

Cochlear Implants

A cochlear implant is a small but complex electronic system used to help individuals who are severely or profoundly hearing impaired/deaf respond to sounds. It does not restore normal hearing to people. The implant has an external device (microphone, computer processor and transmitter) that is placed behind an ear and a second internal device (receiver and stimulator) that is surgically inserted under the skin behind the ear. The external device receives sounds and transmits this information to the internal device.^{1,2}

Cochlear implants operate differently than hearing aids. A conventional hearing aid uses a microphone, amplifier and transducer to send amplified sound into a person's ear(s). Sounds enter the ear canal, impact the eardrum, move through the middle ear, and then are processed by the inner ear; subsequently, sounds are sent to the auditory nerve for processing to the brain.

Cochlear implants, however, go directly to the auditory nerve and then to the brain for processing. Many cochlear implant users experience increased quality of life.^{1,2}

Cochlear implants can be used by people of all ages, and more than 120,000 have been implanted worldwide. In the United States, about 24,000 adults and 16,000 children have been implanted. The majority of children that have received cochlear implants typ-

ically are between 2 and 6 years of age; however implantation age has declined as researchers have reported greater improvement with younger children. Children younger than 12 months of age are currently excluded from Food and Drug Administration (FDA) clinical trials; however, children younger than 12 months have been implanted with FDA-approved devices. In general, the outcomes of children implanted earlier in their lives were significantly better than children implanted later in life. However, the advantage of implanting children before the age of 1 versus waiting until the child was between 1 and 2 years old was questionable.³

While cochlear implants can be very effective, the devices are expensive, as are the surgical procedure to implant them and subsequent required medical care. Further expenses result because intensive post-implantation therapy with an audiologist, teacher of the deaf/hard of hearing and/or speech pathologist is needed so that new wearers can learn to use sounds. Children also may need help in developing social skills. Health insurance may help to cover the costs of a cochlear implant.^{1,2}

Cochlear implantation has been demonstrated to be a safe and reliable procedure; it was introduced by the French in the 1950s, and the first American was implanted in 1961. However, complications from surgery are possible and not all recipients respond equally as well to their implants. Some implanted patients perform better than others as a result of implantation differences, motivational differences and practice using the newly acquired device.^{1,2} Researchers stress that patients with cochlear implants need to undergo a lifetime of continuous follow-up care.¹

While cochlear implantation is now being used for severely and profoundly sensorineural (sensory and neural) hard-of-hearing/deaf adults and children, technology advancements are leading toward the use of cochlear implantation with other types of hearing losses. For example, the National Information Center on Deafness supports research seeking to improve cochlear implants. One research project is studying a shortened electrode array inserted into a select portion of the cochlea to aid listeners who have high frequency hearing loss, a very common type of loss.^{1,2}

For more information about cochlear implantation, contact your audiologist. **\$**

REFERENCES

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3. An Exploratory Look at Pediatric Cochlear Implantation: Is Earliest Always Best?: www.ear-hearing.com/pt/re/earhearing/abstract.00003446-200808000-00002.htm;jsessionid=J7TJyspWpdGQycTByGNp9Jg1VTZqx2jzCRrB4hQSjLhk0hT6yBnN!273838506!181195628!8091!-1



EARLIER IMPLANTS: Researchers report greater improvement with younger children.

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