



Sounds of Silence

Living with tinnitus can be frustrating—even debilitating.

But with the right treatment, people can learn to tune out the noise.

BY KATE HUVANE GAMBLE

Like most people who have tinnitus, David Keenan, 57, a successful photographer who splits his time between Austin, TX, and New York City, remembers the precise moment he was robbed of silence. About six months after retiring from the software programming job he had held for three decades, Keenan was in the process of selling his home. He remembers sitting in the den of his condominium, when all of a sudden he heard a noise in his head.

“It was like a switch turned on. One minute it wasn’t there, and the next minute it was,” says Keenan. “I locked onto this noise and could not let it go.”

Keenan isn’t alone. According to the American Tinnitus Association, about one in five people experience some form of tinnitus, a condition commonly described as a constant, often high-pitched ringing or buzzing in the ears. (See Resource Central, page 36, for tinnitus resources and organizations.) For those who have never experienced these symptoms, tinnitus may seem like a minor nuisance. But people who live with tinnitus know it can disrupt many different areas of a person’s life, including relationships, work, and overall health. In some cases, it can be debilitating and lead to severe anxiety and depression. When Keenan first began experiencing tinnitus, he became “enormously stressed

out” as a result. “It began a long period of time in which I thought my life as I knew it was over. My anxiety was through the roof, and I had a hard time sleeping or concentrating on anything,” he recalls.

These days, Keenan is able to successfully manage his tinnitus. But reaching that point meant getting to the root of what can be a very complex condition and finding the right course of treatment.

GETTING TO THE ROOT OF TINNITUS

Not technically a disease, tinnitus is rather a symptom of a problem within the auditory system, which includes the ear, the auditory nerve that connects the inner ear to the brain, and the parts of the brain that process sound, according to the National Institute on Deafness and Other Communication Disorders (NIDCD).

Tinnitus can be caused by a number of factors, such as exposure to loud noise, age-related hearing loss, earwax buildup, traumatic brain injury (TBI), inner ear problems, diseases of the heart or blood vessels, and certain neurologic disorders. Sometimes the cause is never determined with certainty.

One of the most common—and preventable—triggers of tinnitus is exposure to loud noise, according to Jennifer Melcher, Ph.D., associate professor at Harvard Medical School and research co-director at the Massachusetts Eye and Ear In-

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firmly Tinnitus Center. Contrary to popular belief, it doesn't have to be a sudden, piercing noise like a loud fire alarm. Tinnitus can occur as the result from an accumulation of everyday activities in loud environments, such as going to loud concerts or mowing the lawn without ear protection.

"Many people are exposed to loud sounds that can cause ear damage," Dr. Melcher says, "but it can be a very hard thing to pin down. You might go through life having various exposures, and then there's one incident where you are exposed to very high-volume sounds, and you get tinnitus that never goes away."

Another common cause is age-related hearing loss, according to neurologist Ronald DeVere, M.D., director of the Taste and Smell Disorder Clinic in Austin, TX, Fellow of the American Academy of Neurology (AAN), and coauthor of *Navigating Smell and Taste Disorders*. As people age, the hair cells in the inner ear can break off, which sends discharges that can be interpreted as ringing. Keenan's doctors suspect this was the cause of his tinnitus.

Tinnitus from earwax buildup can usually be alleviated by cleaning out the ear canal, says Dr. DeVere, who has treated many people with tinnitus.

According to the NIDCD, tinnitus is one of the most common service-related disabilities among veterans returning from Iraq and Afghanistan. In these individuals, tinnitus often results from TBI and/or exposure to loud noise.

For example, an explosion during combat can damage a person's auditory system—including the hair cells in the inner ear—and lead to tinnitus as well as TBI, according to Laura Banks, M.D., a neurologist and co-medical director of the Monterey Neurological Institute in Monterey, CA, and an AAN member.

"We're seeing injuries from blasts where the soldiers were relatively distant—as much as a thousand yards away," says Dr. Banks, who often treats patients with tinnitus resulting from TBI. In many cases, treating the underlying TBI can resolve the symptoms of tinnitus, she adds.

