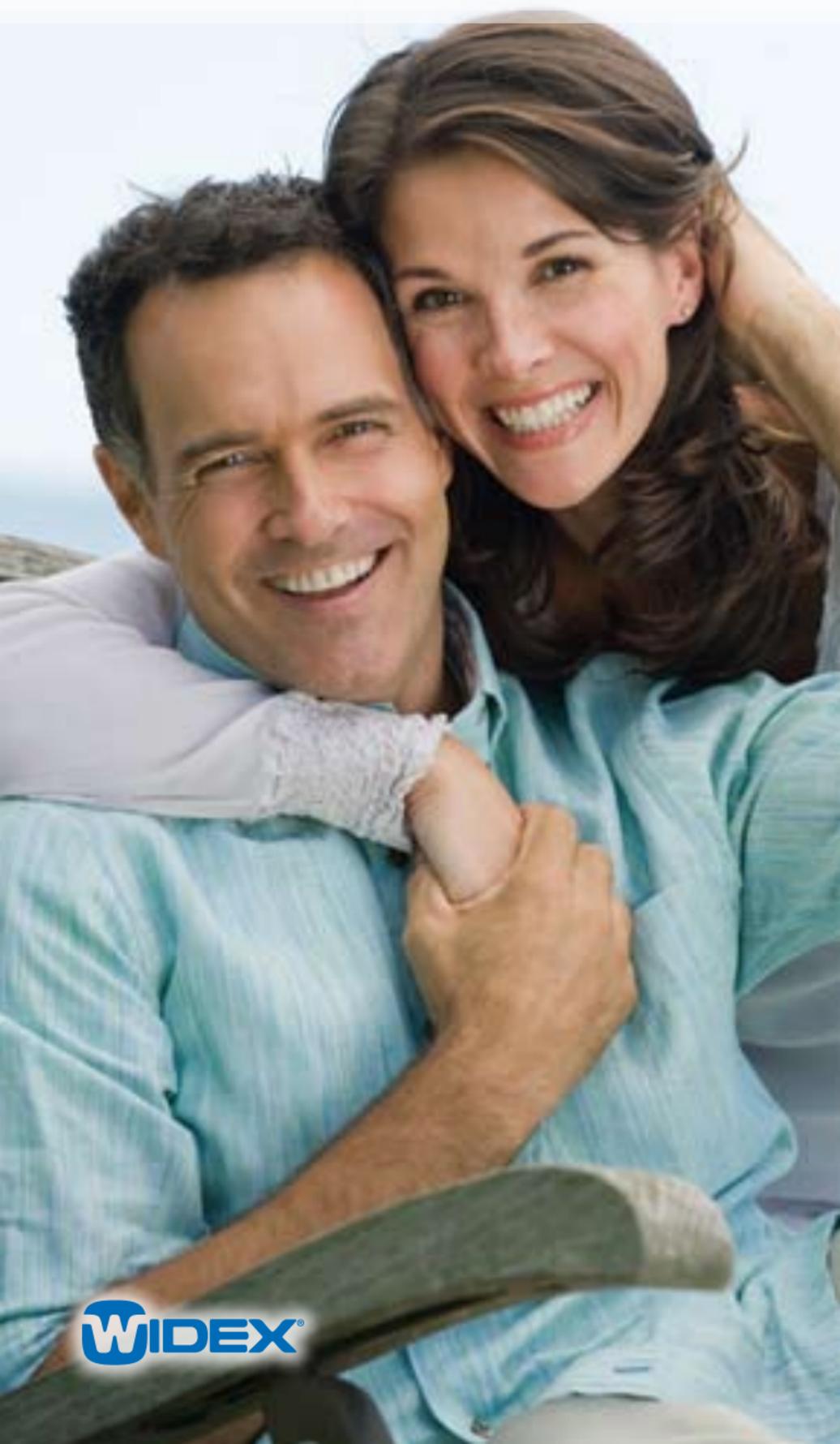


Understanding Hearing and Hearing Loss



Don't Miss Out on Hearing the World Around You

The ability to hear and understand is an essential part to our everyday activities and overall quality of life. Unfortunately, many individuals take their hearing for granted until they can no longer communicate with their friends and family.

