Bone Conduction Implant System

BONEBRIDGE™

A breakthrough technology in hearing systems

NOW available for children
“my quality of life has improved enormously”

Karin, Germany
We are proud to introduce you to the world's first active bone conduction implant – the BONEBRIDGE™.

With the Bonebridge, MED-EL complements its family of hearing implants. The well proven intact skin technology which is already implemented and established in our cochlear implants and middle ear implants, is now being employed successfully in bone conduction stimulation. MED-EL can now offer even more people suffering from varying forms of hearing loss, solutions from the widest product range of hearing implants worldwide.

**Breakthrough technology**

The Bonebridge is an innovative bone conduction implant, which lies completely under the intact skin. It allows sound to be directly transmitted to the inner ear by means of bone conduction. The bone conduction plays a significant role for people, in whom sound cannot be transferred to the inner ear via the natural path through the outer and the middle ear. Therefore the sound is transmitted via the cranial bones to the inner ear to stimulate the auditory nerve.

In order to determine whether the Bonebridge is the right solution for you, the reasons for your hearing loss must first be clarified.

The Bonebridge is available for adults and children aged 5 years or above and can be used for the following types of hearing loss:

- Conductive hearing loss
- Mixed hearing loss
- Single-sided deafness
How our hearing works

The ears are really exceptional organs. They collect sound waves and convert them into information that can be interpreted by the brain. Knowing how natural hearing functions, can help you to understand the reasons for your hearing loss and help decide which treatment options could be best for you.

The human ear is divided into three areas: The outer ear comprises of the visible parts of the ear and the ear canal. The middle ear consists of mainly the eardrum and the three small bones that form the ossicular chain. The inner ear is the actual hearing organ and is called, the cochlea.

How natural hearing works:

1. Sound is picked up by the ear and transmitted through the auditory canal to the eardrum.

2. The eardrum converts the incoming sound into vibrations.

3. The three auditory ossicles are moved by these vibrations and transmit the acoustic stimulation to the cochlea.

4. The fluid in the cochlea is thus set into motion and stimulates the so-called hair cells.

5. The hair cells generate electrical signals which are transmitted from the auditory nerve to the brain.

6. The brain interprets the electrical signals as acoustic sound.
Each type of hearing loss is as different as the person who is suffering from it. Hearing loss originates through damage of one or several parts of the ear. The four different types of hearing loss are explained below:

**Conductive Hearing Loss**
Conductive hearing loss is often caused by malformations of the ear or by severe middle ear infections.

**Sensorineural Hearing Loss**
Hearing loss associated with ageing (presbyacusis or age-related hearing loss) is usually a sensorineural hearing loss. Another common cause could be a noise trauma.

**Mixed Hearing Loss**
Mixed hearing loss means a combination of sensorineural and conductive hearing loss.

**Single-Sided Deafness**
This defines the significant or complete failure of the hearing function on one side. Although patients can hear with the second ear, they still have difficulties in hearing conversation on the impaired side, understanding speech in noisy surroundings and localizing where the sound is coming from.

The Bonebridge is an appropriate solution for conductive and mixed hearing loss and for single-sided deafness.
The first user of the bone conduction principle, known to us, lived in the 18th century. It was the famous composer Ludwig van Beethoven. Even before he reached the age of 30, his hearing problems had begun and became worse year by year. At the end of his life he was practically deaf. In spite of his hearing loss he was still able to hear music. To achieve this, he attached a baton to his piano and bit on the baton with his teeth to be able to hear the music through his jaw bone.

How can sound be transmitted?
The pathway for sound transmission from the outer ear, via the middle ear to the inner ear is known as the air conduction. Besides the air conduction, there is a second mechanism of sound transmission – the so-called bone conduction. Bone conduction bypasses the outer and the middle ear. Through the bones of the skull the sound is transmitted directly to the inner ear.

When is bone conduction hearing used?
When the natural transmission of sound to the inner ear is impeded, bone conduction hearing systems can be used. In bone conduction hearing systems, the cranial bones are stimulated by mechanical vibrations. These vibrations are transmitted directly to the inner ear, where they are processed like normal sound.
INTELLIGENT SIGNAL PROCESSING
DUAL MICROPHONE TECHNOLOGY

THE AP IS HELD BY
MAGNETIC ATTRACTION

SIGNAL TRANSMISSION
SYSTEM

SAFETY
ELECTRONICS

SIGNAL CONVERSION
INTO MECHANICAL VIBRATION

8

signal transmission
system

safety
electronics

signal conversion
into mechanical
vibration

the ap is held by
magnetic attraction

intelligent signal processing
dual microphone technology
How does the BONEBRIDGE™ work?