In rare cases, tinnitus can be caused by a tumor on the auditory nerve, which transmits sound information from the inner ear to the brain. This kind of tumor is called an acoustic neuroma. According to Dr. DeVere, they are often small and "benign" (not cancerous), but a benign acoustic neuroma can still cause dizziness and ringing of the ears. "They aren't very common, but we look for those in

anybody who has ringing in the ears and also complains of hearing loss," he notes.

Another relatively rare cause of tinnitus is a blockage in the internal auditory artery, which is the main branch to the inner ear and acoustic nerve. This can be treated with blood thinners, says Dr. DeVere.

A number of neurologic disorders can cause tinnitus, such as Ménière's disease and intracranial hypertension. Ménière's disease is a disorder of the inner ear that can lead to vertigo and hearing loss, according to Dr. Banks. Intracranial hypertension, a disorder characterized by increased pressure around the brain, can cause pulsatile tinnitus. This rare type of tinnitus sounds like a rhythmic pulsing in the ear.

Finally, tinnitus can occur in individuals with MS. They may experience fatigue as well as sensory and vision problems, says Dr. Banks.

SEEKING ANSWERS

Because there are so many different causes of tinnitus, diagnosis can be challenging. For Keenan, trying to find relief was a "wild scramble of desperation," he says. The first doctor he saw told him that nothing could be done to help his condition. It wasn't until he visited a clinic specializing in hearing disorders that he was able to get some answers. At the Callier Center, which is part of the University of Texas Health System near his home in Austin, TX, Keenan underwent a number of hearing evaluations to determine the frequencies at which he experienced hearing loss and get him started on the road to treatment.

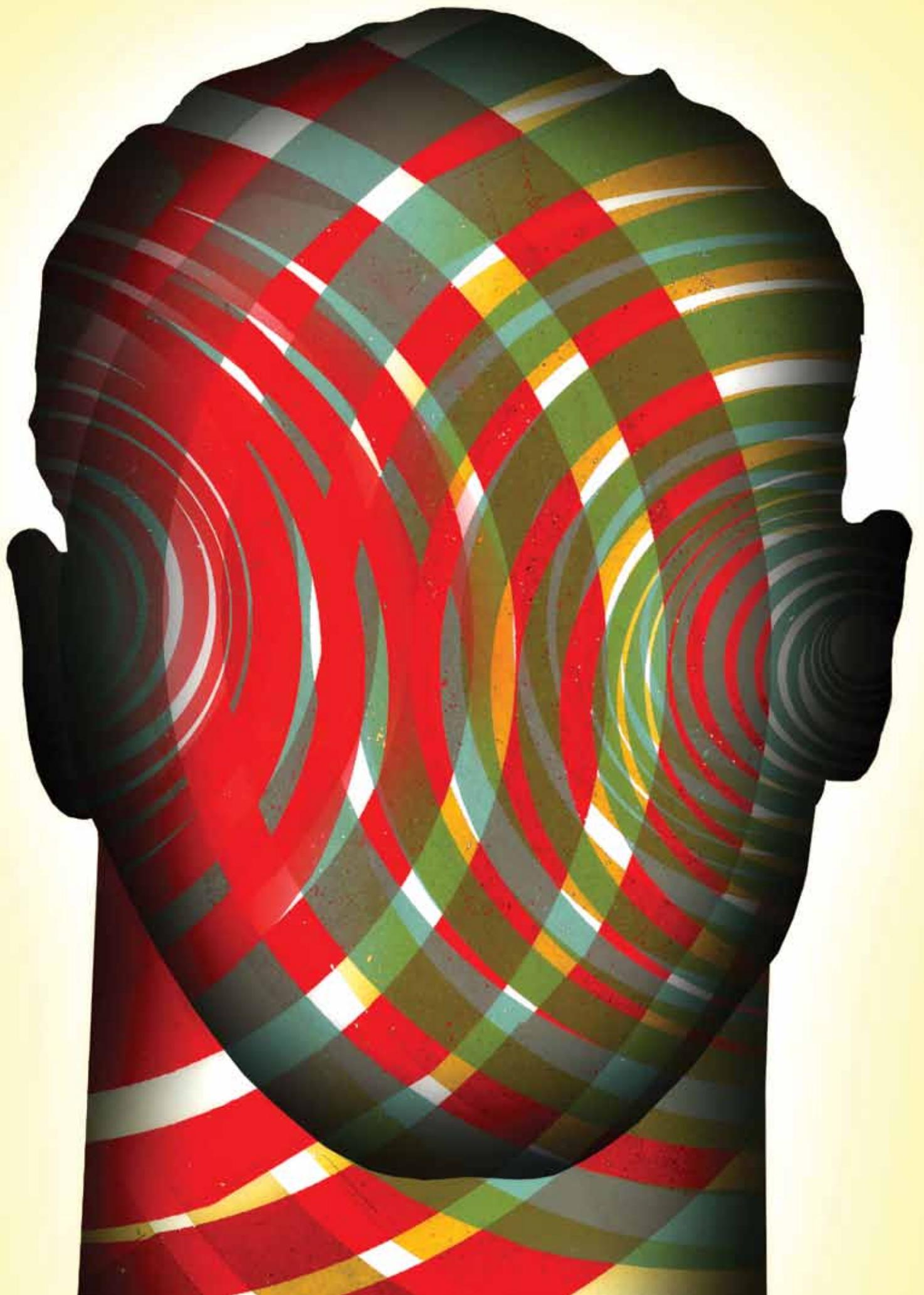
Most people first consult with an ear, nose, and throat (ENT) doctor, as many cases of tinnitus are triggered by hearing loss or wax buildup in the ear, according to Dr. Banks. An ENT will perform a hearing test and look to rule out potentially serious issues such as an acoustic neuroma or aneurysms in the posterior fossa, which is a small space in the lower part of the skull.

