Evaluation of Approaches to Auditory Rehabilitation for mild Traumatic Brain Injury

PI: Gabrielle Saunders

Objectives: Many soldiers are returning from the current OIF/OEF (Operation Iraqi Freedom/Operation Enduring Freedom) conflicts with combat injuries resulting from blast exposure. About 18% of these have a mild traumatic brain Injury (mTBI) which results in post-concussive symptoms, including memory problems, headaches, difficulty concentrating, increased anxiety, and, especially relevant here, functional auditory deficits resulting in problems in understanding speech in less than optimal listening situations. Difficulty understanding speech is a classic symptom of sensorineural hearing loss, however audiometric evaluation of these veterans shows that a number have peripheral hearing sensitivity within clinically normal limits, or at least reported hearing problems that are disproportionate to a mild loss in hearing sensitivity. It has been postulated that these individuals have functional auditory processing problems resulting from injury to the central auditory system. Currently there is no established remediation of auditory processing problems in veterans with mTBI. The long-term objective of the present line of research is to do precisely this.

Research Plan: This is a two-site, randomized controlled, parallel group clinical trial to assess the relative effectiveness of three forms of intervention for veterans who have normal or near-normal peripheral auditory function and significant, consistent, complaints of difficulty hearing. The interventions to be compared are: (1) personal FM system use alone (FM); (2) auditory training with the Brain Fitness Program alone (BFP); and (3) FM+BFP combined. In addition, all participants will receive minimal informational-counseling about the use of communication strategies, and a (4) control group of veterans will receive the minimal informational counseling alone. Thus participants will be randomly assigned to one of four groups: Group 1, FM alone; Group 2, BFP alone; Group 3, FM+ BFP; and Group 4, Control.

Methods: The participants in each group attend three test sessions. During Session 1 the informed consent process is completed, baseline assessments are made to ensure participants meet the study inclusion criteria, and secondary outcome measurement is conducted. Participants are then assigned randomly to an intervention group. Session 2 occurs 1-14 days after Session 1. During Session 2, baseline performance on the primary outcome measures are assessed. Following testing, the participants in Groups 1 and 3 are fitted with personal FM devices and trained in their use. Participants in Groups 2 and 3 are trained on the use of the BFP system. Finally, participants in all four groups are provided with information about the use of communication strategies. Session 3 occurs at the end of a 4-week experimental training period. During Session 3 all participants are retested on the outcome measures.

Findings: Preliminary analyses show that the FM alone and the FM + auditory training groups have significantly better subjective outcomes than either the control group or auditory training alone group, as measured using the Psychosocial Impact of Assistive Devices scale and the Cognitive Self-Report Questionnaire.

Relevance to VA: Currently there is no established standard-of-care for remediation of functional hearing difficulties in veterans with mTBI, therefore, it is incumbent upon the VA to develop evidence-based intervention strategies to address the functional hearing deficits of veterans with normal or near-normal peripheral hearing sensitivity. The long-term objective of the present line of research is to do precisely this.

MeSH Terms: traumatic brain injury, rehabilitation, Auditory Processing Disorder