

Tinnitus

The presence of tinnitus is a very common and annoying occurrence. It may be intermittent or constant in character, mild or severe in intensity, and vary from a low roar to a high-pitched type of sound. It may be subjective (audible only to the patient) or objective (audible to others). It may or may not be associated with hearing impairment.

Tinnitus must always be thought of as a symptom and not a disease, just as pain in the arm or leg is a symptom and not a disease. Most often, disorders of the inner ear are to blame. Some of the hair cells, which convert sound into nerve impulses, may be damaged, resulting in a faulty connection between the inner ear and the hearing nerve. The resulting tinnitus may be compared to the static or hum heard when a radio is mistuned or has a damaged component. If some of the hair cells are actually destroyed, this can also result in tinnitus, since the fibers of the hearing nerve may continue to discharge spontaneously and cause a sound to be heard. This may be compared to the "phantom limb" sensation reported by amputees: they may report itching, pain and other sensations felt in the missing limb.

There are innumerable causes of tinnitus, just as there are many causes of pain. Tinnitus may or may not be accompanied by a hearing impairment. Your Audiologist or Otolaryngologist can tell you if you have a hearing loss. A description of hearing tests (audiograms) can be found elsewhere.

Types of Tinnitus:

External Ear Tinnitus:

Obstruction of the external ear canal, such as wax, foreign bodies, and swelling may produce eardrum pressure which is transmitted across the middle ear to the inner ear and hearing nerve, where it is interpreted as noise. Dilated or constricted blood vessels in the skin of the ear canal or eardrum may

produce a pulsating type of hearing nerve irritation.

Middle Ear Tinnitus:

Any disturbance in the functioning of the middle ear mechanism may result in head noise. Such conditions include swelling of the lining membranes of the middle ear due to allergy, infection, injury, and vascular abnormalities. Fluid from allergy, infection, or eustachian tube obstruction may accumulate in the middle ear chamber with resultant disturbing sensations being relayed to the inner ear and the auditory nerve pathways.

Conditions which produce partial or complete immobility of the ossicular chain (the middle ear bones), such as infection, injury, arthritis and otosclerosis (as hereditary type of hearing loss) may also cause tinnitus.

The most likely explanation of the tinnitus accompanying middle ear disorders is that the outside sounds are prevented from entering the inner ear (this is a "conductive" hearing loss), yet the inner ear itself remains very sensitive to internal "body sounds".

Everyone has experienced the sensation of fullness in the ear due to altitude changes. This pressure sensation is due to a temporary obstruction of the eustachian tube. Such obstruction may be the result of infection, allergic swelling or blockage of the tubal opening in the back of the nasal cavity from a variety of causes. This imbalance of pressure between the middle ear chamber and the external atmosphere may be transmitted to the inner ear as irritative stimuli to the auditory nerve pathways.

Inner Ear Tinnitus:

The hair cells of the inner ear are the most delicate structures of the hearing mechanism. The tiny cells which serve to transform fluid waves into nerve impulses are analogous to the cells of the retina of the eye which transform light waves onto nerve impulses, or the electrical transducers. The slightest swelling or interference with these delicate cells from any cause readily produces impairment of function and irritation. this may occur

from a variety of causes, such as local infection, hereditary degeneration, systemic disease with resultant toxic effects, sudden exposure to a blast intensity of sound, prolonged exposure to high sound levels in susceptible persons, certain drugs to which the patient may be sensitive, aging, or minute changes in the blood supply with resultant changes in nutrition (most often develops in older persons when the thread-like blood vessels near the inner ear begin to harden and thicken). In addition, any condition which disturbs the fluid pressure in the inner ear capsule may produce head noises.

Nerve Pathway Tinnitus:

Pressure changes may produce swelling both from outside and from within the hearing nerve as it traverses the bony canal leading to the brain. In these instances, the tinnitus occurs on one side of the head. Because the bony canal cannot expand very much, this pressure may also disturb the balance and the facial nerve as they pass through the canal.

Rupture or spasm of one of the small blood vessels occurring anywhere in the auditory pathway produces interference with circulation. Consequently, sudden tinnitus, with or without partial or total hearing function, may occur. If the blood clot is small it may be absorbed with little or no permanent changes. This condition, like the pressure phenomenon, occurs only on one side and doesn't mean it would occur again, either on the same or the opposite side.

Brain Tinnitus:

Any disturbance, whether due to swelling, pressure, or interference with circulation, may occasionally involve one or more of the complex hearing pathways as they enter and terminate in the brain. In most of these instances, the symptoms are localized to the one ear, and other symptoms and signs develop which aid the doctor in determining the cause and location of the disturbance.

Hearing Impairment:

Head noise or tinnitus may or may not be associated with hearing impairment. After reviewing the many causes of this symptom, it is easy to understand why the hearing may at times be affected when tinnitus is present. If a hearing loss coexists with tinnitus, the severity of the head noise is not an index as to the future course of the hearing impairment. Many persons with tinnitus have the erroneous fear that they are going to lose their hearing. This is an unnecessary fear. Hearing impairment often occurs without the presence of tinnitus, and vice versa.

Treatment:

If the examination reveals a local or general cause of the head noise, treatment may be instituted. If no cause for the head noise can be found, the following suggestions may be helpful:

1. Make every attempt to obtain adequate rest and avoid overfatigue.
2. The use of nerve stimulants is to be avoided. Therefore, excessive amounts of coffee (caffeine) and smoking (nicotine) should be avoided.
3. Learn as quickly as possible to accept the existence of the head noise as an annoying reality and then promptly and completely ignore it as much as possible.
4. Tinnitus will not cause you to go deaf, will not result in your losing your mind, or cause your death, so immediately forget such distracting and terrifying thoughts.
5. Tinnitus is usually more marked at bedtime, when one's surroundings become quiet. Any noise in the room, such as a loud ticking clock or a cassette deck which turns off after you are asleep will serve to mask (cover up) the irritating head noises and make them much less annoying. A bedside noisemaker that can be adjusted to various tones and intensities is available from specialty retail stores.
6. If your hearing loss is severe enough to require the use of a hearing aid, this will probably also reduce your tinnitus by

bringing in outside sounds that tech to mask the tinnitus. Your doctor may recommend a hearing aid evaluation to determine whether an aid would help you.

7. Some patients who are particularly bothered by tinnitus may be candidates for masking devices. Masking devices cover up the tinnitus by introducing external sounds or electrical stimulation. Some patients obtain relief only when the device is worn, while others find that tinnitus is reduced for a period of hours after the device is removed.

8. Many patients who find it difficult to "live with" their tinnitus become depressed. If your doctor suspects major depression, he or she may suggest therapy for this.

9. Stress and anxiety can greatly increase the distress caused by tinnitus. Some patients can benefit from biofeedback and stress management training. Others have found help from books such as *Relaxation and Stress Reduction Workshop*, by M. Davis.

10. A few patients note tinnitus is made worse by flareups of jaw (temporomandibular) or neck musculoskeletal disorders. In these cases, dental treatment or physical therapy may be helpful.

11. Additional information can also be obtained from the American Tinnitus Association, P.O Box 5, Portland Oregon, 97207-0005.