

Evaluation of Approaches to Auditory Rehabilitation for mild Traumatic Brain Injury

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Objective: 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.

Plan: A between-subjects randomized controlled clinical trial will be conducted to examine the efficacy two interventions expected to improve speech understanding under difficult listening conditions for blast-injured veterans reporting hearing difficulties but who have normal, or almost normal, hearing sensitivity. The first is use of a personal FM (frequency modulation) system. The second is use of an auditory training program, known as LACE™ (Listening And Communication Enhancement). The specific aims of the study are: (1) To compare the effectiveness of a personal FM system alone, LACE™ auditory alone and standard-of-care counseling for blast-injury veterans with functional hearing problems and normal or near-normal hearing sensitivity. (2) To examine whether FM use and auditory training with LACE™ together is more effective than either intervention alone; and, if the sequence in which the two forms of intervention are provided alters the outcome.

Methods: For Specific Aim 1, participants will attend three research test sessions. During Session 1 the informed consent process will be completed, assessments will be made to ensure participants meet the study inclusion criteria and performance on all predictor variables will be assessed. Session 2 will take place within 2 weeks of Session 1. At this time, the outcomes measures will be completed and participants will receive instruction in the intervention to which they are randomized. The intervention period will last 4 weeks. Following the intervention period, participants will return to the laboratory to complete all outcomes measures once again.

For Specific Aim 2 half of the participants who were in the LACE™ arm will crossover into the FM system intervention, and half of the participants who were in the FM system arm will crossover into the LACE™ intervention. The remaining LACE™ participants will receive no further intervention as per the LACE™ protocol, while the remaining participants in the personal FM system arm will continue to use the FM system. The participants in the Standard of Care arm will continue in this arm. The second intervention period will also last for 4 weeks. Following the intervention period all participants will return to the laboratory to complete all outcomes measures for a final time. They will also be interviewed regarding their opinions about each intervention, such as ease of use, preferences and compliance.

Findings to date: The study has not yet begun therefore no data are available.

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