



AT THE FOREFRONT

UChicago
Medicine

Adult Cochlear Implant Informational Packet

Prepared by The Comprehensive Ear and Hearing Center



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WELCOME LETTER

From the entire University of Chicago adult cochlear implant team, we want to thank you for visiting with us as you begin your journey towards cochlear implantation. We hope this brochure provides you and your family important information to help navigate this process, which understandably can seem overwhelming at times.

When considering a cochlear implant, patients and their families should consider that the implant process is the start of a lifetime relationship with the institution and cochlear implant team where the surgery is performed; as such, patients can feel confident that the University of Chicago cochlear implant program is outstanding. We routinely treat even the most complex cases, serving as one of the most comprehensive and experienced cochlear implant teams in the Chicagoland region.

Our dedicated adult cochlear implant audiologists, surgeons, speech-language pathologists, and other support staff have dedicated their lives to perfecting the art and advancing the science of cochlear implantation. We trust that if you decide to have your cochlear implant with our team, you will be joining a caring family dedicated to maximizing your benefit with this miraculous technology.

Welcome!

OUR TEAM

Surgeons

Michael Gluth, MD

Dr. Gluth has vast experience with both routine and complex cochlear implant surgery. He received his surgical training in cochlear implantation as a resident at the Mayo Clinic and as an otology/neurotology fellow at the Ear Science Institute Australia. He is a professor of surgery at the University of Chicago in the Section of Otolaryngology-Head & Neck Surgery.

Terence Edward “Ted” Imbery, MD

Dr. Imbery completed fellowship training in otology/neurotology at the University of Virginia. During his fellowship, he also completed the Advanced Cochlear Implant Surgeons' Training Course through the Institute for Cochlear Implant Training. He is an assistant professor of surgery at the University of Chicago in the Section of Otolaryngology-Head & Neck Surgery.

Audiologists

Jacqueline Kenny Hudson, AuD

Dr. Hudson completed her clinical doctor of audiology at Illinois State University in 2010. As a member of the University of Chicago cochlear implant program, Dr. Hudson has worked with all cochlear implant manufacturers and completes regular continuing education in new technology and programming techniques.

Eric Seper, AuD

Dr. Seper completed his training at the University of Illinois at Urbana-Champaign. He has experience with all cochlear implant manufacturers as well as the hearing aid companies that complement cochlear implants. His professional experience includes both clinical care and hearing aid research.

Jamie Herskovitz, AuD

Dr. Herskovitz received her Bachelor of Science degree in Speech and Hearing Science from the University of Illinois at Urbana-Champaign, and received her Doctorate of Audiology from the University of Wisconsin-Madison. She completed her final year of clinical training at the University of Chicago and has worked with all cochlear implant companies

Speech-Language Pathology

Michelle Havlik, MHS, CCC-SLP, LSLS Cert. AVT

Michelle Havlik is a licensed, ASHA-certified speech-language pathologist who specializes in aural rehabilitation of adult patients with hearing loss who use hearing aids and cochlear implants. She became a Listening and Spoken Language Specialist Certified Auditory Verbal Therapist (LSLS Cert. AVT) in 2014. She obtained her Master of Health Science degree in Communication Disorders from Governors State University and her Bachelor of Arts degree in Speech-Language Pathology from Elmhurst College.

