TINNITUS AND YOU

Learn more about this complex condition, explore tinnitus management options and identify a solution that's right for you.

OTOHARMONICS® CORPORATION

last

TINNITUS

Pronunciations. [tin–NIGHT–us *or* TIN–it–us]
You can say it either way.

Origin. Latin *tinnire,* meaning "to ring."

Definition. Sometimes called an auditory hallucination, tinnitus is the perception of a sound within one or both ears when no actual sound is present.

Types. *Subjective Tinnitus* > Sounds that are perceived only by the affected person and cannot be heard by others. This is the most common type of tinnitus.

Objective Tinnitus > Sounds that can be heard by both the affected person as well as others. This type of tinnitus is rare and may be an indication of a more serious medical condition.

It's common.

Tinnitus affects one in five people.
It is the leading service–connected disability for veterans.

It's misunderstood.

You're not crazy! Tinnitus is real. The good news, is that it's also manageable.

It's complex.

Tinnitus is not a disease or an illness – it's a condition caused by a combination of inner ear damage and the brain's inability to process sound correctly. It occurs because of a mental or physical change that's not necessarily related to hearing.

It impacts daily life.

It's not unusual for people with tinnitus to experience:

stress	memory problems	distraction	irritability
depression	insomnia or other sleep problems	agitation	anxiety

It's personal.

In the same way that no two people have identical fingerprints, no two people have the same tinnitus 'sound print.'

Your sound could be any one, or a combination, of these noises:

beeping	crickets	locusts	roaring	ticking	whining
buzzing	hissing	pure tone	sizzling	tree frogs	whistling
clicking	humming	ringing	songs	tunes	whooshing

It has many causes.

Your tinnitus may be due to:

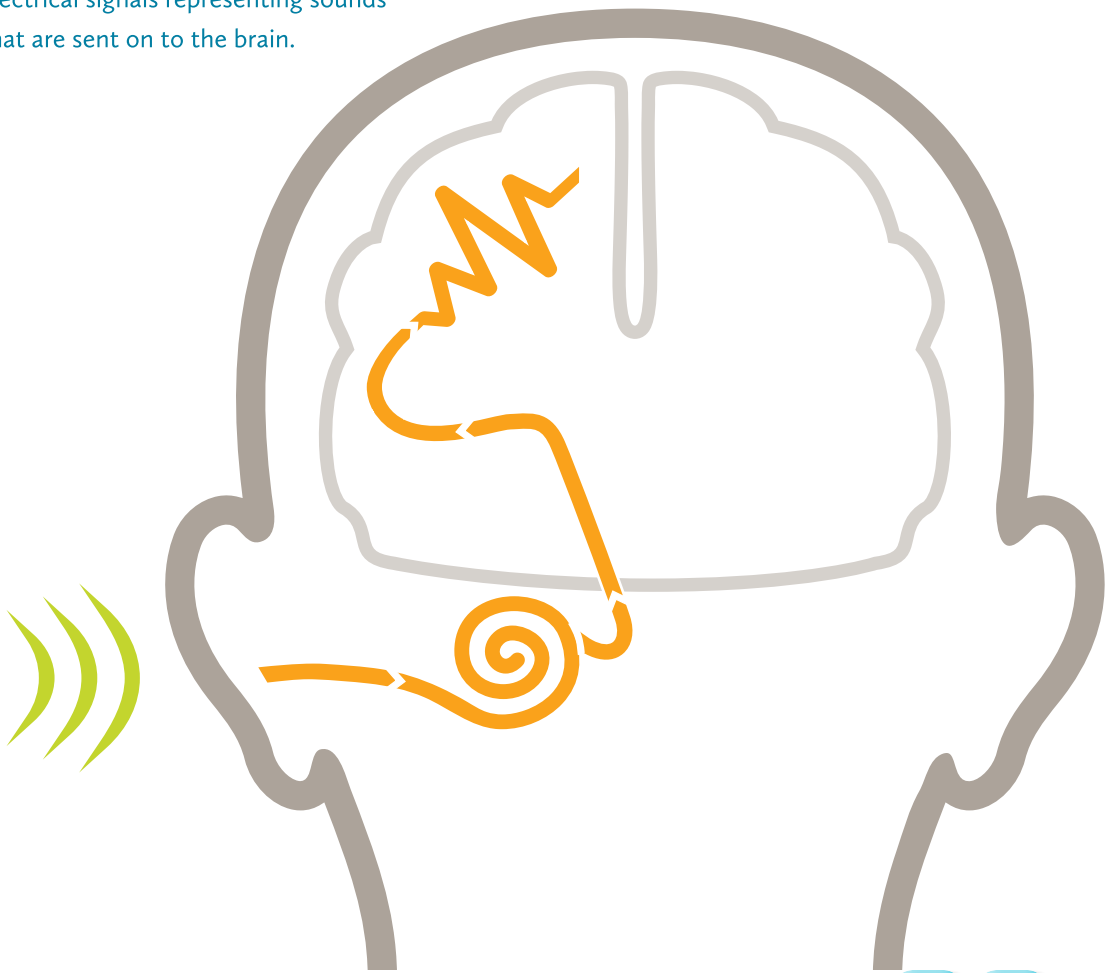
exposure to loud noise	certain medications	cardiovascular disease
head or neck injury	earwax buildup	various neurologic and metabolic disorders (rare)
hearing loss	jaw, or TMJ, conditions	certain types of tumors (rare)

It's manageable.

