HEARING, LISTENING, AND BALANCE ISSUES WITH TRAUMATIC BRAIN INJURY

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Hearing and balance issues are common after TBI

• Hearing loss:
  • Easy to identify however after a TBI, a hearing test should be performed:
    • Temporal bone fracture
• Tinnitus or “ringing” in the ears
• Sound sensitivity that was not there before the head injury (person finds sounds “too loud” that don’t bother other listeners)
Hearing and balance issues are common after TBI

- Auditory processing disorder
  - Subtle
  - Often presents as not hearing well in challenging listening situations, not hearing “fast speech”, speech sounds “different” than it used to before the TBI
  - Often have a hearing test and are told that they have “normal” hearing
    - This is normal ability to hear sounds but not when the system is “taxed” (like what happens in the “real world”)
Erber’s Hierarchy (1992)

Comprehension

Identification

Discrimination

Detection
Focus on ‘functional’ hearing

World Health Organization

• Functional impact
  • One of the main impacts of hearing loss is on the individual’s ability to communicate with others

• Social and emotional impact
  • Exclusion from communication can have a significant impact on everyday life, causing feelings of loneliness, isolation, and frustration
Post concussive syndrome (PCS)

- Can last for weeks, months, and/or years
- Headaches, dizziness, tinnitus, visual perceptual issues, auditory perceptual issues, anxiety, depression, short-term memory issues, among other symptoms
- Synergy among these issues
- Must be on the “look out”—listen carefully to what you tell us
Vestibular/Balance issues

• Significant number of people who have had concussion who have vestibular issues

• Assessment and need for vestibular rehabilitation (evidence of significant improvement)

Hearing/listening is often overlooked in people with TBI

- Significant number of people with TBI have short or long term auditory issues
  - Research suggests up to 75% of people with TBI have residual hearing issues, many of which are subtle
  - Told to “just listen harder”, hearing is “OK” (by using old fashioned method like a whisper test or tuning fork)
- Hearing issues can be subtle and are often not indicated until the auditory system is taxed (back to work, back to school, etc.)
It begins with testing

• Something can be done to address each of the things that happens to the auditory/vestibular system to improve quality of life

• Must have a comprehensive audiologic (hearing) evaluation by an audiologist
  • Specialized questionnaire and specific case history
It begins with testing

• Must have a comprehensive audiologic (hearing) evaluation by an audiologist
  • Hearing evaluation
  • Speech in noise test (have to make the auditory system work: ONLY 15% of audiologists do this testing; tell the audiologist they MUST do this)
  • Other testing known as the auditory processing test battery: How the two ears work together, how the ear/brain can put closure on auditory information, how the auditory system deals with timing
It begins with testing

• If the person has tinnitus or sound tolerance issues
  • Learn about the “parameters” of the tinnitus or sound tolerance
    • Tinnitus is a symptom and not a disease
    • NO CURE but so much can be done to make it livable
    • What pitch or frequency
    • How loud it is perceived
    • How loud is “too loud”
It begins with testing

• Balance testing
  • Vestibular assessment performed by an audiologist
  • Different information than from a neurologist or physical therapist
Managing hearing related issues

• Technology that addresses hearing
  • Improving the sound quality
    • Use of hearing aids for those with hearing loss
      • Not your grandparents hearing aids...current hearing aid technology is amazing
    • Bluetooth connections, remote microphones, technology on the phone such as Live Listen
      • Hearing aids can be used for people with auditory processing issues also—“normal” hearing on an audiogram
    • Features in hearing aids that address speech in noise issues, directionality, timing
Hearing aids

• Must be well fit
  • ”Real ear” measures to optimize fitting: Insist that this be done by the audiologist
  • It is the process not the product: For people with TBI, use of over the counter (OTC) hearing aids is not indicated
    • Audiologist must have experience with this population
  • Appropriate trial period: Need adjustments
Remote microphone systems

• Device worn in ear of listener and speaker(s) use a microphone system (wireless)
• Only hear what comes through the microphone
• Can also be coupled to a hearing aid to give extra benefit
Technology results in:

- Reduced auditory fatigue
- Reduced “cognitive load” so can help with executive function
- Can help to “retrain the brain” providing consistent auditory input
- Can help address issues with ringing/tinnitus and surprisingly sound tolerance issues
Retraining the brain through the ear

• With or without hearing aids

• Listening and Communication Enhancement:
  • LACE: https://laceauditorytraining.com/
  • Learning how to listen in noise
  • Adaptive
  • 45 days

• Amptify app:
  • https://amptify.com/
Work as a team with the speech/language pathologist

• Bottom up: How does the information get from the ear to the brain
  • What the audiologist addresses

• Top down: Once the information gets to the brain, how is it organized/categorized/available for quick recall
  • What the speech/language pathologist addresses
• “There is nothing that can be done about tinnitus”
• NO CURE but much that can be done to address tinnitus distress
• Tinnitus can impact the ability to hear over the sound, create stress and anxiety, and result in attentional issues
• Habituation: Sound that interacts with tinnitus
• Cognitive behavioral therapy in conjunction with audiology treatment
Vestibular rehabilitation/balance

- Balance must be addressed
- Vestibular rehab by audiologist/physical therapist
  - Vestibular rehabilitation support group at Ohio State
SO MUCH MORE TO TALK ABOUT RELATED TO EARS AND HEARING AFTER TBI!

Time of questions, concerns, ideas!