Regardless of age, we all depend upon our hearing and the ability to communicate every day. At home, communicating with your family, watching and listening to your favorite television programs, talking on the telephone, listening to music, having a conversation in a busy restaurant, or simply hearing the sounds of a coffee maker or microwave oven. And even when visiting your doctors or other healthcare professionals. No matter how mild or significant your hearing loss, it interferes with your ability to fully appreciate sounds and experiences.

Unfortunately, most people put off doing something to help them hear better – to their own detriment and to the detriment of their friends and family. Individuals with hearing loss wait on average more than 7 years to begin the process of improved hearing. Once you learn more about hearing and take positive action to do something about your hearing loss, you will realize what you may have been missing!



How We Hear

Your hearing is active throughout the entire day. Hearing is not a sense that you can 'turn on or off'; it works on several levels:

- With our hearing we perceive background sounds, such as traffic noise, or more relevant sounds such as the ringing of an alarm clock. What is *most important*, however, is *the ability to hear speech* – to understand and communicate. The ability to hear soft whispers to loud shouts for help. When our hearing ability is reduced, we are no longer able to hear sounds optimally.

The ear consists of three main parts:

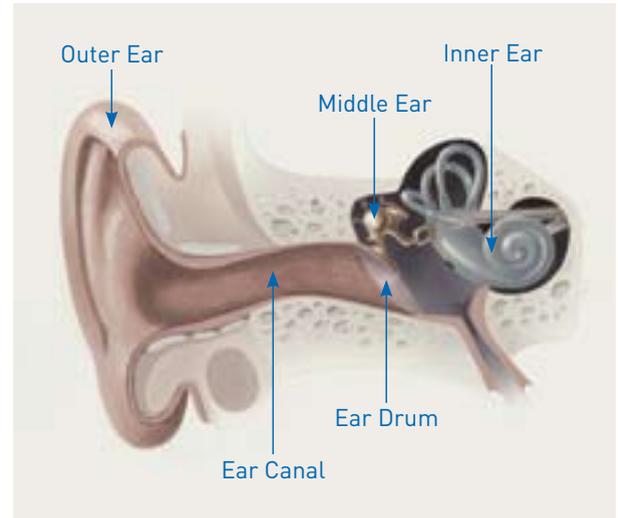
Outer Ear

The Outer Ear includes the visible portion of the ear, called the auricle or pinna, and the ear canal. The pinna is made of cartilage and skin and is formed in the shape of a funnel in order to help gather sound from the environment. This helps in determining the direction of the source of the sound and directing sound down into the ear canal. Sound then travels down the ear canal and into the middle ear.

Middle Ear

The eardrum (tympanic membrane) is a very thin piece of skin that vibrates when sound reaches the membrane. The eardrum acts as the entrance to the air-filled middle ear cavity. Within the middle ear cavity there are three small bones – the malleus (hammer), incus (anvil) and stapes (stirrup). These three small bones move back and forth, transferring sound waves into the fluid-filled cavities of the

The Human Ear



inner ear. Because the middle ear is filled with air – the air pressure must be equalized to the environmental air pressure by the Eustachian tube, which connects the middle ear with the back of the throat and nose.

Inner Ear

The inner ear consists of both the hearing and balance organs. The hearing organ, called the cochlea, is filled with thousands of sensory hair cells that send neural impulses via the VIII (8th/auditory) nerve to the part of the brain responsible for understanding. These hair cells are pitch/frequency specific and allow the human ear to hear various loudness levels and pitches of sounds. The semi-circular canals – the organs of balance – are also located within the inner ear.

