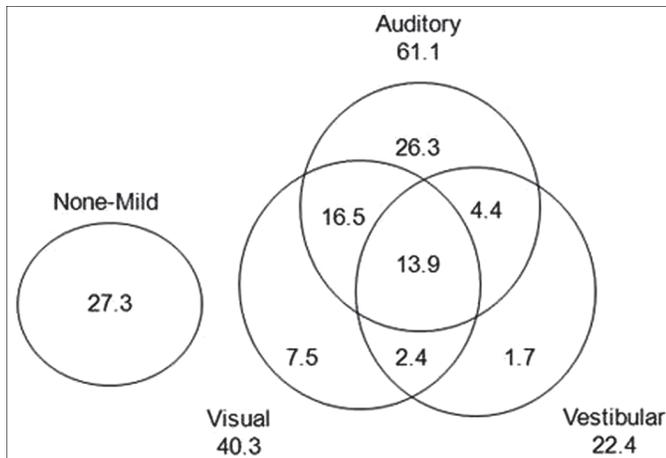


Multisensory impairment reported by veterans with and without mild traumatic brain injury history

Terri K. Pogoda, PhD, et al.

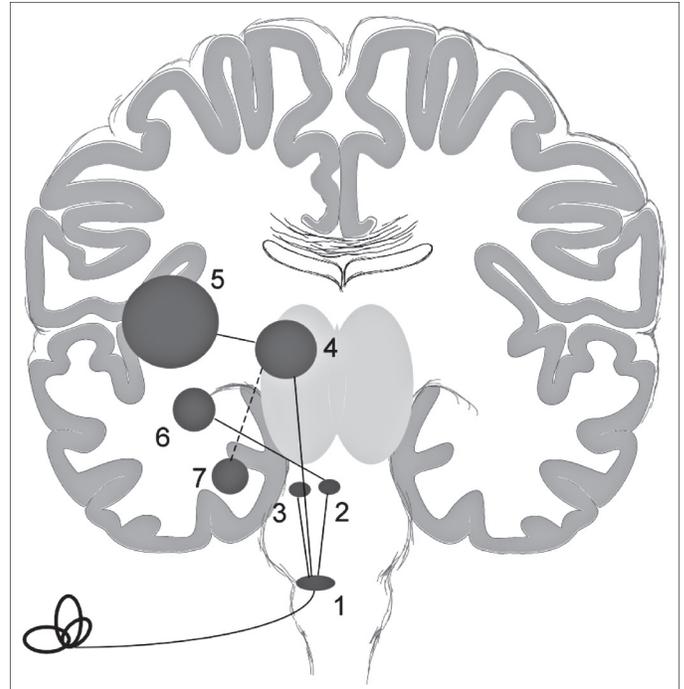


We examined the coexistence of hearing, vision, and balance/coordination/dizziness symptoms reported by Operations Iraqi Freedom/Enduring Freedom veterans who completed an evaluation for traumatic brain injury (TBI). This multisensory impairment was more common among veterans with a number of characteristics, including those with a history of mild TBI, post-traumatic stress disorder, and both blast and nonblast injuries during deployment. Veterans who report these symptoms would likely benefit from referrals to a team of providers so that symptoms can be properly identified. This will help providers develop a treatment plan to help veterans readjust to civilian life.

Sensorintegrative dysfunction underlying vestibular disorders after traumatic brain injury: A review

Laura M. Franke, PhD, et al.

This article reviews studies of vestibular effects of blast injury. We discuss specific results of vestibular tests reported in these studies and the limitations of these investigations. One limitation is that some vestibular processes of the brain are

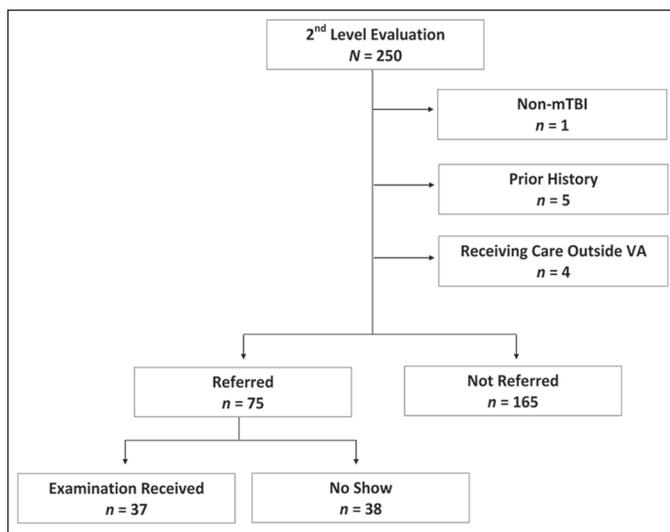


not typically evaluated; these processes include spatial orientation, navigation, and perception of self-motion. Traumatic brain injury (TBI) leading to imbalance may also affect a person's emotions. Further research is necessary to accurately measure these effects of injury. However, it is clear that blast injury can lead to vestibular problems and that the sources of dizziness and balance symptoms after TBI are likely to be complex.

