Hearing Implants for Older Adults
There are different views about hearing loss among older adults. While some individuals consider hearing loss to be a handicap, others believe that it is a natural stage of life. Most older adults agree that it is a problem they would like to solve.
If you or someone you care about has experienced hearing loss, you know that it's the subtleties that matter. The singing of a bird, the ringing of a doorbell or simply joining in a conversation can make such a difference to your day. But it is not just the joys of sound that you may miss. You may feel frustrated while trying to follow conversations in busy environments, you may have faced difficulties in everyday situations such as using the telephone, or you may even feel isolated. Don't miss out on the beauty of sound. Diagnosis of hearing loss is simple and straightforward. Contact your doctor or local health authority to find out where you or someone you care about can have their hearing tested. This brochure provides information about how hearing works, types of hearing loss and possible solutions that bring the richness and clarity of sound back into your life.

Hearing Means Independence
Hearing loss is in fact very common. It is estimated that over 300 million people worldwide have age-related hearing loss.1 Today's hearing industry offers a variety of hearing technologies to help with different types of hearing loss. Hearing aids are the most common means used to enhance hearing but do not always provide a satisfactory solution. MED-EL's hearing implant systems are designed specifically to improve the lives of those who receive little or no benefit from traditional hearing aids or who simply want an alternative.
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Importantly for Older Adults

Many terms from the medical specialty of ENT (ear, nose and throat) and from the world of audiology may be new or unfamiliar to you. Here you find simplified explanations for the most common terms to help you better understand the world of hearing.

### Anatomical Terms

**Auditory Nerve:** Also called hearing nerve; the auditory nerve transmits sound as electrical pulses from the inner ear to the brain.

**Cochlea:** The snail-shaped part of the inner ear that converts mechanical vibrations to electrical pulses. This fluid-filled tube contains the sensory cells for hearing.

**Ear Canal:** The tube connecting the outer ear to the middle ear that funnels sound waves to the eardrum.

**Eardrum:** Also called the tympanic membrane; the eardrum separates the outer from the middle ear and vibrates in response to sound.

**Hair Cells:** Sensory cells inside the cochlea. Sound causes tiny hairs on their surface to move. This generates electrical signals that nerve fibres can conduct to the brain.

**Inner Ear:** The part of the ear that comprises the cochlea, which is dedicated to the sense of hearing, and the vestibular system, which is dedicated to the sense of balance.

**Middle Ear:** The middle part of the ear including the eardrum and three tiny bones (ossicles). The middle ear transfers sound to the inner ear via vibrations.

**Outer Ear:** The visible part of the ear, also called the pinna. It collects sound waves and directs them to the ear canal.

**Ossicles:** Three tiny bones, connected in a chain in the middle ear: hammer, anvil and stirrup. They transmit sound vibrations from the eardrum to the cochlea.
Audiological Terms

**Audiogram:** A graph obtained during a hearing test that illustrates the softest sounds a person could hear for different pitches. It shows the degree and type of hearing loss a person has.

**Audiologist:** A professional trained in the measurement, diagnosis and treatment of hearing loss. Audiologists work with patients of all ages to select and fit hearing aids and hearing implants. They also provide habilitation and rehabilitation to children and adults helping them to hear the best they can with a hearing device.

**Audiology:** A science dedicated to hearing, measurement and rehabilitation.

**Audiometry:** A series of tests to measure hearing and middle ear function.

**Auditory Brainstem Response (ABR):**
A test used to assess the auditory pathways by measuring brain waves in response to sound.

**Bilateral Hearing Loss:** Hearing loss affecting both ears.

**Decibel (dB):** The intensity of a sound is measured in decibels. Intensity is related to loudness or volume.

**Frequency:** Frequency, denoted in Hertz (Hz), is a measure of the speed of sound vibrations. Fast vibrations are high-frequency (high-pitched) sounds, slow vibrations are low-frequency (low-pitched) sounds.

**Hearing Threshold:** The softest sound that an individual can hear. Hearing thresholds are displayed on an audiogram to show an individual’s hearing loss for each frequency tested.

**Localisation:** The ability to determine where a sound comes from.

**Otology:** The branch of medicine dealing with the ear.

**Otologist:** A physician who specialises in the treatment of ear problems.

**Rehabilitation:** Specialised training for individuals with hearing loss to help them improve their listening skills.

**Residual Hearing:** The amount of remaining measurable hearing. Most individuals with hearing loss have some amount of residual hearing.

**Speech Frequencies:** The range of frequencies most important for hearing and understanding speech, within about 500 to 4000 Hz.
Hearing Implants for Older Adults
Ears are extraordinary organs with different parts that work together as an entire system enabling you to hear. They pick up sound waves and change them into information that the brain can interpret. Hearing is the perception of sound. A sound is a wave that can vibrate either slowly, creating low-frequency sounds such as a faucet dripping, or quickly, creating high-frequency sounds such as a bird singing.