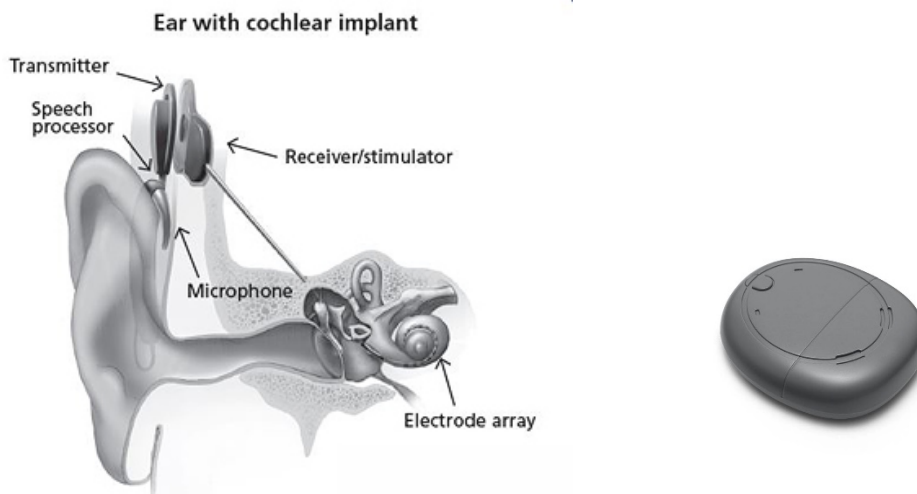
BACKGROUND INFORMATION

Cochlear implants are used to restore inner ear hearing when traditional hearing aids are not enough. Most cases of inner ear (sensorineural) hearing loss are due to disruption or absence of specialized cells deep within the ear that detect sound vibration (hair cells); however, in most of these instances the hearing nerve itself is still capable of detecting sound if stimulated electrically by a cochlear implant. Examples where cochlear implantation may be appropriate include:

- Hearing loss due to the aging process
- Inherited forms of progressive hearing loss
- Fractures of the skull base that involve the ears
- Severe otosclerosis (abnormal bone formation and fixation of stapes bone) involving the inner ears
- Meniere's disease or other inner ear diseases
- Severe noise-induced trauma
- Hearing loss due to meningitis or other severe infection
- Ototoxic effects of certain medications

A cochlear implant consists of two parts:

1. Internal device: this is implanted by your surgeon and consists of a magnet, receiver, and special electrode which is threaded into the cochlea to stimulate the hearing nerve directly
2. External device: this is worn over the ear and contains a microphone, processor, and magnet, which sends the signal to the internal device. Some companies have an "off-the ear" style available as well



EVALUATION

During the evaluation, our team will help you decide if a cochlear implant is a good option for your hearing rehabilitation. This involves a meeting with one of our cochlear implant surgeons and our audiologists. The evaluations do not involve any painful procedures or tests. In general, our team will only offer a cochlear implant if we collectively agree that it is likely to result in a major improvement in your hearing—not just subtle improvement.

Evaluation (Audiologist):

- Review prior hearing tests (audiograms)
- Test hearing with and without your current hearing aids, in conditions with and without background noise
- Test speech understanding (word discrimination)
- Administer hearing quality of life assessments
- Review available cochlear implant devices from various manufacturers
- Discuss realistic expectations and outcomes

Evaluation (Surgeon):

- Perform a detailed medical history and perform a thorough examination with a focus on the ears
- Assess the anatomy of inner ear structures with a CT scan or MRI, if this has been done prior. If not, a CT scan or MRI may be ordered by your surgeon
- Discuss the surgery and associated risks and benefits
- Evaluate your vaccination status and review vaccination recommendations
- Review reports of hearing assessments from the audiologist
- Discuss realistic expectations and outcomes

WHO IS A CANDIDATE?

Patients with bilateral, severe sensorineural hearing loss who no longer get adequate benefit from traditional hearing amplification may be candidates for a cochlear implant. Patients typically have poor clarity (word recognition) on their hearing tests and often they have been struggling with hearing aid use. Many patients may be candidates even if they still have residual, low-frequency (bass tone) hearing or just have hearing loss in one ear.

Depending on your performance on the hearing tests, you may then qualify for cochlear implantation. Medicare/Medicaid and the vast majority of private insurance carriers will cover cochlear implantation if your scores on these tests indicate that you are a candidate. There are certain “cutoffs” for performance, i.e., you have to perform “poorly” enough to qualify. In most cases, you must have previously used traditional hearing amplification. In special circumstances, these requirements may be relaxed, for instance in cases of meningitis.

Patients must have a clear understanding of the expectations and be committed to the entire cochlear implant process. This involves several follow-up visits with your surgeon, speech pathologist, and audiologist for programming and monitoring the device. More importantly, this requires patience and a commitment to adapt to a cochlear implant, and this process will likely take practice and several months of time.

Many patients also inquire if there is an upper age limit for cochlear implantation, but, in fact, there is no age limit!

WHO IS NOT A CANDIDATE?

There are a few, rare instances where cochlear implantation is not possible:

- Absence of cochlea
- Absence of a cochlear nerve

Some *relative* contraindications include:

- Active ear disease or infection
- Severe malformations of the cochlea
- Significant medical comorbidities or an inability to safely tolerate general anesthesia (usually determined by your primary care physician or other specialists)
- Significant psychiatric conditions that would limit proper use of the device
- Poor psychosocial environment where a patient is isolated and unable to practice communication and cochlear implant use
- Unwillingness to participate in follow-up or rehabilitation process
- Extended duration of deafness
- Adults who were deafened prior to development of spoken language. In some rare instances, an implant can be considered to aid with sound awareness, but normal speech and language is not expected to develop as this is after the brain's critical period of language development

WHICH EAR TO IMPLANT?

