Soldiers screened for potential vulnerability to tinnitus

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U.S. ARMY

(PhysOrg.com) -- Hearing loss is common for soldiers coming home from deployments to Iraq and Afghanistan, but another perhaps equally vexing problem is a condition that causes them to hear sound that isn't there.

“Tinnitus is the perception of sound that isn’t really present in the environment. It’s a phantom noise,” says Jay Piccirillo, MD, professor of otolaryngology at Washington University School of Medicine in St. Louis. “Tinnitus has become quite a problem for the military. Improvised explosive devices can cause acoustic trauma, closed-head injury and traumatic brain injury, leading to hearing loss, dizziness and

tinnitus.”

With support from the U.S. Department of Defense, Piccirillo and colleagues at Washington University will use MRI scans to look for preexisting vulnerabilities in the brain’s cortical neural networks that are associated with the development of tinnitus in active-duty military personnel. Researchers hope to identify differences in brain activity that will aid development of preventive strategies to alleviate the effects of tinnitus.

“Through cognitive testing, we’ve known for many years that people with bothersome tinnitus have problems with concentration, memory, attention and other neurocognitive functions,” Piccirillo says.

Piccirillo and his neurobiology colleagues have found evidence that MRI scans of the brains of patients with tinnitus differ in important ways from the brain scans of persons without tinnitus. They found major differences in a variety of neural networks responsible for hearing, vision, sensation and short-term memory, among others.

“It really set the light bulb off for us to see that tinnitus isn’t just the perception of noise; it’s all of these cortical derangements,” Piccirillo says. “It’s almost as if the auditory center has hijacked other parts of the brain, causing it to focus too much on the noise.”

Now researchers wonder if tinnitus patients’ brains behaved abnormally before they began to experience phantom noise.

“We don’t know what these tinnitus patients’ brains looked like before they were tinnitus patients," Piccirillo says. “Were the differences there beforehand? Or are they a result of the tinnitus?”

To help answer that question, Piccirillo and colleagues will perform

brain scans and cognitive tests on 200 soldiers before they are deployed to an active combat zone.

“Before they go, they are healthy soldiers,” Piccirillo says. “But what we know from these wars is that 20 to 40 percent of them come back with a variety of problems, including tinnitus. Within nine months of their return from deployment, we’ll bring them back to do the exact same tests.”

Surprisingly, tinnitus is not always associated with physical injury to the ear or head.

“There are environmental, emotional and psychological triggers that can lead to tinnitus," Piccirillo says. “A person could have an emotional trauma, such as the death of a loved one, and then start experiencing tinnitus. Some people view tinnitus as just one of a spectrum of traumatic stress disorders, which are particularly relevant to active-duty soldiers.”

If they do identify a subset of soldiers who are vulnerable, Piccirillo says it may provide an opportunity to develop therapies that reduce the impact of tinnitus.

For now, there is no active therapy for treating or preventing tinnitus. But according to Piccirillo, cognitive and behavioral therapy can be helpful in redirecting the patient’s attention away from the sound.

Provided by Washington University School of Medicine in St. Louis