The Bonebridge is a bone conduction implant system, consisting of an external audio processor, worn behind the ear and an implant, positioned surgically under the skin.

The audio processor is kept in a position directly above the implant by means of magnetic attraction and can therefore be worn discreetly and comfortably under the hair.

Sound waves are recorded by the microphones of the audio processor. The audio processor converts the sound into electrical signals. These electrical signals are transferred through the intact skin to the implanted part of the Bonebridge system.

The electrical signals are converted into mechanical vibrations by the implant and transmitted to the bone. The bone then conducts the vibrations directly to the inner ear, which is embedded in bone. This is the reason why such implants are also called bone conduction implants.

In the inner ear, the mechanical vibrations are converted into nerve signals and transmitted to the brain via the auditory nerve and perceived as sound.

As the signals are transferred directly to the inner ear via bone, hearing impairments in the outer and middle ear can be compensated.
The innovative bone conduction hearing system provides numerous benefits to the user:

**Intact Skin**
- Cosmetically appealing
- The implant is positioned completely invisibly under the skin. The audio processor can be worn discretely and comfortably under the hair and is therefore barely visible.
- Experience with other hearing implants shows that these kinds of intact skin implants are associated with an extremely low rate of skin complications.
- No occlusion of the ear canal.

**Gentle surgery**
The Bonebridge surgery is a quick, simple procedure, usually lasting half to one hour. No further surgical intervention is required afterwards. All replaceable parts of the Bonebridge system are located in the external audio processor.

**Activation of the implant**
The Bonebridge can be activated two to four weeks after surgery. Activation is accomplished by fitting the audio processor to the user’s individual needs.

**Simple handling**
The audio processor is really simple for patients to handle. Only the battery of the audio processor must be replaced every 5-7 days.

**Profiting from the latest signal processing technology**
With the Bonebridge you profit from the latest technology in signal processing. The external audio processor can be upgraded years after implantation and the Bonebridge user can always benefit from latest technology.
Amadé BB audio processor – state-of-the-art technology

The externally worn audio processor of the Bonebridge system is compliant with state-of-the-art technology.

Cosmetically appealing
The audio processor can be worn discretely and comfortably under the hair and is therefore barely visible.

Free program selection
With the Amadé BB, you are in charge of all hearing situations. You can choose from three different programs which are adapted to your personal hearing preferences.

Hearing the important things
With the Amadé, you can easily concentrate on sounds coming from the front. With the directional microphone mode, you will benefit especially in noisy surroundings, for example at parties or in restaurants, and be able to follow a conversation clearly.

Different colours
The housing design of the Amadé is available in four different colours. Choose the colour that best matches your hair colour or the one you like best.

Dark Chocolate          Terra Brown          Golden Sand          Silver Grey
Sound Smoothing
Your Amadé reduces loud or sudden sounds like rattling cutlery or the rustling of a newspaper and permits clear and enjoyable hearing in every situation.

Speech and noise management
The Amadé distinguishes between speech and background noise. It focuses on speech and automatically identifies and reduces background noise.

Wind noise reduction
The intelligent technology monitors your surroundings constantly: wind noises are thus automatically suppressed and your hearing enjoyment is increased.
Countries where MED-EL Hearing Implant Systems have been implanted (as of 2012)
The company

Med-eL Medical Electronics are among the pioneers in the field of implantable hearing solutions. The first multi-channel micro-electronic cochlear implant worldwide was developed by the two Austrian scientists and founders of Med-eL, Di Dr. Ingeborg and Prof. Dr. Erwin Hochmair, and implanted in Vienna in 1977. For the first time, it was possible to replace a human sensory organ, namely the sense of hearing. The company, which is still privately-owned, continuously sets new standards in the development of innovative medical technology for people suffering from hearing loss. The goal of the company is to overcome hearing loss by their comprehensive set of hearing implant solutions and to open the world of hearing to people all around the globe.

Research & Development: safeguarding the future with innovation

Since its founding, Med-eL has continuously invested in research and development, more than 15 percent of the turnover flows back into this sector. New standards and trail-blazing innovations confirm that this is the right way. A secret of the success is the close cooperation with highly qualified researchers and developers (engineering, software, physics, chemistry, medicine, etc.).

The world of hearing: wide range of hearing implant systems

Every day dozens of people around the globe receive a Med-eL hearing implant system. More than half of these are children.