Discussion between the surgeon, audiologist, and patient will decide which ear to implant. Sometimes this is an easy decision, other times it is not straightforward. These are some general considerations listed below, but understand that each patient situation is unique:

- If both ears have a similar degree of hearing loss, then the ear with the shorter period of hearing loss is typically preferred
- The ear with more favorable anatomy as determined by the CT or MRI scan
- The ear without a history of ear infections or other disease
- If one ear still has serviceable hearing with a hearing aid, the other, “worse” ear can be implanted, and the patient can continue to wear the hearing aid in the “better” ear
- If there is no obvious better ear, then the patient may simply choose the side

SURGERY

Cochlear implant surgery is performed under general anesthesia and typically takes 1 to 2 hours to complete (per ear). It is usually done as an outpatient, meaning you may go home the same day of surgery. A small incision is made behind the ear to access the mastoid bone, which is partially drilled away to expose the inner ear structures and allow the internal device to be placed. Patients often worry about their hair being shaved for surgery; we only need to remove a very small amount from just behind your ear! During surgery, our audiologist also performs testing of the device to ensure that it is working properly. In some instances, we may also take an X-ray to ensure the device is properly positioned within the cochlea before concluding the case.

What are the risks of cochlear implant surgery?

- Bleeding around the device
- Infection
- Device failure
- Device extrusion/exposure
- Imbalance/dizziness
- Possible loss of some or all natural (or residual) hearing if present before surgery in the ear implanted
- Change or alteration of taste
- Facial nerve weakness or paralysis
- Meningitis (rare, but the reason for the vaccination recommendations)
- Leakage of brain (cerebrospinal) fluid
- Risks from general anesthesia; depending on your medical comorbidities, pre-operative testing/clearance may be requested from your primary provider or other specialists
- Failure to improve or gain adequate benefit from the device

Your surgeon will review these risks with you in more detail, but in general these risks are quite rare and the surgery is well tolerated.

AFTER SURGERY

You will wake up with a gauze dressing over your ear which should remain in place for 24-48 hours after surgery to help reduce swelling. Once removed, it is best to keep the incision dry until instructed otherwise by your surgeon. Pain is usually minimal; often times Tylenol or Ibuprofen is all that is needed. Rarely will a short course of pain medication be needed. Some surgeons may prescribe a course of antibiotics to take after surgery to help prevent infection.

The first post-operative visit is usually 1-2 weeks later to assess the healing of the wound(s). Patients may often return to work/school in a few days after surgery. Strenuous activity or exercise should be avoided until cleared by your surgeon.

Some symptoms you may experience after surgery include:

- Numbness of the outer ear (auricle), which is a result of the incision behind the ear
- Dizziness/imbalance for a few days
- Stiffness/soreness of the neck
- Some pain or soreness when chewing
- Change in taste or a dry mouth
- Popping, fullness, or pressure sensation in the ear

Notify your surgeon if any of the following are present:

- Persistent, bright red bleeding from the wound
- Significant swelling/bruising over the wound
- Signs of infection, such as high fever, redness of wound, drainage that is yellow-green or foul smelling
- Signs that the incision is coming apart or breaking down
- Extreme pain that is not relieved with medication
- Persistent, clear fluid leaking from nose
- Persisting dizziness or vertigo that is so severe it limits mobility or ability to tolerate food/drink

ACTIVATION

It is important to note that the device is not activated during surgery. This is to allow appropriate healing and reduction of any swelling after surgery. Approximately 2-4 weeks after surgery you will have an appointment with the audiologist to activate and program the device. The audiologist will also review proper use and features of the device.

To activate your device, the external speech processor has to be “mapped” or programmed for you to hear sound through the implant. The audiologist will put the processor over your ear and connect it to the internal device via the magnet. With computer software, the electrodes of the implant are stimulated. You will hear a series of “beeps” and the audiologist will measure your response to these sounds to determine levels that are loud but comfortable.

The initial speech you hear through the implant may sound unnatural and it is hard to predict what you will experience. For some, speech may sound “robotic,” “mechanical,” “cartoonish,” etc. ***Please do not get discouraged with the sound quality at your activation.*** This will only get better with time and continued practice. ***Remember***, you are learning how to hear again in a totally new way, and it will take time for your brain to adapt to the new signals. Over time, with continued wear and practice listening, most people improve greatly and do better than how they were doing before implantation. Unfortunately, it is hard to predict how long this process may take.

