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Hearing Loss

Approximately one in ten persons in the United States has some degree of hearing loss. Hearing is measured in decibels (dB), and a hearing level of 0-25 dB is considered **normal hearing**. Your level is:

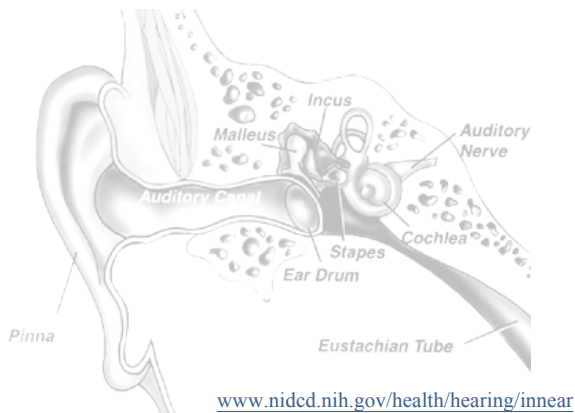
Right ear _____ dB Left ear _____ dB

Hearing Severity / % Loss

25 dB (normal).....0%	65dB(Severe).....60%
35 dB (mild).....15%	75dB(Severe).....75%
45 dB (moderate)..30%	>85dB (Profound)..>90%

Normal speech discrimination is 88-100%. Yours is:

Right ear _____ % Left ear _____ %



www.nidcd.nih.gov/health/hearing/innear

The normal ear is divided into the outer, middle and inner ear. The outer ear helps carry sound to the ear drum, or tympanic membrane. In the middle ear, sound is transmitted from the ear drum to the three hearing bones, or ossicles (malleus=hammer, incus=anvil and stapes=stirrups), and then to the inner ear. In the inner ear, sound is converted into a fluid wave, and interpreted by the **hearing organ**, the cochlea, as different sound frequencies. The hearing nerve carries this sound information to the brain. The inner ear also contains balance organs, which is why sometimes dizziness or disequilibrium can accompany hearing loss.

When there is some difficulty in the external or middle ear, a conductive hearing loss occurs. This

may result from blockage of the ear canal (wax), from a perforation (hole) in the ear drum, or from infection or disease of any of the three middle ear bones. With a conductive loss only, the patient will never go deaf, but will always be able to hear, either with reconstructive ear surgery or by use of a properly fitted hearing aid. Some patients who are not candidates for surgery, may benefit from a new technology, the Baha (bone-anchored hearing aid).

When there is a problem with the inner ear or nerve of hearing, a sensori-neural hearing loss occurs. This is most commonly from normal aging, is usually worse in high frequencies, and can progress to total deafness. Noise exposure is another common cause of high frequency hearing loss. Patients with sensori-neural hearing loss usually complain of difficulty hearing in loud environments. Bilateral hearing loss requires the use of hearing aids. For severe to profound hearing loss which hearing aids may not help, advances in technology provide new options, such as totally implantable hearing aids and cochlear implants. Hearing loss in only one ear can be treated with a hearing aid, and in cases of unilateral deafness can also be treated with a Baha (bone-anchored hearing aid).

Patients with sensori-neural hearing loss often also complain of **tinnitus**(head noise), which they describe as a ringing/humming sensation, which they hear most at night when its quiet. White background noise at night can help with sleep, and hearing aids often improve the tinnitus. Although tinnitus is not itself serious, patients can be bothered enough to take medication.

Causes of Sensori-neural Hearing Loss

Labyrinthitis, or vestibular neuritis, is thought to be caused by a viral upper respiratory viral infection (a cold), or from a bacterial ear infection. Acute labyrinthitis can cause a sudden hearing loss, and severe dizziness. **Meniere disease** presents as spinning or vague dizziness that last for minutes to hours, and is typically accompanied by tinnitus

(head noise) and a sensation of pressure or fullness in the ear. It can also cause intermittent hearing loss, a gradual worsening of hearing or a sudden hearing loss that is permanent. **Autoimmune ear disease** is another cause of sudden hearing loss. Sudden hearing loss needs immediate testing and treatment usually with oral steroids and antiviral medication. Steroid injections can also be done through the ear drum in the clinic setting. These losses can be diagnosed with hearing and balance testing, and treated with hearing aids or balance therapy, respectively.

