

Central Auditory Processing Disorders Associated with Blast Exposure (PI: Leek)

Objectives: The incidence and nature of central auditory dysfunction in warfighters who are exposed to high-explosive blasts while serving in combat have not been clearly determined. The objectives of this study are to determine whether central auditory processing (CAP) disorders are associated with exposure to high-explosive blasts. This study will also examine the incidence, magnitude and timing of spontaneous recovery of CAP function from blast exposure. The information provided by this study will help guide clinicians in both the military and VA health care systems regarding the likelihood of central auditory processing disorders in soldiers returning from deployment and suggest some clinical rehabilitative strategies for the treatment of these patients with CAP deficits.

Plan: Using a battery of behavioral and neurophysiological tests, we will prospectively evaluate central auditory function in warfighters who have been exposed to explosive blasts.

Methods: This is a multi-site study that will be carried out at the National Center for Rehabilitative Auditory Research (NCRAR) located at the Portland VA Medical Center, and at the Walter Reed Army Medical Center (WRAMC) located in Washington, D.C. A battery of central auditory processing tests will be administered to soldiers who have been exposed to a blast during their deployments, and who have returned to WRAMC. Those patients who demonstrate aspects of central auditory processing disorder will be invited to participate in further testing to take place at NCRAR or at WRAMC (at the convenience of the patient) 9-12 months later. There they will undergo the same battery of central auditory tests. Control subjects will be recruited who do not have a history of blast exposure and who are matched in age, gender, and audiometric configuration with experimental subjects. Control subjects will be tested at the NCRAR site. A total of 80-100 subjects will participate in each group. The battery of tests includes behavioral tests and neurophysiologic measures, and tinnitus and balance problems assessed by questionnaire. Results of each test will be evaluated against norms established in the literature and against performance of control subjects. Differences will be analyzed using t-tests comparing group scores, as well as correlations among scores on the various tests within the battery.

Findings to Date: Thirty-five blast exposed participants have been enrolled at WRAMC. Preliminary findings show that about 90% of the participants who have completed the central tests scored abnormally on at least one of the five tests. Twenty-three control subjects have participated at PVAMC, matched to the experimental subjects by age, gender and audiometric configuration. Thirty percent of the control subjects had an abnormal test result on at least one test.

Clinical Relevance: There is an increasing number of new Veterans who have been exposed to high explosive blasts requesting VA audiological services because they have trouble understanding speech, yet testing reveals only minor hearing impairment. This project uses non-routine audiological tests of auditory function to try to understand, and perhaps develop effective treatments for, damage to the central auditory system.

Relevance to the VA: The signature injuries of the current conflicts in Afghanistan and Iraq are those associated with exposure to high-explosive blasts. Many of the soldiers involved in OEF/OIF will be returning to their homes to be cared for by their local VAs. This work indicates that VA audiologists must begin to incorporate new audiological tests of central auditory function in order to adequately diagnose and treat the hidden injuries to the central auditory system that may occur with some regularity among these newest Veterans.