

The First Steps

A Guide to Cochlear Implants



hearLIFE

Congratulations

You're taking the first steps in rejoining the conversation. The change in your hearing may have been so gradual that at first you didn't notice it. As your hearing declined, you might have started relying on family members to repeat things for you. And then one day, you grew tired of missing words or even entire conversations, so you decided to do something about it.

It might not be easy to consider seeking treatment beyond hearing aids. It's not uncommon for people to put off a hearing test or to continue wearing hearing aids even when they're no longer helpful. No matter which path led you to this powerful decision, we understand that you may be

wondering what your life with a cochlear implant will be like.

This guide has been designed to help answer your questions. First we'll have a look at how hearing works and what hearing loss is. You'll learn about cochlear implant systems and how they work. We'll discuss the benefits of treating your hearing loss and give you a glimpse of the process of receiving an implant. Finally, you'll read about what lies ahead for you and your family—improved communication, better engagement at home and work, and a return to the experiences and sounds you've been missing.



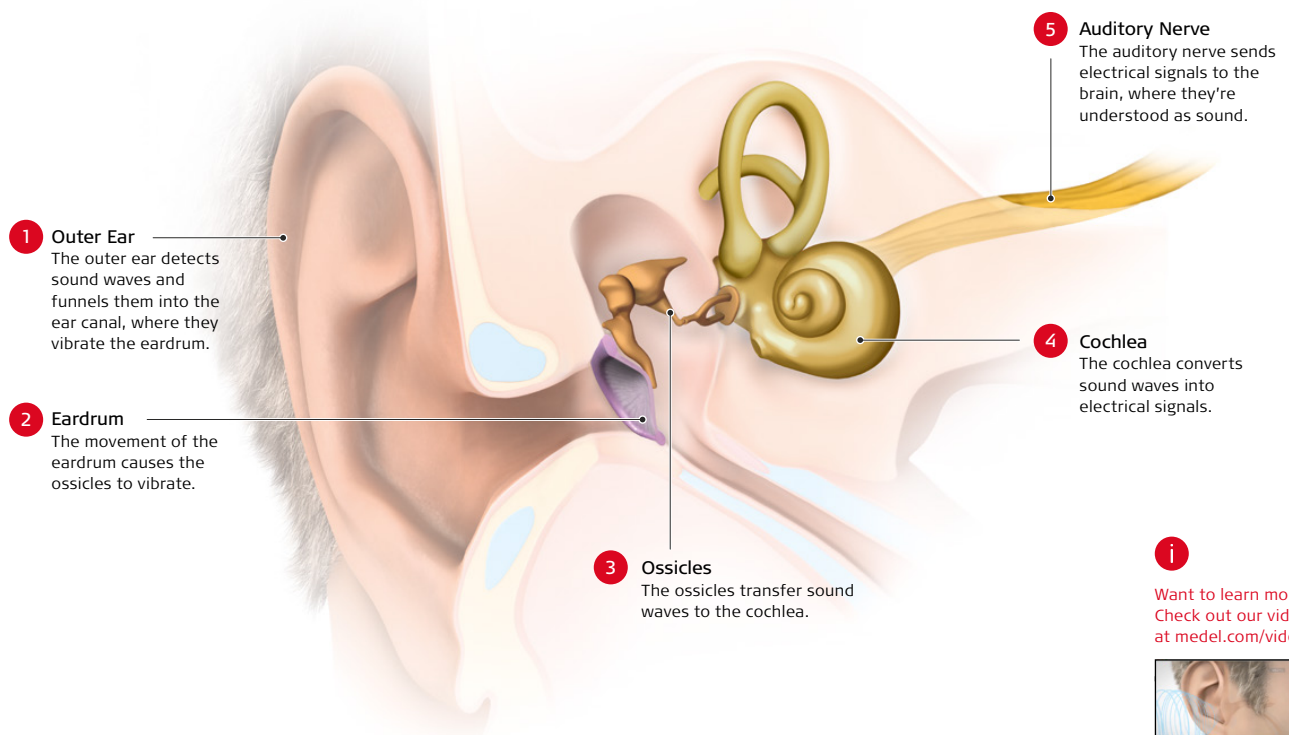
How Does Hearing Work?