**How Hearing Works**

1. The pinna funnels sound into the ear canal and causes the eardrum to move.
2. The eardrum vibrates with sound.
3. Sound vibrations move through the ossicles to the cochlea.
4. Sound vibrations cause the fluid in the cochlea to move. Hair cells sense the vibrations within the fluid of the cochlea and generate signals that are transmitted to the brain by the auditory nerve. Hair cells at the inner part of the cochlea send low-pitch sound information, while hair cells at the outer end send high-pitch sound information.
5. The auditory nerve sends signals to the brain, where they are interpreted as sound.
The Audiogram

An audiogram is a graph used to document an individual’s ability to hear. Its purpose is to show the degree and type of hearing loss in each ear.

Frequency (pitch) is depicted from left to right on an audiogram ranging from 125–8000 Hz. The loudness of sounds, which is measured in dB (decibels), runs down the grid, from -10 to 120 dB. The quietest sound an average person with normal hearing can hear is 0 dB.

An audiogram records the results of a hearing test. During a hearing test, an individual listens to beeping sounds presented at different loudness levels and frequencies. The results show the lowest sound level at which an individual is able to hear a certain frequency. The audiogram can be used to evaluate the improvement or deterioration of an individual’s hearing over time by comparing it with previous results. Average normal hearing ranges between 0 and 20 dB HL (decibels hearing level). If an individual’s hearing thresholds are greater than 20 dB HL, they have a hearing loss. An individual with a hearing loss of 40 dB HL, for example, may not be able to hear certain speech sounds. The degree of hearing loss may be mild, moderate, severe or profound.

The graph below shows the frequencies and loudness of typical sounds in everyday life.
Audiogram indicating moderate sensorineural hearing loss
Types of Hearing Loss

Depending on the part of the ear that is affected, experts generally distinguish between conductive hearing loss, sensorineural hearing loss, mixed hearing loss and neural hearing loss.

**Conductive Hearing Loss**
Any medical condition in the outer or middle ear that prevents sound from being properly transferred to the middle ear is a conductive hearing loss. Conductive hearing losses are usually mild or moderate in nature, causing hearing losses of up to 60 or 70 dB. In some cases, conductive hearing losses can be temporary and medication or surgery can help. However, if a conductive hearing loss is irreversible, many people can benefit from a hearing aid or a middle ear implant.

**Sensorineural Hearing Loss**
A problem in the cochlea can cause sensorineural hearing loss. It results from missing or damaged hair cells in the cochlea and is usually permanent. The hearing loss can be mild, moderate, severe or profound. Surgical procedures cannot cure sensorineural hearing loss. Treatment options for mild to severe sensorineural hearing loss are traditional hearing aids or middle ear implants. Severe and profound hearing losses can usually be helped with a cochlear implant.

Conductive Hearing Loss
A blockage or deformity in the middle ear can prevent the bones from vibrating properly.

Sensorineural Hearing Loss
The cochlea does not function properly and is unable to convert sound vibrations into electrical pulses.
Partial deafness is a profound sensorineural hearing loss in the high-frequency range with residual hearing in the low frequencies. Electric Acoustic Stimulation (EAS) is ideally suited for individuals with this kind of hearing loss. This technology combines both acoustic amplification and cochlear implant technology in one system.

Mixed Hearing Loss
A mixed hearing loss is a combination of conductive and sensorineural hearing losses. It results from problems in both the outer/middle ear and inner ear. Treatment options may include medication, surgery, hearing aids or a middle ear implant.

Neural Hearing Loss
A problem that results in the absence of or damage to the auditory nerve can cause a neural hearing loss. Neural hearing loss is profound and permanent. Hearing aids and cochlear implants cannot help because the nerve is not able to pass on sound information to the brain. In some cases, however, an auditory brainstem implant (ABI) may help.
Causes of Hearing Loss

Age-related Hearing Loss
Hearing loss is very common in older adults and is often associated with the ageing process. It is currently estimated that over 300 million people worldwide have age-related hearing loss (ARHL); this figure is projected to reach 900 million by 2050.\(^1\)

Age-related hearing loss, also called presbycusis, is the leading cause of hearing loss in older adults.\(^2\) ARHL usually occurs in both ears, affecting them approximately equally. Hearing usually deteriorates in the high frequencies first. Understanding speech relies on hearing high-frequency sounds. Even a mild loss can impair speech understanding. For this reason, individuals with ARHL typically complain that they cannot understand people’s speech properly, although their hearing is good in the low frequencies.

There are several causes of ARHL including changes in the blood supply to the ear and loss of neurons in the cochlea.\(^3\) A number of other factors that can affect hearing include: smoking, ototoxic medications (e.g., certain antibiotics that can cause hearing loss as a side effect) and cardiovascular diseases (e.g., high blood pressure). ARHL is a gradual process and people may not realise at first that their hearing is deteriorating.

