Hearing Loss

HEARING LOSS AND TINNITUS:

The Veterans Health Administration needs to provide a full continuum of audiology services.

Historically, tinnitus, commonly referred to as "ringing in the ears," has been a leading disability for veterans and in FY 2010 it topped the list as the most prevalent service-connected disability for returning personnel from Operations Enduring and Iraqi Freedom (OEF/OIF).[117] Similarly, with regard to veterans who served in previous conflicts, tinnitus has always been one of the top 10 service-connected disabilities for veterans from any period of service (including peacetime).[118] With noise exposure and hearing damage being the number-one cause of tinnitus, it is not hard to understand why tinnitus is so prevalent within veteran and active duty military populations. There is currently no cure for tinnitus; treatment options are limited; and efficacy varies depending on the patient.

How Tinnitus Manifests

Acoustic trauma has been part of military life since muskets and cannons were part of the arsenal, and OEF/OIF is no exception. America's future veterans are exposed to some of the noisiest battlegrounds ever. improvised explosive devices (IEDs)—the signature weapon of the insurgency—regularly hit patrols, which leads to a wealth of problems, including hearing loss and tinnitus. The noise emitted from IEDs is a main source of the disproportionate increases of tinnitus in veterans, but tinnitus can also be caused from head and neck trauma. Traumatic brain injury (TBI), one of the signature wounds of these conflicts, is producing a whole new generation of veterans with both mild and severe head injuries that are often accompanied by tinnitus. Head and neck trauma is the second most frequently reported cause of tinnitus. Blast-related TBI produces significantly greater rates of hearing loss and tinnitus compared with nonblast-related TBI, affecting up to 60 percent of these patients.[119]

Tinnitus and TBI

In particular, mild traumatic brain injury or mild TBI often includes tinnitus as a manifestation of injury. As defined by the Department of Defense policy for mild traumatic brain injury, TBI is the presence of a documented head trauma or blast exposure event, followed by a change in mental and physical status, which includes multiple symptoms, one of which could be tinnitus. A recent DOD study on Iraq veterans indicated that 70 percent of those exposed to a blast reported tinnitus within the first 72 hours after the incident; 43 percent of those seen one month after exposure to blast continued to report tinnitus. While the rate decreases over time, tinnitus rates exceeded hearing loss rates at all time points. These findings also demonstrate the need for more comprehensive diagnostics and broader range of therapeutic approaches for tinnitus, particularly when it is not accompanied by hearing loss, which can only be achieved by continued and additional research on the condition.

Another research finding on the OEF/OIF veteran population, conducted at the James H. Quillen Veterans Affairs Medical Center Tinnitus Clinic, in Mountain Home, Tennessee, noted the increasing association between tinnitus and post-traumatic stress disorder (PTSD). Of the first 300 patients enrolled at the clinic, 34 percent also carried a diagnosis of PTSD.[120]

These indications of the direct connections between tinnitus and TBI, as well as tinnitus and PTSD, point to the urgent need to address any gaps in research and treatment modalities provided by both the Departments of Defense and Veterans Affairs. Steps to address these conditions and gap areas have begun to be addressed by Congress, VA, and the DOD; however, much more needs to be done to adequately address the growing needs of America's veterans.

Invisible Injury

Many service members returning from war are physically disabled. Those types of injuries are easily seen, diagnosed, and treated by physicians. Veterans exposed to blasts from roadside bombs often suffer internal injuries that are not as easy to detect and treat. Tinnitus is one of the most prevalent invisible injuries. In September 2010, the Invisible Wounds Caucus held a meeting to specifically address tinnitus. This was the first time a Congressional body had addressed tinnitus in a meeting on veterans' health and was an excellent step toward better understanding tinnitus. We hope Congress will continue to address tinnitus at future caucus meetings as well as within the VA committees when appropriate to do so.

Tinnitus Prevalence

For millions of Americans, tinnitus becomes more than an annoyance. Chronic tinnitus can leave an individual feeling isolated and impaired in the ability to communicate with others. This isolation can cause anxiety, de-

pression, and feelings of despair. Tinnitus can be so debilitating that some affected individuals cannot work, interact with family and friends, or even sleep. Tinnitus impacts some 50 million Americans to some degree. Sixteen million individuals are chronically afflicted and 2 million are incapacitated by their tinnitus.[121] It is estimated that 250 million people worldwide experience chronic tinnitus.[122]

Adding to the Rolls Every Year

The number of veterans who are receiving disability compensation for tinnitus has risen steadily over the past 10 years. Since 2005, service-connected disability for tinnitus has increased alarmingly by 15 percent per year. At the end of 2009, nearly 800,000 veterans from all periods of service were service-connected for their tinnitus. A veteran with tinnitus may be awarded up to a 10 percent disability, which currently equals $123 a month. Although tinnitus is a condition and not a disease, it is considered a "disease of the ear" according to title 38, United States Code.

