

South of England Cochlear Implant Centre

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UNIVERSITY OF
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The MED-EL Vibrant Soundbridge Middle Ear Implant



Audio processor in place



Audio processor covered by hair



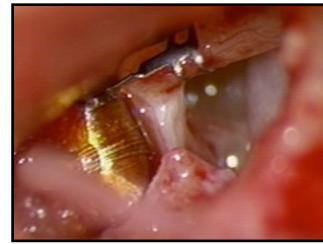
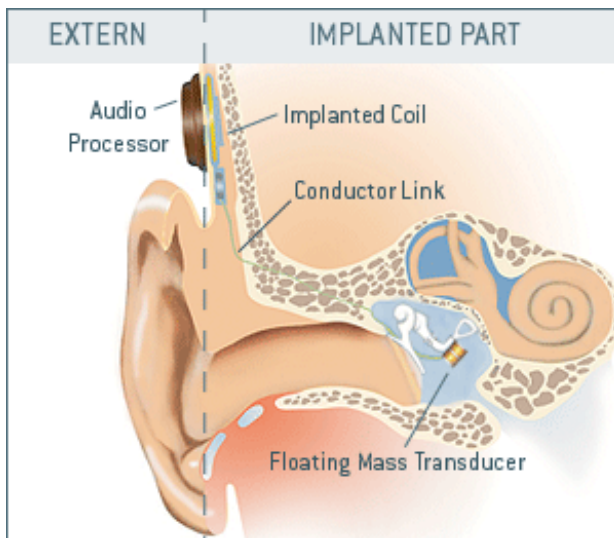
Do you have any patients who are unable to use a conventional analogue or digital hearing aid for any of the following reasons:

Recurrent Otitis Externa
Feedback
Occlusion effect
Mould discomfort, Wax impaction
Abnormal meatus
Abnormal pinna
Meatal stenosis/atresia
Problems in background noise
Mastoid cavity problems
Insufficient benefit after middle ear surgery

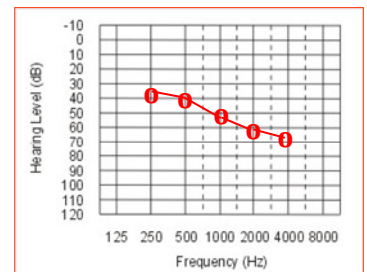
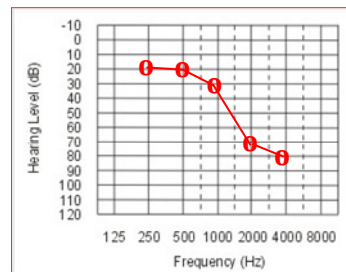
If your patient's inability to achieve consistent or satisfactory benefit from a hearing aid is *significantly interfering with their quality of life* and if they are *suitably motivated* to find a solution then they may well benefit from a MED-EL Vibrant Soundbridge Middle Ear Implant. This middle ear implant is suitable for both **SENSORINEURAL** and **MIXED** hearing losses.

Sensori-Neural Hearing Loss

The original indication for the Vibrant Soundbridge (VSB) was for a sensorineural hearing loss in patients who were unable to use or were dissatisfied with a conventional digital hearing aid. A receiver stimulator package is implanted under the skin behind the ear. Within the package is a magnet that holds the external hearing aid part (Audio processor) in place. Nothing penetrates the skin. A wire connects the package to the floating mass transducer (FMT) in the middle ear. The FMT is a tiny electromagnet that vibrates and is clipped onto the incus. Its vibrations directly drive the ossicular chain which transmits sound into the cochlea.