Noise Exposure
Over time, exposure to loud noise can detrimentally affect hearing. Hearing loss caused by loud sounds is called noise induced hearing loss and is the second leading cause of adult-onset hearing loss after ARHL.\(^4\) Loud sounds can damage sensitive structures in the inner ear. Sounds between 120 dB and 150 dB can damage hearing as can prolonged or repeated exposure to sounds above 85 dB. Typically, high-frequency hearing is affected.

Diseases
There are a number of diseases and disorders that can affect the ear and cause hearing loss. These may be present at birth or may occur later on in adulthood. Disorders of the outer and middle ears include malformations and infections, perforated eardrums and otosclerosis. Inner ear hearing loss may be caused by autoimmune diseases, sudden hearing loss and Meniere's disease.\(^5\)
Hearing Implants for Older Adults

Many studies demonstrated that ARHL is correlated with a decreased quality of life.\textsuperscript{6,7,8} People with hearing loss are more likely to experience social isolation and depression as their hearing deteriorates. If left untreated, these may contribute to the decline of health with age. Not being able to understand speech leads to frustration which can turn into embarrassment and loneliness. These psychological effects can, however, be lessened through correct assessment, diagnosis and treatment of the hearing problems.

Consequences of Hearing Loss

Decreased Quality of Life
There are many effective treatment options for hearing loss including: communication strategy training, assistive listening devices, hearing aids, Electric Acoustic Stimulation, middle ear and cochlear implant systems.

Communication Effectiveness
Besides devices that improve hearing, it is also important to learn techniques to support communication ability.

For example, listening in well-lit environments so that a speaker’s face can clearly be seen allows an individual to use visual speech cues. Choosing or moving to a quiet place makes it easier to focus on speech. Also when the distance between the listener and the speaker is not more than one metre, speech understanding is facilitated.

Hearing Aids
Hearing aids are an effective method for treating mild to moderate hearing losses. They work by amplifying sounds. In the past, hearing aids were regarded as cosmetically unappealing, often being associated with certain stigmas. Today, they are small, discreet and come in many shapes, colours and sizes. In combination with modern technological innovations, this has increased the acceptance of hearing aids, enabling them to lose commonly associated negative connotations. Your hearing care professional is instrumental in selecting the right hearing aid.

Hearing aids can be worn behind the ear (BTE), in the ear (ITE) or completely in the ear canal (ITC). Open-fit BTEs use thin tubes and very small ear moulds to transmit sound into the ear canal. They are generally best suited for individuals with milder degrees of hearing loss.

Most hearing aids today are digital. They use a miniaturised computer to convert sound to digital signals before amplification. They can be adjusted to amplify sounds at specific frequencies so they are customised to individual hearing needs. Digital hearing aids can also filter out background noise enabling the user to understand speech better.
Assistive Listening Devices (ALDs)

An assistive listening device (ALD) is an optional aid that can improve day-to-day communication. An ALD is used with or without hearing aids or hearing implants to overcome the negative effects of distance, background noise or poor room acoustics.

There are many different kinds of ALDs designed for various listening situations including personal frequency modulation (FM), infrared and induction loop systems. Some are available to hearing impaired listeners in public venues. Many hearing impaired people use ALDs either alone or with a hearing aid or implant and report benefits such as better speech understanding in difficult listening environments. For more detailed information on ALDs, please contact your audiologist.
The VIBRANT SOUNDBRIDGE® for Older Adults

Some individuals cannot wear hearing aids for medical reasons or they do not achieve sufficient benefit from them, while others simply do not want to wear hearing aids. Regardless of the reason, MED-EL's Vibrant Soundbridge Middle Ear Implant System may be an excellent solution. The Vibrant Soundbridge is suitable for sensorineural hearing loss as well as for conductive and mixed hearing losses.
How the Vibrant Soundbridge® Works

The Vibrant Soundbridge directly causes the structures in the middle ear to vibrate in much the same way as normal sound moves them via the ear canal. This direct stimulation enables excellent sound quality without blocking the ear canal.

The Vibrant Soundbridge consists of an internal and an external component. The external component is the audio processor and contains the battery, the microphone and high-quality, fully digital signal processing. It converts sounds into electrical signals which are transferred to the implant. The audio processor is worn on the head and can be discreetly covered by hair.

The internal component is surgically placed under the skin towards the back of the head. One part of the internal component is the Floating Mass Transducer (FMT), which is attached to a vibratory structure of the middle ear. When activated, the FMT vibrates in a controlled manner, specific to each patient’s hearing needs, causing the structures of the ear to vibrate. These vibrations can be amplified and adjusted to optimally compensate for different types and degrees of hearing loss. The FMT is the core component of the system and is smaller than a grain of rice.
Direct Stimulation of the Middle Ear

1 Sounds are picked up by the audio processor’s microphone. The audio processor is held over the implant by magnetic attraction to a magnet in the implanted part.

