



SEALS Health News

VOLUME VI, ISSUE 5

JANUARY 2023

What is hearing?

Hearing refers to the awareness of the presence of sounds and placing meaning to that sound. It begins as vibrations that travel through your ear (outer ear, middle ear, and inner ear) through your nerves to your brain – where you hear.



What are the parts of our hearing system?

The hearing system (auditory system) consists of many different parts and sections. Successful hearing requires all of these parts and sections to function properly.

Outer ear: The pinna sits on the side of your ear and collects the sounds in the environment. The ear canal funnels the sounds to your eardrum.

Middle ear: The sound from the ear canal hits and vibrates the eardrum – a membrane that divides the outer ear from the middle ear. The eardrum is connected to a series of three tiny bones. You may know them as hammer, anvil and stirrup. As the eardrum moves, so do the tiny bones.

Hearing

Our hearing system has many working parts. The outer ear collects the sounds which vibrate the eardrum in the middle ear. The inner ear gets these vibrations and sends them to the auditory nerve. These impulses go to our brain, which translates them into what we hear.

Inner ear: The third bone in the series of tiny bones in the middle ear is connected to another thin membrane that divides the middle ear from the inner ear. The inner ear consists of a spiral shaped structure known as the cochlea (means snail-shell). Within the cochlea sits the organ of hearing where we have thousands of tiny cells, known as hair cells. The hair cells are stimulated and send messages to the auditory nerve.

Auditory nervous system: The auditory nerve runs from the cochlea to a station in the brainstem (known as nucleus). From that station, neural impulses travel to the brain – specifically the temporal lobe where sound is attached meaning and we HEAR.



How common is hearing loss?

More than 1 in 10 Americans have some degree of hearing loss. It's the most common sensory processing disorder. These disorders affect how your brain processes information from senses, such as hearing, vision, taste and touch.



What conditions can impact our ability to hear?

Many conditions, illnesses and diseases can cause a problem with hearing. Most of these conditions can be treated or managed by healthcare providers. Here are a few examples of conditions that affect your hearing:

Aging: The longer we live the more we are exposed to sounds, to environmental toxins, and medicines, and experience greater health issues. All of these take their toll on our hearing. So hearing loss is common in the older population – not because we are old but because we have lived life for a lot of years.

Damage/trauma: Pushing cotton swabs or other objects into the ear can result in a punctured eardrum; a hard slap on the ear can cause trauma, and head trauma can cause fractures within the ear. These examples can result in hearing problems that can be temporary or permanent and may require medical intervention.

Disease: Cardiovascular diseases and diabetes can put you at greater risk for hearing issues by decreasing the blood supply to the ear and the auditory system.

Medication: Many drugs used to treat cancer, infections and heart disease can damage your hearing. If you take these drugs, your hearing should be monitored to detect changes. If possible, medications should be changed.

Sound exposure: Being exposed to sounds that are too loud for too long will damage the structures in the inner ear and cause hearing loss. The exposure can be long term (for example, working for many years in a factory), or it can happen with just one exposure (to things like firearms or firecrackers). The greater the exposure, the greater the hearing loss. Sound-induced hearing loss, however, is 100% preventable by using hearing protection devices like earplugs or earmuffs.



Ear wax: Ear wax in your ear canal is normal and healthy. Yet sometimes the wax can build up too much and block the sound from getting to your eardrum, causing hearing loss. Once the wax is removed by a healthcare professional, hearing should be restored.

What is the prognosis (outlook) for people who have hearing loss?

Certain types and causes of hearing loss are treatable. You may regain most, or all, hearing with treatment. Sensorineural and age-related hearing loss is usually permanent. Most people with this type of hearing loss benefit from hearing aids.

What are the types of hearing loss?

You can have hearing loss in one ear (unilateral) or both (bilateral). The type depends on where damage occurs within the hearing system.

