Cochlear implants for advanced hearing loss

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Dear Mayo Clinic: I'm 72 and have worn hearing aids for about a decade. Over the past several years, my hearing seems to be getting worse. Although I've tried several different kinds of hearing aids, I can't hear well with them anymore. A friend suggested I ask my doctor about a cochlear implant. I thought those were just for people who are deaf. Could a cochlear implant help someone like me? How does it work?

A: It's possible that a cochlear implant could be a good alternative to hearing aids in your situation. When they were introduced in the 1980s, it's true that cochlear implants mainly were used for people who had complete hearing loss. Today, however, they often are used to help people who have more advanced hearing loss that cannot be corrected with hearing aids.

Your ear has three areas: the outer, middle and inner ear. Sound waves pass through the outer ear and cause vibrations at the eardrum. The eardrum and three small bones of the middle ear transmit the vibrations as they travel to the inner ear. Within the inner ear, the vibrations pass through fluid in a snail-shaped structure, called the cochlea.

Attached to nerve cells in the cochlea are thousands of tiny hairs that help translate sound vibrations into electrical signals that are sent to your brain through your auditory nerve. The vibrations of different sounds affect these tiny hairs in different ways, causing the nerve cells to send different signals to your brain. That's how you distinguish one sound from another.

In most people who develop hearing loss, the hairs in the cochlea are damaged or missing, usually as a result of aging and exposure to loud noise, or for genetic reasons. That means the electrical signals can't be transmitted efficiently to the brain, and the result is hearing loss. A cochlear implant bypasses hair cells that don't work anymore and gives the brain the ability to perceive sound once again.

The implant has two main pieces: an external processor that fits behind your ear and an internal receiver implanted under the skin behind your ear. The processor captures and processes sound signals and then sends those signals to the receiver. The receiver sends the signals to tiny electrodes that are placed directly into the cochlea when the device is implanted. Those signals are received by the auditory nerve and directed to your brain. Your brain interprets those signals as sounds. All of the parts of a cochlear implant are small, and the processor that fits behind your ear looks somewhat similar to a hearing aid. Because of the small size of these devices, they are relatively inconspicuous, particularly in people with long hair.

Cochlear implantation requires a relatively short outpatient surgical procedure. A small incision is made behind the ear to insert the device. Most people experience little discomfort from the surgery, and its overall risk is low. The device usually is turned on several weeks following surgery. After the device is turned on, you will be able to hear; however, hearing improvement continues for six months to a year after surgery.

Cochlear implants are a well-established technology. At first, physicians and researchers only recommended them for people who had total hearing loss. Over the years, though, research has shown that cochlear implants can be useful for people who still have some hearing. They can be particularly helpful for people who have difficulty understanding speech in everyday listening situations, despite using good hearing aids.

Talk to your doctor or a medical professional who specializes in hearing loss to find out if you would be a good candidate for a cochlear implant. The great majority of people who receive a cochlear implant find that they are able to communicate better with the people around them and more fully participate in conversations and other daily activities that require the ability to hear clearly.