Sound, the Ear, and the Brain

Knowing how hearing works will help you better understand hearing loss and how cochlear implants can overcome it. First, let's take a closer look at the ear.

The ear is made up of three parts—the outer ear, middle ear, and inner ear. The outer ear is the part you can typically see. The middle ear contains the smallest bones in the human body, the ossicles, which help carry sound from the outer ear to the inner ear. The inner ear houses the cochlea, a snail-shaped, fluid-filled organ about the size of a pea. All of these parts work together to detect sound waves and change them into signals that your brain can understand as sound.

How Hearing Works





Questions & Answers

How common is hearing loss?

Worldwide, approximately 360 million people have some type of hearing loss. Most of these people are adults, and as the world population ages, the incidence of hearing loss is rising. Among older adults, hearing loss is the most common sensory disorder and one of the most prevalent chronic conditions.^{1,2,3,4}

What Is Sensorineural Hearing Loss?

Sensorineural hearing loss (SNHL) is a type of hearing loss that's caused by damage in the inner ear. Hair cells in the cochlea are either damaged or missing, or the auditory nerve is damaged. Individuals who have mild-to-moderate SNHL have difficulty hearing quiet sounds and may find that even loud sounds seem muffled. Those with severe-to-profound SNHL may not be able to hear even very loud sounds.

Causes

The most common cause of hearing loss among adults is the aging process. Other causes include genetics, exposure to loud noise, certain diseases, and medications that may be necessary and life-saving—but harmful to the ear. Sudden hearing loss

may be associated with certain infections and diseases, and it can also result from head injury. In most cases of sudden hearing loss, however, the exact cause can't be pinpointed.

Treatment

Regardless of the cause, severe-to-profound SNHL can usually be treated successfully with cochlear implants. Cochlear implants have been routinely implanted since the 1980s, and they've made it possible for hundreds of thousands of people all over the world to strengthen connections to sounds, experiences, and loved ones. Over the next few pages, we'll have a look at what cochlear implants are and how they can be used to treat hearing loss.

What Is a Cochlear Implant System?

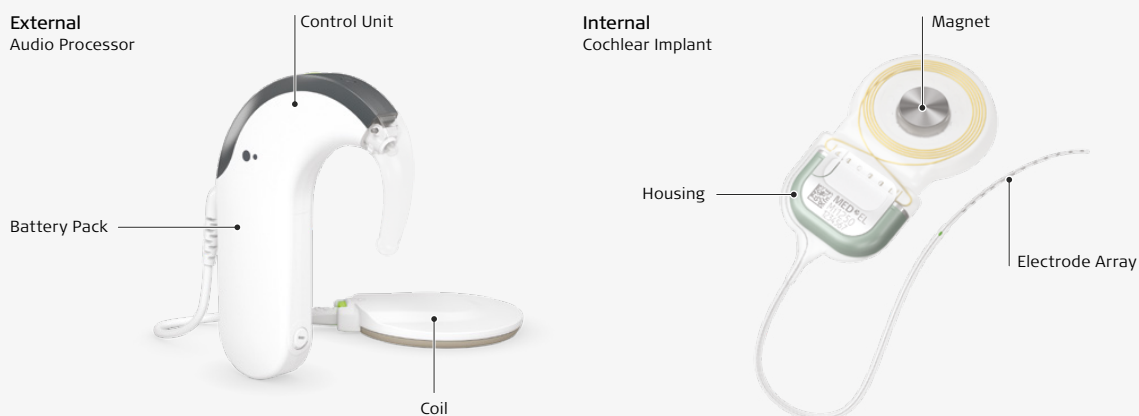
A Hearing Loss Solution

For some individuals with hearing loss, hearing aids don't provide enough—or any—benefit. This is often where cochlear implants come in. You're probably at least somewhat familiar with hearing aids, but what is a cochlear implant and how does it help someone to hear?

