

St Thomas' Hearing Implant Centre : Assessment for cochlear implants

Who can attend/receive the service?

People who have a bilateral severe to profound sensorineural hearing loss and are not accessing speech easily through conventional hearing aids may be referred for cochlear implant assessment.

- **Bilateral** means that both ears have a hearing loss.
- **Severe** means that the hearing loss is greater than 70dB.
- **Profound** means that the hearing loss is 90dB or greater. This means that you may not be able to hear anything softer than 90dB.
- **Sensorineural** means that the cochlea or auditory nerve isn't working correctly.

There are sections later in this booklet that explain in detail how the ear and cochlear implants work, as well as a list of helpful terms to know.

Depending on an individual's hearing loss, the assessment will be for either a traditional cochlear implant or an electric acoustic stimulation (EAS) cochlear implant.

Where do I need to go?

The service is based in the ENT department, 2nd Floor, Lambeth Wing, St Thomas' Hospital, Westminster Bridge Road, London, SE1 7EH.

What do I need to bring with me?

If you use hearing aids already please bring these to the appointments. Please bring names and contact details for other professionals involved with your medical care and details of any medication you take.

Travel costs

Some families are entitled to reimbursement towards travel costs. Please enquire at the cashiers' office on the ground floor in North Wing (next to the Knowledge & Information Centre (KIC)). If you are entitled to travel cost reimbursement, one of the administrators in the Audiology Department will give you a form to complete each time you visit, which needs to be signed by the clinician looking after your child. The completed and signed form needs to be taken to the cashiers' office who will reimburse you.

What do I do if I cannot attend an appointment?

If you cannot attend an appointment please let the department know as soon as possible. If you do not attend for two consecutive appointments without informing the department it is possible you will be discharged from the service. Please call the administrators on 020 7188 6245, fax 020 7188 8905 or e-mail aiadmin@gstt.nhs.uk with your name and contact details so we can get back to you.

Who are the team?

Our internationally trained staff provides professional and caring services to children and adults.

Consultant otolaryngologists

Mr Alec Fitzgerald O'Connor, Mr Dan Jiang

Audiological scientists

Terry Nunn, Jennifer Demler, Catherine Mills, Sheena McLaren, Elaine Burke

Hearing therapist

Karen Archer

Speech and language therapists

Sandra Driver, Emma Stark, Kathryn Webb, Hazel Walters

Administrators

Susie Altham, Melika Emmanuel, Sandra Allen

ENT nurses

Carol Kimberlin

The assessment process

This information is a guide to the types of assessments that will be made over a number of appointments.

The expected length of assessment, from referral to operation, is typically eighteen weeks. The assessment may be slowed down for many reasons, including patient request or additional medical conditions. The assessment may also be accelerated in specific cases, e.g. post-meningitis cases or other medical/audiological reasons.

Results of tests will be explained as the assessment progresses. The team will decide whether you could benefit from a cochlear implant. If you are offered an implant you are under no pressure to accept. The assessment process is as much for you to gather information about the benefits and risks and decide if cochlear implantation is for you. On completion of the assessment a team report will be sent to you and all the professionals you have asked us to inform.

Please note if you find it a challenge to lip read, staff members will make sure you have access to all the information and conversations by typing what is being asked or said to you.

Initial screening assessment (two hours)

Initial meeting with an audiological scientist and possibly a member of the rehabilitation team who will:

- explain the assessment process
- take a full case history
- discuss issues surrounding cochlear implantation
- carry out some audiological assessment, for example a hearing test.

Medical assessment (30 minutes)

Initial meeting with an ENT surgeon will involve discussion of:

- your medical case history
- decisions made regarding further assessments required
- Magnetic Resonance Imaging (MRI) and Computer Tomography (CT) may be discussed.

If appropriate a full assessment will then consist of:

Audiology assessments (two hours per appointment)

Further clinic appointments will be needed to assess your hearing, amplification needs and functional aided hearing abilities. The number of appointments required will vary but will typically include the following:

- hearing aid fitting
- auditory brainstem hearing test (non invasive)
- speech perception testing.

