

Growing Together

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The Children's Medical Center

Cochlear Implants

The Hearing
Miracle

Meeting the
Special Needs of
Children

RSV – Surviving
this Winter
Virus

A Day in the
Life of a Pediatric
Resident



Timmy, Can You Hear Me?



BY RAJEAN CAMPBELL SNOW

Chances are, most children are familiar with the unique voice of Donald Duck. Most children of the hearing world, that is. But recent advancements are allowing some profoundly deaf children the chance to become familiar with the synthesized sounds similar to those made by the popular Walt Disney character.

Last March The Children's Medical Center made local history when two children underwent a new operation known as the cochlear implant – the first such procedure for children in the Miami Valley.

The cochlear implant – also referred to as the "bionic ear" – was approved by the Food and Drug Administration for use in children in June 1990. Nine months later a surgical team at CMC lead by Terrence Schneiderman, MD, began inserting the device in carefully screened children. He has performed this procedure on several adults at Miami Valley Hospital as well.

Since FDA approval for children, a regional deaf education network has been formed to pool resources and to provide advice for educational activities and referrals. The Dayton Pediatric Cochlear Implant Advisory Board, chaired by Robert A. Goldenberg, MD, includes doctors, audiologists, speech pathologists, psychologists, educational audiologists, and insurance and fundraising experts.

The group is hoping this new procedure will partially restore hearing for many children who were born deaf or who have deafness in both ears due to an injury or illness. And judging from the progress being made by the first few young patients, medical experts and family members have reason to be excited.

Seven-year-old Timothy Leonard of Springboro, the area's first child to receive the cochlear implant, longed to hear his pet Dalmation bark.

"Now Tim often says his dog barks too loud," his mother Carla says with a smile. "We're happy to deal with that problem."

After Tim lost his hearing at age two because of meningitis, Carla and her husband Robert never thought they would see the day their son could hear a dog bark – or any other sound ever again.

"When we heard about this surgery, we felt we had nothing to lose and possibly everything to gain," she says. "Because these are Tim's most formative years, we wanted this surgery as soon as possible so that

if it worked, he could benefit now instead of later. We also knew that this would not be a quick fix."

Dr. Goldenberg agrees with Carla about the importance of children receiving the implant and explains why cochlear implant patients are monitored for years.

"The success of the surgery and rehabilitation is certainly a critical step, but what is really exciting is how these children are able to enhance their learning because they are better able to communicate," he says. "We are all eager to follow their progress through their school years. Tim is now being mainstreamed into math class - now that's progress."

A great deal of work takes place before surgery as well. There is a medical consultation and basic audiological evaluation done at the doctor's office. The patient then comes to Children's for a series of audiological, speech pathology and psychological exams. This can take about a month.

If the patient is approved for the implant, the operation, which lasts between three and four hours, is scheduled.

Dr. Schneiderman makes an incision behind the ear and through a surgical procedure, carefully inserts as much of the 22-channel cochlear implant as possible into the inner ear. Because of possible nerve damage caused by such diseases as meningitis, not all 22 electrodes can always be inserted.

"The success of the operation varies according to the individual, although 99 percent of the patients receive at least some benefits and others benefit a great deal," he explains.

After surgery, the silent waiting continues. The patient must recuperate for five to six weeks before the device is turned on.

Dr. Schneiderman says the procedure is not a miracle and rehabilitation can be a long process. "Many patients, particularly teenagers, expect to be just like their friends immediately after surgery, so some psychological assistance might be needed from the CMC team."

Once the patient has fully recovered from surgery, the therapists in CMC's audiology department become intrinsically

Continued on next page...

Vickie Adams, audiologist, programs Ashley's speech processor so that the youngster will be able to hear a full range of sounds - from soft to loud.



(Top) Dr. Schneiderman adjusts the transmitter coil, which allows Ashley Justice to hear sounds.
(Bottom) Ashley and Tim Leonard learn to differentiate sounds with Terry Wiegel, speech therapist.



involved in the extensive rehabilitation. Rehabilitation takes place in CMC's rehabilitative services department, headed by Patrick Flannery, director. Two key players in the process are Vickie Adams, MA, CCC-A, audiologist, and Terry Wiegel, MS, CCC, speech pathologist.

Adams states that until the cochlear implant is turned on, it's unclear whether the operation was a success. She works with each patient at a computer for two to three days custom-designing a program for the speech processor. Adams says that when the day comes for the "bionic ear" to be turned on, it is a day filled with excitement and fear for both the patient and their parents.

"Words cannot express the feeling I get when I see the children's faces and those of their parents once they can hear sounds," she emphasizes. The sound often scares the kids at first, she adds, but that subsides with therapy.