Individuals who have tinnitus in only one ear or who experience a significant difference in hearing between the two ears should be checked for an acoustic neuroma or a tumor on the auditory nerve, says Dr. Melcher.

If pulsatile tinnitus is suspected, the person will undergo further evaluation, such as an MRI or CT scan. Pulsatile tinnitus can be caused by intracranial hypertension, narrowed arteries in the neck, or altered blood flow near the ear. It is also associated with certain kinds of tumors on

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the jugular vein. In rare cases, pulsatile tinnitus can be caused by brain tumors or abnormalities in brain structure, which can be diagnosed by a neuro-otologist or a neuro-oncologist in conjunction with a neuroradiologist.

MANAGING CHRONIC TINNITUS

One of the biggest challenges in managing tinnitus—for both patients and physicians—is the fact that there is no “gold standard” when it comes to treatment, according to Dr. Melcher. “There’s nothing out there that says if a person walks into a clinic with subjective chronic tinnitus [meaning that he or she has experienced tinnitus for a prolonged period of time], these are the guidelines to follow,” she says.

Many of the treatments used to manage tinnitus, however, do revolve around a similar concept: the combination of sound therapy and counseling to help individuals alter their reaction to noises and change their perception so that they no longer notice it. For example, in tinnitus retraining therapy, patients work with psychologists or audiologists to learn how to cope with their tinnitus and incorporate devices such as noise generators to help mask the sounds. These programs, however, often are not covered by insurance and can be costly.

Keenan underwent a form of tinnitus retraining therapy called neuromonics. This desensitization procedure uses a small device resembling an MP3 player to deliver sound to the ear that can help mask the tinnitus—at least partially—and lessen one’s awareness of tinnitus over time (usually months or years). At this point, though, limited data is available on the effectiveness or safety of neuromonics, and it is usually not covered by insurance.

Hearing aid devices may also be used as part of tinnitus therapy. In people who have age-related hearing loss, advanced hearing aids can serve dual purposes by combining a hearing aid with a “tinnitus sound generator” to help reduce the prominence of the tinnitus. Some studies suggest that these combination hearing aids can improve hearing and lessen the symptoms of tinnitus. Many insurance companies cover at least a portion of the cost of hearing aids.

Other treatments that may be recommended include the following:

- ▶ Medications including anti-anxiety drugs and antidepressants, which are prescribed to treat the depression and anxiety associated with tinnitus.

- ▶ Lifestyle changes such as avoiding irritants (including loud noises, caffeine, and nicotine), managing stress, reducing alcohol intake, and using a fan or soft music to help mask the noise from tinnitus.
- ▶ Cochlear implants that use electrical stimulation to help mask and suppress the sounds associated with tinnitus.

