2021 | @HEARINGASSESSMENTCENTER

TINNITUS

Official Publication of Hearing Assessment Center

WHAT'S INSIDE THIS ISSUE:

What is tinnitus? Do you have tinnitus? Why does it happen? When you should be concerned?

HAC
HEARING ASSESSMENT CENTER

TINNITUS

by Dr. Donald Guillen

There are currently an estimated 48 million Americans living with hearing loss today. Most of these 48 million are of the baby boomer generation. Moreover, a staggering 10,000 baby boomers retire each day and an estimated 1 in 6 of these individuals have hearing loss. With this in mind, one of the most common symptoms of hearing loss is tinnitus.

Tinnitus, put simply, can be defined as the perceived sensation of sound (e.g., ringing, buzzing, etc.) in the absence of a physical sound or external acoustic stimulus. That is, you perceive a sound that is not actually there. Most patients describe the sound as being “in their head."

A very common question I get from patients suffering from tinnitus is: Why do I have tinnitus? Most are concerned that something serious is happening to them and, while tinnitus is a serious condition, for almost all, it is not related to a life-threatening circumstance. There are many etiologies to navigate through and sometimes the exact etiology of tinnitus will remain unknown. The most common causes, however, are noise exposure and hearing loss.

HAC
HEARING ASSESSMENT CENTER

TINNITUS

With so many Americans dealing with hearing loss and subsequently, tinnitus, it is important to understand the many reasons tinnitus may suddenly appear and what treatment options exist to help cope with this condition. This report will serve as an instructional guide for patients to make sense of the complex world of tinnitus.

32% of US population suffers from some form of tinnitus. In the hearing impaired, this percentage shoots up to as high as 85%!*

When consulting with a hearing healthcare provider and describing tinnitus as an otologic symptom, you may be prompted with what seem to be very specific questions. The reason for this is that there can be serious etiologies associated with tinnitus perception, but there can also be very benign and mostly harmless reasons as to why you are experiencing this complex symptom. Answering these questions as accurately and specifically as possible allows your provider to determine appropriate course of treatment.

HAC
HEARING ASSESSMENT CENTER

Let's delve into some of the more common questions you may need to be prepared to answer during your tinnitus consultation:

How long have you been perceiving the tinnitus for?

- Did it appear abruptly (sudden onset) and strongly or has it been progressive and (slower/gradual onset) worsening over the course of many years.

Can you describe the type of ringing?

- Is it pulsatile (pulsing) or steady/constant?
- Do you hear one or multiple sounds?

How are you sleeping?

- Is the tinnitus keeping you up at night?
- Is it preventing you from being able to fall asleep or stay asleep?

Do you have a history of Temporomandibular Joint Dysfunction (TMJ)?

If yes, do you wear a mouthguard?

- Have you seen a dentist recently to ensure the mouthguard is working properly?
- Have you experienced jaw tightness or tenderness over the past weeks?
- If no, have you ever had your dentition evaluate for TMJ?

- Do you have a history of cerumen impaction or ear wax build up?
- Do you have a history of head or neck trauma (traumatic brain injury)?
- History of pain syndromes, neurological disease, or autoimmune issues such as Lyme's disease?

