

Hearing implant will open the world of sound for many

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help a person communicate by improving the accuracy of lip reading and enabling people to hear sounds important to their safety.

The implant can help people distinguish between loud and soft sounds as well as control the loudness of their voices.

While the surgery can be performed on those people who benefit from the use of a hearing aid, the implant was designed for those whose hearing cannot be improved through any other means, according to SM, the only manufacturer of the cochlear device in the country.

About 14 million people in the United States have hearing problems, Brandes said. Of that total about 2 million are profoundly deaf which means they hear very little, if anything. And what hearing there is generally "close to the threshold of pain," Brandes said.

THOSE WHO are considered profoundly deaf are candidates for the cochlear implant, Brandes said. In the Detroit area alone that includes approximately 4-5,000 people whose lives could be improved.

In some cases, however, those who are profoundly deaf have adapted well to a deaf environment and reject the implant procedure because of fear of change, Brandes said.

But for those who choose to have the implant, surgery, a three-four day stay in the hospital, motivation and training are required to achieve some type of result.

The cochlear implant system involves several pieces of equipment that are designed to work together to help a person hear sound:

- A microphone (2-3 millimeters in size), which can be worn anywhere, changes the mechanical energy of sound to electrical energy.
- A processor which is the "size of a credit card," according to Brandes, amplifies electrical energy from the microphone and filters it. The processor operates on batteries.
- "It simply converts sound, waves to electrical impulses," Brandes said.
- A transmitter (a skin magnet) worn behind the patient's ear, changes the electrical energy into magnetic signals. This is done so wires are not needed to pass through the skin.
- The receiver is implanted through

surgery and the removal of the mastoid bone. The signal from the transmitter causes electricity to flow to the small receiver placed just under the skin, behind the ear.

The receiver is made of a small coil and two wires or electrodes. One wire extends to the patient's inner ear, the other is placed outside the inner ear.

WHEN AN electrical current passes between these two wires the hearing nerve is stimulated and produces an impulse the brain interprets as sound.

"This is not a hearing aid," Brandes said. "A hearing aid simply amplifies sound."

The cochlear implant, on the other hand, actually stimulates a patient's hearing nerve, Brandes said.

The implant procedure, including hospital and surgical expenses, is about \$9-10,000, according to Brandes.

"It's relatively cheap to regain hearing," he said.

But to date, insurance companies are unwilling to cover the procedure, said Brandes. "Insurance companies are unwilling to make a decision."

Although the implant produces positive results for patients, certain risks

are involved, Brandes said. The risks are similar to those in other types of ear surgery such as infection, weakness or paralysis of the facial muscles.

Additional risks include possible brain damage and severed blood vessels and facial nerves if the procedure is not done properly, Brandes said.

Now that cochlear implants are possible, physicians and researchers are looking to the future.

What's hoped for is to miniaturize the transmitter so it can be implanted in the skin and operated by body heat rather than batteries, Brandes said.

The microphone which must now be clipped onto a man's tie or woman's bra strap could be left externally in the outside ear, he added.

It's also hoped that soon the implants can be done on children.

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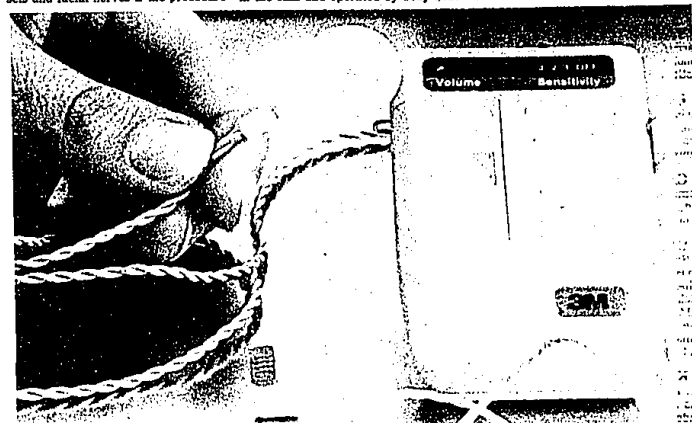
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This is the device which will open a whole new world to Robert Esher who has been deaf since birth.

Man fights to catch up after years of loneliness

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of hearing can be regained in a patient, Brandes said.

"It's a question of all or none. Those who have no hearing now, now will be hearing," he said.

The implant, manufactured only by SM, electrically stimulates the cochlea — the spiral tube of the inner ear — which contains the nerve endings essential for hearing.

Many people who are deaf have badly damaged sensory cells inside the cochlea. Cochlear implants help people hear sounds by bypassing those sensory cells and delivering tiny amounts of electrical current near the hearing nerve. The electrical current excites

the nerve, sends a signal to the brain. The person then hears the signal as sound.

"This is the first time we can enter the inner ear," he continued. "Up to this date the cochlea has never been able to be stimulated."

THE COCHLEAR implant system involves several small pieces of equipment.

On the outside of his body, Esher will wear a tiny microphone, processor and transmitter in addition to the receiver which was implanted last week behind his ear, just under the skin.

Esher must wait about two months for his skin to heal completely before receiving the transmitter, the final

piece of equipment placed behind his ear. Esher will be unable to hear any sound until the transmitter is in place.

"At first it's going to be annoying to him," Brandes said. "He has to learn how to use the implant. He has to work with it."

Although the ideal candidate for a cochlear implant would be one who had been able to hear at one time and is able to speak, Esher's desire to have the surgery and an opportunity to hear something, anything, gives him a chance at success.

"The patient who has the surgery have a high desire rate to hear," Brandes said.



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