PROCEDURE

Cochlear implant

A cochlear implant is an electronic device that provides sound signals to the hearing nerve.

PURPOSE
Improve access to sound and speech

PROCEDURE TYPE
Therapeutic surgery placing electrodes inside the cochlea

WHERE IT IS DONE
Operating theatre

ANAESTHESIA
General

HOW LONG IT TAKES
Two to four hours

PREPARATION
Hearing assessment, imaging, fasting, medicine and vaccine review

RECOVERY
Same day or overnight; no driving after anaesthesia

MAIN RISKS
Infection, dizziness, facial nerve injury, device failure

RESULTS
First assessed at activation, usually weeks after surgery

Overview

A cochlear implant is an electronic hearing device that may help people with severe inner-ear hearing loss when hearing aids do not provide enough benefit.

It has an internal part placed during surgery and an external sound processor worn behind the ear or on the head. The processor collects sound and sends coded signals to electrodes inside the cochlea, which stimulate the hearing nerve.

The implant bypasses damaged sound-sensing cells. It does not restore normal hearing or simply make sounds louder. The brain learns to interpret the signals through programming and hearing rehabilitation.

Why the procedure is performed

The aim is to improve access to speech and other sounds when well-fitted hearing aids are insufficient. Benefits may include better understanding of conversation, awareness of environmental sounds and easier telephone use.

In children born deaf or who lose hearing early, an implant may support spoken-language development. Outcomes depend on factors including age at implantation, access to language, other medical or developmental needs and consistent rehabilitation.

Some people with hearing in only one ear may also be considered. An implant may improve awareness of sound from that side, sound location or tinnitus, but results vary.

Who should and should not have it

You may be assessed if you have sensorineural hearing loss and appropriately fitted hearing aids provide limited speech understanding. The team also considers ear anatomy, general health, communication goals and your ability to attend follow-up and rehabilitation.

Surgery may be avoided or delayed if:

Some issues can be treated or planned around. An absent or severely damaged hearing nerve may require a different implant. Your team should explain the expected benefit and the possibility that speech understanding may remain limited.

- There is an active middle-ear, implant-site or scalp infection
- General anaesthesia is currently unsafe
- Ear anatomy prevents safe electrode placement
- The hearing nerve is absent or cannot carry implant signals
- Follow-up programming and rehabilitation cannot be arranged
- Expected benefits do not justify the risks or meet your goals

How to prepare

Follow your treating facility's instructions because preparation and device practices differ.

Assessment usually includes hearing and speech-recognition tests with and without hearing aids, an ear examination and CT or MRI imaging. Children may also need speech, language and developmental assessments.

Tell the team about all medicines, allergies, previous ear surgery, balance problems and implanted medical devices. Do not stop blood thinners or other prescribed medicines unless the surgical team tells you when and how.

Cochlear implants increase the risk of certain forms of bacterial meningitis. Your team should review your vaccination record, particularly pneumococcal vaccination, and explain which vaccines must be completed before surgery.

Follow fasting instructions. Arrange for a responsible adult to take you home and stay with you if you leave hospital on the day of surgery.

What happens during the procedure

You receive general anaesthesia and remain unconscious during the operation.

The surgeon makes an incision behind the ear, places the receiver under the skin and creates a route through the bone to the cochlea. A flexible electrode array is inserted into the cochlea and connected to the receiver. The team usually tests the implant before closing the incision and applying a dressing.

Surgery on one ear usually takes two to four hours. Bilateral surgery may take longer. The external processor is not normally fitted or switched on during the operation.

Recovery and what to expect afterward

Mild to moderate pain or pressure near the incision is common and may be treated with pain medicine. Report pain that worsens instead of improving.

You can usually eat and drink once awake and any nausea has settled. Rest for the first few days and follow instructions about wound care, hair washing, water exposure, exercise and lifting.

Temporary dizziness, a blocked-ear feeling, taste changes or increased tinnitus can occur. Avoid activities where dizziness could cause a fall.

You cannot drive home. Do not drive while affected by anaesthesia, dizziness or medicines that reduce alertness, and follow your surgical team's restriction.