Treatments that have not been investigated extensively in patients with tinnitus or are used in rare cases include:

- ▶ Deep brain stimulation, which may work to calm the neural networks involved in tinnitus.
- ▶ Transcranial magnetic stimulation, a technique that uses a small device placed on the scalp to generate short magnetic pulses to reduce the symptoms of tinnitus.
- ▶ Vagus nerve stimulation, which in animal studies has been shown to restore the activity of neurons to normal and reduce symptoms.

“There are a lot of things in the mix,” says Dr. Melcher, “Many different aspects of the condition are being studied, and there are a lot of possibilities in terms of treatment now.”

FINDING THE RIGHT COMBINATION

The combination of sound therapy and counseling has been successful for many people. For Keenan, self-help tapes along with neuromonics enabled him to tune out the noises that had been causing him so much frustration. Keenan’s neuromonics treatment was supervised by an audiologist.

“The noise hasn’t changed, as far as I can tell,” he says. “But I got used to it.” Over a period of a year and a half, Keenan was able to retrain his brain to ignore the sound and accept it as background noise. He has been able to successfully tune out the sounds of tinnitus for the past three years. “My brain learned that the noise is not important and that it poses no threat, and therefore I was able to tune it out,” he says.

Another factor that played a key role in Keenan’s road to recovery was a psychiatrist’s prescription for an antidepressant. Within a month, he noticed a significant improvement.

“When I was in my really anxious state, my brain perceived the noise as a very serious threat. I thought it was going to ruin my life,” says Keenan. But after starting his

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treatment, he found that the noise no longer triggered anxiety and fear. “I can recognize that the noise is there, and I can even listen to it a little bit, but I know now that my brain will move on to something else fairly quickly.”

Dr. Melcher believes a holistic approach that addresses any underlying psychological, social, and neurologic issues—along with the sound itself—can lead to a better understanding of what is causing a person’s tinnitus and therefore help map out an effective treatment strategy. She believes that incorporating changes to improve quality of life as well as treating the root causes of tinnitus “are an important part of the equation.”

Through the efforts of professional associations and research organizations, researchers have been able to develop a more thorough understanding of why tinnitus occurs and how it can be better managed. For patients, that means instead of being told to simply grin and bear a potentially debilitating condition, there is hope that it can be successfully managed and, as in Keenan’s case, tuned out. 

Tinnitus: The Basics

- ▶ Tinnitus is characterized by a ringing in the ears that can also sound like buzzing, roaring, or clicking. It may be a sound that starts and stops or a continuous sound, and its intensity can range from soft to loud.
- ▶ It is estimated that as many as 36 million Americans experience tinnitus.
- ▶ Tinnitus itself is not a disease but rather a symptom of a problem with the auditory system.
- ▶ The condition can be caused by a number of factors, including exposure to loud noise, earwax build-up, inner ear diseases, age-related hearing loss, neurologic disorders, or traumatic brain injury. In rare cases, it can result from diseases of the heart and blood vessels.
- ▶ Although there is no cure, tinnitus can be managed with a number of therapies, including tinnitus retraining therapy, hearing aids and other devices, medications, lifestyle changes, and counseling that focuses on treating a person’s emotional reaction to the tinnitus rather than the tinnitus itself.
- ▶ Living with tinnitus can be extremely frustrating, but it is important for those who have it to remember that they are not alone and support is available.



What Treatments Are Most Effective for Transverse Myelitis?

What are the causes of transverse myelitis?

Are there therapies available that bring relief?

Learn what neurologists recommend.

The American Academy of Neurology has published **Clinical Evaluation and Treatment of Transverse Myelitis** which assesses the best available methods to evaluate and treat this disorder involving the spinal cord.

Go online to ▶ www.aan.com/guidelines

to read the summary or the complete guideline.

American Academy of Neurology practice guidelines examine medical evidence on how to best diagnose and treat neurologic disorders. Use these guidelines and patient/family summaries to learn more about:

- Brain injury
- Child neurology
- Dementia
- Movement disorders
- Epilepsy
- Headache and migraine
- Multiple sclerosis
- Neuromuscular disorders
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