2 The audio processor converts environmental sounds into a digital signal.

3 This signal is transmitted across the skin to the implant.

4 The implant sends the signal down the conductor link to the FMT.

5 The FMT converts the signal into vibrations that directly drive a middle ear structure.

6 These vibrations conduct sound to the inner ear and to the brain.
Benefits of the Vibrant Soundbridge®

High Quality Speech and Sound
The Vibrant Soundbridge allows you to hear softer, high-frequency sounds such as children’s voices and birds singing. Frequently, users are delighted with the quality of sound, as soon as they listen with the Vibrant Soundbridge for the first time. A significant improvement in clarity of speech and overall sound quality is noticeable, including your own voice.

Preserving Residual Hearing
Preserving any natural hearing ability whilst restoring impaired function is at the core of MED-EL’s philosophy. Implantation of a Vibrant Soundbridge does not interfere with the natural ability of the hearing organ and residual hearing remains unchanged.

Easy to Use and Comfortable to Wear
The Vibrant Soundbridge is easy to operate. Once the audio processor is placed on the head and programmed, no further adjustments are required. Users rate wearing comfort with the Vibrant Soundbridge as very high. As no part of the system is worn in the ear canal, sound can be enjoyed without occlusion or irritating whistling.

Intelligent Technology
The externally worn audio processor of the Vibrant Soundbridge is based on a state-of-the-art design and features intelligent technology allowing it to take advantage of future innovations in sound processing. Users can benefit from features like wind-noise reduction, Sound Smoothing and speech and noise management. These features are particularly advantageous for older adults with manual dexterity problems because processor adjustments are made automatically.

Reliable and Flexible
The Vibrant Soundbridge has proven to be effective and reliable for over a decade. Results from a large study which analysed the long term performance with the Vibrant Soundbridge show that the system offers good, stable speech comprehension over time.11, 12

Safe Implantation
The Vibrant Soundbridge System is an implantable middle ear hearing system. The internal part of the Vibrant Soundbridge is implanted under the skin in the area behind the ear. The procedure normally takes one to two hours and is performed under either general or local anaesthesia. After that, no further intervention is necessary. All serviceable parts of the Vibrant Soundbridge are located in the external audio processor. Because sound information is transmitted through the intact skin, users have little to no risk of developing infections in the area of the implant. The implantation is routine for experienced ENT surgeons and is performed in hundreds of clinics around the world. If you wish to have more information, your surgeon will fully counsel you on the details of the implantation. For a list of experienced surgeons and clinics, please visit our website at medel.com.
The Vibrant Soundbridge® – Different from a Hearing Aid

It Works Differently
Unlike a hearing aid which amplifies sounds, the Vibrant Soundbridge converts sound into vibrations. This mechanical energy is used to directly stimulate middle ear structures for exceptional high-frequency sound perception. The ear canal remains completely open.

It Feels Different
Users rate wearing comfort with the Soundbridge as very high because the audio processor is held over the implant by magnetic attraction. Because of this special design, users wear their device throughout the day, enjoying the best level of comfort to suit their lifestyle. The Vibrant Soundbridge allows the ear canal to remain completely open and sound can be enjoyed without occlusion or irritating whistling.

It Sounds Different
Featuring direct drive, the Vibrant Soundbridge offers improved hearing quality and speech understanding, particularly in noisy surroundings.

It Looks Different
The special design allows the external audio processor, the only visible part of the Vibrant Soundbridge, to be hidden discreetly and comfortably under the hair. The sleek design of the audio processor is available in different colours, providing you with options to best match your hair colour.
Many older adults with severe to profound hearing loss reach a point where hearing aids no longer provide sufficient benefit. The MAESTRO Cochlear Implant System can help older adults by replacing and mimicking the functions of the inner ear, enabling them to access the rich world of sound.

MAESTRO™ Cochlear Implant System

MAESTRO CI System with the CONCERTO Cochlear Implant, OPUS 2 Audio Processor and FineTuner remote control.
Studies suggest that the age of an adult does not influence the effectiveness of a cochlear implant (CI). In other words, older adults are just as likely to experience similar significant benefits as adults implanted at a younger age.

Cochlear implants are the only devices available designed specifically to help people with sensorineural hearing loss who no longer benefit from hearing aids. Since the 1990's, they have been an established treatment for people of all ages, including people over 60 years. Unlike hearing aids, cochlear implant systems do not amplify sound. They bypass the ear canal, middle ear, and non-functioning parts of the cochlea and deliver sound signals directly to the hearing nerve.

A cochlear implant system consists of internal and external components.
1 Sounds are picked up by the microphone of the audio processor.

2 The audio processor analyses and codes sounds into a special pattern of digital information.

3 This information is sent to the coil and is transmitted across the skin to the implant.

4 The implant interprets the code and sends electrical pulses to the electrodes in the cochlea.

5 The auditory nerve picks up the signals and sends them to the auditory centre in the brain. The brain recognises these signals as sound (speech, music, etc.).
The benefits of cochlear implantation can be measured both audiologically and in quality of life.\textsuperscript{14}

**Speech Understanding**

Relearning to understand speech, even in difficult listening situations, allows many adults to reintegrate into their community and work environment. Through an effective follow-up programme, learning to understand speech again is achieved gradually, and many CI recipients understand speech without lip-reading and in difficult listening situations.