Speech and language assessments (up to two hours)

An evaluation of your communication skills and the impact your hearing loss has had will be carried out. Issues surrounding implantation, expectations and outcomes will also be discussed.

Magnetic resonance imaging (MRI) and computerised tomography (CT) scans

MRI and CT scan (if appropriate) will be carried out to check the integrity of the cochleae and hearing nerves. You will receive feedback from the scan when you meet with the surgeon at the end of the assessment or at your next appointment with the team.

Information day (three hours)

You will be invited to attend an information day, which is open to extended family, to find out more about cochlear implantation. This will help you to be better informed for the decision making process. A palantypist (speech to text) will be available for those who find lip reading problematic.

Final ENT (30 minutes)

A final appointment with the surgeon will involve discussion of:

- medical issues surrounding cochlear implant surgery
- surgical consent.

Once consent is signed you will be offered the next available surgery slot by the ENT admissions team. They will endeavour to give you as much notice as possible. If you are unable to accept the date they offer then you will be offered an alternative date.

What ongoing support can I expect following surgery?

The following is an approximate outline of the contact with the team following implantation. You can contact the department at any stage should you have any questions or concerns in between these appointments.

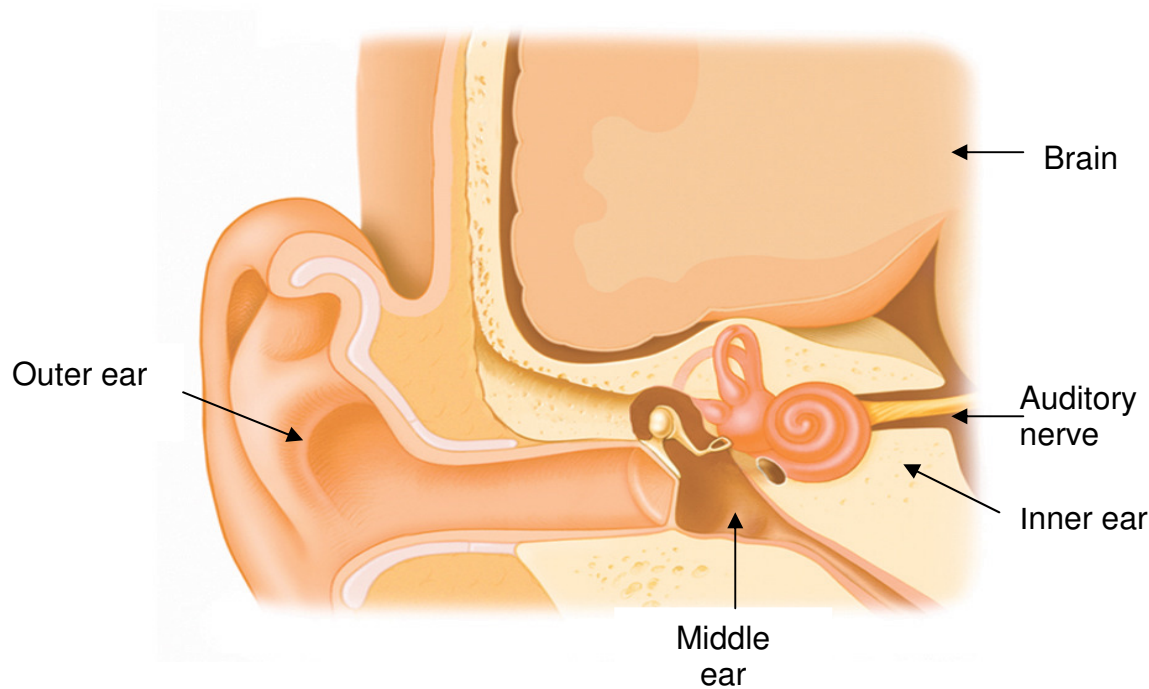
Timeline	Team contact
Operation	
10 days after operation	<ul style="list-style-type: none">• Medical follow-up
Four to six weeks after operation	<ul style="list-style-type: none">• Switch-on device over two days
One week after switch-on	<ul style="list-style-type: none">• Clinic session for mapping and rehabilitation
Six weeks after switch-on	<ul style="list-style-type: none">• Clinic session for mapping and rehabilitation
For the first six months, as needed	<ul style="list-style-type: none">• Additional rehabilitation sessions booked as required
Three months after switch-on	<ul style="list-style-type: none">• Clinic session
Six months after switch-on	<ul style="list-style-type: none">• Clinic session
Nine months and/or one year after switch-on	<ul style="list-style-type: none">• Clinic session review, mapping and rehabilitation
18 months after switch-on (as required)	<ul style="list-style-type: none">• Clinic session
Annually as required	<ul style="list-style-type: none">• Clinic session

How does the ear work?