Translated into financial terms, the government paid out approximately $1.1 billion in VA disability compensation for tinnitus in 2009. At the current rate of increase, service-connected disability payments to veterans for tinnitus will cost $2.26 billion annually by 2014.[123] While the government will spend increasing amounts to compensate veterans with tinnitus, its investment in research pales in comparison (less than 1 percent of current compensation payments combined).

The scientific community has made groundbreaking discoveries about tinnitus in the past 10 years, such as better understanding of the genesis of tinnitus in the brain and which brain systems are involved with tinnitus perception. We now know that tinnitus originates in the brain and not the ear. Because of these discoveries, and the increases in tinnitus prevalence in both military and civilian populations, it is imperative that we continue to support increased tinnitus research to help expedite further discovery. This support will help to acquire to better treatments and an eventual cure for all who suffer from tinnitus. There have been early steps toward collaboration on these research efforts by VA, the DOD, and the National Institutes of Health (NIH), including a two-day workshop in August of 2009 specifically addressing the current state of tinnitus research. *The Independent Budget* encourages continued collaboration by NIH, the DOD, and VA to ensure the best possible outcomes for America's veterans with tinnitus.

Noise-Induced Hearing Loss and Tinnitus

During present-day combat, a single exposure to the impulse noise of an IED can cause immediate tinnitus and hearing damage. An impulse noise is a short burst of acoustic energy, which can be either a single burst or multiple bursts of energy. According to the National Institute for Occupational Safety and Health, prolonged exposure from sounds at 85+ decibel levels (dBA) can be damaging, depending on the length of exposure. For every three-decibel increase, the time an individual needs to be exposed decreases by half, and the chance of noise-induced hearing loss and tinnitus increases exponentially. At 140+ dBA, the sound pressure level of an IED, damage occurs instantaneously. Table 4 shows a few common military operations and associated noise levels, all exceeding the 140 dBA threshold.[124]

It's no surprise that service members using weaponry that emits such high decibel levels, in training or combat, are at greater risk of this type of disability than their civilian counterparts.

Hearing Conservation

Hearing conservation programs have been in place since the 1970s to protect and preserve the ears of our military service personnel. However, a study released by the Institute of Medicine in 2005, titled *Noise and Military Service* reviewed these hearing conservation programs and concluded they were not adequately protecting the auditory systems of service members. Additional studies conducted to assess the job performance of those exposed to extremely noisy environments in the military concluded that the noise not only caused disabilities, but put the overall safety of the service member and their team at risk. Reaction time can be reduced as a result of tinnitus, thus degrading combat performance and the ability to understand and execute commands quickly and properly.

Many military personnel develop tinnitus and other hearing impairments prior to active combat as a result of

Table 4. Noise Levels—Common Military Operations

Type of Artillery	Position	Decibel Level (dBA) (Impulse Noise)
105 mm Towed Howitzer	Gunner	183
Hand Grenade	At 50 Feet from Target	164
Rifle	Gunner	163
9 mm Pistol	N/A	157
F18C Handgun	N/A	150
Machine Gun	Gunner	145

training. If a service member is disabled prior to combat, his or her effectiveness already may be compromised at the beginning of combat exposure. A study in *Tank Gunner Performance and Hearing Impairment* concluded that hearing impairments may delay a service member's ability to identify a target by as much as 50 seconds and be the cause of other inefficiencies and impairments in the line of duty.[125]

The Role of Medical Research

Research has increased our knowledge about hearing loss and how it occurs, while less has been discovered about tinnitus—but that knowledge is growing. So much more is known today about tinnitus and its origins than was known 10 years ago. This knowledge better informs health professionals on how to best treat a patient with a particular subset of symptoms.

Tinnitus is a condition of the auditory system that originates in the brain. This finding reinforces the connection between TBI and tinnitus and may help explain why this population of veterans is experiencing tinnitus in record numbers. Of 692 TBI patients at Walter Reed Army Medical Center between January 2003 and March 2006, nearly 90 percent had nonpenetrating head injuries.[126] The extent and epidemiology of how tinnitus and TBI are affecting each other will remain unknown unless the federal government funds more medical and prosthetic research as encouraged by *The Independent Budget*.

Even though tinnitus research has come a long way, especially in recent years, much more needs to be learned. With so many veterans being added to the rolls every year for service-connected tinnitus, VA, the DOD, and NIH need to continue working collaboratively to continue as the leaders in tinnitus research. As of July 2009, more than 120,000 OEF/OIF veterans had been awarded service-connected disability for tinnitus. Prior to that, there were approximately 650,000 veterans from previous conflicts already on the rolls for tinnitus. VA estimates show that it is likely that the actual number of veterans who have tinnitus sustained from combat and active duty is closer injuries is closer to 3 to 4 million.[127]

Recommendations:

The Veterans Health Administration must rededicate itself to the excellence of programs for treatment of tinnitus and all associated polytraumatic injuries of war including hearing loss, traumatic brain injury, and post-traumatic stress disorder.

Congress must continue providing funding for VA and the DOD to prevent, treat, and cure tinnitus.

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