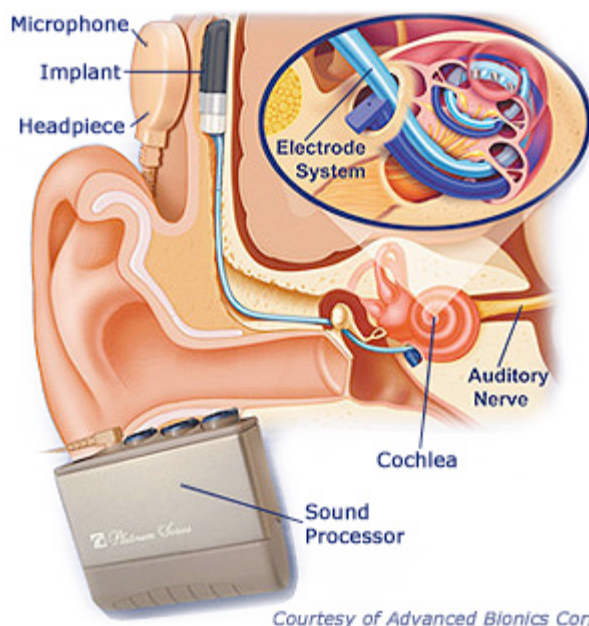


Cochlear Implants

A cochlear implant is a surgically implanted electronic hearing device that provides individuals with the sensation of hearing by bypassing the damaged part of the ear and stimulating the hearing nerve directly. A cochlear implant is an option when the child has very little remaining hearing, for example in severe or profound hearing impairment. A cochlear implant may be of more help than hearing aids in some cases, especially when the hearing impairment is so severe that even the most powerful hearing aid cannot make the sounds loud enough for the child to hear.

Cochlear implant surgery involves placing tiny electrodes into the cochlea in the inner ear. These electrodes convert sound into electrical signals that go to the hearing (auditory) nerve. The cochlear implant surgery causes a permanent change to the cochlea, and any hearing that the child had before the implant surgery may no longer be present. Once the decision is made to go ahead with a cochlear implant and the surgery is completed, the procedure cannot be reversed.



Hearing Aids vs. Cochlear Implants

Hearing aids amplify sound and rely on the integrity of the hair cells of the inner ear. Therefore, patients with a severe to profound hearing loss may obtain limited or no benefit from hearing aids for speech perception. A cochlear implant on the other hand bypasses/replaces damaged hair cells and directly stimulates the auditory nerve. The electrodes in the internal component of the implant provide the "electrical spark" that is picked up by the nerve and taken to the brain for interpretation. Since these electrodes lie along the length of the cochlea, it is possible to have access to the full range of sounds even where there are no hair cells present.

How a Cochlear Implant Works

1. Sound waves enter the system through the microphone (located in the processor).
2. The sound processor converts the sound into a distinctive digital code that has been programmed or "mapped" by the audiologist to maximize cochlear implant sound and speech understanding.
3. Once processed, the electrically coded signal is sent to the headpiece and transmitted through the skin via radio frequency (RF) waves to the implant.
4. The implant receives the signal and delivers it to the array of electrodes positioned within the cochlea.
5. The electrodes stimulate the hearing nerve fibres within the cochlea.
6. The nerve sends the signal to the brain for interpretation.

Early Intervention

The ability to detect sound is critical to a child's ability to learn speech and language. The absence of such sound can have profound effects on speech and language development as well as the educational achievements of children. Given the potential impact on a child's life, it is critical that hearing impairment in children is detected early. Similarly, early referrals to the Cochlear Implant Team are crucial to ensure that maximum benefit is obtained from the cochlear implant.

Having the cochlear implant surgery is just the first step. After surgery, the child will hear many different sounds, but must learn what the sounds mean. Children with cochlear implants will require much training and language experience before learning to perceive and to produce meaningful speech sounds. Children with cochlear implants usually work together with speech-pathologists or auditory-verbal therapists to help them learn to understand language and to talk.

The cost of the cochlear implant device and the cochlear implant surgery are covered by provincial programs. The cost of the training necessary to help the child learn how to listen with the implant is also currently covered. Cochlear implant surgery for infants/children is offered in 3 locations in Ontario: London, Ottawa, and Toronto.

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