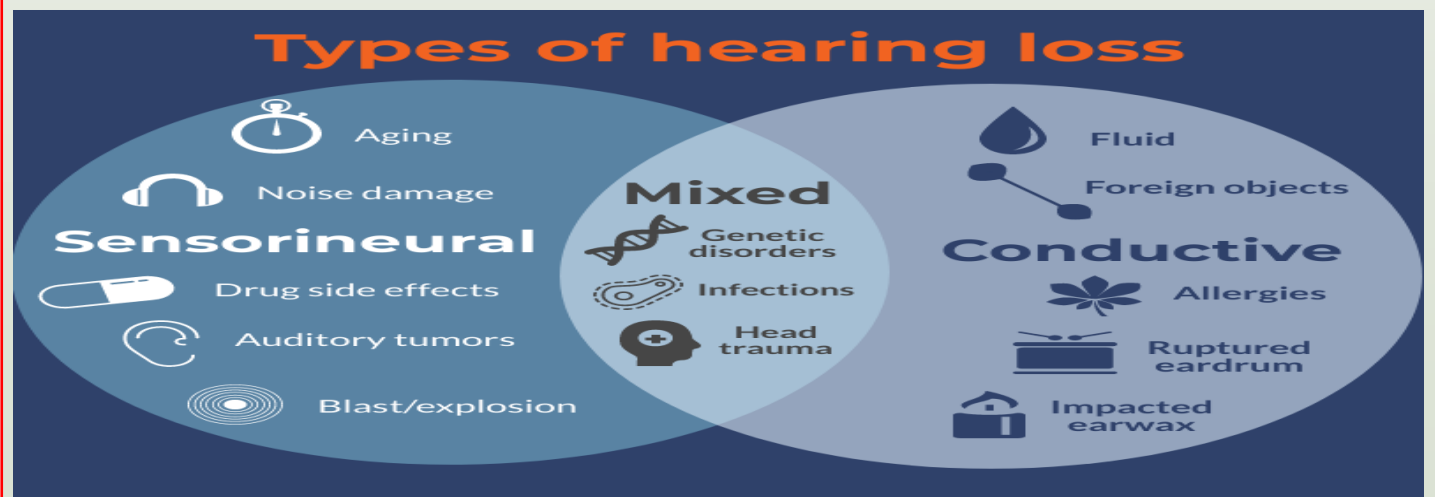
Types of hearing loss include:

- ◇ **Conductive:** Something blocks sound from passing through the outer ear (ear canal) or middle ear (area containing the three tiny ear bones: malleolus, incus and stapes). The block may be an ear infection, earwax or fluid in the ear. Loud noises may sound muffled, and soft sounds can be hard to hear. Medicine or surgery often helps.
- ◇ **Sensorineural:** Hearing loss affects the inner ear (cochlea) or auditory nerve. Loud noises, diseases or the aging process often cause it. Children are prone to this type due to congenital conditions (present at birth), trauma during childbirth, head injuries or infections. Sensorineural hearing loss is often permanent. Hearing aids and hearing assistive devices can help.
- ◇ **Mixed:** Some people have both conductive and sensorineural hearing loss. A head injury, infection or inherited condition can cause mixed hearing loss. You may need treatments for both types of hearing loss.

What’s the difference between hearing loss and deafness?

A person with hearing loss can still hear sounds well enough to participate in conversations. They can improve their hearing ability through hearing aids or other treatments.

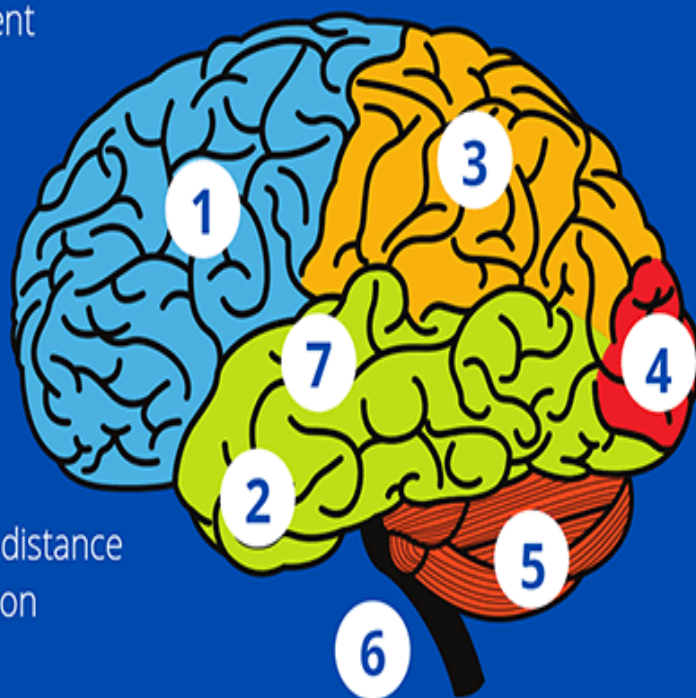
Someone who is deaf can hear very little or nothing at all. Hearing aids and devices don’t help. A person who is deaf may use sign language to communicate.



