015).

REFERRAL FOR TREATMENT

- Referral to treat persistent physical, cognitive, and behavioral symptoms.
  - Physical therapy
  - Occupational therapy
  - Psychology
  - Speech-Language Pathology

INTERDISCIPLINARY TEAM

Concussion Management Team
- Administrator
- Athletic Director
- Athletic Trainer
- Coach
- School Counselor
- School Psychologist
- School Nurse
- Teacher
- Parent/Guardian
- Student
- Medical Provider
- Hospital Healthcare Providers
- Community Healthcare Professionals
- SLP?

Center on Brain Injury Research and Training (www.cbirt.org)
ROLE OF SLP IN CONCUSSION

- Prevention
  - Provide education to patients, professionals, families, students, caregivers and others.

- Assessment
  - Evaluation of deficits in language, speech, and cognition.
  - Assess functional deficits.

- Treatment
  - Treatment of deficits in language, speech, and cognition.
  - Implement and teach compensatory strategies.
  - Education: Patient, family, professionals, etc.

Role of the SLP in Prevention
PREVENTION

- Concussion prevention starts with education.
- Concussion education is no single person or professions responsibility.
- Speech-Language Pathologists can and should play an important role in concussion education in schools, hospitals and in the community.
- Speech-Language Pathologists are uniquely situated to provide concussion training to coaches, student-athletes, families, and educators.

ASHA Scope of Practice:

- Prevention and Advocacy
  - Speech-language pathologists engage in prevention and advocacy activities related to human communication and swallowing.
- Education, Administration, and Research
  - Speech-language pathologists also serve as educators, administrators, and researchers.
  - Educating the public regarding communication and swallowing.
  - Fostering public awareness of communication and swallowing disorders and their treatment

http://www.asha.org/policy/SP2007-00283/
Duff, 2009
EDUCATION

American Academy of Neurology Guidelines for evaluation & management of concussion in sports:

Pre-participation counseling recommendations:

- School-based professionals should be educated by experienced LHCPs ... to understand the risks of experiencing a concussion.
- LHCPs should inform athletes (and the athlete’s families) of evidence concerning concussion risk factors and symptoms.


PREVENTION

- Students, parents, teachers, coaches and other professionals can benefit from a better understanding of concussion and its’ symptoms.
- Studies have shown that student athletes have poor knowledge of concussion symptoms (Carroll-Alfano, 2015, Cournoyer & Tripp, 2014, Kroshus, Baugh, Hawrilenko, Daneshvar, 2014).
  - Knowledge of cognitive and behavioral symptoms is particularly poor.
- Even with education, student athletes do not always report concussions (Bagley et al., 2012, Miyashita, Timpson, Frye, Gloeckner, 2013)
PREVENTION

Concussion education programs should emphasize:
- The diversity of concussion symptoms, especially cognitive and behavioral symptoms.
- The need to seek medical attention when experiencing any symptoms of a concussion.

SLPs should be a part of the concussion team at your facility.
- Medical facilities
- School facilities

PREVENTION

Get Educated
- Center for Disease Control
  Heads Up: Concussion
  http://www.cdc.gov/concussion/headsup/
- CDC Heads Up Clinicians
  http://www.cdc.gov/concussion/HeadsUp/clinicians
- Brain 101 http://brain101.orcasinc.com/5000/
- Concussion Policy in your school/facility/district
- Learn about the law in your state
Role of the SLP in Assessment

ASSESSMENT OF CONCUSSION BY SPEECH-LANGUAGE PATHOLOGIST

- History/Interview
  - Medical
  - Social
  - Academic/Work
  - Detailed description of difficulties
- Formal/Standardized Testing
- Informal Testing
FORMAL ASSESSMENT

- Brief or screening tools are probably not going to be sensitive enough for MTBI/concussion.
- Considerations
  - What are the implications of the deficits?
  - How do the deficits affect the person’s functioning in daily life?
  - Will testing bring on or exacerbate symptoms?
  - Will formal testing have to be completed over multiple sessions?

