

Cochlear Implant

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Abstract: Cochlear implants can fill your world with the joy of sound. A cochlear implant can help you or your child hear better in everyday life. Getting a cochlear implant is a big decision, but it can change your life. In this article, we will get the necessary knowledge about the use of the structure of the cochlear implant. Cochlear implants are a device that provides excellent hearing quality and excellent reliability.

Keywords: Cochlear implant, hearing, auditory nerve, deafness, surgery, temporal bone, surgery, sensory-oral.

Purpose of research: Our purpose of research is to study the structure of the cochlear implant, which is needed today, and its useful aspects.

Test methods and materials. A cochlear implant is a surgery to implant a cochlear implant, which allows a patient who cannot hear due to cochlear disease to hear sounds through electrical stimulation of the remaining auditory nerve. Cochlear implantation has been recognized as an effective rehabilitation method by providing useful hearing to patients with bilateral profound sensorineural hearing loss (totally deaf) who do not benefit from hearing aids. In particular, cochlear implantation in children teaches hearing. Important for the development of language and intelligence, age-related hearing loss has recently become a social problem and is the method of choice for patients who cannot use hearing aids. How does a cochlear implant work? Cochlear implants are designed for people with severe and profound sensorineural hearing loss. In this type of hearing loss, the hair cells in the inner ear are damaged and cannot perceive sounds properly. A cochlear implant bypasses these damaged hair cells and sends electrical signals directly to the auditory nerve and the brain, where they are perceived as sound.

In what cases the right to cochlear implantation is exercised:

- If hearing is difficult in both ears and hearing rehabilitation with hearing aids is not effective for more than 3 months, cochlear implantation is considered.
- There should be a properly functioning auditory nerve and no significant structural abnormalities of the ear on CT or MRI. In addition, if there is a serious intellectual decline, the effectiveness of the transplant is reduced by half.
- Must be in good health and have no medical, neurological, or psychiatric problems that would preclude general anesthesia or surgery.
- The shorter the period of hearing loss, the greater the benefit from cochlear implants. If you have experience with speech or language, you may benefit more from cochlear implants.
- For congenitally deaf children, the effect is greatest if the procedure is performed before age 5, especially before age 3. Recently, the procedure is performed at about 1 year of age.

- Not only is family and community support important for rehabilitation, but you also need to be realistic and have a strong motivation for your surgery.

A cochlear implant pre-surgery evaluation will determine if you are a suitable candidate and if there will be any problems after surgery. It consists of a general physical examination (blood test, electrocardiogram, etc.), hearing and language evaluation, imaging tests (temporal bone CT, temporal bone MRI), balance function test, and more.

Approximately 3-4 weeks after surgery, when the swelling in the surgical area is reduced, an external device is worn and mapping is performed. Mapping is a series of processes by which sound signals are transferred from the language processor to a receptor/stimulator in the body and tuned as appropriately as possible so that each person hears the best sound possible. It usually begins 4-6 weeks after surgery, as the postoperative swelling decreases and the thickness of the scalp should be less than 6 mm. The smallest sound stimulus level at which the patient can perceive a sound stimulus (T-level) and the loudest sound warning level (C) that does not cause discomfort as the stimulus sound gradually increases -level) a series of processes to determine. say so. The frequency of mapping varies for children and adults, but mapping is usually done once a week to determine the appropriate intensity of stimulation. After 3-4 mappings, the appropriate sound level is determined, and then 3-4 mappings are carried out once every month. Once the map is stable, it is checked every six months to once a year. In addition to regular mapping, patients should undergo a mid-term review if there are changes in their hearing.

After cochlear implantation surgery, a certain level of training is required to understand and speak the language. Children who have not yet learned to speak should receive regular auditory training and speech therapy after surgery to help them acquire language, as if they were learning each word from their parents for the first time in their lives. Even if you are an adult who can speak, if you have surgery, the sounds you hear through the machine will be different than what you have heard before, so you will need to practice hearing the sounds even after the surgery. When adults who are already able to speak well undergo surgery for hearing loss, the sounds are different from what they heard before, but the brain quickly adapts the old sounds to the new sounds and allows them to have a normal conversation.

Conclusion. Cochlear implant machines and surgical techniques continue to evolve. Fully waterproof products that allow swimming have been released, external devices are getting smaller, and hybrid cochlear implants, which combine hearing aids and cochlear implants, have expanded the scope of cochlear implants. In the future, such implants will be further developed and will have even more positive potential.

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