How Hearing Happens

Part 2: The Brain

- 1 Frontal Lobe**
Memory, thinking, behavior, movement
- 2 Temporal Lobe**
Language, hearing, speech, vision, memory, emotion, behavior
- 3 Parietal Lobe**
Language, speech, math, memory, touch, taste, temperature, pain
- 4 Occipital Lobe**
Motion processing, color, depth and distance perception, face and object recognition
- 5 Cerebellum**
Coordinates voluntary movements, balance
- 6 Brainstem**
Heart/lung function, swallowing, transmits sensory and motor information
- 7 Thalamus**
Transmits sensory and motor information (cannot be seen from outside of brain)



The Whole Brain Responds to Sound

Many parts of the brain are involved in processing sound, some at the same time as others.



How hearing loss in one ear affects hearing

Hearing loss in one ear presents unique challenges. Depending on the severity of your condition, you may experience:



Difficulty locating sounds

Your brain knows where a sound is coming from by which ear receives the sound first, known as **sound localization**. When a person can only hear well from one ear, he or she may have difficulty figuring out where the sound originated.



Disorientation in crowds

Your brain is in charge of **selective listening**, meaning, filtering out noises that aren't useful. This is easier to do with two ears. The effort required to hear may also make you feel tired faster.



Off-kilter volume detection

The brain senses a sound **more loudly** when it's received by both ears than through just one. This is because the brain receives signals from the nerves located in both ears and uses this information to process sounds.



Higher-pitched sounds are muffled

Due to the way sound waves travel, high-frequency sounds don't "bend" around to the side of the functional ear. This is known as the **"head shadow"** effect.

What is the right way to clean your ears?

Here are a few ear hygiene tips:

- Clean your ears with extra care. Don't clean your ears with anything smaller than a washcloth on your finger. Don't use Q-tips®, bobby pins or sharp pointed objects to clean your ears. These objects may injure the ear canal or eardrum.
- Earwax is the ear's way of cleaning itself. If you have a build-up of earwax that is blocking your hearing, see a healthcare provider to have it removed. Don't try to remove it on your own.
- If you experience itching or pain in your ears, call your healthcare provider. They'll examine you, advise you on suitable treatment and help you decide if you need to see a specialist.



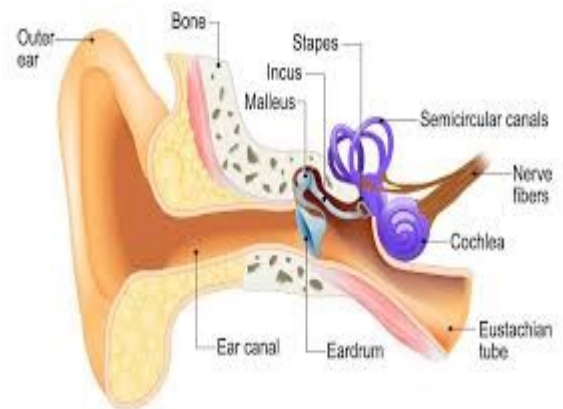
If you have pierced ears, clean your earrings and earlobes regularly with rubbing alcohol.

What should you know about illness, medications and how they can affect your ears?

Because of the ways that our bodies are connected, certain illnesses can make ear infections or hearing loss more likely. In addition, your ears can be affected by side effects from medications.

Some illnesses and medical conditions can affect your hearing. If you experience sudden hearing loss or have constant noise in your ears or head, see a healthcare provider promptly.

Drainage from the ear isn't normal and usually suggests infection. See your healthcare provider as soon as possible.



Some medications can affect hearing. Take medications only as directed, and consult your provider if you develop difficulty hearing, balance problems or ringing in the ears.

What does noise have to do with ear care?

Illness and earwax aren't the only things you need to think about in terms of proper ear care. It's important to guard against noise.

