

# Cochlear Implants

A cochlear implant is sometimes called a hearing aid of last resort. It is usually fitted only when hearing aids provide little or no benefit.

## AT A GLANCE

- A cochlear implant is an advanced hearing technology coil that replaces the function of the cochlea in delivering stimulation to the hearing nerve
- It bypasses the damaged hair cells of the cochlea to electrically stimulate the hearing nerve receptors
- It can help someone with severe or profound hearing loss to hear sounds and understand speech
- Its effectiveness varies from person to person
- Not everyone is clinically suitable for a cochlear implant.



## WHAT IS A COCHLEAR IMPLANT?

A cochlear implant is sometimes called a bionic ear. It is not a hearing aid.

It has two parts

1. The internal receiver is surgically implanted under the skin in the bone behind the ear with

a tiny electrode array inserted into the cochlea. Because of the spiral shape of the cochlea, the array wraps around the central hearing nerve.

2. The external processor is worn behind the ear like a hearing aid and a coil, connected to the processor by a cable, attaches to the internal receptor through the skin using small internal and external magnets to hold the two parts together.

## HOW IT WORKS

The microphones on the processor pick up sound waves outside the ear in the same way as a hearing aid does. The speech processor interprets the sound, changing it into electrical impulses. The coil transmits these impulses to the receiver under the skin.

The receiver sends the electrical impulses through the array to stimulate the hearing nerve.

The equipment is powered by batteries in the external processor.

- Microphone - picks up speech and environmental sound and converts it into electrical signals
- Speech processor - processes these electrical impulses
- Transmitter coil - transmits the electrical impulses to the implanted receiver
- The electrical impulses are channelled through the induction coil and sent to the electrode array in the cochlea
- The auditory nerve sends signals to the brain in the normal way, and these signals are recognised as sound.

## WHAT DOES A COCHLEAR IMPLANT DO?

It allows the auditory system of someone with severe or profound hearing loss or deafness to be stimulated by sound and possibly understand speech and other sounds. It bypasses the damaged sense organ of the cochlea to transmit sound impulses to the brain.

The effectiveness of the implant varies from person to person, and in some cases it can take time to get effective results.

## HOW IS IT FITTED?

The implant is installed during surgery that can last up to three hours. The internal receiver is fitted into the bone behind the ear and the electrode array passed through the middle ear into the cochlea.

The external coil and speech processor are fitted three to six weeks after surgery.

Once the cochlear implant system is fitted, it needs to be adjusted or 'mapped' several times as the person gets used to what they are hearing, to achieve the best programming. In the longer term this will only need to happen once a year.

## WHERE ARE COCHLEAR IMPLANTS DONE?

Cochlear implants are done in Auckland and Christchurch under programmes funded by the government and charitable donations.

You can pay to have the implant done if you do not wish to join the waiting list.

- The Northern Cochlear Implant Trust provides implants for people living from Taupo-north
- The Southern Hearing Charitable Trust provides implants for people living from Taupo-south

## WHO WILL BENEFIT FROM COCHLEAR IMPLANTS?

Cochlear implants are fitted to both adults and children.

For babies who are born with severe or profound hearing loss or deafness, current medical opinion is that the sooner an implant is fitted, the better, in order to help normal auditory, speech, and learning development. Benefits can be achieved from the age of six months.

Adults and children who have a severe or profound hearing loss or deafness but have developed oral skills will also usually benefit.

## WHAT ARE THE RISKS?

All surgery carries risk and those from cochlear implant surgery include

- **Infection:** It is recommended patients are vaccinated against meningitis
- **Facial nerve damage:** The facial nerve runs through the middle ear and can be damaged but this is rare
- **Loss of balance:** Some patients experience loss of balance because the organs that control balance are connected to the cochlea. Where this does happen it is usually temporary
- **Device failure:** The implanted device can fail, but this is rare.

## HOW MUCH DOES IT COST?

The price tag on a cochlear implant can be up to \$50,000 including the device, the operation, and the rehabilitation programme.

Government funding allows the two cochlear implant programmes to provide implants for adults and children, but there can be waiting lists, especially for adults.

ACC funding may be available if the hearing loss was caused by an accident.

At least some of the implant procedure may be covered by private insurance.



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