**Speech Skills**

Hearing the speech of others, as well as their own voice, helps CI recipients to fine tune their speaking abilities. Recipients report that improved speech skills have opened them up to new social opportunities.

**Telephone Use**

Due to improved speech recognition and understanding provided by a MED-EL cochlear implant,\textsuperscript{15,16} using the telephone is reported to be much easier. Owing to the superior performance of a MED-EL CI System in noisy situations,\textsuperscript{17} using the telephone – even in background noise – is possible for most users.

**Music**

MED-EL’s MAESTRO Cochlear Implant System enables users to distinguish between vast varieties of sounds, allowing for enhanced music appreciation. With the advanced technologies used in the MAESTRO CI System users report a clear improvement in the quality of music appreciation.

**Independence**

MED-EL realises how important independence is to hearing implant recipients. MED-EL hearing implants help users to be better in touch with their surroundings, allowing them to live life unrestricted. Simple things like hearing a door bell or the telephone ring, joining in a conversation without help from another person and being able to hear traffic from a distance make all the difference to being independent.

**Improved Quality of Life**

Psychological benefits for adult CI users have been well documented.\textsuperscript{18,19} They include alleviation of loneliness and depression as well as enhancement of self-esteem, with a resultant increase in social integration. In many cases, the boost in self-confidence leads to an increase in social activities and a general improvement in emotional health attributes. The vast majority of older cochlear implant users say that they would choose to undergo cochlear implantation again.

**Safe Implantation**

Elderly adults may be concerned about undergoing cochlear implantation because of the risks associated with anaesthesia. However, several studies demonstrate that anaesthesia is well tolerated by elderly patients undergoing cochlear implantation.\textsuperscript{20} In rare cases, local anaesthesia can be used.
FineTune on the Go
The FineTuner remote control allows easy adjustment of basic settings. The FineTuner is easy for people who have difficulties seeing or using small controls. Instead of fiddling around with small switches, the large, easy-to-recognise buttons on the FineTuner allow users to change settings on the go, without taking off the processor and without interrupting hearing.

Automatic Sound Management
While some cochlear implant systems require special switches or settings for optimising hearing in changing listening situations, MED-EL processors make the adjustments automatically. For a stress-free hearing experience, MED-EL processors enable users to hear clearly and comfortably in all listening environments without having to make adjustments!

Power-Efficient and Cost-Effective
Users enjoy an exceptionally long battery life of up to a week, with a single set of hearing aid batteries, without sacrificing performance. Alternatively, the DaCapo Rechargeable Battery System saves users money on hearing aid batteries and makes the audio processor even lighter.

Safe and Reliable Devices
MED-EL hearing implants are designed according to the highest safety standards for long-term reliability, durability and performance. Safety features include SoundGuard, which automatically stops stimulation if static electricity occurs (such as when taking off a sweater) and a status light that provides a visual indication of potential problems (such as low battery power). MED-EL’s industry-leading product reliability reporting for both internal and external components can be followed on medel.com/reliability.
EAS™ Hearing Implant System for Older Adults

Electric Acoustic Stimulation (EAS)

EAS combines the advantages of acoustic amplification and cochlear implant technology in one system. This combined method addresses the specific needs of people with some degree of hearing in the low frequencies but poor hearing in the high frequencies. This kind of hearing loss is often referred to as partial deafness. Individuals with partial deafness are unable to hear high-frequency sounds such as the singing of a bird, or the ringing of a doorbell. They are, however, to varying degrees, able to hear low-frequency sounds such as the whirring of a truck motor or the beating of a drum.
How EAS Works

Electric Stimulation

A cochlear implant converts sounds into coded electrical pulses. These pulses stimulate the auditory nerve. The brain interprets these signals as sound.

1 Mid- and high-frequency sounds are picked up by the microphone of the DUET 2 Audio Processor and are converted into a special code.

2 This code is sent to the coil and is transmitted across the skin.

3 The implant interprets the code and sends electrical pulses to the electrodes in the cochlea.

4 The auditory nerve relays these signals to the brain.

Acoustic Amplification

Acoustic amplification turns up the volume on the sounds that the cochlea is still able to hear. For EAS, only the low frequencies are amplified by the loudspeaker.

1 Low-frequency sounds are picked up by the microphone and are digitally processed.

2 Sounds are amplified by the loudspeaker located in the ear hook and are relayed via the ear mould to the ear canal.

3 Sounds reach the functional areas of the cochlea responsible for processing low-frequency sounds.

4 The auditory nerve sends the signals to the brain.

Study results show that people with partial deafness hear better with an EAS system in noisy situations thanks to the combination of both electric and acoustic stimulation.21

The EAS System features many of the same benefits of the MAESTRO Cochlear Implant Systems including easy adjustment, power-efficient electronics and specially soft and flexible electrodes for the preservation of hearing.
Is EAS a Solution for You?