Hearing Loss in the Outer and/or Middle Ear is Called a Conductive Hearing Loss

Common causes of a Conductive Hearing Loss related to the...

...Outer Ear include:

- Earwax or foreign objects blocking the ear canal
- Skin Infections (e.g. "swimmers ear")
- Deformity of the outer ear or ear canal.

...Middle Ear include:

- Perforated Eardrum
- Infection of the middle ear cavity – resulting in fluid filling the normally air-filled space
- Calcification or breakage of the bones of the middle ear

In most cases, Conductive Hearing Loss can be treated medically (usually through the use of prescriptive medications or surgery). In some cases, Conductive Hearing Loss cannot be treated medically, but can be improved through the use of hearing aids/assistive listening devices.

Hearing Loss in the Inner Ear is Called a Sensorineural Hearing Loss

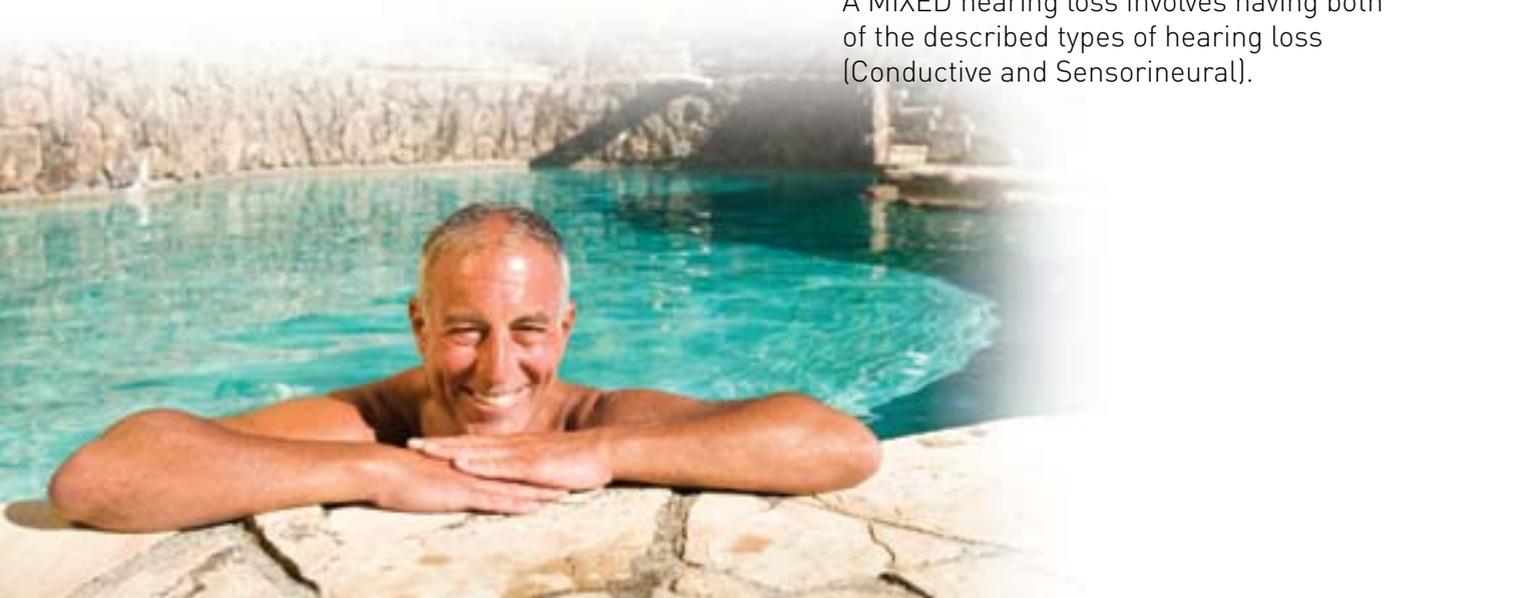
This type of hearing loss occurs within the Cochlea and/or the hearing (VIII/8th) nerve. If the hair cells within the cochlea become damaged, then we lose the ability to hear at soft and normal sound levels. And in many cases, we also lose the ability to distinguish sounds resulting in difficulty understanding speech.