The ear is made up of three parts, the outer (external) ear, the middle ear and the inner ear.

1. The part we can see is the **outer ear** which also includes the ear canal. It functions to capture sound energy and funnel it to the ear drum. When the sound energy reaches the ear drum it causes the ear drum to move and vibrate.
2. There are three tiny **middle ear** bones connected to the ear drum. When the ear drum vibrates it causes the three bones to vibrate as well.
3. As these bones vibrate they push against the **inner ear** (cochlea). The cochlea is a fluid filled organ which contains many sensory cells called hair cells. As the three bones push against the cochlea the fluid inside the cochlea begins to move, which causes the hair cells to move and bend. The hair cells contact the nerve of hearing (auditory nerve) and as they move and bend they stimulate the nerve. The nerve then sends the message to the brain for processing.

In the case of severe to profound deafness, the hair cells and part of the auditory nerve are affected. This is called sensorineural hearing loss. This damage prevents the sound signals from being transmitted to the brain.



*Image taken from Tools for Schools, Advanced Bionics

What is a cochlear implant?

A cochlear implant is an electronic device used to replace the damaged hair cells in the inner ear. It is made up of two parts:

1. The external portion includes a speech processor, the transmitting coil and the microphone.
2. The internal portion includes the receiver and electrode.

How does it work?

1. Sounds in the environment are picked up by the microphone which sends the signal to the speech processor.
2. The speech processor filters the sound into coded signals.
3. The coded signals are then sent to the transmitting coil which sends the signal through the skin to the implanted receiver.
4. The receiver electrically activates the electrode array which in turn stimulates the auditory nerve.
5. Nerve impulses are sent to the brain where they are interpreted as sound.

For some patients who have some residual low frequency hearing they may be assessed for a combined electric acoustic cochlear implant (EAS). The implant part works as above but there is an acoustic hearing aid that can be programmed to use with the implant to amplify your residual low frequency hearing.



*Image taken from Cochlear Corporation's Literature

If I receive a cochlear implant, will I be able to hear normally?

Adults receive one cochlear implant on the NHS. A cochlear implant does not restore normal hearing.

Once you receive a cochlear implant, you should be able to hear sounds that you were not able to hear with your hearing aids. Although you will be able to hear more sounds, you will need to be trained to use and understand these sounds. Receiving a cochlear implant is simply the first step in a very long process. The degree of success you will have in developing listening skills cannot be predicted, however, with the proper training and support you will have the best chance of being a successful implant user.

Useful sources of information

Additional information regarding cochlear implants can be found on the following websites:

Advanced Bionics (cochlear implant company)

www.advancedbionics.com

Cochlear Corporation (cochlear implant company)

www.cochlear.com

MEDEL (cochlear implant company)

www.medel.com

British Cochlear Implant Group (professional organisation)

www.bcig.org

The Home Counties Cochlear Implant Group

www.hccig.org.uk

The Ear Foundation

www.earfoundation.org.uk

The LINK centre for deafened people

www.linkcentre.org

Helpful terms to know

Acoustic feedback: The whistling sound heard from hearing aids. This occurs when sound escapes from the earmould and is re-amplified. Common causes include loose fitting earmoulds and excessive ear wax.

Air conduction test: Measures the hearing loss by placing ear inserts in the ear and measuring the entire hearing mechanism. May also be completed using loudspeakers in test room.

Amplification: To make louder, increase the volume.

Audiogram: A graphic (visual) representation of a person's hearing thresholds.

Audiologist: A clinician trained to diagnose, evaluate and treat hearing loss.

Auditory brainstem response test (ABR): A measurement of the nerve's response to sound. Can provide objective information to be used in combination with other clinical tests.