"Learn to live with it" is not an acceptable solution for your tinnitus. Therapy options do exist and can be tailored to meet your needs as an individual. A consultation with your primary healthcare provider is recommended to rule out a more serious medical condition.

THE HEARING PATHWAY

Sound waves move through the air into the outer ear, through the mechanical middle ear and into the fluid–filled cochlea. Thousands of hair cells line the cochlea and are activated in the presence of sound. The individual hair cells are tuned to specific pitches, also called frequencies. The hair cells create electrical signals representing sounds that are sent on to the brain.



1. *Auditory Nerve*

   The superhighway of sound, the auditory nerve carries frequencies from the cochlea through multiple areas in the brain.

2. *Brainstem*

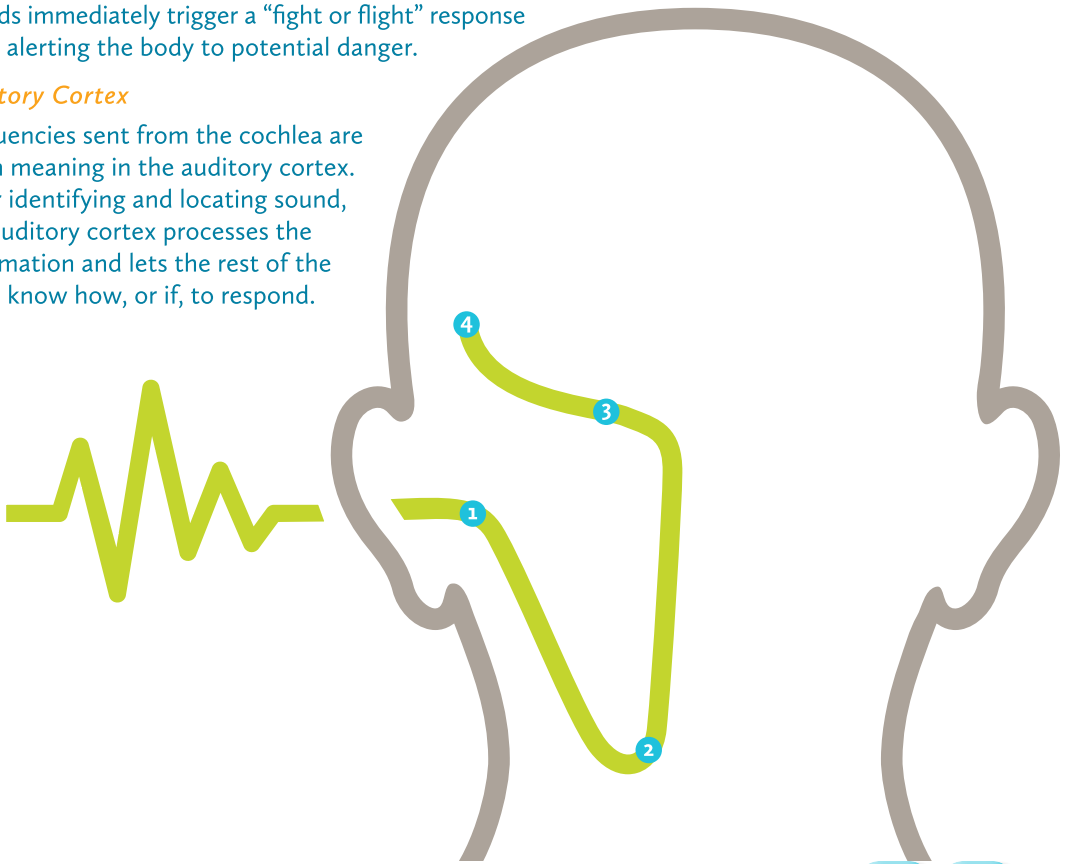
   Acting as a traffic director, the brainstem sorts through millions of messages sent between the body and the brain.

3. *Limbic System*

   Sound is prioritized and sent on to the other parts of the brain through the limbic system, where emotions and memories begin to form. Threatening sounds immediately trigger a "fight or flight" response here, alerting the body to potential danger.

4. *Auditory Cortex*

   Frequencies sent from the cochlea are given meaning in the auditory cortex. After identifying and locating sound, the auditory cortex processes the information and lets the rest of the brain know how, or if, to respond.



Learning and Adapting

From memorizing a few new facts to recovering from an injury or illness, the brain has the remarkable ability to learn from experience, adapt and change. This is called neuroplasticity.

Neuroplasticity refers to the brain's capacity to create new neural pathways and to reorganize existing ones. These pathways connect different parts of the brain to each other. This process occurs continuously throughout life and allows for learning, memory formation, healthy development and healing after brain damage.