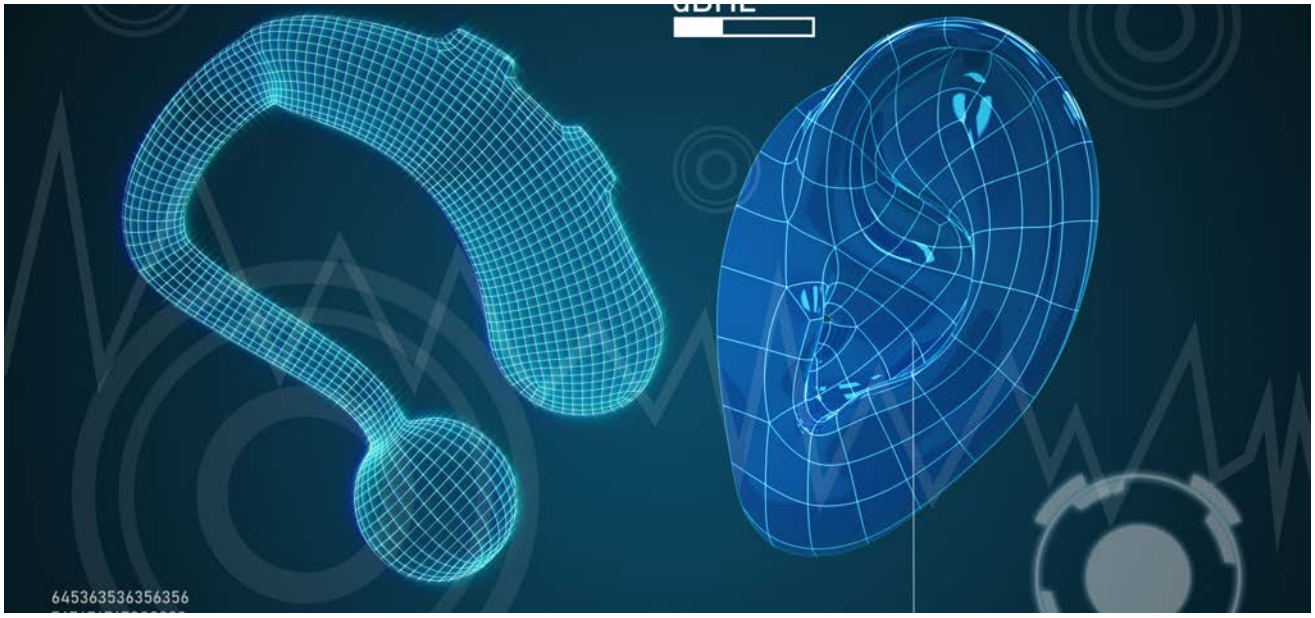
HAC
HEARING ASSESSMENT CENTER

Have there been any recent changes to your medications?

- Do these medications include aspirin, blood thinners, or NSAIDs?
- Recent need for chemotherapy agents due to cancer diagnosis?

- Have you had any recent or long-term exposure to loud noises, blasts, or concerts?
- Do you have a history of depression, anxiety, or any other related psychological diagnosis? Are you undergoing treatment?
- Are you having any other symptoms of the ears such as ear pressure, ear pain/discomfort, balance/vertigo issues, or hearing difficulties?

These are just a few of the questions you need to be prepared to answer in our office. Tinnitus can have a single cause, but often it can be related to a myriad of factors. By identifying these things and also in performing comprehensive and detailed testing in our office, the likely origin/etiology of the tinnitus can be ascertained. Once suspected etiology is ascertained, a course of treatment can be developed, and with this a more defined prognosis can be given.



HAC
HEARING ASSESSMENT CENTER

How Will You Evaluate My Tinnitus?

There are essentially four steps to evaluating tinnitus. The **first step** involves an in-depth case history as was mentioned in the previous section. Following the case history, an assessment of the tinnitus severity is necessary.

During this **second step,** a patient will be presented with various questionnaires, inventories, and other forms. In our office we utilize both the Tinnitus Handicap Inventory (Newman et al., 1996) and the Tinnitus Functional Index (Henry et al., 2014) to determine perceived handicap related to tinnitus. This step is crucial and is helpful in determining what the course of action will be.

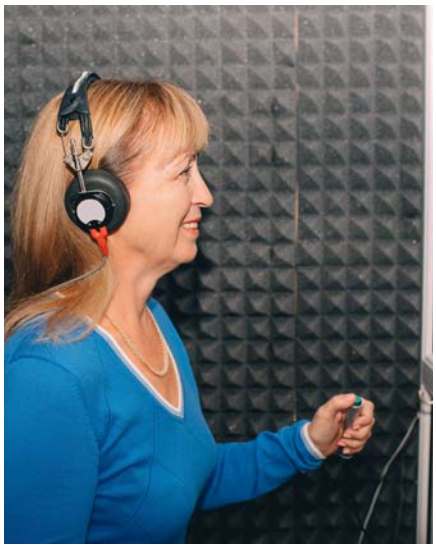
The **third step** involves physical examination of the ear (otoscopic evaluation), as well as visual inspection and screening of the head, jaw, and neck area.

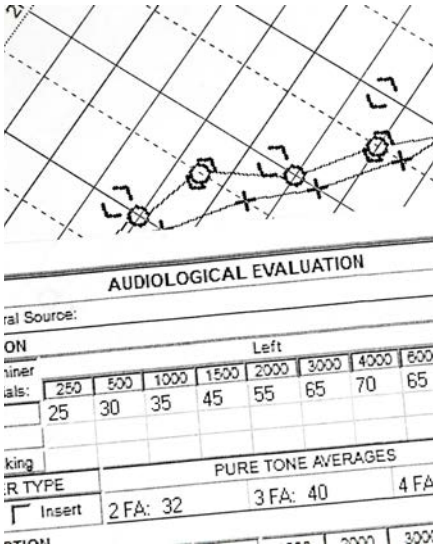
Fourth and lastly, thorough testing is performed in a calibrated and sound-treated booth. These tests are split into two separate types: (1) audiological testing, and (2) psychoacoustic measures. Audiological testing comprises pure-tone audiometry (tone testing), speech audiometry, acoustic immittance measures (middle ear function test), and otoacoustic emissions testing (cochlear function test). This testing helps to determine if there is a physical hearing loss that exists, and if so, what type of hearing loss.