EAS is designed for individuals with significant high-frequency hearing loss who still have some hearing in the low frequencies. Certain criteria have to be met if an individual is to proceed with the operation. For more information regarding candidacy requirements, please contact your audiologist.

Implantation
Because the EAS System contains a cochlear implant, the surgical procedure is identical to cochlear implant surgery with comparable recovery times.
Receiving a Hearing Implant

Is a Hearing Implant a Solution for You?
Hearing implants are designed for individuals of all ages with different types and degrees of hearing loss who receive little or no benefit from hearing aids and have no medical contraindications. The age at implantation can be as young as several months, with no age limit for older adults. A recent study, for example, demonstrated that CI implantation improved audiological performance and quality of life in older adults with no upper age limit.22

Implantation
MED-EL hearing implants have been implanted in children and adults for over 20 years. Today, hearing implantation is a routine surgery with more than 200,000 people having been implanted worldwide. The operation usually lasts around 2 hours and is performed under general anaesthesia. Recovery rates are fast. After 3–5 days normal activities can be resumed. In some countries, patients go home the same day.
First Fitting
Approximately four to six weeks after implantation, recipients have their audio processor adapted to their specific needs. This is called the “first fitting”. The audio processor is programmed for each individual by an audiologist or other trained professional. The programme contains settings for pitch and loudness. Initially, setting up an ideal programme requires several fitting sessions to fine tune the processor.

Follow-up Programme
While hearing implants provide a remarkable opportunity for adults with hearing loss, sometimes sounds can be initially confusing. Adults may benefit from rehabilitation to help them communicate to the best of their ability. MED-EL offers a wide range of materials available for adult rehabilitation through the BRIDGE to better communication programme and SoundScape. For music appreciation, MED-EL has music programmes with suggestions on how to enhance the music listening experience. For more information regarding our rehabilitation programmes, please contact your clinic or local hearing specialist.
Bilateral Implantation

Bilateral implantation means receiving a hearing implant in both ears. Hearing with two ears has distinct advantages such as improved speech understanding in noise, better speech recognition, sound localisation and even music appreciation. MED-EL pioneered bilateral cochlear implantation in 1996 and has since accumulated leading experience in this field.

Bilateral Implant Surgery

A second implantation is no different than implanting the first. Candidacy requirements are the same, surgical risks are similar, and potential benefits/limitations of one implant apply equally to two implants. However, the implant team may have recommendations regarding the timing of surgery. Bilateral implants can be placed either simultaneously or sequentially depending on the candidate’s and the surgeon’s decision.

Simultaneous surgery means that implants are placed and activated at about the same time. This allows the brain to begin its hearing implant listening experience with sound coming from both ears. Sequential surgery means an individual initially receives one implant and gets a second one later on.

If you are considering bilateral implantation, we recommend that you talk to your implant centre. They can help you establish appropriate expectations based on your history and experience. It is also very helpful to talk with other bilateral implant users, therefore we have created a website that allows you to connect, share experiences and chat live with other MED-EL recipients from around the world. Connect now at hearpeers.com.
Questions and Answers

Below is a list of common questions and answers regarding hearing implants and their usage. If you have any other questions that are not answered below, please feel free to contact your clinic, visit our website medel.com or go to www.hearpeers.com to get information from other implant users.

Are there any special concerns about surgery in older adults?
In general, there are no special concerns for older adults undergoing hearing implant surgery. Your surgeon will discuss your health and medical status to advise you about your particular situation.

How long is the recovery time?
Recovery rates are fast. After 3-5 days normal activities can be resumed. In some countries, patients are allowed to go home the same day.

Will the surgery or my hearing implant make my tinnitus or my dizziness worse?
Typically, neither the surgery nor the hearing implant will make your tinnitus or dizziness worse. However, some individuals do experience tinnitus or dizziness after surgery that usually goes away within a few months. On the other hand, many find that hearing implants improve their tinnitus.

How easy is the hearing implant to use?
We have purposely designed our audio processors to be easy to use. Your clinic will help you along the way and you will also receive a user manual to help you at home.

Is it difficult to wear the audio processor with my glasses?
Glasses slip easily behind the CI audio processor without affecting the position or comfort of the processor or your glasses. With the Vibrant Soundbridge the audio processor sits towards the back of your head. Therefore it does not interfere with glasses.

My hearing aids sometimes whistle. Will my hearing implant also whistle?
No, your hearing implant does not whistle. Hearing implants use a different type of technology where the microphone and loudspeaker are more distant from each other than in a hearing aid.

Can I use my cochlear implant with assistive listening devices, such as loop systems?
The OPUS 2 processor has an integrated state-of-the-art miniature receiver (telecoil) that can be used with a wide variety of telephones, public sound systems and loop systems. Cinemas, theatres, museums and many other locations offer induction loop and infrared systems that make listening easier by minimising background noise.