FMT on incus long process

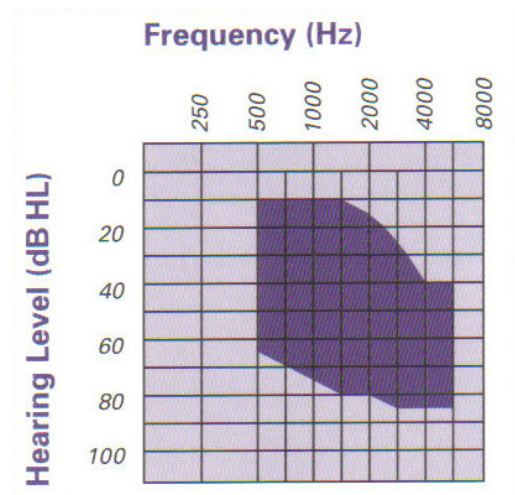


Ideal candidates

Patients who have problems with: **recurrent ear infections, wax impaction, feedback and occlusion effect** and patients with **sloping hearing losses which are difficult to aid** could benefit.

Selection criteria for patients with a SENSORINEURAL hearing loss :

- **Air** conduction thresholds within the shaded area.
- No air bone gap
- Normal tympanometry
- Speech understanding of $\geq 50\%$ on open set word test (AB words) at 65 dB SPL in the free field using hearing aids
- Stable hearing loss
- Previous experience of hearing aids
- No skin condition of scalp which may affect attachment of audio processor
- Realistic expectations
- No retrocochlear or central pathology
- Over 18 years old



During the last 12 years over 4000 devices have been implanted worldwide.

The main advantage is that the ear canal is left open avoiding many of the problems of conventional hearing aids.

Patient satisfaction is high.

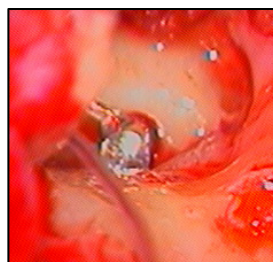
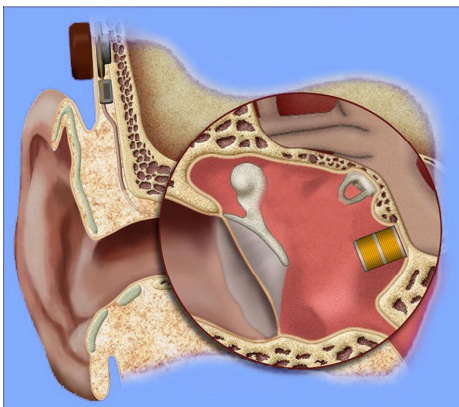
Mixed Hearing Loss (sensorineural AND conductive components)

There is now a new indication for the Vibrant Soundbridge for the treatment of patients with a MIXED HEARING LOSS who can not use a hearing aid.

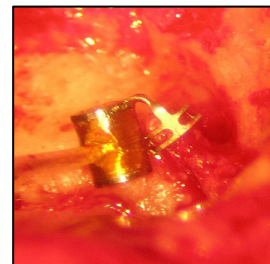
Potential patients are those with a sensorineural loss AND an added conductive component. Indications include:

- failed ossiculoplasties
- ossicular abnormalities
- tympanosclerosis
- otosclerosis with a sensorineural component
- atelectasis
- mastoid cavities with mould fitting problems
- mastoid cavities irritated by hearing aid moulds
- mastoid cavities with no middle ear space
- canal atresia – congenital or acquired

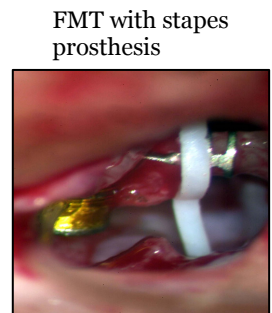
The vibrating part of the Vibrant Soundbridge, the floating mass transducer, is placed directly onto the round window, stapes bone or incus. It then 'directly drives' the cochlear fluids overcoming the conductive component and giving gain of the bone conduction thresholds.