ASSESSMENT

- Speech and Language deficits tend to be less common following concussion; however, they can occur.
  - Word Retrieval Difficulties
    - May be assessed separately or as part of other comprehensive standardized tests.
  - Pragmatics
  - Articulation changes
  - Dysfluencies/Acquired stuttering (Duffy, Manning & Roth, 2011)
ASSESSMENT

Cognition/Cognitive-Communication Disorders
- Orientation
  - Disorientation generally resolves fairly quickly
- Attention
- Memory
- Problem Solving/Reasoning
- Executive Function


Attention Processing Test
- Sohlberg & Mateer
- Ages 18-80 years
- Evaluates several components of attention
- Sustained, selective, divided, alternating

Test of Everyday Attention
- Robertson, Nimmo-Smith, Ward, Ridgeway
- Ages 18-80 years
- Sustained, selective, divided, alternating
- 3 parallel versions
ASSESSMENT

- Rivermead Behavioural Memory Test (RBMT-3)
  - Wilson et al.
  - Ages 16-96 years
  - Assesses visual and auditory memory
- California Verbal Learning Test (CLVT-II)
  - Delis, Kramer, Kaplan, & Ober
  - Ages 16-89 years
  - Assessment of verbal learning and memory
- Woodcock Johnson Tests of Cognitive Abilities (IV)
  - Woodcock & Bonner Johnson
  - Ages 2-90 years
  - Memory, processing, reasoning

ASSESSMENT

- Scales of Traumatic Brain Injury
  - Adamovich and Henderson
  - Ages 16-Adult
  - Perception, orientation, organization, recall & reasoning
- Pediatric Test of Brain Injury
  - Hotz, Helm-Estabrooks, Nelson, & Plante
  - Ages 6-16 years
  - Orientation, naming, memory, comprehension
- Behavior Rating of Executive Function (BRIEF)
  - Gioia et al.
  - Ages 2-18 years (different versions)
ASSESSMENT

- Behavior Rating of Executive Function (BRIEF)
  - Gioia et al.
  - Ages 2-18 years (different versions)
  - Assesses executive function and self-regulation in children and teens.

- Behavioural Assessment of Dysexecutive Functioning (BADS)
  - Wilson et al.
  - Ages 16-87 years
  - Planning, organization, problem solving, attention.
  - Questionnaire for patient & caregiver/family

WARNING SIGNS IN SCHOOL

- Sometimes schools may not be aware or notified a student has had a concussion.

- Warning signs:
  - Increased problems concentrating
  - Increased problems remembering new information.
  - Longer time required to complete tasks.
  - Increased symptoms (headache, fatigue, etc.) when working.
  - Greater irritability.
  - Decline in academic performance.
Role of the SLP in Treatment

TREATMENT OF CONCUSSION BY SPEECH-LANGUAGE PATHOLOGIST

- Direct treatment of deficit areas
- Teach & Implement Strategies
- Education for patient, family, teachers, peers
TREATMENT

- Treatment can include any areas of deficit.
  - Speech
  - Language
  - Cognition/Cognitive-Communication

Considerations

- Time is important
  - Time it takes to complete a task.
  - Time the patient/client/student can participate in therapy activities.
- Fatigue and fatigue management (Hicks, Larkins, & Purdy, 2011).
- Headache
  - Cognitive tasks can be a trigger for headaches (Blume, 2015).

STRATEGIES & ACCOMMODATIONS

- Excused absences from work/classes (during rest phase)
- Rest periods during the school day
- Shortened day
- Extension of assignment deadlines
- Testing accommodations (staggering, postponing/rescheduling of multiple tests, quiet environment)
- Extended testing time
- Accommodations for sensitivity to light or noise.
- Avoidance of physical activity (gym, practice)
STRATEGIES & ACCOMMODATIONS

Tasks or assignments divided into steps.
Preferential seating
Increased time to complete assignments/tests.
Written and verbal directions for assignments or tasks.
Keeping a schedule/calendar/planner.
Checking to ensure assignments are written down and materials needed.
Strategies for notetaking or have a temporary note taker help the student.
Highlight important information

STRATEGIES & ACCOMMODATIONS

Tutor
One on one instruction
Use of a reader or recordings so the student doesn’t have to read.
Limit distractions
Use of a computer or recording lectures.
Alarms/timers
Plan ahead
To do lists
Memory strategies/associations

(McGrath, 2010, cbirt.org)
EDUCATION

- Student/Patient/Client
- Family Members
- Teachers
- Coaches
- Peers
- Education regarding
  - Concussion – Brain injury
  - Strategies
  - Accommodations
- Refer for counseling
  - Behavioral symptoms
  - Psychosocial

REFERENCES

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Questions