Psychoacoustic measures are split into four separate measurements of tinnitus characteristics. With this, the hope is to more accurately define and understand your tinnitus. These measures help to determine: (1) pitch, (2) loudness, (3) maskability, and (4) residual inhibition. Acquiring these measurements allows your hearing healthcare provider to determine appropriate and corresponding therapeutic effects from treatment. The next section will review and highlight treatment options available for treating your tinnitus.

HOW WILL MY TINNITUS BE TREATED?

It is essential to understand that there is not a set standard of care for patients with tinnitus. That's right, each patient with tinnitus requires specific care according to their own tinnitus characteristics and likely cause of origin. With this in mind, there are, however, certain management guidelines that can be undertaken. Clinically, tinnitus patients can traditionally be split into two groups. The first group, which composes approximately 80% of tinnitus sufferers, are patients who have learned to cope with the condition and don't feel it hampers their overall day to day functioning. The second group is composed of individuals with very severe and chronic forms of tinnitus perception that require significant follow up, care, and management. These individuals compose about a fifth of all tinnitus patients. Those in the larger group see benefit from one or a combination of traditional amplification, counseling, or white noise generator use. These are generally effective at lessening tinnitus symptoms. Because tinnitus is a primary symptom of hearing loss, it is imperative to treat this deficit first before proceeding with any other options focusing on the tinnitus.





HAC
HEARING ASSESSMENT CENTER

WHY IS MY TINNITUS HAPPENING?

At the most fundamental level, tinnitus is understood to occur due to physiological changes at the level of the cochlea. Within this organ, you have sensory nerve endings that are extremely sensitive to changes in the body. Many theories exist, but the most common belief is that tinnitus is your brain's response to making sense of damage that occurs at these nerve endings (cortical rearrangement). These nerve endings become structurally weakened or completely atrophied.

In the process, the brain tries to reorganize and thus perceives a sound where there actually isn't one. This process has been equated in principle to phantom limb syndrome found in individuals with amputations who still experience sensations (e.g., pain, temperature sensitivities) in a limb that does not exist.

The more hearing loss that develops, typically the more these sensory nerve endings atrophy. Thus, this leads to a continued sensory deprivation effect over time. As more hearing loss develops, the more your perception of the tinnitus increases, since in theory your brain's rearrangement response continues.

HAC
HEARING ASSESSMENT CENTER

Although most tinnitus is related to physiological changes in the ears, there can be many other reasons or external factors that can cause, trigger, or exacerbate this condition. These include and are not limited to:

- Sudden sensorineural hearing loss
- Noise/acoustic trauma
- Presbycusis or age-related hearing loss
- Ear toxic (ototoxic) drugs, increase in dosage or sudden changes to medications:
  - NSAIDs including aspirin
  - Loop diuretics
  - Aminoglycoside class antibiotics
  - Chemotherapy agents
- Auditory nerve lesions or growths can result in abnormal neuronal activity in central auditory pathways that can be perceived as tinnitus
- Chronic Temporomandibular Joint Dysfunction (TMJ)
- Head and neck injuries
- Meniere's Disease
- Emotional trauma and/or stress
- Autoimmune disorders
- Vitamin deficiency
- High caffeine intake
- Vascular abnormalities (arteriovenous malformation, carotid stenosis or dissections, increased blood flow)
- Stress
- Excessive recreational drug and alcohol use
- Etiology can be idiopathic (unknown)

HAC
HEARING ASSESSMENT CENTER

WHY IS TINNITUS LINKED TO HEARING LOSS?

The easiest way to answer this question is two words: **sensory deprivation**. Again, tinnitus results from physiological changes at the level of cochlear nerve endings. These changes lead to decreased neural activation. Decreased neural activation is something even individuals with normal hearing sensitivity can experience. For example, ever notice that when in a quiet room, you may begin to perceive ringing or buzzing in your ears, but that as soon as either a fan, vent or machine turns on, these sounds suddenly disappear? This is because for a moment's time you are actually receiving decreased auditory stimulation, so much so that your brain is trying to make sense of this drastic change in input. Hearing loss works in this same exact way, with hearing loss your world gets quieter and darker, due to the decreased amount of input.

Another useful example on the importance of treating hearing loss when tinnitus exists is a visual one, that utilizes a lit candle in a dark room as shown in the picture below:

HAC
HEARING ASSESSMENT CENTER

Imagine that the wick of this lit candle represents your tinnitus perception. On the other hand, the amount of naturally occurring light or darkness surrounding the candle represents your overall hearing ability.