FMT in round window



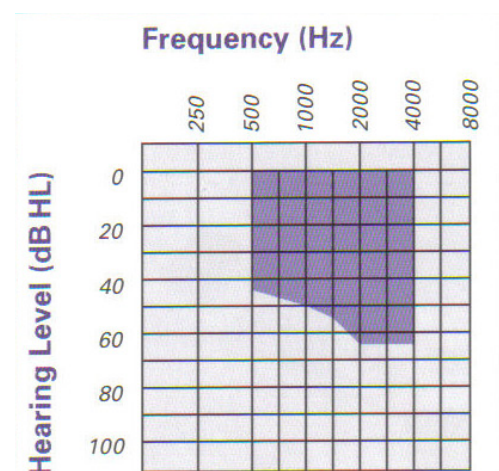
FMT on stapes



FMT with stapes prosthesis

Selection criteria:

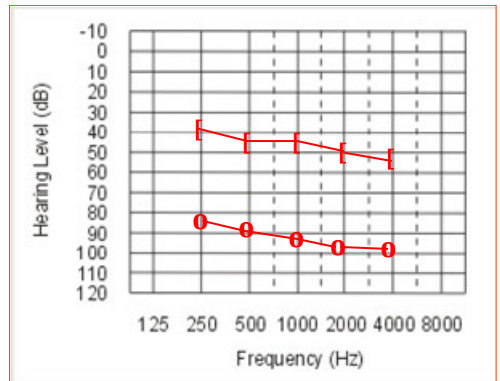
- **Bone** conduction within the shaded area
- Ear anatomy allows placing of the FMT in contact with a suitable vibratory structure in the ear
- Dry ear
- Stable bone conduction thresholds
- Realistic expectations
- No retrocochlear or central auditory disorders
- Over 18 years old.



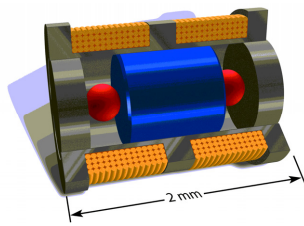
Results suggest a significant improvement in speech reception thresholds compared to conventional hearing aids. The VSB is amplifying the bone conduction levels whereas a conventional aid needs significantly more power to amplify the air conduction levels. More amplification often means more distortion.

A BAHA is most effective when bone conduction thresholds (representing sensorineural function) are normal. The advantage of the VSB over a BAHA is avoidance of a percutaneous abutment and improved sensorineural gain. In order to help justify funding a VSB over a BAHA, it probably competes with a BAHA in those patients with a MIXED hearing loss whose sensorineural thresholds (measured by bone conduction) are at the limit of BAHA criteria i.e. 35–50 dB especially in the high tones. It doesn't matter how bad the air conduction is. In these patients the audiological benefits are probably better than a BAHA. Further experience will tell how the benefit from a VSB compares with a BAHA for patients with better bone conduction thresholds.

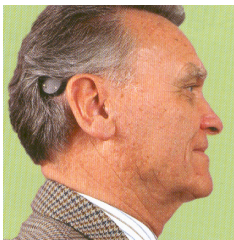
An ideal candidate for a VSB. ○ = AC [= BC



How does it work?



The FMT is the clever part. It consists of a tiny barrel the size of a grain of rice. The barrel contains a magnet sandwiched between two springs. Fine wire is coiled around the outside of the barrel. Passing a current through the wire coils creates a magnetic field which makes the magnet move. By alternating that current the magnet vibrates causing the casing to vibrate. The casing is attached by a clip to the incus long process, the stapes or placed up against the round window. The vibrations directly drive the cochlear fluids.



A receiver stimulator package is implanted under the skin behind the ear. Within the package is a magnet that holds the external Audio Processor in place. Nothing penetrates the skin. A wire connects the subcutaneous receiver stimulator package to the floating mass transducer (FMT) in the middle ear. The sound is collected by the Audio Processor which causes no discomfort and can be covered by the hair.

Benefits

Patients report the following benefits:

- **More natural sound**
- **Benefit in background noise**
- **No feedback issues**
- **Good cosmesis**
- **No discomfort**
- **Avoidance of mould induced problems:**
~ otitis externa, wax impaction, occlusion effect, blockage

If you have a patient who can not get on with a hearing aid for whatever reason and whose audiology is within the above criteria and who is strongly motivated to do something about their hearing loss please consider referring them to the South of England Cochlear Implant Centre for assessment for a Vibrant Soundbridge.

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