- At home or work, wear hearing protection during exposure to loud levels of noise. This includes when you're mowing the lawn, using a leaf blower or using power tools. The law requires you to use hearing protection if you work in a noisy environment. Homecare centers, hunting shops and some garden centers carry ear-protecting headgear. **If hearing protection is available at work, use it.**
- When using stereos and home theater systems, avoid high volume levels. If you think it's too loud, it probably is.
- When using personal sound systems, the volume should be at a comfortable level. If someone else can hear what you're listening to with ear buds, the volume is too high. Remove the headphones from time to time to give your ears a rest.
- Wear earplugs at rock concerts, nightclubs and loud motor sporting events.

Keep automobile sound systems at sensible volumes. Doing this can help you avoid hearing damage and allow you to hear and yield to emergency vehicles.

What are the symptoms of hearing loss?

Hearing loss can happen gradually. You might not even notice you're losing your hearing.

Most people don't have any pain with hearing loss. Instead, you might notice you:

- Ask people to repeat themselves often.
- Can't follow a conversation (especially on the telephone or at a restaurant) or think other people mumble.
- Can't hear certain high-pitched sounds, like birds singing.
- Need to turn up the volume on the TV or radio.

Experience ringing in the ears (tinnitus), pain (earache), a fluid sensation or pressure inside the ear. Have balance problems or dizziness.

Signs of hearing loss in children include:

- Not startling at loud noises.
- Not turning toward sounds or when you say the child's name (after a child is 6 months of age).
- Responding to some but not all sounds.
- Saying "huh?" a lot.
- Speech delays, such as not saying "dada" or "mama" by age 1.



When should I call a hearing care specialist?

Call or visit a healthcare provider for immediate medical treatment if you experience sudden hearing loss, even if it's only in one ear. The treatment for your hearing loss may not be effective if you delay treatment.

Hearing care specialists are different from your primary care physician. They include:

- **Audiologist:** Health professional trained to diagnose and treat non-medical hearing and balance problems.
- **Otolaryngologist:** Physician who treats problems with the ear, nose and throat.
- **Otologist:** Specialist whose practice is limited to the ear and the medical and surgical management of ear or hearing issues.

Schedule an appointment to see a hearing care specialist if you are noticing a change in your ability to hear or understand, or if it seems like everyone is mumbling. Hearing loss can occur very gradually so it is good practice to have your hearing tested to obtain a baseline and then on a regular basis. This is especially true if you have a family history of hearing loss.

How is my hearing tested? To test your hearing, you'll be given a test called an audiogram. During this test, your provider plays sounds through headphones. You'll press a button when you hear a sound. The results measure your ability to hear. Tests take place in your provider's or audiologist's office in a soundproof booth.



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Information brought to you by:
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How is hearing loss managed or treated?

Hearing loss treatments often depend on the type and degree of hearing loss. Treatments include:

Hearing assist devices: These devices help restore hearing. Hearing aids are devices worn on or inside the ear to amplify sound. Healthcare providers surgically implant cochlear implants into the inner ear to treat inner ear hearing loss.

- **Hearing rehabilitation:** Also called audiologic rehabilitation, this therapy helps you adjust to hearing loss and hearing aids. A therapist also can help you learn to use visual cues and lip reading to improve communication.
- **Listening devices:** Devices can make it easier to hear the telephone, television or videos on your computer.

Medications: Hearing loss caused by ear infections may improve with antibiotics. Corticosteroids can ease the swelling of cochlear hair cells after exposure to loud noise. If medications are causing your hearing loss, your provider may prescribe a different drug.

Surgery: Your provider may place ear tubes in the eardrum. Ear tubes treat chronic middle ear infections that contribute to hearing loss. Providers also perform surgeries to remove tumors, repair birth defects and place cochlear implants.

How can I prevent hearing loss?

Noise exposure is one of the most common and preventable causes of hearing loss. To help prevent noise-induced hearing loss:

- Limit your exposure to loud events and environments.
- Wear sound-reducing earplugs (inside the ears) or earmuffs (outside the ears).
- Lower the volume (if possible) on power tools, electronic devices, earbuds and toys.

Though all human brains become smaller with age, **shrinkage is accelerated** in adults with hearing loss.