Bilateral: Referring to both ears.

Bone conduction test: A test which measures hearing loss by placing a vibrator on the mastoid process (behind the external ear) and measuring the auditory nerves response to sounds

Cochlea: The organ of hearing within the inner ear which converts the sound vibrations to nerve impulses then sends these to the brain.

CT scan (computerised tomography): A medical procedure which looks at the bone structures of the body.

Digital hearing aid: A programmable device capable of sophisticated processing of sounds.

Earmould: A custom-made part that delivers sounds from the hearing aid to the ear.

FM system (radio aid): A device used with hearing aids and cochlear implants that reduces the negative effects of noise and distance on the understanding of speech; commonly used in meetings.

Frequency: A range of pitches detected by the ear from low (base) to high (treble) pitch sounds (i.e. similar to keys on a piano).

Hearing aid: A device which amplifies sound. Patients are commonly fitted with a behind-the-ear (BTE) hearing aid.

Inner ear: The innermost portion of the ear consisting of the cochlea (hearing) and vestibular (balance) systems.

Intensity: Loudness perception ranging from low (quiet) to high (loud).

Lip-reading or speech-reading: The use of visual cues to supplement auditory (hearing) skills to understand oral languages.

Middle ear: The portion of the hearing mechanism between the outer ear and the cochlea (inner ear), consisting of the eardrum, the ossicles (three bones) and the opening of the eustachian tube (tube connecting the ear to the throat).

MRI (magnetic resonance imaging): A medical test looking at the soft tissues of the body. The MRI provides the ENT doctor with important information regarding the structures of the ear.

Otoacoustic emissions test (OAE): A test for cochlear functioning involving the measurement of low-level, inaudible sounds produced by vibrations in the cochlea.

Otolaryngologist (ENT): A medical specialist of the ear, nose and throat.

Outer ear: Visible portion of the ear consisting of the pinna, concha and leading to the ear canal.

Residual hearing: The hearing which remains after hearing loss.

Sensorineural hearing loss: A hearing loss caused by damage to the cochlea, hearing nerve or auditory pathways of the brain.

Speech and language therapist (SALT): A clinician trained and certified to evaluate, diagnose and treat speech, language and communication problems.

Threshold: The softest sound an individual is able to hear.

Tympanogram: A method of evaluating the functioning of the middle ear.

Unilateral: Referring to one ear.

Contact us

If you have any questions please contact the Auditory Implant Programme

t: 0207 188 6245, 9am to 5pm, Monday to Friday

f: 0207 188 8905

e: AIAdmin@gstt.nhs.uk

Pharmacy Medicines Helpline

If you have any questions or concerns about your medicines, please speak to the staff caring for you or call our helpline. **t:** 020 7188 8748 9am to 5pm, Monday to Friday

Patient Advice and Liaison Service (PALS)

To make comments or raise concerns about the Trust's services, please contact PALS. Ask a member of staff to direct you to the PALS office or:

t: 020 7188 8801 at St Thomas'

t: 020 7188 8803 at Guy's

e: pals@gstt.nhs.uk

Knowledge & Information Centre (KIC)

For more information about health conditions, support groups and local services, or to search the internet and send emails, please visit the KIC on the Ground Floor, North Wing, St Thomas' Hospital. **t:** 020 7188 3416

Language support services

If you need an interpreter or information about your care in a different language or format, please get in touch using the following contact details. **t:** 020 7188 8815 **fax:** 020 7188 5953

NHS Direct

Offers health information and advice from specially trained nurses over the phone 24 hours a day.

t: 0845 4647 **w:** www.nhsdirect.nhs.uk

NHS Choices

Provides online information and guidance on all aspects of health and healthcare, to help you make choices about your health. **w:** www.nhs.uk

Become a member of your local hospitals, and help shape our future

Membership is free and it is completely up to you how much you get involved. To become a member of our Foundation Trust, you need to be 18 years of age or over, live in Lambeth, Southwark, Lewisham, Wandsworth or Westminster or have been a patient at either hospital in the last five years. To join:

t: 0848 143 4017

e: members@gstt.nhs.uk

w: www.guysandstthomas.nhs.uk

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