AUDIOLOGY FOLLOW-UP

During the first few months of hearing with your implant, reprogramming or “mapping” is done numerous times. As your hearing and understanding with the cochlear implant improves, fewer reprogramming visits are needed, and many patients can be spaced out to annual visits.

As you begin the first months of your post-implantation journey, ***it is important to wear the implant all day every day!*** Try and have others read books, magazines, and newspapers aloud to practice listening. Many also enjoy listening to audiobooks, while you follow along reading. Ask your audiologist and speech-language pathologist for other ways or ideas that you can learn and practice at home.

AURAL REHABILITATION

The process of aural rehabilitation can be challenging after your device is activated. Again, you are learning to listen in a completely new way! We have a skilled speech-language pathologist with specialized training in aural rehabilitation (auditory therapy). Aural rehab therapy can improve the benefit you receive from your cochlear implant through systematic auditory training, reduce frustration from communication breakdowns with skills training specific to your lifestyle and personal goals, track your progress, assist your audiologist with customized implant programming, and reduce the overall impact of your perceived hearing difficulties in daily life.

During this comprehensive evaluation, your speech, listening, memory, reading, and writing skills may be assessed with the goal to help you better:

- Understand new sounds that have not been heard before
- Understand differences between sounds and between words
- Improve reading and following speech when read aloud
- Improve your speech understanding in daily life
- Use communication strategies to prevent and repair communication breakdowns
- Adjust your listening environment to improve speech understanding
- Improve clarity of speech

The aural rehabilitation evaluation and therapy visits are often coordinated to be the same day as your ENT or audiology follow-up appointments to minimize your travel. The initial evaluation is typically completed about 6-8 weeks after surgery, and the number of recommended aural rehabilitation therapy visits after this evaluation can vary and is based on your individualized needs. Our speech-language pathologist can also:

- Create a customized, independent listening program for you to do daily
- Provide counseling on outcomes, progress, and expectations for functional listening development
- Provide auditory training individualized to your needs
- Provide training and counseling to your frequent communication partners who attend aural rehab with you
- Co-treat with your audiologist to optimize your implant programming as needed

WHAT TO EXPECT LONG-TERM

The majority of people with cochlear implants are pleased with their hearing and receive significantly greater hearing benefit from their cochlear implant than what they received with a hearing aid when ***given proper programming, therapy, daily practice, and time***. Typically, cochlear implant users can converse well in face-to-face conversations, but the time and therapy it takes to get to this point can vary greatly from person to person and is hard to predict. Some difficulties may persist in understanding speech when talking with a group of people or when there is background noise present. The cochlear implant improves hearing but does not lead to normal hearing functions in every situation you may encounter.

Aural rehabilitation can help in providing ideas and strategies for reducing frustration in these more challenging listening situations. Your commitment to wearing your cochlear implant full-time and persevering with programming and therapy is needed to get the best outcomes. Our goal as a team is to work alongside you to achieve the best results possible. We are here to help you in any way we can!

RESOURCES/REFERENCES

Clinic phone: 773-702-1865

Program Website: <https://www.uchicagomedicine.org/conditions-services/ear-nose-throat/conditions-services/cochlear-implants>

Follow us on Twitter: <https://twitter.com/UChicagoHearing>

Device manufacturers:

- **Advanced Bionics**
28515 Westinghouse Place
Valencia, CA 91355
1-877-829-0026
<https://advancedbionics.com/us/en/home.html>
- **Cochlear Corporation**
13059 E. Peakview Avenue
Centennial, CO 80111
1-800-483-3123
<https://www.cochlear.com/us/en/home>
- **MED-EL Corporation**
2511 Old Cornwallis Road, Suite 100
Durham, NC 27713
1-888-633-3524
<https://www.medel.com/us/>

VACCINATION RECOMMENDATIONS

- **People with cochlear implants are at a slightly increased risk for bacterial meningitis, especially pneumococcal meningitis**
- **There are two vaccinations which can help protect against this:**
 - **Pneumococcal conjugate vaccine (Prevnar; PCV13)**
 - **Pneumococcal polysaccharide vaccine (Pneumovax; PPSV23)**
- **Adults 19 through 64 years old with cochlear implants should receive one dose of PCV13 followed by one dose of PPSV23, *if they have not* previously received these vaccines**
- **All adults age 65 years or older getting a cochlear implant should receive:**
 - **1 dose of PCV13 (if they have never received a dose)**
 - **1 dose of PPSV23**

<https://www.cdc.gov/vaccines/vpd/mening/public/dis-cochlear-faq-gen.html>