Common causes of Sensorineural Hearing Loss include but are not limited to:

- The Natural Aging Process
- Genetics
- Noise Exposure
- Medications (*certain drugs can be toxic to the inner ear*)
- Birth Defects
- Certain virus' and infections

Over 90% of all hearing loss is Sensorineural and cannot be treated through medication or surgery. However, in most cases, individuals with Sensorineural Hearing Loss can be helped significantly through the use of amplification systems (hearing aids and/or assistive listening devices).

A MIXED hearing loss involves having both of the described types of hearing loss (Conductive and Sensorineural).



There are Different Degrees of Hearing Loss

(From Mild To Profound)

Mild Hearing Loss

Difficulty hearing soft speech and some conversations. Difficulty is worsened in the presence of any background or interfering noise and in small to large groups of people. Minimal or no difficulty in quiet environments with one or two people.

Moderate Hearing Loss

Hearing of soft speech is limited and difficulty understanding conversational speech – especially when there is background or interfering noise. Higher volume levels are required for hearing TV, radio and telephone.

Moderately-Severe Hearing Loss

Clarity (understanding) of normal speech is significantly affected. Speech must be loud and hearing in group conversations is significantly limited.

Severe Hearing Loss

Normal conversational speech is not heard or understood. In most cases, significant difficulty with loud speech. Often the individual will understand shouted or amplified speech.

Profound Hearing Loss

Unable to clearly understand even amplified speech. Very loud environmental sounds are sometimes barely heard.

Today's advanced, ultra-comfortable hearing aids include virtually invisible models that are so small, others may not even notice you are wearing them.



What Is Noise?

In today's world we are constantly bombarded with sound. Many sounds are enjoyable, but unfortunately there are often situations where sound becomes noise. So what is noise? Any unwanted sound. Everyone perceives "noise" differently because we all have different levels of sensitivity to noise.

Noise can be a soft continuous sound such as an air conditioner or motor running. Noise can be described as moderate levels (inside of an airplane) or a radio or TV that interferes with concentration. Or an extremely loud noise such as a jack hammer or the firing a gun. These excessively loud noises can cause hearing loss.

Individuals with a hearing loss have greater difficulty hearing and understanding in background noise due to the damage to the ear. Understanding specific speech sounds in noise

is reduced and results in a limited amount of understanding. Added to this is a problem that some hearing aids not only amplify speech, but also background noise, making hearing clearly in noisy situations very difficult.

How Does Noise Damage Our Hearing?

The inner ear can be damaged by the impact of loud sound. The sensory hair cells within the inner ear (the cochlea) which are shown can become damaged or destroyed when exposed to very loud sounds. The inner hair cells cannot be repaired or regenerate, in most cases resulting in permanent hearing loss. Therefore, it is important to take care of our hearing by being cautious about our exposure to noise and utilizing ear protection whenever possible.



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Normal cochlea of the inner ear.



©Widex

Severely noise-damaged cochlea of the inner ear.

Hearing Loss & Understanding Speech

Speech (soft to loud) is the most important sound that we hear everyday. Speech is made up of vowels (a, e, i, o, u) and consonants (for example, s, t, n, d, f, ch). Vowel sounds are lower in pitch and louder in volume.

Consonant sounds are higher in pitch and softer in volume (especially female voices).

All types of hearing loss affect an individuals' ability to hear and understand conversational sounds. Hearing loss often initially affects those higher pitched consonant sounds.

