ear bones), and frequently requires surgery.

Tympanic Membrane Atelectasis or Retraction (collapse of the ear drum): Poor Eustachian tube function may also result in excessive negative pressure behind the ear drum causing the ear drum to collapse onto the middle ear bones. Severe retraction of the ear drum may necessitate ear tube surgery or a surgery to rebuild the ear drum (tympanoplasty).

Tympanic Membrane Perforation: A hole in the ear drum due to infections or trauma may result in hearing loss as the sound vibrations are not effectively captured by the damaged ear drum. A tympanoplasty is the surgical repair of the ear drum. Generally, this is an outpatient surgery performed by an otolaryngologist with a very high success rate (over 90%).

Cholesteatoma: This may develop when the ear drum collapses to the point that the outer skin of the ear drum grows into the middle ear and becomes trapped. In spite of the ending of the word cholesteatoma, this is not a tumor but a benign collection of skin that can cause destruction of the middle ear structures and, if left untreated, more serious problems. This is almost always a surgical disease and may require a staged surgical approach (more than one surgery) in order to safely remove the cholesteatoma and restore hearing by repairing the damaged middle ear bones.

Damage to the Middle Ear Ossicles: This may result from trauma, infection, cholesteatoma or a retracted ear drum leading to conductive hearing loss. Surgical reconstruction of the ossicular chain is often successful in restoring hearing in these cases.

Otosclerosis: This is an inherited disease in which the bone around the stapes bone hardens and the stapes fails to vibrate effectively. The conductive hearing loss slowly progresses in early adulthood. It affects women more often than men and affects slightly less than 1% of the population overall. This condition may be treated with a hearing aid or with a stapedotomy surgery which is highly effective in restoring hearing in most cases.

Many types of hearing loss can also be improved with the use of conventional hearing aids. An otolaryngologist can determine the specific cause of the hearing loss, advise patients of their treatment and rehabilitative options, and help patients achieve the best possible hearing outcome and hearing related quality of life.

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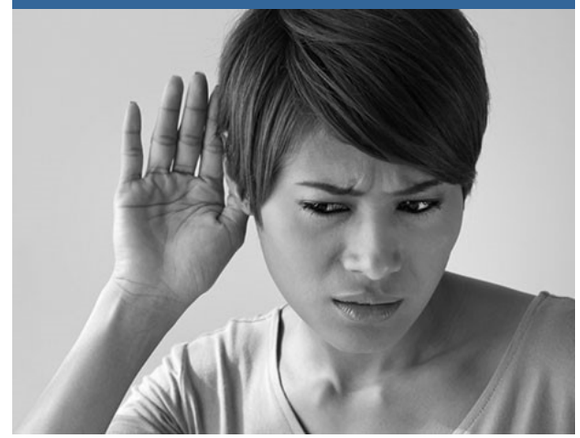
Conductive Hearing Loss



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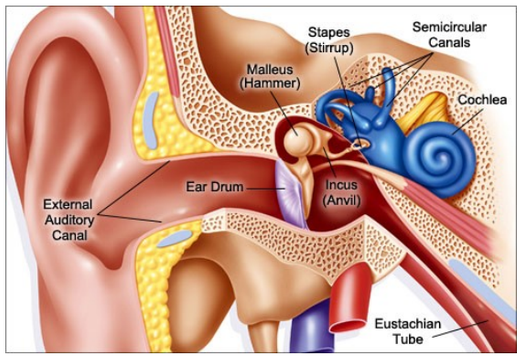
How does the ear hear sounds?

The ear can be divided into three parts:

- The external ear includes the pinna (outer, visible ear) and the ear canal
- The middle ear includes the tympanic membrane (ear drum) and the ossicles (middle ear bones)
- The inner ear, which includes the cochlea (organ of hearing) and vestibule (organ of balance)



Sound waves enter the ear canal and cause a vibration of the tympanic membrane (ear drum) which is then passed through three tiny bones behind the ear drum in the middle ear space: the malleus (hammer), incus (anvil) and stapes (stirrup). The sound vibrations in the ossicles are then transmitted to the nerves and fluids in the cochlea (inner ear), which generates a nerve impulse that passes along the auditory nerve to the brain.

What are the types of hearing loss?

Hearing loss can be divided into two types: Conductive Hearing Loss, which is essentially a mechanical problem with the conduction of sound vibrations, and Sensorineural Hearing Loss, a problem with the generation and/or transmission of nerve impulses from the inner ear to the brain. Mixed hearing loss refers to a combination of these two types. The preliminary classification of hearing loss as conductive or sensorineural can be determined by a physician using a tuning fork in the office. A formal audiogram, or hearing test, is the best way to determine the type and degree of hearing loss. The distinction between these two types of hearing loss is important because many cases of conductive hearing loss can be improved with medical or surgical intervention. An otolaryngologist, also called an Ear Nose and Throat or ENT doctor, can determine the specific diagnosis and treatments for either type of hearing loss and perform surgical treatments, if necessary.

What can cause conductive hearing loss

Conductive hearing loss may result from diseases that affect the external ear or middle ear structures.

Problems with the external ear

Cerumen (ear wax) obstruction: Ear wax can be identified by a medical examination and can usually be removed quickly. This condition may actually be aggravated by cotton tipped applicators (Q-tips) that many patients use in an attempt to clean their ears.

Otitis Externa: Often referred to as “swimmer’s ear”, an infection of the ear canal may be related to water exposure. Although the most common symptoms of otitis external are pain and tenderness of the ear, conductive hearing loss can also occur if there is severe swelling of the ear canal. The infection can be treated with antibiotic eardrops or acid eardrops.

Foreign body in Ear Canal: This is also readily identified on examination and can usually be cleared in the office. Occasionally, a brief anesthesia is required for this procedure in children. Common foreign bodies include beads and beans in children and cotton or the tips of cotton-tipped applicators in adults.

Bony lesions of Ear Canal: These are benign growths of bone along the walls of the ear canal resulting in a narrowing of the ear canal which may then lead to frequent obstruction from a small amount of wax or water. These bony lesions can generally be managed with vigilant cleaning of ear wax to prevent obstruction. In rare cases these lesions require surgical removal.

Atresia of the Ear Canal: Complete malformation of the external ear canal is called atresia. It may be seen along with complete or partial malformation of the pinna (outer ear) and is noted at birth. It is rarely associated with other congenital abnormalities and is most often only on one side (unilateral). Management of congenital aural atresia is complex. Surgical treatment may be beneficial to either reconstruct the ear canal in select cases or to implant a device that vibrates the bone of the ear directly.

Problems with the middle ear structures

Middle Ear Fluid or Infection (otitis media): The middle ear space may be filled with fluid instead of air.

Otitis media is divided into three types: acute otitis media, serous otitis media (middle ear fluid) or chronic otitis media.

Acute otitis media occurs rapidly, is painful, and may cause fever. Serous otitis media often follows an acute otitis media infection or may occur on its own.

Both conditions are common in children and are related to an inability to ventilate the middle ear space due to poor Eustachian tube function (the channel which connects the middle ear space with the nasal passage). Otitis media may be treated medically or with a myringotomy with tube insertion (also known as an M&T or ear tube surgery). In most adults, an M&T surgery may be performed in the office. In children, a brief general anesthesia is usually required.

Chronic otitis media is associated with damage to the ear drum or ossicles (middle