The Role of the Speech-Language Pathologist in the Management of Acute and Chronic Concussion Symptomatology Part II

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Background

- The Centers for Disease Control and Prevention (CDC) estimates that of the 1.7 million traumatic brain injuries that occur annually in the US, 75% of them are mild TBIs or concussions (CDC, 2015).
  - 1.4 million individuals in the United States who sustain a TBI are treated and released from the ED on the same day (Faul et al., 2010)
    - 300,000 are individuals between the ages of 15-25 years of age.
    - ED visits are increasing as knowledge increases (CDC, 2015)
- It is estimated that 50% of these may go unreported (Harmon et al., 2013).
- While a single concussion has been considered less severe when compared to other forms of brain injury, a second impact to the head prior to brain recovery may result in greater or more prolonged neurocognitive dysfunction impacting athletic, academic, and social activities of daily life (Harmon et al., 2013).

Purpose

- The purpose of this presentation is to illustrate through research and case studies, evidence based procedures used by speech-language pathologists and a multi-disciplinary team to manage the neurobehavioral and neurocognitive symptoms associated with post-concussion syndrome.
- Participants will be able to:
  - identify key factors that can prolong recovery time following concussion, and
  - explain evidence based diagnostic and treatment protocols used to manage chronic post-concussion symptoms.

Concussion Defined: Review

- Concussion is a complex pathophysiological process affecting the brain, induced by biomechanical forces.
- Concussion can be caused by a direct blow to the head, face, neck or elsewhere on the body with an "implosive" force transmitted to the head (McCrory et al., 2013).
  - Causes:
    - Sport Related: football, hockey, rugby, basketball, cheerleading, etc.
      - High Impact vs Low Impact
    - Work-related injuries: military service, construction, etc.
    - Recreational activities
    - Non-Sport Related:
      - Motor vehicle accidents
      - Falls
      - Violence
    - Other…

Consequences of Concussion:

- Post-concussive Syndrome/Symptoms
  - Persistent headache, light-headedness, lethargy, sleep disturbance, light and noise sensitivity, memory dysfunction, decreased attention and concentration
  - Secondary factors: anxiety, irritability and depression
- Resolution of the clinical and cognitive symptoms typically follows a sequential course.
  - 80-90% of concussions resolve in a short 7-14 day period if managed appropriately.
- 10-20% of individuals experience persistent concussive symptoms (PCS) (Jotwani & Harmon, 2013)
  - Debate: 1 week to 3 months
  - Greater risk with non-sport related injuries
  - Social, academic, occupational and emotion impact:

Subconcussive Hits:

- Research is now beginning to emerge debating the additional influence of routine, repetitive and acutely asymptomatic subconcussive blows to the head.
  - No acute symptoms reported
  - May lead to altered brain gray matter functional connectivity and white matter microstructure that cumulatively over time results in neurocognitive change (Davenport et al., 2014)
    - Preliminary research: varsity football offensive and defensive lineman can incur in excess of 1,000 subconcussive hits over the course of 1 season (Gyslan, et al., 2012).

Consequences of Repeated Concussions or Subconcussive Hits:

- Long-Term
  - Chronic Traumatic Encephalopathy (CTE)
    - Neurodegenerative disease that occurs years or even decades, following recovery from head trauma (Gavett, Stern, & McKee, 2011)
      - Mean age of onset – 43 years of age
      - Reported cases in high impact sports: football, soccer, boxing, hockey (Gavett et al., 2011)
    - Diagnosis can only be made through autopsy
      - Reduced brain volume – frontal, temporal, and parietal lobes
    - Symptoms:
      - Increased anger
      - Suicidal tendencies
      - Poor episodic memory and weakened executive function skills
    - More research is needed…

Factors Negatively Impacting Recovery:

- Gender
  - Neck Strength
- History of Learning Disability
- Number of previous concussions
- History of migraines
- Children and Adolescents
- Varsity vs. Club Sport/Recreational Athletics

Harmon et al., 2013, Knollman-Porter & Musille, 2016, & Zuckerman et al, 2014

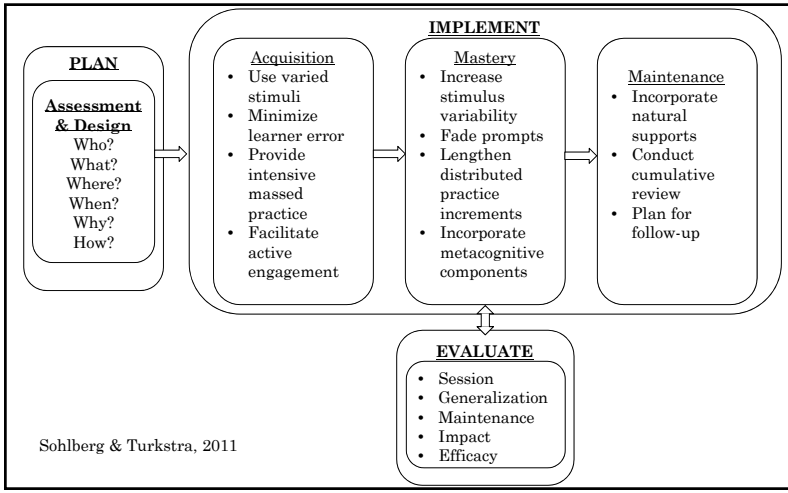
Post-Concussion Recommendations

- If symptoms persist for greater than 2 months, the athlete is seen for a more comprehensive evaluation by the SLP and possible referral to a neuropsychologist for a comprehensive assessment including psychosocial testing.
  - Current Debate: Why wait to start treatment
    - Restorative versus Compensatory Approaches
    - Negative consequences
- Based on the assessment results, the Miami University clinic develops an individualized therapy program for the treatment of persistent memory and attention problems via the use of hierarchical strategies (Marshall et al., 2012).

