

Cochlear Implants

What is a cochlear implant?

A cochlear implant is a device that helps people with significant hearing loss. It will not provide “normal” hearing. However, it can provide recipients with important access to auditory information. This may lead to greatly improved communication and awareness of environmental sounds. The first cochlear implant was introduced in 1972. The U.S. Food and Drug Administration (FDA) has found them to be a safe and effective treatment for hearing loss.

How does a cochlear implant work?

A cochlear implant has parts placed both on the outside and inside of your head. These parts work together to help you tune into sounds.

External, or outside, parts: You will have a device that looks like a hearing aid connected to a magnet above the same ear on the side of your head. The part that sits behind your ear has a microphone. The part above your ear is a sound processor/transmitter. The microphone picks up sounds and sends them to the sound processor. The sound processor changes the sound into a digital signal and sends the signal to the transmitter. A magnet holds the transmitter and receiver in place.

The sound processor sends the signal to a transmitter. This goes on your head, behind the ear. The transmitter sends the signal to a receiver under your skin. A magnet holds the transmitter and receiver together.

Internal, or inside, parts: The receiver is under the skin behind the ear. It decodes and sends signals to electrodes in your inner ear, or cochlea. The electrodes send that signal to the brain. The brain interprets the signal and decodes the information to help you understand the sound.

Who can get a cochlear implant?

Cochlear implants will not work for everyone. The FDA has approved them for anyone who is older than 1 year and who has a significant hearing loss in both ears. If you have a significant hearing loss in only one ear, you will need to be over 5 years old to be considered for a cochlear implant and have

profound hearing loss in that ear. Candidacy for an implant is based on the results of audiometric tests that examine the severity of the hearing loss and the patient’s ability to recognize speech with and without hearing aids.

A team of professionals will work together to see if a cochlear implant will work for you. This team may include the following people:

- an audiologist
- an ear, nose, and throat doctor or surgeon
- a neuropsychologist
- a counselor or social worker
- a speech-language pathologist (SLP)
- teachers, as needed

Everyone on the team has a different role to help you. The implant surgeon will perform a medical evaluation. This includes radiographic testing to evaluate the status of the inner ear. CT scans and MRIs may be necessary.

The SLP will evaluate communication and make recommendations.

An audiologist will give you tests, including

- a hearing test and
- speech perception testing.

The audiologist will use the results to consider what works best for you. At times, a hearing aid helps. Sometimes, it will not. If you have a significant hearing loss, you may be a good candidate for a cochlear implant. Sometimes, patients do best with a cochlear implant in both ears. Other times, it may be best to have a cochlear implant in one ear and use a hearing aid in the other ear. The audiologist will work with you and the rest of the team to make suggestions.

Even if a cochlear implant will work for you, there are some factors that will influence its effectiveness:

- differences in the inner ear, or cochlea
- how long hearing loss has been present
- cognitive abilities
- ability to understand speech, with or without hearing aids

What should I know about surgery?

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Cochlear implant surgery can be performed on one ear (unilateral) or on both ears (bilateral). Your surgeon will implant the receiver and electrodes. They are turned on by the audiologist after you have some time to heal. Most people can return to their normal activities within a few days of surgery.

What will happen after surgery?

You will not hear right away with the implants. You will go back to the clinic about 2–4 weeks after your surgery. At this time, the external parts of your implant will be added and programmed by the audiologist. Programming is when the audiologist stimulates the electrodes to find the level when the patient first hears the sound. It is also important to find the level when sounds are loud and still comfortable. It can take many visits to the audiologist to get the programming just right for you. The audiologist will counsel you on care and maintenance of the implant.

You will need treatment to help you figure out what the sounds are and what they mean. This is called audiologic rehabilitation. You may see an audiologist, an SLP, a teacher, or a counselor. You will learn to listen, say speech sounds clearly, and use other communication tools as needed. You will need to follow up every year with the audiologist to check the implant and how it's working for you.

What should I know?

Researchers are always doing scientific studies to find out who can benefit from a cochlear implant. Over the years, advances in the technology have helped more people receive implants. Your team will use current guidelines and studies to make suggestions for you. Many patients hear best with a cochlear implant in one ear and a hearing aid in the other ear (bimodal); other patients hear best when they use two cochlear implants (bilateral). Current guidelines and decisions about receiving either one or two implants can be provided by the team of professionals mentioned previously, who are familiar with cochlear implant technology.

What kinds of results can I expect?

The amount of benefit that a patient receives from a cochlear implant depends on several factors. Research has shown that adults who acquired their hearing loss after learning to talk receive greater benefit than those who had significant hearing loss before learning to talk. Children who receive cochlear implants at an early age (younger than 18 months) and appropriate intervention, including speech-language therapy that focuses on spoken language, tend to demonstrate the greatest benefit.

Notes:

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For more information and to view the entire Audiology Information Series library, visit www.asha.org/aud/pei/.

For more information about balance problems, preventing falls, hearing loss, hearing aids, or referral to an ASHA-certified audiologist, contact:



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