Many people return to desk-based work or school within one to two weeks. Physical work may require longer, depending on balance, duties and whether one or both ears were treated.

Risks and possible complications

Risks depend on your health, anatomy and device. They include:

MRI scans require special planning because the implant contains a magnet. MRI conditions vary by model, and precautions or temporary magnet removal may be necessary. Keep your implant identification information and tell imaging staff about the implant before any MRI.

- Bleeding, infection or breakdown of skin over the implant
- Temporary or lasting dizziness or balance problems
- Increased tinnitus or altered taste
- Loss of remaining natural hearing in the implanted ear
- Facial nerve weakness or twitching
- Leakage of fluid surrounding the brain and spinal cord
- Meningitis
- Device movement, failure or infection requiring another operation
- Limited hearing benefit despite a working implant

Results and follow up

You will not hear through the implant immediately. The external processor is fitted and the implant activated after the incision has healed, commonly several weeks later.

At activation, an audiologist programs the electrodes to create a personal listening map. Sound may initially seem mechanical or unclear. Understanding usually develops gradually as the brain adapts.

You will need repeated programming, hearing tests and rehabilitation. This may include listening exercises, speech and language therapy or communication support. Children usually need long-term family and educational involvement.

Improvement cannot be guaranteed. The team will monitor hearing progress, wound healing, device function, balance and comfort.

Alternatives

Alternatives depend on your hearing loss and communication priorities.

- Optimised hearing aids: Avoid surgery but may not provide clear speech when inner-ear damage is severe.
- CROS or BiCROS hearing aids: Send sound from the poorer side to the better ear without restoring hearing in the affected ear.
- Bone-conduction devices: Route sound through the skull and may suit conductive, mixed or one-sided hearing loss.
- Auditory brainstem implant: May be considered when the hearing nerve is absent or unusable, although outcomes are less predictable.
- Communication strategies: Sign language, lip-reading, captions, assistive devices and environmental changes can be used with or without hearing technology.
- No surgery: Continuing current supports avoids surgical risks but may leave existing limits in access to sound.

When to call your healthcare team

Contact the implant or surgical team promptly for increasing pain, redness, swelling, drainage, fever, persistent vomiting, worsening dizziness, new facial weakness or a processor or implant-site problem.

Seek urgent medical assessment for clear watery fluid leaking from the ear or nose, sudden marked facial weakness or severe, rapidly worsening swelling.

Call emergency services for trouble breathing, loss of consciousness, a seizure, or possible meningitis symptoms such as severe headache with fever, neck stiffness, confusion or unusual sensitivity to light.

Routine questions about processor comfort, sound quality, programming or rehabilitation can usually wait for normal clinic hours.

Common questions

Will I be asleep?

Yes. Surgery is usually performed under general anaesthesia.

Can I drive home?

No. Arrange transport. Resume driving only after the anaesthetic has worn off, you are not dizzy and your surgical team says it is safe.

How painful is cochlear implant surgery?

Pain, pressure or tenderness near the incision usually improves over several days. Contact the team if pain becomes severe or steadily worsens.

When will I know whether it worked?

The implant is tested during surgery, but hearing results are assessed after activation. Meaningful improvement may develop over weeks or months.

Will sounds seem normal?

Sounds may initially seem electronic or unfamiliar. Programming and listening practice help the brain adapt, but the implant does not reproduce normal hearing.

Can I have an MRI afterward?

Often, but only under conditions approved for your implant model. Tell the imaging service before booking and bring your device identification information.

Sources

- US Food and Drug Administration. Cochlear Implants
- National Institute on Deafness and Other Communication Disorders. Cochlear Implants
- Centers for Disease Control and Prevention. Cochlear Implants and Vaccine Recommendations
- National Institute for Health and Care Excellence. Cochlear implants for children and adults with severe to profound deafness, Technology Appraisal TA566
- American Academy of Otolaryngology-Head and Neck Surgery. Position Statement: Cochlear Implants
- Zeitler DM, Prentiss SM. American Cochlear Implant Alliance Task Force recommendations for determining cochlear implant candidacy in adults. The Laryngoscope . 2024