An **acoustic tumor** is a benign (not cancer) slow-growing mass that occasionally occurs on the balance nerve, that grows and puts pressure on the hearing nerve. It typically presents with hearing loss in one side and tinnitus (head noise), but can also cause dizziness. Any patient with an unexplained hearing loss in only one ear and dizziness should get an MRI to rule out this tumor. It can be followed with serial MRIs and can also be treated with a form of radiation. Most commonly, an acoustic tumor is treated with surgery to prevent complications caused by ongoing tumor growth. An operation has been developed to remove small tumors and preserve hearing. Large tumors usually have to be removed through the ear bone, and hearing is not spared. Disease of the central nervous system (brain) can also cause hearing loss.

Causes of Conductive Hearing Loss

Otosclerosis is a disease of the inner ear bone that is hereditary, and a common cause of correctable hearing loss. It usually presents as a slowly progressive hearing loss over months to years. **Stapedial otosclerosis** spreads to the stapes (stirrup) bone and prevents sound conduction into the inner ear. Hearing loss from this problem is usually correctable with surgery. A simple hearing test can detect how much hearing loss is from the stapes bone versus the nerve. In **cochlear otosclerosis**, the disease has spread to the nerve, and occasionally to the balance organs as well. Calcium fluoride medication can sometimes help prevent progression of hearing loss from this problem. Patients who are not candidates for surgery, may benefit from hearing aids.

Another common cause of conductive hearing loss is **chronic ear disease**. Chronic infection, and the development of a cholesteatoma, or skin cyst, can erode the middle ear bones and disrupt hearing conduction. Sometimes even without chronic

infection, the hearing bones can be congenitally malformed or even fixed to the adjacent bone. In either case, malformed or absent hearing bones can be replaced in surgery with a middle ear prosthesis. Sometimes just repairing a hole in the ear drum can fix the hearing loss.

A **hearing aid** is a good option for many patients. Today hearing aids are digital, they last longer, and some even have blue tooth technology and the ability to sync with an ipod or mp3 player. There are also smaller, more cosmetic options, even hearing aids that sit deep inside the ear canal. We recommend seeing an audiologist (AuD) trained in hearing aids, rather than a retail hearing aid dealer.

You are a good candidate for a:

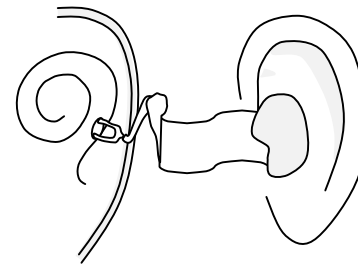
Right Left

Hearing aid

Baha (Bone-anchored hearing aid)

Totally implantable hearing aid

Cochlear implant



Possible complications from surgery

- **Ear infection** – foul drainage indicates infection and requires antibiotic drops or pills.
- **Hearing loss** – can occur in about 3% of cases.
- **Severe Dizziness** – can occur, and may require a short course of steroid pills.
- **Hematoma** – a collection of blood can occur, and may need draining or even hospitalization and IV antibiotics if it gets infected.
- **Facial Nerve Weakness** - can occur right after surgery from the local anesthetic, but is a rare complication from surgery. It is usually temporary, but can take weeks or months to completely resolve.
- **Spinal fluid leak** – is a rare complication from mastoid surgery, and may require a lumbar drain and hospitalization.

For more information visit:

<http://www.entnet.org/healthinformation/ears.cfm>

<http://www.nidcd.nih.gov/health/hearing>