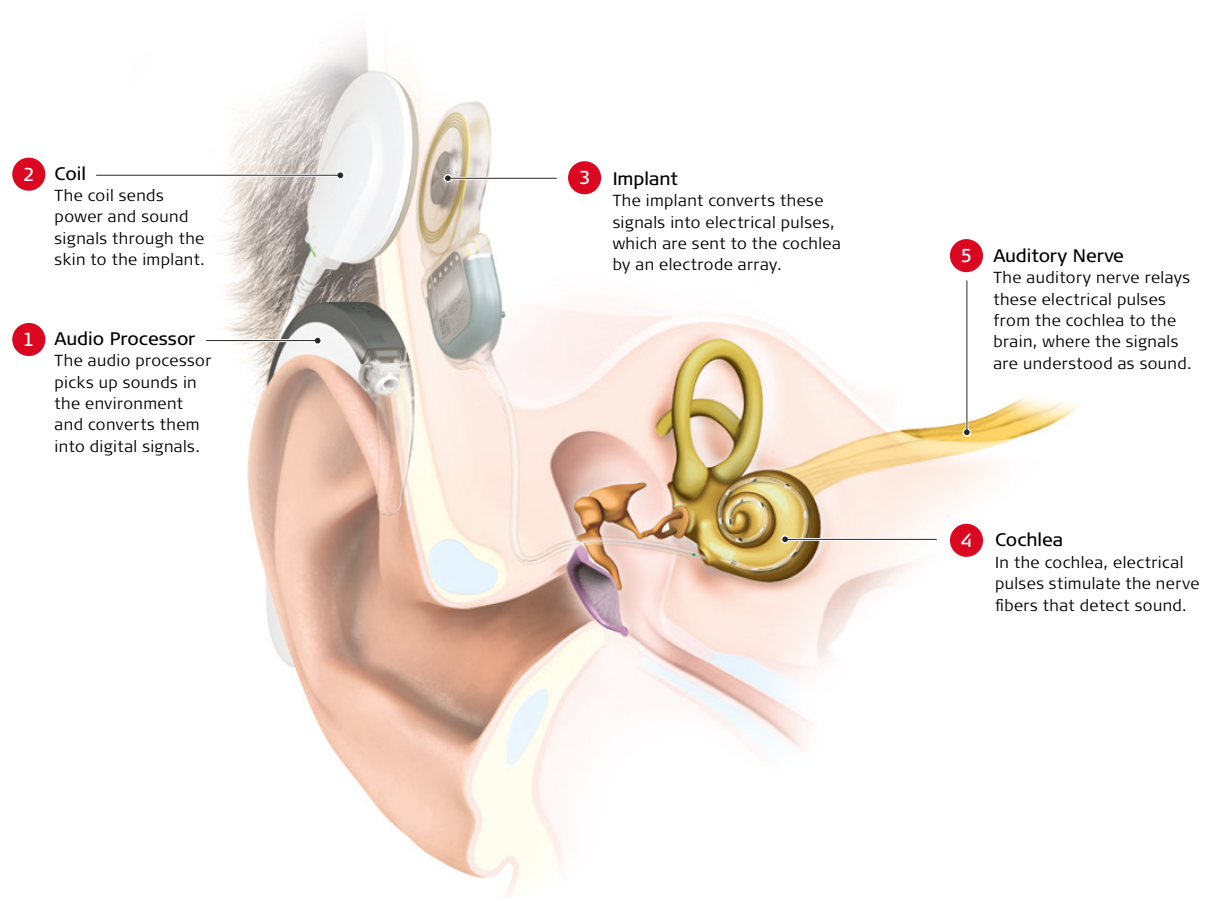
A cochlear implant is a medical device that replicates the sense of hearing. For individuals who would otherwise not be able to hear, it can give access to sound. It does this by bypassing the non-functioning parts of the cochlea and electrically sending sound signals to the brain.

A cochlear implant system has two main components—an external audio processor and an internal cochlear implant. The audio processor is worn either on or off the ear, depending on the model you choose. The audio processor is the part that you'll handle every day and may come to think of as your “ear.”

The external audio processor communicates with the implant. The implant is placed just under the skin during a straightforward surgical procedure. After surgery, the implant won't be noticeable to you or others.



How Does a CI System Work?



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? Questions & Answers

What's the difference between a CI system and a hearing aid?

Whereas a hearing aid only amplifies sound, a cochlear implant directly stimulates the inner ear. Hearing aids are suitable for mild-to-moderate hearing loss. Cochlear implants can help people with severe-to-profound hearing loss. A hearing aid is typically worn inside the ear canal or on the ear, while an audio processor for a CI is worn on or off the ear and does not block the ear canal.