Audiological issues and hearing loss among veterans with mild traumatic brain injury

Michael Oleksiak, et al.

Hearing difficulty is a common problem among veterans who experience a mild traumatic brain injury (TBI). We reviewed the medical records of 250 Operation Iraq Freedom/Operation Enduring Freedom (OIF/OEF) veterans diagnosed with mild TBI and recorded their hearing problems and subsequent visits to audiology. Results



demonstrate a high frequency of hearing difficulty and/or loss within this population. We also discuss typical tests and treatment. OIF/OEF veterans and clinicians should be aware that hearing issues after a mild TBI are frequent. Open discussion of this common problem may result in veterans' increased willingness to request and receive treatment.

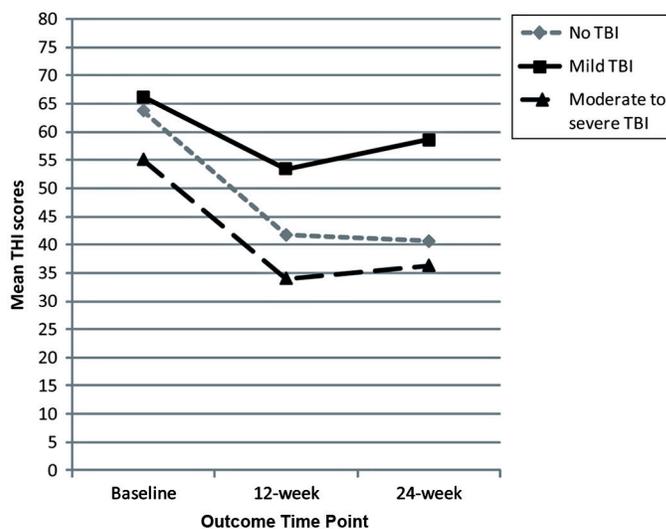
Performance on tests of central auditory processing by individuals exposed to high-intensity blasts

Frederick J. Gallun, PhD, et al.

Tests of central auditory processing ability were conducted on 36 patients recently exposed to high-intensity blasts on the battlefield in Iraq or Afghanistan. Compared with control subjects matched in age and peripheral hearing (which was, at worst, mild impairment in all cases), those exposed to blasts were more likely to perform abnormally on one or more tests of central auditory function. These results suggest that, for some patients, blast exposure may lead to difficulties with hearing in complex auditory environments, even when peripheral hearing sensitivity is near normal limits.

Pilot study to develop telehealth tinnitus management for persons with and without traumatic brain injury

James A. Henry, PhD, et al.



We conducted a pilot study to develop and test a home-based telehealth method of tinnitus intervention. The study included three groups of participants with bothersome tinnitus: (1) people with a history of mild traumatic brain injury (TBI), (2) people with a history of moderate-to-severe TBI, and (3) people with no current TBI symptoms. An audiologist and a psychologist provided six telephone counseling sessions over a 6-month period. Participants completed questionnaires before the sessions, at 12 weeks, and at 24 weeks. All groups showed trends reflecting improvement in their self-perceived functional limitations due to tinnitus. A follow-up randomized clinical study is underway.

Blast exposure and dual sensory impairment: An evidence review and integrated rehabilitation approach

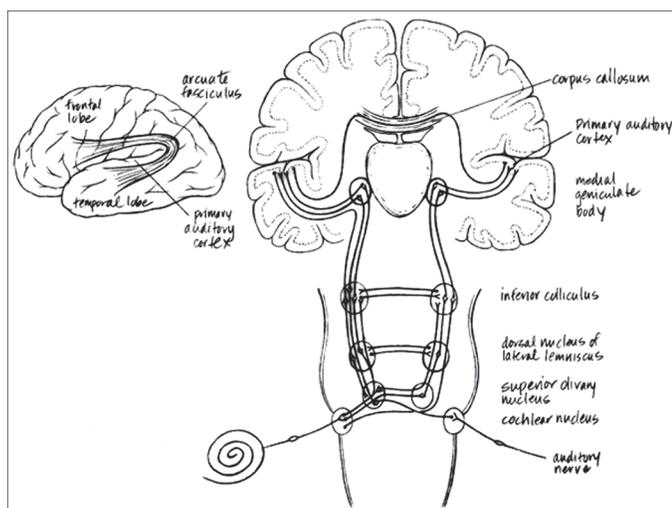
Gabrielle H. Saunders, PhD; Katharina V. Echt, PhD