Should I consider using a hearing aid in the other ear?
If you have some hearing in your other ear, then you may want to use/get a hearing aid. It is generally best to keep providing sound to an ear that can hear.

Will I still need to use a hearing aid in my implanted ear?
There is no further need for a hearing aid in the implanted ear.
Are the batteries rechargeable?
MED-EL CI users have the choice between a fully rechargeable battery pack, providing up to 16 hours of operation, or standard hearing aid batteries that can last up to one week. Vibrant Soundbridge users can also use standard hearing aid batteries for up to 7 days.

How long will my rechargeable batteries last?
The rechargeable battery pack for the CI usually lasts for a whole day of use. It can be used for approximately 500 charging cycles.

Does my health insurance pay for the batteries?
In some countries, batteries may be reimbursed by your health insurance. However, that tends to be the exception rather than the rule. You should check with your insurance provider for more specific information.

Will my health insurance pay for my hearing implant?
Whether or not your health insurance will pay for your hearing implant depends on which country you live in, as well as on the type of hearing implant you receive. There are also other factors that health insurance companies consider. It is best if you check with your health insurance company; sometimes your hearing implant centre can do this for you. In some cases, MED-EL provides assistance.

What do I do if something breaks?
MED-EL’s product reliability records are in a class of their own. We provide honest, transparent and up-to-date reporting all available at medel.com/reliability. However, if something does break, you should contact your clinic or MED-EL representative. We will then do everything within our power to rectify the problem as quickly and efficiently as possible.

Will radios, televisions, and mobile phones interfere with my hearing implant?
In rare cases, the audio processor may interfere with television reception when an indoor antenna is used. To reduce interference, move away from the television and change the antenna’s position. Radio signals will not affect the hearing implant system. Some mobile phones may interfere with the external parts of the hearing implant system. Hearing implant systems are compatible with most mobile phones, but if you are considering buying a mobile phone, you should test it beforehand.

Will metal detectors and body scanners at the airport interfere with my hearing implant?
Your hearing implant is likely to show up on metal detectors and body scanners but it will not be damaged by the scans. Scans may produce sounds that only you, as an implant user, can hear. To avoid this, switch off your audio processor when walking through metal detectors or body scanners.

Will rehabilitation be needed? If so, what can I do?
Hearing implant users may need some help learning to listen with their new implant. Speech and language therapists can help individuals communicate to the best of their ability. Sometimes even experienced users like to practice their listening skills to get the best benefit out of their hearing implant. MED-EL offers a number of listening tips and training materials for adult
users. Please see medel.com for more information. You can also contact your hearing implant centre for more rehabilitation training opportunities.

I already have a medical implant (e.g., pacemaker, artificial knee), will there be any problems using the hearing implant and my other implant at the same time? No cases of interference with other medical implants have been reported to MED-EL.

How long will it take until I can hear better with my hearing implant? This depends on your hearing history, your type and degree of hearing loss and your commitment to rehabilitation.

Should I go to the clinic if I experience a change in my hearing? You should go to the clinic whenever you experience a change in your hearing, or if you experience tinnitus or dizziness or a worsening thereof. Your clinic is there to help you get the best possible performance out of your hearing implant. If you have any concerns or questions regarding your implant, you should contact your clinic or ENT doctor.

How often are clinic visits necessary? During the first months after receiving your hearing implant, you will need to visit the clinic several times to have your audio processor programmed. There you will learn how to use and care for your hearing implant. Later on, you will need to return to the clinic once or twice a year for programming.

Should I use my hearing implant every day? The brain needs to learn how to interpret sounds again. Wearing the audio processor every day enables you to get the most out of your hearing experience.

How many hours a day should I use my hearing implant? Hearing implants should be worn during waking hours. If necessary, they can be stored and dried over night.
At MED-EL, we don’t consider our job finished once you’ve been fitted with a hearing implant. Rehabilitation and support following implantation is a crucial component to your success. Learning how to interpret sounds again is a process. MED-EL is there to help every step of the way, offering a line of rehabilitation materials and outstanding, worldwide service.

“BRIDGE to better communication” is a comprehensive support programme developed by MED-EL in cooperation with leading experts worldwide. It was specially designed for education and rehabilitation to help bridge the gap between implantation and the development of improved listening skills and spoken communication. The BRIDGE programme offers a wide variety of communication packages for clinical and home use, as well as materials that facilitate appreciation of music. The BRIDGE materials cover a broad range of abilities and needs with one goal in mind: to ensure the best possible results for our family of hearing implant users.

SoundScape is an online section that includes various interactive listening activities for all age groups.

Long-term Care and Commitment
Real People, Real Experiences

With Patience and Will Power to Hearing Success

Elisabeth, CI-User

Around the age of 40 I discovered that my hearing was slowly deteriorating. For many years, I coped well with hearing aids. However, my hearing loss continued to worsen and I suffered a series of sudden hearing losses. For years, I had to rely only on the residual hearing in my left ear. It was a difficult time. Some days I accepted my fate coolly, while on others I felt depressed and in despair. I was scared. Scared of how my family would deal with the whole situation. Scared of how I would cope with everyday life without any hearing.

