Surgical Treatments for Hearing Loss - BAHA and Atresiaplasty

Most of the time, permanent childhood hearing impairment is not treated surgically. Most treatments are focused on helping your child make the best use of the hearing that he/she has in order to develop communication, speech, and language skills to the best of his/her ability. In some situations, however, a surgical treatment can help improve your child's access to sound.

Bone-anchored hearing aid

What is this? A metal implant that is surgically placed in the bone above and behind the ear that allows sound to be transmitted through the bone to a functional inner ear. There are different manufacturers of this kind of device, including the Cochlear Baha, Oticon Ponto, and Sophono.

Who can get this? Children with single-sided deafness or microtia/atresia, who use bone-conduction hearing to restore access to sound on the side that is deaf or has microtia/atresia. Prior to age 5, these bone-conduction hearing aids are worn on a softband. After age 5, there is an option to surgically implant part of the bone-conduction hearing aid. Exact timing of the surgery takes into account the timing of external ear (microtia) reconstruction and other factors, and should be discussed with your surgeon.

How does this work? Bone-conduction hearing aids work by transmitting sound in the air directly to the bone. The sound can then go do two things: 1) in microtia/atresia, the sound goes through the bone to the functional inner ear on the same side; 2) in single-sided deafness, the sound goes through the bone to the functional inner ear on the opposite side.

What is the process like? In this surgery, a metal implant is placed into the skull bone so it can integrate with the bone. To the implant, we then either attach a magnet, which is completely covered in skin, or a post ("abutment") which goes through the skin. The external bone-conduction hearing aid then attaches via the magnet or post to stimulate the implant. This is a simple, same-day surgery that takes about 60 minutes under general anesthesia.

What are the risks and benefits of this surgery? The primary benefit is to have a long-term solution to provide access to sound from the affected side without need for the softband. Risks include infection or skin problems around the site of the abutment or magnet that might require medical or surgical treatment, or removal of the abutment or implant.

Ear canal reconstruction (atresiaplasty)

What is this? Reconstruction of an aural atresia by building a new ear canal, eardrum, and creating a connection between the new eardrum and the inner ear (cochlea) through the bones of the middle ear (ossicles).

Who can get this? Select children with microtia/atresia who have middle- and inner-ear anatomy that is amenable to surgical reconstruction of the ear canal, eardrum, and middle-ear bones. A CT scan is necessary to determine whether ear canal reconstruction is possible. Timing of the surgery is complex: it is most effective when children are at least 6-7 years of age and can tolerate frequent ear cleanings in the office. Coordination of the ear canal reconstruction with different methods of reconstruction of the outer ear (microtia) is also important, and must be discussed with your surgeon.

How does this work? By creating an ear canal and eardrum, the goal is to restore the sound connection and transmission from the outside world to the inner ear. Sound can then travel through

the new ear canal, be picked up by the new eardrum, and transmitted through the little bones in the middle ear to the cochlea.

What is the process like? In this surgery, incisions are made around the ear, bone is removed to create the new ear canal and establish a pathway to the middle and inner ear. Skin from the groin is then used to line the new ear canal and create an eardrum. Sometimes, a tiny metal implant is used to reconstruct the bones of the middle ear. This usually takes about 5-6 hours under general anesthesia, and your child will usually be able to go home the same day.

What are the risks and benefits of this surgery? The primary benefit is to improve hearing on the atretic side by re-establishing a pathway for sound conduction. There is a small risk of weakness of the muscles of facial movement, and of permanent sensorineural hearing loss. The most common challenges after surgery are the ear canal closing up again, or there being a residual conductive hearing loss. Because of these, there is a high chance of need for further surgery after the initial surgery, to either help the ear canal stay open, or to fine-tune the hearing result. Even in the best of circumstances, the hearing will never be perfect. In some cases, your child would still benefit from a hearing aid on the atretic side even after ear canal reconstruction. Rather than requiring a bone-anchored hearing aid, however, children with some residual conductive hearing loss after ear canal reconstruction can often use a traditional air-conduction hearing aid as long as they have had some kind of outer ear reconstruction.

For more information:
earcommunity.com: online forum for families of deaf/HOH children in general, with a particular focus on microtia and atresia.