The brain also has the ability to learn to ignore sensory signals over time. Everyday things like wearing glasses and socks or hearing neighborhood noises like trains and traffic become easy to tune out. The ability to filter out these signals is called habituation.

While tinnitus is perceived in the ear, it actually occurs as a result of false signaling in the brain. The good news is that the brain has a profound ability to learn and create new signals. Utilizing that ability is key to tinnitus management.

Tinnitus is most commonly caused by physical changes within the cochlea. When hair cells in the cochlea are damaged, the volume and frequency of sounds are harder to recognize, causing delivery of incomplete information to the brain.

When this happens, the brain tries to compensate for the loss and fills in the gap with new information in order to deliver a complete message. Unfortunately, like using autocorrect on a computer or cell phone, the message isn't always sent as intended. Sometimes the misinformation can trigger an internal alarm, causing the fight or flight response to kick in. For many, this is experienced as tinnitus.

Tinnitus can also occur when there is no damage to the cochlea. It can happen following a traumatic brain injury or an emotionally stressful event, during or after an illness, from growths on the auditory nerve, or sometimes for no apparent reason at all. The brain creates the sound and then reacts to it negatively, leading to the perception of tinnitus.

IT CAN TAKE TIME TO SEE RELIEF FROM TINNITUS. SOMETIMES PEOPLE MUST TRY MULTIPLE OPTIONS BEFORE LANDING ON SOMETHING THAT WORKS.

LIFESTYLE CONSIDERATIONS

Diet
Exercise
Stress
Medication
Noise exposure
Stimulants – nicotine, caffeine...
Depressants – alcohol, marijuana...

BEHAVIORAL AND EMOTIONAL APPROACHES

Cognitive Behavioral Therapy (CBT) – A structured counseling technique that works to change the emotional response to tinnitus by identifying, then altering negative thoughts and behaviors related to the tinnitus sound.

Mindfulness Therapy – A counseling method that builds on CBT. Rather than analyzing or manipulating thoughts and feelings, patients are encouraged to be aware of and accept them as they are.

Tinnitus Retraining Therapy (TRT) – A combination of counseling and sound therapy that helps patients to lower the awareness of their tinnitus.

Progressive Tinnitus Management (PTM) – A program developed with veterans in mind that offers a range of care options from self–help to intensive one–on–one therapy.

SOUND–BASED TECHNIQUES

Hearing Aid – A sound amplification device that can also provide relief for some hard of hearing tinnitus patients.

Cochlear Implant – A surgically implanted device that can provide a sense of sound to people who are profoundly deaf or severely hard of hearing. It may also provide relief for tinnitus patients.

Masking – Use of sound, such as music or white noise, to drown out tinnitus.

Neuroscience–Based Sound Therapy – Leverages the brain's ability to diminish the effects of tinnitus through neuroplasticity and habituation.

ALTERNATIVE APPROACHES

Acupuncture

Hypnosis

Herbal Remedies

Vitamins

TINNITUS RELIEF THROUGH SOUND STIMULATION™

TINNITUS MANAGEMENT USING THE LEVO SYSTEM

Neuroscience–based therapy.

Leveraging the cognitive abilities of the brain, Levo relieves the symptoms of tinnitus through the process of neural habituation.

Your personal sound print.

Like no two fingerprints are the same, no two people have the same tinnitus sound. Use the Levo System to identify, map and create your unique sound print.

Therapy during sleep.

By listening to your sound print nightly while sleeping, your brain naturally learns to ignore the perceived sound of tinnitus, diminishing its impact over time.

TINNITUS RELIEF THROUGH SOUND STIMULATION™

levo® SYSTEM

YOUR UNIQUE SOUND. YOUR UNIQUE THERAPY.™

Take control of tinnitus.

Therapy while asleep is convenient, efficient, and frees up your wakeful hours.

A quality experience.

Your system includes an Apple® iPod touch® mobile digital device, Levo software and custom ear buds designed to provide optimal fit, maximum comfort and superior sound delivery.

Measure progress.

With a proprietary method to track and measure tinnitus sound therapy, follow your progress over time and share the results with others.

TINNITUS TERMS

Habituation – The brain's ability to learn to ignore something it's experienced too often.

Levo® System – A neuroscience–based therapy that leverages the brain's natural abilities to diminish the effects of tinnitus.

Neuroplasticity – The brain's capacity to create new neural pathways and to reorganize existing ones. It allows for learning, memory formation, healthy development, and healing after brain damage.

Objective Tinnitus – Sounds that can be heard by both the affected person as well as others. This type of tinnitus is rare and may be an indication of a more serious medical condition.

Sound Print – Like a finger print, a precise replica of a person's unique tinnitus sound.

Subjective Tinnitus – Sounds that are perceived only by the affected person and cannot be heard by others. This is the most common type of tinnitus.

Tinnitus – Sometimes called an auditory hallucination, tinnitus is the perception of a sound within one or both ears when no actual sound is present.

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