As my hearing abilities diminished, so did my circle of friends. I drew back from society more and more. In bigger groups, I was no longer able to participate in conversations. I simply did not enjoy just sitting there without understanding anything anymore. Family life was not always easy either.

After another sudden hearing loss, my ENT doctor suggested a cochlear implant. The decision was not too difficult. Of course I was a little afraid of the surgery and anaesthesia at 66 years of age, but I trusted my ENT surgeon. After successful surgery, I could hardly wait for my first fitting. A couple of hours after the first fitting, I took a walk and heard the birds singing. This was such an incredible, wonderful experience for me! With patience, regular speech understanding training and further processor fittings, my speech understanding gradually improved.

I quickly got used to the cochlear implant. In the beginning, I did not want others to see the processor, but soon my hair had grown and the hearing device could not be seen.

As my hearing abilities grew, so did my self esteem. The CI helped me to cope with everyday life and made communication possible. I would be helpless without my CI. I am so grateful for this technology. My quality of life has improved so much!

Twice a month I meet with a discussion group. With my CI, I understand really well and after being in the discussion group for 20 years I still love meeting with the members of the group to discuss interesting topics. Without my CI, this would have been unthinkable. My cochlear implant enables me to participate in the hearing world again. I want to encourage other people with a severe hearing loss to consider a cochlear implant as well – for better quality of life.
My name is Friedrich and I was born in 1941. In 1998, I got in-the-ear hearing aids in both ears for the first time. However, even after the adjustment period, I was completely dissatisfied with them. I took the devices out after four months and never used them again.

I first heard of the Vibrant Soundbridge when I read about it in a newspaper article. Right away it was obvious to me that direct stimulation of the natural hearing system behind the eardrum must be the best technical solution. The natural system is untouched, which means that the ear canal remains completely open.

After the surgery, I felt uncomfortable for the first 24 hours because of the bandage. After that I was free of pain. First hearing six weeks after the operation was just terrific. In March 2006, the other ear was implanted. My speech understanding was already much better after the first surgery but now, after my second Soundbridge, I also have perfect directional hearing. I wear my Soundbridge all day long and normally I don’t notice it at all. Unlike eye glasses, I am not aware of the Vibrant Soundbridge.

Prof. Dr. Georg Sprinzl, University ENT Clinic Innsbruck::

“It is a proven fact that hearing implants enhance the quality of life for individuals with hearing loss. For older adults who may have other handicaps in addition to a hearing loss, quality of life can be even more adversely affected. A hearing implant helps reintegrate them socially, leading them from isolation back to society. With a hearing implant, their speech understanding improves considerably, consequently leading to a better ability to communicate.”
I was born in 1938 and for about the last 20 years I have had tinnitus. Initially it was quiet but it progressively got louder and so annoying that I promised to myself that I would try anything to stop it. I tried medicine to improve blood circulation (dusodril, ginkgo), oxygen therapy, ozone therapy, lidocaine and more, but all with no success.

In 1995, I decided to do tinnitus retraining therapy. For me the retraining therapy was very successful. The hyper sensitivity to noise had almost disappeared and the ringing in my ears was only a background noise, which meant it had become tolerable. Through the training, it became apparent that I needed hearing aids, especially for high-frequency sounds.

Unfortunately, the high-frequency hearing loss deteriorated and in the last few years the hearing loss became so bad that my everyday life was severely restricted. I couldn't even hear the telephone ring, the alarm clock or the doorbell, even with the strongest hearing aids. Understanding speech only mostly worked through lip reading. I always got the same responses from the ENT doctors that they couldn't do anything for me and that there was no available help.

Coincidentally, it was brought to my attention from a hearing aid acoustician that it was possible to have an operation which preserved residual hearing. The system was called EAS. So, on the 11th of October 2006, I was operated on without any complications during the surgery. Four weeks later, I had the first fitting session with a MED-EL DUET Audio Processor and immediately experienced good hearing results. The new hearing was impressive. Everything that had been muffled for years suddenly became clear again. The residual hearing in the low frequencies had been preserved, and after a few weeks the acoustic amplification part of the system designed for the low frequencies could be switched on.

After the acoustic amplification was turned on, I really noticed a difference. In the low frequencies, the acoustic amplification enabled voices and tones to have a more natural sound and especially when listening to music I could appreciate a fuller sound. Understanding speech in background noise also got considerably better.

The EAS System has been wonderfully successful and I can hear well again. I can summarise that I have regained my energy once more. With gratefulness and enjoyment, I can again passively and actively participate in a musical life (choir singing) and join in with cultural and social events.
References

MED-EL Headquarters
Fürstenweg 77a
6020 Innsbruck, Austria
office@medel.com