Aging and Hearing Loss

Changes in hearing are a natural part of getting older. Our hearing starts to decline as early as age 18, but for most of us, this shift is so gradual we don't notice it until a few decades later. Hearing loss that gets worse over time and occurs as part of the aging process is called presbycusis. This type of hearing loss usually affects both ears.

As we approach our 70s and 80s, it can become increasingly difficult for our ears to detect and make sense of the sound that's coming in. One of the most immediate effects is that understanding speech in

noisy environments becomes more difficult. Even in relatively quiet places, you might find that you can hear speech—but not understand it. The source of sounds, from voices to footsteps, may be less easily identifiable. It's especially hard to make out speech that's fast or distorted by echoes in a room.

Age-related hearing loss can't be reversed, but it can be successfully treated with cochlear implants. Cochlear implants can help you manage the challenges associated with hearing loss.

When Hearing Loss Is Sudden

Unlike age-related hearing loss, sudden sensorineural hearing loss (SSHL) is not very common. Sudden hearing loss starts without any prior signs of trouble. It can occur at any age, but it often arises in late middle age.

Individuals with this type of hearing loss may have difficulty hearing high-frequency sounds only, low-frequency sounds only or all frequencies. SSHL almost always affects only one ear.

Benefits of Cochlear Implants

Your cochlear implant will make it possible for you to hear your family's voices again, react to the ringing of the telephone, and hear a gust of wind as keenly as you feel it. You'll be able to take in these sounds and many more, but how else might a cochlear implant affect you?

Most noticeably, you'll gain a greater awareness of the sounds all around you. Tuning in to everyday sounds such as car horns and the voices of others can help alert you to any potential risks in your environment. Beyond these fundamental benefits, a cochlear implant will also expand your opportunities to communicate with your family, friends, and colleagues.

Adults who have received cochlear implants report that they can understand speech more easily, which usually leads to better

communication. After implantation, most recipients feel more confident and are able to get more involved in social activities. Many people experience an overall improvement in mental health.³

Cochlear implant use is also associated with improvements in cognition. Cognition is the process of gaining knowledge about the world through the senses and reasoning. We start developing cognitive skills from birth and practice them throughout our lives. Whether hearing loss occurs suddenly or worsens over time, it puts a strain on cognitive abilities. By doing something about your hearing loss, you can minimize this strain. If you're dedicating extra energy to deciphering what's being said around you, getting an implant may help improve your concentration, attention, and other aspects of cognition.⁵

Better With Both

If you have hearing loss in both ears, you might be wondering how much difference a second cochlear implant would make. Research has shown that people with hearing loss on both sides who use two cochlear implants often fare better than people with only one CI. Why?

A second cochlear implant will make it possible for you to localize sound. When you know which direction sounds are coming from, you're much more likely to focus more easily on important sounds, hear better in noisy situations, and even stay safer.

Using two cochlear implants can help you concentrate on important sounds and tune out distracting background noise. For anyone, listening with two ears requires less effort than listening with one ear.

Compared to adults with one cochlear implant, those with two CIs typically report that they're less tired at the end of the day. Using two CIs frees up some of your mental resources so you can focus more on conversations and less on trying to localize sounds.

Single-Sided Deafness

If, on the other hand, your hearing in one ear is just fine, you might also wonder how a CI could benefit you. Those with hearing loss in only one ear, called single-sided deafness, gain similar benefits from using a single CI. By supporting your "good ear" with a cochlear implant in the other ear, you'll more easily understand speech in noisy places, recognize where sounds are coming from, and free up mental resources for things other than listening.

What to Expect

Assessment

An assessment for a cochlear implant is usually done by an ENT doctor, who checks the type and degree of your hearing loss. As soon as it's determined that you're a candidate for a CI, you'll be referred for implantation.

Implantation

Cochlear implant surgery typically lasts from 1–3 hours and is performed under general anesthesia. You'll probably be able to return to your everyday routine a few days after surgery. Your hospital stay could last from one to several days, depending on local practice and your individual needs.