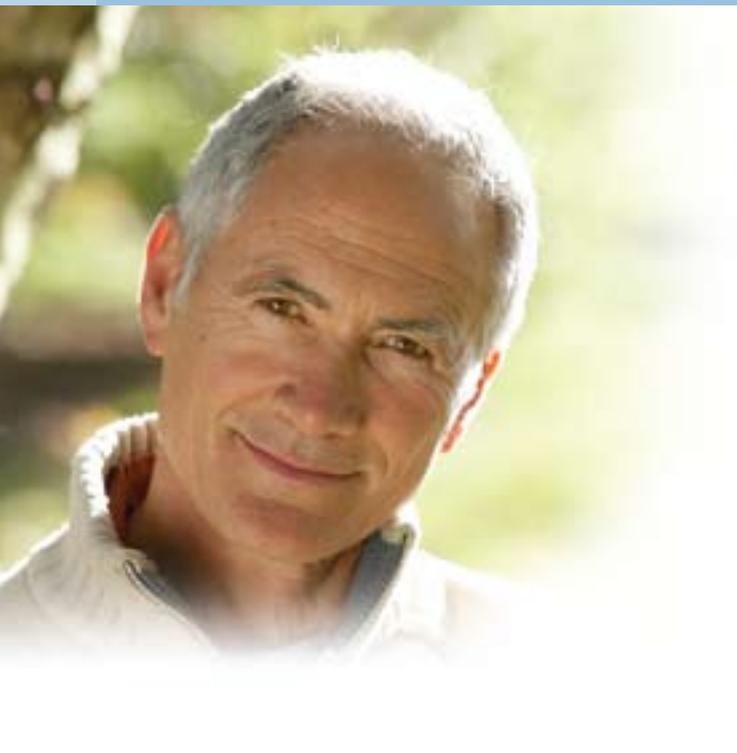
These sounds (s, f, v, sh, th, ch) play a key role in distinguishing words and understanding speech clearly. Many individuals with hearing loss will report: "I hear people talking but I don't understand what is being said."

Warning signs of hearing loss:

If you, family members, friends, or loved ones have experienced any of the following, please have your hearing tested by a hearing healthcare professional:

- Can hear but do not understand
- Have difficulty hearing in restaurants and/or places of worship
- Frequently ask people to repeat themselves
- Look at people's faces to assist in understanding conversations
- Turn up the volume of the TV and/or radio
- Feel that everyone mumbles or doesn't speak clearly





Nature Gave Us Two Ears for a Reason

Hearing with two ears is called “Binaural Hearing”. Because we have two ears, we are more effectively able to process sound and understand speech. Without such processing, our brain receives an incomplete sound picture.

Imagine for a moment that you have to tie a knot with only one hand. You can still tie a knot, using your body as a support, but it is not as effective as having both of your hands to perform this function. The fact is, most people **function better** with **both** hands, and **hear better** with **both** ears.

Utilizing the Best Possible Hearing in Two Ears Results in:

Better Sound Discrimination

Many sounds which are almost exactly alike when heard with one ear can be more easily differentiated when heard with two ears (e.g. shoe & sue; cup & cut; with & wish).

Improved Understanding

Binaural Hearing (hearing with both ears) helps you sort out and understand individual voices. Our “built-in signal processor” in the brain blends signals from both ears into a more natural single sound “picture” as nature intended. Without such equality, our brain presents us with incomplete information, resulting in difficulty understanding speech.

Locating Sound Source

Our brain locates a sound source by measuring the tiny differences in duration and intensity of sound arriving at each ear. These differences are then translated by the brain, allowing us to instantaneously recognize a sound’s exact location. When a person hears with only one ear, there is increased difficulty in locating sound.

Less Stressful Listening

Listening with only one ear is physically tiring and stressful. With good hearing in both ears you respond more confidently, and you don’t need to always worry about turning your “good ear” towards sounds.



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Hearing aids may not provide the same benefits to all users, and may not be appropriate for everyone with a hearing loss. A hearing professional can test your hearing and determine if hearing aids can help you. Your success with hearing aids depends upon a competent examination, proper fitting and your ability to adapt to a hearing instrument.