The darker the room (more hearing loss), the less natural light surrounding the wick of the candle (decreased stimulation), and subsequently your visual perception of the wick is very high (higher tinnitus perception). On the contrary, if the light was turned on in this room (restored hearing levels), the darkness surrounding the candle would cease to exist and your visual perception of the wick would go down substantially (lower tinnitus perception). This is because there would be more visual stimulation overall. In summary, the easiest and quickest way to find relief from tinnitus is by addressing any hearing deficits that exist because of how interconnected hearing loss, tinnitus perception, and auditory stimulation are.

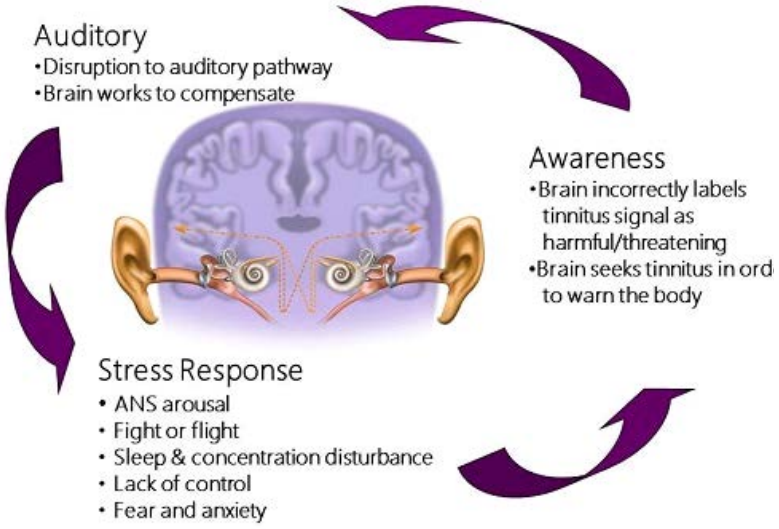
WHEN DOES TINNITUS BECOME A CONCERN?

As mentioned before, for about 80% of individuals, tinnitus perception although annoying and bothersome, does not inhibit their overall day to day functioning. However, for the remaining 20% this is not the case. For this group there is typically a pronounced emotional response to the tinnitus. A large systematic review by Goecze et al. (2013), investigated the association between depression and tinnitus. Researchers found that over half of patients with depression present with some form of tinnitus!

HAC
HEARING ASSESSMENT CENTER

It may be time to seek further assistance and help from a tinnitus specialist if you or a loved one is dealing with tinnitus and subsequently dealing with any of the following conditions listed below:

- Depression
- Anxiety
- Irritability
- Fatigue
- Chronic stress
- Insomnia
- Concentration difficulties
- Memory impairment
- Suicidal ideations



Scheduling a thorough tinnitus consultation with a specialist is important not only for identifying the likely origin of your tinnitus, but also for managing it through available therapies. These include tinnitus retraining therapy (TRT), cognitive behavioral therapy (CBT), pharmacological intervention, sound therapy and patient education. Most often, intervention across various healthcare disciplines (e.g., neurology, psychiatry, psychology, or otology) is required. Nonetheless, treatment is specific to each patient's needs and therefore requires custom care. The underlying goal should be to steer the patient from having an emotional and psychological response to the tinnitus (refer to figure above to understand this relationship) and in doing so, allowing the patient to resume daily functions with minimal tinnitus handicap.

HAC
HEARING ASSESSMENT CENTER

Summary

In short, tinnitus is typically a symptom of hearing loss that affects millions of people every single day. There can be many reasons as to why this condition presents itself. For most, it is relatively simple to manage, especially if and when an existing hearing loss is treated. For others, tinnitus perception can be a complex symptom that necessitates specialized treatment, testing, and follow-up care. No matter where you are with your tinnitus, the first important step is to visit an audiologist for comprehensive audiological testing.

References

Langguth, B., Kreuzer, P. M., Kleinjung, T., & De Ridder, D. (2013). Tinnitus: causes and clinical management. The Lancet Neurology, 12(9), 920–930. https://doi-org.proxy-tu.researchport.umd.edu/10.1016/S1474-4422(13)70160-1

March, P., & Schub, T. (2018). Tinnitus and Retraining Therapy. CINAHL Nursing Guide. Retrieved from http://search.ebscohost.com/login.aspx?Direct=true&db=nrc&AN=T702368&site=eds-live&scope=site

Myers, P. J., Griest, S., Kaelin, C., Legro, M. W., Schmidt, C. J., Zaugg, T. L., & Henry, J. A. (2014). Development of a progressive audiologic tinnitus management program for Veterans with tinnitus. Journal of Rehabilitation Research & Development, 51(4), 609–621. Retrieved from http://search.ebscohost.com.proxy-tu.researchport.umd.edu/login.aspx?direct=true&db=s3h&AN=97366996&site=eds-live&scope=site

HEARING ASSESSMENT CENTER

Visit our website for more information and E-books about hearing loss and Dementia.

WWW.HEARINGASSESSMENT.COM