Many veterans of Operation Iraqi Freedom/Operation Enduring Freedom were injured by blasts. Blasts

cause many types of injuries that arise from underpressurization of air; flying debris; the body being thrown by the blast wave; and factors such as inhalation of toxic fumes, burns, and crush injuries. In this article, we discuss the effects of closed-head brain injuries that arise primarily from the blast wave. Damage to the brain can be widespread, and new data show it often appears to cause damage to the auditory and visual processing areas in the brain. In turn, this causes problems with hearing and seeing that are different from typical hearing loss and vision loss in that the servicemember or veteran often has “normal” hearing thresholds and normal visual acuity but reports problems hearing in noisy places, understanding speech when it is spoken quickly, reading, and maintaining attention. People with combined hearing and vision deficits have dual sensory impairment (DSI). There is currently a dearth of research regarding the best ways to assess, treat, measure, and rehabilitate individuals with DSI. This article presents a review of the current state of knowledge regarding blast exposure and DSI and also outlines existing gaps in knowledge regarding assessment, rehabilitation, and clinical service models for addressing blast-related DSI.

Implications of blast exposure for central auditory function: A review

Frederick J. Gallun, PhD, et al.



The central and peripheral auditory systems are both at serious risk of injury when exposed to a high-

intensity blast. A clear understanding of speech in the presence of background noise requires an auditory system functioning at all levels. Treatment options include low-gain hearing aids, remote microphone technology, and auditory-training regimens, but clinical evidence does not yet exist for recommending one or more of these options. Understanding the problems patients who have been exposed to high-intensity blasts experience and finding effective solutions is essential for improving the lives of veterans who have been exposed to high-intensity blasts during the course of their military service.

Visual symptomatology and referral patterns for Operation Iraqi Freedom and Operation Enduring Freedom veterans with traumatic brain injury

Ryan Bulson, OD, MS, FAAO, et al.

Traumatic brain injury (TBI) has become an increasingly common condition in Operation Iraqi Freedom and Operation Enduring Freedom veterans. This study conducted at a Polytrauma Support Clinic Team site found that approximately 50 percent of veterans with TBI reported visual symptoms that affected their quality of life. The most common symptoms were blurred vision, sensitivity to light, and difficulty focusing the eyes at near.

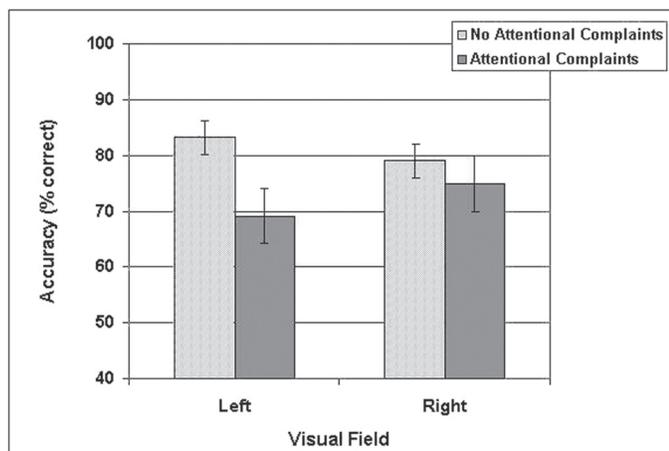
Vergence in mild traumatic brain injury: A pilot study

Dora Szymanowicz, OD, MS, et al.

Vergence eye movements are used to binocularly track objects varying in depth, as well as to maintain accurate and sustained eye alignment during such complex and demanding tasks as reading. Abnormality in the vergence system may adversely affect activities of daily living (ADLs) and produce nearwork symptoms. The present findings objectively document a range of steady-state and dynamic abnormalities in individuals with mild traumatic brain injury (mTBI). Understanding these deficits may lead to more efficacious remediation in the individual with mTBI, with improvement in their ADLs and reduction in symptoms at near.

Mild traumatic brain injury and posttraumatic stress disorder: Investigation of visual attention in Operation Iraqi Freedom/Operation Enduring Freedom veterans

Kristen Barlow-Ogden, MA; William Poynter, PhD



Many veterans are returning from Iraq and Afghanistan with diagnoses of mild traumatic brain injury (mTBI) and posttraumatic stress disorder (PTSD). These veterans also report vision and attention problems. This study objectively measured the visual attention of veterans with mTBI and PTSD by using a computerized behavioral task that selectively showed stimuli to the subjects' left or right visual field. We observed slower and more variable response times in the veterans with both mTBI and PTSD. We also found that veterans with both mTBI and PTSD were slower to orient their attention to the left visual field, while veterans with PTSD only showed the opposite pattern (slower to orient attention to the right visual field).