First Fitting

About four weeks after implantation, you'll receive your audio processor. During this session, called a first fitting, an audiologist

will program and activate your processor. This day, sometimes referred to as activation day, can be a very emotional one for you and your family. Prior to the first fitting, some CI recipients have been without sound for months or even years. At first, sounds may seem strange and unfamiliar, but they'll become clearer and more understandable as you progress through rehabilitation.

Rehabilitation

Rehabilitation is the process of learning to hear with a cochlear implant. During rehabilitation, you'll work with an audiologist and speech therapist on improving your listening skills. Participating in rehabilitation is essential to your success with a CI. Over the next few pages, we'll take a look at rehabilitation and discuss how it can contribute to your progress.



Questions & Answers

Is surgery safe?

Cochlear implant surgery is straightforward and safe. The risks are minimal, and no greater than those associated with other ear surgeries. Research has consistently shown that cochlear implantation is beneficial and safe for older adults. Your overall health is a much more important factor than your age for a successful surgery. Talk to your doctor about any considerations that might affect your candidacy for a CI.^{3,6}

Do CIs interfere with MRIs?

MED-EL implants have been designed for outstanding MRI safety*, enabling you to benefit from MRI technology when you need it. It is likely that most people will receive an MRI in their lifetime, so choosing a cochlear implant that enables high-resolution MRI scans gives you access to advanced medical technology.

* MED-EL cochlear implants since 1994 are MR conditional. Recipients with a MED-EL cochlear implant may be safely MRI scanned following the conditions detailed in the instructions for use.

Life With an Implant

Steps Towards Success

What Is Rehabilitation?

Rehabilitation is the process of training the brain to understand sound with a cochlear implant. Think of your cochlear implant as an instrument for accessing sound. As with any instrument, learning how to use a cochlear implant will take motivation and practice. While participating in rehabilitation, you'll learn strategies for practicing as effectively as possible, and you'll be given guidance on how to apply goals from therapy sessions to your daily life.

Your rehabilitation programme will be designed by an audiologist or speech therapist. Sessions will most likely be held in a clinic or at a hospital. For the first few weeks and months after you receive your CI, your audiologist and speech therapist will play important roles in guiding your auditory rehabilitation. Once you become accustomed to your CI, you'll spend less time with a therapist and more time practicing your listening skills at home and wherever you go.

To gain the most benefit from your cochlear implant, start participating in rehabilitation as soon as your audio processor is activated. Together with your audiologist and speech therapist, you'll establish rehabilitation goals. These goals will evolve based on your needs, interests, and progress. You can expect therapy goals to fall into one of the following skill areas:

- **Auditory:** From your first fitting, you'll practice improving your awareness of sound. You'll work on interpreting and understanding specific sounds. If there are sounds you haven't heard in many years, you'll practice associating them with things in your environment.
- **Speech:** Once you've trained your brain to understand sounds with a CI, the focus of your therapy sessions will shift towards the improvement of speech skills. If you recently lost your hearing and haven't been without access to sound for very long, you may not need any practice in this area.
- **Communication management:** If your hearing loss has worsened over time, you've probably developed strategies for coping with hearing loss. As part of rehabilitation, you'll learn proven techniques for communicating effectively and overcoming any lingering obstacles.
- **Practical and technical:** On activation day, you'll receive basic information about how to operate and take care of your audio processor. Your audiologist will give you tips for adjusting to your new CI system. In later sessions, you'll learn how to use assistive listening devices to further improve your listening experience.



Questions & Answers

How well will I do with a cochlear implant?

Many of our recipients do very well with implants. They're able to return to work, integrate more fully into their social circles, and enjoy music. Your success with a CI depends on several factors, such as the degree of your hearing loss and the amount of time that passes between the onset of hearing loss and your implantation. You'll be in control of other aspects, such as your expectations and motivation, your participation in rehabilitation, and the number of hours you spend using your audio processor each day. Our comprehensive rehabilitation programme provides recipients with individualized care to support personal development and optimal progress.



Be Proactive

Your audiologist and speech therapist will be expert resources for you, but don't underestimate the role you play in the rehabilitation process. Make decisions about your own therapy. Participate actively in sessions and ask questions. Whenever you can, practice your listening

skills. Research has shown that if you do all of these things, you're more likely to be satisfied with your cochlear implant. Finally, get your family involved too. If the people you're closest to are supportive, your chances of successful rehabilitation are even greater.⁷

Boost Your Listening

If you've been wearing hearing aids, you may already use assistive listening devices (ALDs) to hear better in certain situations. Assistive listening devices also work well with cochlear implant audio processors.