Hearing implants: improving the quality of life

Med-eL offers the broadest portfolio of hearing implant systems and system components worldwide. Med-eL enables surgeons and audiologists to specifically select the best hearing solution for patients suffering from the widest diversity of hearing loss and to adapt these solutions to the personal requirements of the patient. For people suffering from hearing loss, hearing implants are often the only possibility to compensate their hearing loss and therefore significantly improve their quality of life. The solutions from Med-eL are convincing due to their user friendliness, reliability and efficiency as well as their technical edge. Our product philosophy is: “the highest innovative strength and the highest efficiency for best possible hearing.” A special role is attributed to the preservation of the natural residual hearing.
What do other BONEBRIDGE™ users say?

Her spirit for life has been rejuvenated and she can now enjoy her life to the full. Before Lisa received her Bonebridge she tended to be quieter in school but now she actively gets involved in all sorts of events and activities and includes herself in the groups at school. She finds the audio processor very simple to use and can independently put it on and take off herself. As a six year old, she enjoys it when we read stories to her and has so much fun when the whole family get together.

Lisa’s parents, Austria

I am so happy that I opted for the Bonebridge. The operation is so easy; the colour of the audio processor inconspicuously matches my hair colour and therefore provides an excellent cosmetic result. I am so relieved that my ear canal can remain open and free, as this is great benefit. The sound quality has also proved to be natural for me. All in all everything went very well and positively for me. My quality of life has improved enormously and I am so happy that I have made this decision.

Karin, Germany

The best sound quality that I have experienced in 60 years. I opted for the Bonebridge because the implantable part of the Bonebridge lies completely under the skin. I wore a double-sided pair of bone spectacles for 50 years and thought I was being well treated, but the Amadé audio processor has shown that there was room for improvement. I was surprised at how well the communication is working and am really happy that the Amadé audio processor and the Bonebridge have been developed.

Hartmut, Germany

With the Bonebridge, I feel much more actively involved in life. Since I received the hearing implant, music has played an increasingly important role in my life because for me the sound is now louder and more intensive. What pleases me the most: When I get into my car in the morning and turn on the music and hear everything much more intensively and clearly! This makes me feel so happy! I feel like a new person since the day my Bonebridge was activated.

Daniela, Austria
FAQs

What are the benefits offered by the Bonebridge as opposed to conventional bone conduction hearing aids?
With conventional bone conduction hearing aids you have a dampening effect because of the transmission through the skin. On the contrary, the Bonebridge is implanted under the skin, therefore the dampening effect can be avoided. A great advantage of the Bonebridge is that the users don’t have any problems with pressure pain. Compared to the Bonebridge, so-called bone conduction spectacles must be pressed to the scalp using specific strong pressure to allow vibration to be transmitted through the skin to the bone. That constant high pressure applied can cause skin problems and headaches.

What are the benefits offered by the Bonebridge as opposed to bone anchored hearing aids?
Besides the unfavourable cosmetic situation; bone anchored hearing aids have a pedestal that protrudes through the skin. This may cause skin irritations and skin infections. The Bonebridge is the first active bone conduction implant that leaves the skin intact. Experience shows that these types of intact skin hearing implants have an extremely low rate of skin complication.

Can I test hearing with a bone conduction implant before surgery?
If you would like to find out whether the Bonebridge is the right solution for you, you can experience bone conduction hearing prior to the implant surgery. This is accomplished with the aid of a bone conduction headband or bone conduction headphones, positioned on the skin behind the ear. The sound is then carried by the bone to the inner ear.

Can I feel vibrations in the head?
No. The mechanical vibrations of the bone conduction implant are not perceptible as vibrations.

When can I start to use the device after surgery?
The implant is usually activated two to four weeks after the surgical procedure. The implant is activated by fitting the audio processor to the individual hearing loss.

How long can I wear the audio processor?
You can wear the audio processor as long as you wish. The majority of users wear it all day. However it should be removed before you go to sleep or bathe.

What do I have to do on a daily basis, so that my Bonebridge system works?
When you get up, all you have to do is to place the audio processor over the implant. Only the battery of the audio processor needs to be replaced approximately every 5-7 days.

Who can tell me if the Bonebridge is the right solution for me?
If you are interested in a Bonebridge system, please contact a hearing implant centre in your area. You can find the relevant information on our website (www.medel.com) under “Find a Clinic”. The type and severity of your hearing loss will be determined in the implant centre by means of audiological tests. In conjunction with a medical examination, it can be established whether the Bonebridge or another MED-EL hearing system is suitable for you.