Self-Perceived Hearing Difficulties in Some Adults with mTBI

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Abstract
Mild traumatic brain injury (mTBI) can result in self-perceived hearing and communication problems despite normal audiogram. Self-perceived auditory and cognitive-communication abilities were measured in a group of adults with mTBI. Results demonstrated that adults with mTBI separated into two distinct groups: those without and those with self-perceived auditory and cognitive-communication difficulties. Results suggest that adults with a history of mTBI who complain of hearing difficulties should be screened for auditory and cognitive-communication deficits, despite having normal pure-tone hearing.

Introduction
• Some adults with clinically normal hearing present with complaints of ‘hearing problems’ and suprathreshold auditory deficits, especially in acoustically complex listening situations.
• Unless specialized testing is conducted, auditory processing deficits, or hearing difficulties (HD) may go undiagnosed.
• Hearing difficulties often result in deficits with communication, frustration and fatigue. For individuals with mTBI, these symptoms may be exacerbated (including social isolation and depression).
• Individuals with mTBI can present with normal auditory and cognitive behaviors in quiet and structured settings. When presented with noisy, complex and distracting environments, however, the same individuals can break down both behaviorally and cognitively.

The purpose of the present study, therefore, was to better understand the self-perceived auditory and cognitive difficulties of:
• Adults with a history of TBI and no self-perceived HD
• Adults with a history of TBI and self-perceived HD

Methods
Participants
• 20 adults (mean = 21.9 years of age)
  • Normal hearing (thresholds ≤ 20 dB HL 250-8000 Hz)
  • No history of TBI and no self-perceived HD
• 10 adults with TBI (mean = 24.7 years of age)
  • Normal hearing (thresholds ≤ 20 dB HL 250-8000 Hz)
  • History of TBI and no self-perceived HD
• 10 adults with TBI HD (mean = 48.5 years of age)
  • Essentially normal hearing (thresholds ≤ 25 dB HL 250-4000 Hz)
  • History of TBI and self-perceived HD

Questionnaires
Auditory Processing Questionnaire (APQ)²
• Hearing Handicap Inventory for Adults (HHIA)³
• Abbreviated Profile of Hearing Aid Benefit ( AphAB)⁴
• Cognitive Difficulties Scale (CDS)⁵
• LaTrobe Communication Questionnaire (LCQ)²⁵

Cognitive Questionnaires
• Cognitive Abilities
• Post-TBI LQG Score
• Post-TBI CDS Score

Results
Auditory Questionnaires
Figures 1 & 2. Mean APQ scores for the Control group (black), TBI group (cyan), and TBI HD group (blue). Error bars represent one standard deviation.

Cognitive Questionnaires
Figures 5 & 6. Mean LQG scores pre- and post-TBI (left panel) and CDS scores (right panel). Figures 5: Pre-TBI scores are presented for the Control group (current communication difficulties; black) and prior to the TBI for the TBI group (cyan) and TBI HD group (blue). The Post-TBI scores represent communication difficulties post-TBI. Error bars represent one standard deviation.

Discussion
Self-Perceived Hearing and Communication Difficulties
• Greater difficulty hearing and communicating relative to the control group was reported by the TBI HD participants. This demonstrates the importance of obtaining patient perception of their hearing and communication abilities, even in the face of a clinically normal audiogram.
• Greater cognitive deficits relative to the control group were reported by the TBI and TBI HD participants. This demonstrates the importance of a multi-disciplinary approach and making appropriate referrals based on findings. Cognitive screening tools are appropriate to determine if further referrals are necessary or to better understand the cognitive-communication difficulties a patient may be experiencing.

Conclusions
• The TBI HD group demonstrates the need for testing beyond the standard audiometric examination – clinically normal pure tone thresholds were unable to predict suprathreshold auditory processing deficits.
• Individuals with subjective hearing complaints and a history of mTBI (e.g., head injury or concussion) and clinically normal hearing represent a unique population that can benefit from additional testing and audiological rehabilitation strategies (e.g., technology, counseling, communication strategies training, etc.).

References

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