Adams has been videotaping the programming sessions as a memento for the families and is glad she did. "The tears flow," she says, and admits she has cried right along with them. "The feeling at that moment is incredible."

Wiegel also gets excited when talking about the possibilities this tiny device brings to the deaf world.

"Once the device is programmed, I help the children put meaning to the new sounds they are hearing," Wiegel says. "When I can cover my mouth (so the children can't lip read) or stand behind them and they can hear a command or distinguish a vowel sound, it is so rewarding."

Wiegel works with each child for 30 to 45 minutes every week. She teaches the children to associate sounds with objects such as drums, bells and xylophones. Further into the therapy, they're taught how certain letters sound and how to recognize words and sentences.

Sounds that are very important for deaf children to learn are those connected with safety—such as a car horn, fire alarm and an emergency vehicle siren.

Kim Justice of Piqua, mother of the second cochlear implant recipient,

What It Is and How It Works

eight-year-old Ashley, explains the importance of her daughter's ability to recognize these sounds.

"Before the surgery and therapy I was a lot more protective of Ashley. Now that she can hear people yelling and car horns blowing I don't worry about her as much. I guess I've finally loosened my tight reins – and that's very comforting," she says.

Ashley, who was born deaf, has always been outgoing, according to her parents. But since surgery, "She has just blossomed," Kim says.

Ashley's dad Tom and Kim agree that having the surgery was the best decision they could have made for their daughter. "Before, mere conversations were a struggle. Now it is so wonderful to hear her shout 'Be quiet' to the family bird or to see her excitement when she runs to answer the telephone, even though all she can say right now is 'hello.'"

The therapy for cochlear implant patients can easily exceed one year, according to Adams and Wiegel. For now, the results "speak" for themselves. Both Tim and Ashley have increased their ability by 50 percent to recognize and correctly identify sounds, which was the cochlear implant team's goal.

The third recipient, seven-year-old Jennifer Booth of Xenia, had her surgery in September and already she has been seen dancing to music coming from her "boom box" while doing chores, according to Adams. Last month, a three-year-old girl – the youngest child to receive the implant at CMC – underwent surgery. Like the other children receiving cochlear implants, all surgery and rehabilitation will take place at Children's.

Nationwide, just over 400 children have had the operation since the FDA's approval. And the silence may end soon for many other deaf children and adults who are able to take advantage of this latest development.

"We were always told by doctors – from the time Ashley was born – that by the time she was a teenager something would be designed to help her. Tom and I never really believed it would be true," Kim Justice recalls. "Today, our lives have changed forever – and she's not even a teenager. Now we will always believe."

Inquiries regarding possible candidates for the device should be directed to Vickie Adams, MA, CCC-A (226-8300), or Molly Justus, Solfer, Goldenberg Ear Associates (223-1234).

The cochlear implant includes a magnet, a receiver/stimulator and a banded array of 22 electrodes that extend from the receiver/stimulator into the inner ear (cochlea).

The directional microphone looks like a behind-the-ear hearing aid and is connected to the speech processor and transmitter by two cords.

The speech processor looks like a pocket calculator and is worn on a belt or carried in the pocket.



What is a cochlear implant?

A cochlear implant is a device designed to provide sound information for profoundly hearing-impaired adults and children.

How is it different from a hearing aid?

Hearing aids and other listening devices are simple amplifiers of sound. They are designed to make sounds louder. However, amplified sound through even the most powerful hearing aids may not benefit profoundly hearing-impaired children because their inner ears have been damaged by trauma, disease or other conditions.

A cochlear implant bypasses some of the damaged parts of the inner ear and can provide useful hearing for those who do not benefit from hearing aids.

What is the general criteria for cochlear implants in children?

- two through 17 years of age
- profound sensorineural hearing loss in both ears
- little or no benefit from hearing aids

- no medical contraindications
- educational program that emphasizes development of auditory skills
- high motivation and appropriate expectations

What does the system look like?

The cochlear implant. The internal components of the 22-channel system (which is surgically implanted) include a magnet, a receiver/stimulator and a banded array of 22 electrodes that extend from the receiver/stimulator into the inner ear (cochlea).

The speech processor. It looks like a pocket calculator and weighs about 3.5 ounces. It is worn on a belt or carried in the pocket.

The directional microphone, cable and transmitter. The microphone looks like a behind-the-ear hearing aid and is connected to the speech processor and transmitter by two cords. The transmitter coil contains a small magnet, which connects to the magnet in the internal receiver/stimulator and holds the transmitter in place.