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MACARTHUR ENT

Bone Conduction and Middle Ear Implants

Hearing implants for when conventional hearing aids are not suitable

Please read first – this is general information, not advice about your own situation

- This sheet is a **summary of the published medical literature**. The figures quoted are averages from studies of groups of patients.
- It is **not specific to your condition**. The findings in your ears, your hearing, your general health and your preferences all change which options suit you and what your individual risks are.
- Your ENT surgeon will discuss your own examination, tests and options with you. Please bring any questions to your appointment.

Who are these implants for?

Bone conduction and middle ear implants are considered when a regular hearing aid cannot be worn or does not give enough benefit. Common reasons include:

- **Conductive or mixed hearing loss** – a problem with the ear canal, eardrum or middle ear bones, sometimes with inner ear loss as well
- **Chronic or discharging ears**, or previous ear surgery that has not restored hearing – a hearing aid mould can make these ears worse
- **Absent or narrow ear canal** (aural atresia) or an under-developed outer ear (microtia)
- **Single-sided deafness** – one ear has little or no usable hearing and the other hears well
- **Unable to tolerate hearing aids** – for example skin allergy, repeated infections or an ear canal that will not hold a mould

A hearing test (including bone conduction levels) and usually a CT scan are needed to confirm suitability and plan the implant site.

How do they work?

Bone conduction implants pass sound as vibration through the skull bone directly to the inner ear, bypassing the ear canal and middle ear. **Active middle ear implants** attach a tiny vibrating device to one of the middle ear bones (or near the inner ear), driving it directly.

Types of device

Type	Examples	Key features
Non-surgical	Softband, adhesive devices	Worn on a headband or stuck to the skin. Used for young children and for a trial before surgery.
Percutaneous (through the skin)	Baha Connect, Ponto	A titanium post passes through the skin and the processor clips on. Strong sound transmission; highest rate of skin problems; needs daily cleaning.
Active transcutaneous	Osia 300, BONEBRIDGE	The vibrating part is implanted under intact skin, so there is no post through the skin. Strong sound transmission with low rates of skin problems and major complications. These have largely replaced older passive magnetic devices.
Active middle ear implant	Vibrant Soundbridge	Transducer fixed to a middle ear bone or near the inner ear. Suits conductive, mixed and some sensorineural losses when aids are unsuitable.

Trying before surgery

Most people, and especially children, trial a non-surgical softband or adhesive device first. This lets you and your audiologist hear the likely benefit before an implant is placed.

The operation

- Simpler bone conduction implants usually take under an hour, often as day surgery; adults may have a local anaesthetic with sedation, children a general anaesthetic.
- Active implants need a slightly larger operation under general anaesthetic, typically 1–2 hours.
- The sound processor is usually fitted and switched on **2–6 weeks** after surgery, once the wound has healed. Non-surgical devices can be used straight away.

What results can be expected?

- Bone conduction implants commonly improve hearing levels by **25–30 dB or more** compared with no device, with better understanding of speech, including in background noise.
- Active middle ear implants have shown gains of roughly 27–36 dB, with benefit maintained for 10 years or more in long-term studies.
- With **single-sided deafness**, the main benefits are hearing sounds on the deaf side and following speech in noise; the good ear still does most of the work.
- Quality-of-life questionnaires consistently improve after implantation. Hearing results usually settle by about 3 months, and satisfaction often keeps improving to about 6 months.

Possible complications

Issue	What the literature reports
Skin reactions around the implant	About 30% with percutaneous (through-the-skin) posts versus about 6% with transcutaneous devices in children; most are minor and settle with local care.
Implant loss	About 5% with percutaneous posts in children; close to 0% with transcutaneous devices.
Revision surgery	About 6% (percutaneous) versus about 3% (transcutaneous).
Active middle ear implants	Overall complication rate around 16%, with device failure in roughly 3–4% over long-term follow-up. Most users are still using the device many years later.
After surgery	Temporary pain, numbness, dizziness or tinnitus, which usually settle within days.

MRI scans

Most modern devices are **MRI-conditional**, but the rules differ between devices – including magnet strength, whether the magnet must be removed, and image distortion near the implant. Always tell your doctor and the radiology department which implant you have **before** any MRI is booked, and carry your implant card.

Recovery and long-term care

- Expect swelling and tenderness for 1–2 weeks. Most people return to light activity within a few days and full activity, including swimming and sport, after about 4–6 weeks once cleared.
- Percutaneous posts need **daily cleaning** of the skin around the abutment for as long as the implant is in place.
- Regular reviews include hearing tests and processor programming. External processors are usually upgraded every several years.

Remember

- The numbers on this sheet summarise the published literature and describe groups of patients, not you as an individual. Your own risks and the best option for you will be discussed at your consultation.
- Appointments: Macarthur ENT, Gregory Hills and Campbelltown – (02) 4625 1682 · macarthurent.com.au. A GP referral is needed for a Medicare rebate.