

# Surgical treatment of deafness

The auditory nerve stimulation of the deaf has been experimented with since the 1950s. During the 1980s, the cochlear implant became a common method of treating and rehabilitating deafness.

## Cochlear neuroprosthesis (implant)

An electronic device that stimulates the auditory nerve endings in the cochlea. She is able to partially restore hearing to people who have lost it or were not born with it. It consists of two parts:

### Internal part

- Biocompatible encapsulated electronic circuits;
- from this comes the electrode, which consists of a bundle of wires;
- it is placed during the operation in a milled bed in the temporal bone behind the ear;
- we introduce the electron beam into the scala tympani so that it is as close as possible to the ggl. spirale;
- on the electrode, different electrodes are terminated at different distances from the insertion point in the base of the modiolus, it depends on the pitch of the tone, which electrode is activated - the further it is from the base, the lower the tone.

### External part

- Includes a microphone, speech processor, and transmitting coil;
- converts acoustic energy into electrical energy;
- the speech processor is worn in a pocket, on a belt or, more modernly, behind a buttonhole;
- the transmitter coil can be placed externally on the skin behind the ear - it communicates transcutaneously, wirelessly with the inner part.

## Selection of candidates

- It is complicated, a number of examinations are required.
- Chronic changes in the middle ear are a contraindication.
- The cochlear implant is not given to patients in poor general condition.
- Indication in an adult - bilateral complete postlingual deafness (perceptual defect with loss over 120 dB of tone audiogram)

### Promontory test

- It takes place under local anesthesia,
- After the myringotomy, we place a platinum ball electrode on the promontory of the middle ear, with which we induce an impulse and possibly an auditory sensation (positivity),
- We find out if we caused stimulation, what quality, if it hurt,
- Patients with a positive promoter test are indicated for implantation,
- On HRCT we look for obliterations in the cochlea, they are not contraindications, but you need to know about them.

## Implant in children

- The implantation program for children is somewhat different from the program for adults,
- There must be a quality speech therapy and psychological examination,
- He must go through a long period of intensive hearing rehabilitation.

## Implant Effect

- The patient with the implant is not a normal hearing person,
- The sensations arising from the implant are completely different from the patient's previous experiences,
- They must completely rebuild their associations about sounds through integration with other senses - especially sight,
- The patient has to learn the new hearing (therefore it is not very suitable for old people),
- Many patients are able to talk on the phone, some cannot hear without reading.

## Trunk neuroprosthesis

- Some deaf people will not be helped by a cochlear implant (bilateral lesion of n. VIII - neurofibromatosis, trauma),
- We electrically stimulate the auditory nuclei,
- ABI - *auditory brainstem implant*,
- The principle is similar to above, the loading is controlled by evoked potentials.

## Links

### Source

- BENEŠ, Jiří. *Studijní materiály* [online]. [cit. 2009]. <[http://jirben2.chytrak.cz/materialy/orl\\_jb.doc](http://jirben2.chytrak.cz/materialy/orl_jb.doc)>.

### References

- KLOZAR, Jan. *Speciální otorhinolaryngologie*. 1. edition. Galén, 2005. pp. 224. ISBN 80-7262-346-X.



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