Relationship of screen-based symptoms for mild traumatic brain injury and mental health problems in Iraq and Afghanistan veterans: Distinct or overlapping symptoms?

Shira Maguen, PhD, et al.

This study aimed to differentiate distinct from overlapping screen-based symptoms of traumatic brain injury (TBI), posttraumatic stress disorder (PTSD), and depression in Iraq and Afghanistan veterans using factor analytic techniques. Veterans seeking Department of Vet-

erans Affairs (VA) care underwent VA population-based screening for TBI, PTSD, and depression. Overlapping symptoms were found between TBI and PTSD (irritability) and PTSD and depression (emotional numbing). Distinct TBI symptoms included dizziness, headaches, memory problems, and photophobia. Four separate constructs emerged: TBI; PTSD; depression; and a fourth construct consisting of two common postdeployment symptoms, hypervigilance and sleep problems. These findings highlight the need to increase our focus on symptoms that are common across screens in assessing, triaging, and initiating treatment among returning combat veterans.

Mild traumatic brain injury and pain in Operation Iraqi Freedom/Operation Enduring Freedom veterans

Jennifer Romesser, PsyD, et al.

1. Did you have any injury during your deployment from any of the following? (check all that apply: fragment, bullet, explosion, etc.)
2. Did any injury you received while deployed result in any of the following? (check all that apply: being dazed, confused or "seeing stars," not remembering the injury, losing consciousness, head injury, etc.)
3. Did any of these begin or get worse afterward? (check all that apply: dizziness, headache, memory problems, balance problems, ringing in the ears, irritability, sleep problems.
4. In the past week, have you had any of the above problems? (check all that apply: dizziness, memory problems, etc.).

The purpose of this study was to describe the pain experience in Operation Iraqi Freedom/Operation Enduring Freedom veterans with and without a history of mild traumatic brain injury (mTBI) who present to polytrauma clinics for evaluation and management. We sought to evaluate the relationship between a veteran's history of mTBI and posttraumatic stress (PTS) on axial pain, headaches, and pain interference. We performed a retrospective chart review of 529 Iraq/Afghanistan veterans referred for evaluation. Problems with headache, low back, and neck pain were frequently endorsed. There were statistically significant differences between the mTBI groups on PTS symptom endorsement, and PTS was predictive of pain experience and interference.

A history of mTBI with loss of consciousness predicted headache pain, but otherwise did not predict pain or pain interference. PTS was strongly related to the pain experience. Implications for evaluation and management of pain in this complex population are discussed.

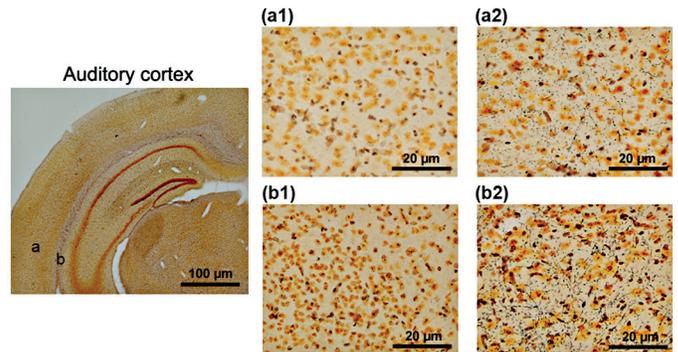
Preliminary framework for Familiar Auditory Sensory Training (FAST) provided during coma recovery

Theresa Louise-Bender Pape, DrPH, MA,
CCC-SLP/L, et al.

Sensory stimulation is provided to patients in states of seriously impaired consciousness because it is thought that stimulation will minimize sensory deprivation and/or optimize recovery. There remains a need, however, to examine the therapeutic efficacy of sensory stimulation. A Familiar Auditory Sensory Training (FAST) protocol was, therefore, developed for examination in a randomized clinical trial. This article describes the intervention according to underlying conceptual framework. Procedures to create the intervention and lessons learned to date are also described.

Preliminary studies on differential expression of auditory functional genes in the brain after repeated blast exposures

Manojkumar Valiyaveetil, PhD, et al.



Repeated blast exposures of mice showed significant alteration in multiple genes involved in age- or noise-related hearing loss. Blast exposure also showed significant neuropathology in the auditory cortex, suggesting that blast exposure damages central auditory processing systems. Differentially expressed genes include otoferlin, otoancorin, cadherins, and calcium regulating proteins/receptors, which are known to play various roles in auditory processing and hearing impairment. Changes in hearing-related gene expression after blast exposures need to be investigated further to draw specific biochemical pathways involved in defective central auditory processing leading to auditory dysfunction and tinnitus.