Learn more about ALDs at medel.com/connectivity.

In case ALDs are new to you, they're devices that enable you to connect your audio processor, either wirelessly or with a cable, to nearly any external sound source. They help you tune out distracting background noise so you can focus more easily on the sounds you want to hear—music, a movie, or the voice of a telephone caller. ALDs provide clear sound input, even from across a room.

These devices are particularly useful in noisy or large spaces where anyone might strain to hear, such as bustling restaurants, crowded conference halls, and cinemas.

Many companies make ALDs that you can buy for your personal use. And, because hearing loss is so common, many public places, from banks to taxi cabs, also have hearing assistive technology in place. Look for the telecoil symbol, which is typically blue and depicts an ear with the letter 'T.' This symbol signifies that ALD technology is available. If you're not sure, just ask.



Questions & Answers

What steps should I take next?

Now that you understand the basics of how a cochlear implant works, the next step is to find out which CI system best fits your individual needs. Our latest CI system is designed for exceptional hearing performance and ease-of-use, and is ideal for adults. You'll find more about all these features in our product brochure: *A New Beginning*.



Contact us for a copy of our latest CI system brochure.





About Us

Since our founding more than 30 years ago by engineers Ingeborg and Erwin Hochmair, MED-EL has been pioneering innovation in the field of hearing implants. And because we want to give every one of our recipients superior hearing performance and peace of mind, we make creating high-quality and reliable products a priority.

We're dedicated to supporting you and your family as you make the transformative decision to get a cochlear implant. We encourage you to contact us with any questions. From your first fitting to your last rehabilitation session and beyond, MED-EL will be there for you.

medel.com



Glossary

Anatomy of the Ear

Auditory Nerve: The nerve that sends impulses from the inner ear to the brain.

Cochlea: The hearing organ in the inner ear.

Ear Canal: The passageway between the outer ear and the eardrum.

Eardrum: A thin layer of tissue between the outer and middle ear; also known as the tympanic membrane.

Hair Cells: Cells in the inner ear that change sound waves into nerve impulses.

Inner Ear: The part of the ear made up of the cochlea and the balance system.

Middle Ear: The part of the ear that includes the ossicles and the eardrum.

Outer Ear: The part of the ear that is normally visible; known as the pinna. It collects sound waves and directs them through the ear canal.

Ossicles: The three tiny bones in the middle ear—the malleus, incus, and stapes.

Audiology

Acquired Hearing Loss: Hearing loss that develops anytime after birth.

Audiogram: A graph that represents the results of a hearing test.

Audiologist: A healthcare professional who treats people with a hearing loss or ear disorder.

Audiology: The science of hearing, which is concerned with the diagnosis of auditory and communication disorders; also deals with aural rehabilitation.

Audiometry: A series of tests given by an audiologist that assesses hearing and middle ear function.

Auditory: Of or related to hearing.

Auditory Brainstem Response (ABR):

A test that checks the functioning of auditory pathways by measuring the brain's response to sounds.

Bilateral Hearing Loss: Hearing loss in both ears.

Binaural Hearing: Hearing with both ears.

Decibel (dB): A unit used to measure the intensity of a sound.

ENT: The branch of medicine that concerns the ear, nose, and throat.

Frequency: The pitch of a sound; measured in hertz (Hz).

Hearing Threshold: The softest sound that can be heard at any given frequency; indicates the degree of hearing loss.

Otology: The branch of medicine that concerns the ear and conditions of the ear.

Otologist: A physician who specializes in the treatment of ear conditions.

Presbycusis: Hearing loss that's associated with aging; also known as age-related hearing loss.

Rehabilitation: Specialised, post-implantation training for the development of listening, speaking, and communication skills.

Residual Hearing: Hearing that is measurable, usable, and present in varying degrees.

Sound Intensity: Relates to the intensity of a sound; measured in decibels (dB).

Sound Localization: Identifying where a sound is coming from.

Sudden Hearing Loss: Hearing loss that occurs within 24 to 72 hours; also known as sudden deafness.

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