

Cochlear Implants

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What is a cochlear implant?

A cochlear implant is a small electronic device consisting of surgically implanted internal components with an externally worn speech processor. An implant has four basic components:

- Microphone
- Speech processor
- Transmitter and receiver/stimulator
- Electrodes

))) Currently, cochlear implants are FDA approved for anyone over 12 months of age who has significant hearing loss. (((

At this time, a cochlear implant will **not** provide normal hearing. However, it can give children and adults with significant hearing loss useful auditory information for improved communication and awareness of their environment.

Cochlear implants have been around for more than 20 years, and the Food and Drug Administration (FDA) has found them to be a safe and effective treatment for deafness.

How does a cochlear implant work?

The microphone in the cochlear implant picks up sound and sends it to the speech processor, which arranges the sound for delivery to the transmitter/receiver. The transmitter converts this sound signal to an electrical signal, which is collected by the internal receiver (just under the skin) and sent to the electrodes. The receiver instructs certain electrodes to activate inside the cochlea (the end organ of hearing). This activation sends the electrical signal to the brain, where it is interpreted as sound and decoded.

Who is a candidate for a cochlear implant?

Currently, cochlear implants are FDA approved for anyone over 12 months of age who has significant hearing loss. Candidacy for an implant is based on two primary factors:

- Severity of the hearing loss
- Inability of the patient to recognize speech with or without hearing aids

What kinds of professionals will I or my child see, and what kind of testing will be done to determine implant candidacy?

The decision for cochlear implantation involves a team of professionals who work together with the patient and family/caregiver to evaluate the auditory, speech-language, medical, educational, and personal needs of the patient. The qualified audiologist will determine the appropriateness of amplification, conduct the preoperative audiogram and speech perception testing, and counsel the patient and family/caregiver regarding the cochlear implant. The implant surgeon will perform a medical evaluation, which will include radiographic testing to evaluate the status of the inner ear. Additional team member professionals may include:

- Speech-language pathologists
- Teachers
- Neuropsychologists
- Social workers/care coordinators

What should I know about surgery?

Cochlear implant surgery typically lasts between 3 and 5 hours and may be done on either an outpatient or inpatient basis. It will include the patient being given general anesthesia, a surgical cut and drilling of the skull just behind the ear into the mastoid bone to access the inner ear (the cochlea) insertion of the electrodes into the cochlea, and placement of the receiver in the temporal bone, above the mastoid bone. Most patients return to their normal activities within a few days of surgery.

What will happen after surgery?

Approximately 2–4 weeks after surgery, the patient returns to the clinic for fitting of the external equipment. The electrodes are stimulated to determine the level when sound is first heard and to determine the level when sounds are loud but comfortable. This is a process called “mapping” or “programming” of the implant. Special techniques are used to obtain this information from young children. Patients then return for further fine-tuning of the device on several occasions during the first year of device use. After the first 12 months, annual follow-up is recommended to check the speech processor and to evaluate progress with the device.

Factors that do NOT rule out candidacy for a cochlear implant but that may have an impact on outcome include abnormalities of the inner ear, prolonged deafness prior to receiving the implant, additional handicaps including cognitive delays, and lack of appropriate (re)habilitation.

What should I know?

There are many myths regarding candidacy for a cochlear implant. The candidacy criteria are constantly changing. Current guidelines can be provided by the team of professionals, mentioned above, who are familiar with cochlear implant technology, including the audiologist and otologist.

NOTES:

What kind of results can I expect?

The amount of benefit a patient will receive from a cochlear implant depends on several factors. Adults with acquired hearing loss after learning to talk have been shown to have a greater benefit than those who have had significant hearing prior to learning to talk. Children who have been implanted at an early age and receive appropriate habilitation, including speech-language therapy, tend to demonstrate the greatest benefit.



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For more information about hearing loss, hearing aids, or referral to an ASHA-certified audiologist, contact the:



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