- The American Speech-Language Hearing Association's (ASHA) most recent position statement on the role of the SLP in cognitive-communication disorders states that SLPs may be involved in any of the following roles: identification, assessment, intervention, counseling, collaboration with other care team members, case management, education of patients/family members/other professionals, prevention, advocacy, or research (ASHA, 2005)

Assessment and Management of Chronic Post-Concussion Syndrome:

- Criteria: Individuals who continue to exhibit changes in neurocognitive function or persistent neurobehavioral symptoms beyond months.
- Focus:
  - Assess/treat regardless of time since injury
  - Assessment and management should focus on the unique neurocognitive and neurobehavioral symptoms the individual is experiencing
  - Education and reassurance is needed
    - Awareness
  - Advise about precautionary measures



Sohlberg & Turkstra, 2011

Assessment and Design:

- Most common: no baseline neurocognitive data
  - What should be done?
    - Obtain detailed information regarding:
      - Head injury history
      - Academic history
      - Sport history
      - Medical history
      - Psychological History
    - Collect artifacts: past and current academic/work related materials
      - Tests
      - Writing
      - Grades

Case Study 1: Assessment

- Who:
  - Previous Concussion History:

Case Study 1: Assessment

- Academic History
- Chief Complaints:

- Performance on Neurocognitive Assessments
  - Repeatable Battery for the Assessment of Neurocognitive Status (Randolph, 1998)

Case Study 1: Assessment

- Interview and Observations:
  - Self-rating of symptoms, strengths and challenges
    - Do the symptoms increase during certain conditions?
  - Study Skills/Patterns
    - Education
      - Sustained attention
      - Selective attention
      - Alternating
      - Divided attention
      - Immediate and delayed memory
  - Test Taking Skills
  - Independent Use of Strategies
    - What works and what doesn't work

The Goals of Cognitive and Behavioral Rehabilitation

- To enhance the person's capacity to process and interpret information.
- To improve the person's ability to independently function in all aspects of family and community life through the use of supports and/or strategies.

Cognitive Rehabilitation

- Two basic principals for cognitive rehabilitation (Sohlberg & Mateer, 2001)
  - Restorative
  - Compensatory

Cognitive Rehabilitation

- Restorative Principals
  - Principals of neuroplasticity (Kleim & Jones, 2006)
    - Use if or loose it
    - Use it and improve it
    - Specificity
    - Repetition matters
    - Intensity matters*
    - Timing matters
    - Salience
    - Age
    - Transference
    - Interference
  - Negative influence of post-concussion symptoms

Cognitive Rehabilitation

- Compensatory
  - Compensate for deficits with newly learned strategies using retained cognitive skills and functional reorganization of the brain
    - Technology
      - High-tech, low-tech or no-tech

Cognitive Rehabilitation Includes:

- Fostering awareness of strengths and challenges
- Addressing the emotional responses to the injury
  - Look fine but don't feel fine
  - "It's in your head"
- Balancing safety considerations while encouraging independence
- Suggesting environmental changes
- Setting goals with clients and their families
- Reinforcing self or family generated strategies
- Providing structured, sequenced and repetitive practice

Cognitive Rehabilitation Includes:

- Training general strategies and asking them to practice them in a variety of settings
  - Functional environments
- Evaluating the intervention with patient and their family
- Providing education
- Providing technical devices
- Monitoring or assisting with employment or education plans
  - Reducing academic load
  - Alternative athletic options

Case Study 1: Management

- Multi-disciplinary Team:
  - Physical Therapy: Vestibular Therapy
  - Psychology
  - Neurologist
  - Family Physician
  - Speech Language Pathologists
- Medications:
  - ADHD
  - Depression
  - Anxiety

Management:

- Treatment focus will be based on the unique needs of the individual
- Encourage Self-Reflection
  - Extensive Journaling
    - Best time of day/worst time of day
    - Distractions
    - Study routines
    - Classroom routines
    - Test taking routines
    - Pacing: setting timers
- Structured Treatment Tasks
  - Complex Attentional Tasks: Attention Process Training
  - Complex Executive Function Tasks: Deductive Reasoning
    - Self-reflective practice
    - Word of caution*
- Functional Treatment Tasks
  - TED Talks
  - Note taking tasks
  - Scheduling (e.g. electronic or paper based)

Management:

- Begin with structured activities and then work towards real world experiences
  - Leave the therapy room
  - Challenge by increasing time demands and the amount of distractions while providing support and encouragement

Potential Challenges:

- Attitudes regarding recovery
- Compliance with recommendations
- Varsity athletes vs recreational athletes vs non-athletes

Case Study 2

- Demographic Information
- Head Injury History
- Past Medical History
- Psychological History
- Academic History
- Social History
- Self-Rating of Performance
- Student Goals

Case Study 2:

- What information is still needed?
- Recommendations?

Preferred Methods of Concussion Education among College Students

- Types of educational materials used
- Effectiveness
- What is still needed?
  - Schools
  - Hospitals
  - Clinics

Discussion

- Successful management of post concussion syndrome requires a multi-disciplinary team approach with professionals observing and analyzing symptoms and behaviors in a variety of scenarios and settings to make the best return to play/work and post-injury recovery decisions.
- Speech-language pathologists have the training in the diagnostic and treatment methods necessary to be an active participant in the concussion management team.
- Persistent symptoms can cause individuals to have difficulty with academic, social, occupational, and athletic activities.
- Appropriate and timely management is warranted to help individuals return to their pre-injury academic and athletic endeavors successfully.

Questions

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