

Acoustic Trauma and the Impact of Noise on Our Men and Women in Uniform

BY BRAD INGRAO



When we talk about hearing loss and related issues among Veterans, we're typically using it as a catch-all phrase for several types of injuries to the ear that can be sustained in combat and service. In this article, audiologist Brad Ingrao discusses some of the service-connected injuries that affect hearing and balance.

World War II and the Korean War

My first experience with Veterans and hearing loss was in 1986 when I had a clinical rotation at the Castle Point Campus of the VA Hudson Valley Health Care System near Poughkeepsie, New York. Nearly all of the patients

were World War II (WWII) Veterans. Their hearing loss was so predictable that my professor and I could usually guess the shape of the audiogram based on which type of duty the Veteran had. In those days, hearing loss was most often from loud sound exposure—usually from gunfire and aircraft engines.

The injury was generally limited to the cochlea, the part of the inner ear that acts like a microphone, converting sound vibration to nerve signals. Tinnitus, or ringing in the ear, was often reported. But patients usually said that they'd learned to ignore it. A very few reported shell shock. But as with tinnitus, they indicated that once they got home and back into the swing of their lives, it settled down.

The typical treatment for this type of injury was hearing aids, although at that time, the Department of Veterans Affairs (VA) provided them only if the Veteran had reported the hearing injury while still on active duty. Unfortunately, for most WWII Veterans, the rush to get home meant that many skipped their exit hearing test and lost that opportunity. This changed in later years, after several studies between 1988 and 2011 showed that treating hearing loss early and with appropriate hearing aids significantly improves overall wellness and quality of life. This not only is the right thing to do, but it also makes the managed health care that the VA provides more cost effective.

The Vietnam War

My next VA experience began in 2014, when I was hired as the chief of audiology and speech pathology at the New Mexico VA Health Care System in Albuquerque. We still saw the occasional WWII and Korean War Veterans, but now, our primary population was those who'd served in Vietnam. These patients also had noise-induced hearing

Understanding Acoustic Trauma

Acoustic trauma, or noise-induced hearing loss, can occur in two ways: with a single blast of excessively loud sound—like an explosion or gunfire near the ear; or over a longer term, when repeatedly exposed to loud noises, like aircraft engines and machinery.

Delicate hair cells in the inner ear—sensory receptors—vibrate in response to sound waves, thereby sending electrical signals along the auditory nerve to the brain for interpreting. Extreme, high-decibel sound overloads these hair cells with too much movement, causing them to break or die. Fewer functioning hair cells means diminished hearing. Once destroyed, these hair cells can't be repaired or replaced.

Tinnitus is another common consequence of acoustic trauma. Simply described, it's when the brain perceives a noise, like buzzing or chirping, that has no external environmental source. It can come on following damage to the cochlea within the inner ear, to the vestibular nerve between the ear and the brain, or to the brainstem. But there can be other underlying causes as well. **HL**

loss—or acoustic trauma. But their reports of tinnitus were much more severe than I'd seen at Castle Point.

Many of these Veterans also experienced post-traumatic stress disorder, or PTSD. The VA has done extensive research and now has a much better understanding of the complexity of PTSD. In short, exposure to tragic events changes how the brain reacts and pays attention to sound, light and other stimuli. When these Veterans perceive a ringing or buzzing in their ears connected to hearing loss, they have a much harder time shifting attention away from it than their predecessors did. The VA maintains two dedicated research facilities, one of which has a team that has looked at tinnitus for several decades. This team, led by James Henry, Ph.D., developed the Progressive Tinnitus Management program (PTM), which has been shown to be highly effective. All VA audiologists have access to in-depth training in PTM. And many VA centers have dedicated tinnitus specialists.

The Gulf War and Post 9/11

In 2016, I transferred to the VA Long Beach Healthcare System in California. In just a short time, I noticed another shift in the population in the audiology service.

We still had lots of Vietnam Veterans. But now those who'd served in the Gulf War, Iraq War and Afghanistan War were being referred to us, but not by primary care—rather, by the traumatic brain injury (TBI) team.

The rapid increase in the use of improvised explosive devices, or IEDs, during the post 9/11 conflicts led to many more Veterans suffering concussions and other blast injuries. Research into these kinds of injuries is still ongoing, but a study by Michael Oleksiak and peers, published in 2012 in the *Journal of Rehabilitation Research & Development*, found that 87% of Veterans with mild TBI reported some degree of hearing loss and tinnitus. An earlier study by Stephen Fausti, Ph.D., and other VA researchers, published in 2009 in the same journal, found that those exposed to blasts during military service also reported a wide range of balance and other vestibular system disorders.

Addressing Service-Connected Hearing and Balance Issues

So what does this mean for our men and women in uniform?

If you're a combat Veteran, you most likely have some degree of hearing loss and probably tinnitus. This will likely cause you greater difficulty in background noise than would be expected from your audiogram alone. If untreated, the hearing loss is detracting from your quality of life. But it can be helped by the VA, usually at no cost to you.

If you suffered even a mild TBI, you may also have balance disturbance, including an increased risk of falling. The VA is there for you, and audiology is a good entry point. Once you establish eligibility, you can schedule an appointment with audiology without a primary care referral.

Starting here allows the team to identify any hearing or balance issues. It also allows them to make sure you get appropriate treatment and equipment—as well as referrals to other teams, as needed.

As my former VA health technician, a Marine staff sergeant used to say, “We got your six!” **HL**



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He specializes in severe-to-profound hearing loss, including cochlear implants, musicians with hearing loss, and hearing assistive technologies. He's presented at professional and consumer conferences in 48 states and six countries, in both English and ASL. Reach him at bingrao@e-audiology.net.