

Report: Strategies to prevent noise-induced hearing loss, tinnitus in soldiers

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Antioxidants, dietary supplements and high-tech brain imaging are among some of the novel strategies that may help detect, treat and even prevent noise-induced hearing loss and tinnitus among American troops, according to researchers at Henry Ford Hospital.

A culmination of nearly 25 years of research on noise-induced hearing loss – a growing medical issue that affects more than 12 percent of American troops returning from conflicts around the globe – will be presented Sept. 9 at the American Academy of Otolaryngology-Head & Neck Surgery annual meeting in Washington, D.C.

Led by Michael Seidman, M.D., the research team is the first to identify how acoustic trauma from machinery and [explosive devices](#) damages the inner ear cells and breaks down cell growth, much like age-related hearing loss.

"Improvised explosive devices, aircraft and other weaponry being used by the military are frankly deafening our troops," says Dr. Seidman, director of the Division of Otologic/Neurotologic Surgery in the Department of Otolaryngology-Head & Neck Surgery at Henry Ford Hospital.

"Noise-induced hearing loss doesn't just impact a person's ability to hear; it can cause balance issues, make it difficult to sleep and communicate, and even raise the risk for heart disease by increasing a person's blood pressure, lipids and blood sugar."

As part of his presentation, Dr. Seidman will explain how noise-induced hearing loss, as well as tinnitus-related traumatic brain injury, occurs based on research from Wayne State University's Jinsheng Zhang, Ph.D.

Dr. Zhang has developed a model of blast-induced tinnitus and hearing loss using a shock tube that generates a 194 decibel shock wave similar to many of the explosive devices being deployed against troops.

Further, Dr. Seidman will discuss the use of nutraceuticals, such as acetyl-l-carnitine, alpha lipoic acid and resveratrol – a substance found in red wine and red grapes – to mitigate hearing-related issues.

Based on initial results, Dr. Seidman says a nutraceutical with a resveratrol-based component may possibly hold the potential to not only prevent, but reverse hearing loss in certain circumstances for soldiers. This research is based on animal models, but will soon be tested with humans, to see if a pill could soon be developed to prevent acoustic trauma in troops.

In addition, Dr. Seidman will highlight new research on tinnitus, a chronic ringing of the head or ears that affects more than 50 million patients.

A study co-authored by Susan Bowyer, Ph.D., senior bioscientific researcher at Henry Ford Hospital, found that an imaging technique called magnetoencephalography (MEG) can determine the site of perception of tinnitus in the brain, which could in turn allow physicians to target the area with electrical or chemical therapies to lessen symptoms.

Although there is no cure for tinnitus, several interventions are available, including dietary modification, the use of specific herbs and supplements, sound therapies, centrally acting medications and electrical

stimulation of the cochlea and brain using implantable electrodes and an implantable pulse generator.

To date, Dr. Seidman has treated six patients with direct electrical stimulation to the brain, reducing the tinnitus in four of those patients.

In all, the team's work on noise-induced [hearing loss](#) and [tinnitus](#) has led to more than 50 peer-reviewed publications and several patents.

According to Dr. Seidman, more research and funding are needed in order to generate critical data to facilitate an understanding of the damage caused by [acoustic trauma](#) and develop strategies to mitigate that damage.

Provided by Henry Ford Health System

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