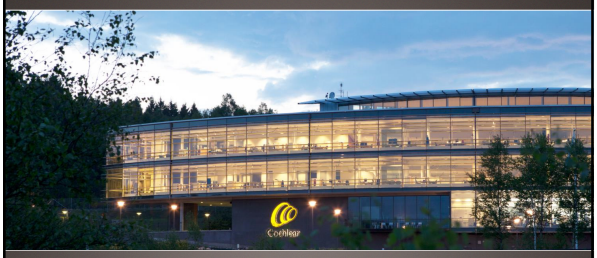

Closing the Gap: Mixed and Conductive Hearing Loss in Adults

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Hear now. And always

Agenda

- Conductive and mixed hearing loss in children
- Treating conductive and mixed hearing loss in children with Baha® Technology
- Exploring Baha solutions for children

Conductive and Mixed Hearing Loss (CMHL) in Children

- Prevalence of conductive hearing loss in children may be up to 3.5% of the general population[1]
- 29% of children with Down Syndrome have permanent mixed or conductive hearing loss; another 32% have fluctuating losses[2]
- 25% of children with cleft palate have conductive hearing loss of 25 dBHL or more[3]

1 - Feder KP, Michaud D, McNamee J, Fitzpatrick E, Ramage-Morin P, Beauregard Y. (2017) Prevalence of hearing loss among a representative sample of Canadian children and adolescents, 3 to 19 years of age. Ear & Hearing, 38(1):7-20.
2 - Nightengale E, Yoon P, Wolter-Warmerdam K, Daniels D, Hickey F (2017) Understanding hearing and hearing loss in children with Down Syndrome. American Journal of Audiology, 26:301-308.
3 - Goudy S, Lott D, Canady J, Smith RJ (2006) Conductive hearing loss and otopathology in cleft palate patients. Otolaryngol Head Neck Surg, 134(6):946-8.

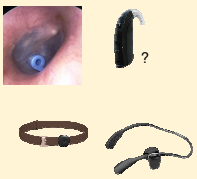
Congenital Aural Atresia & Microtia

- Prevalence of Microtia is 1.76 per 10,000 live births in North America[1]
  - higher incidences in Hispanic populations (2.89) and Asian or Pacific Islander populations (2.08)[1]
- Degree of hearing restoration by surgical correction is dependent on severity[2]
- Majority of pediatric patients who have reconstruction will still require some form of amplification after surgery[3]
- About 75% of patients who do not receive good hearing benefit from surgery also do not benefit from a revision[2]

1 – Luquetti DV, Leoncini E, Mastroiacovo P. (2011) Microtia-Anotia: A global review of prevalence rates. Birth Defects Res A Clin Mol Teratol. 91(9):813-822.
2- Chang SO, Choi BY, Hur DG. (2006) Analysis of the long-term hearing results after the surgical repair of aural atresia. Laryngoscope. 116(10):1835-1841.
3 - Evans AK, Kazahaya K. (2007) Canal atresia. Surgery or implantable hearing devices? The expert's question is revisited. International Journal of Pediatric Otorhinolaryngology. 71(3):367-374.

Treating CMHL Hearing Loss in Children

Intermittent/Fluctuating Hearing Loss



Permanent Hearing Loss

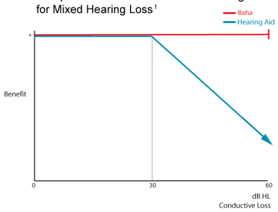
Why Consider Baha® Technology?

- ✓ Nothing worn in the ear canal, which is helpful in cases where ear drainage is present[1]
- ✓ Baha does not need to be re-adjusted if the air conduction thresholds fluctuate because gain is only required for the bone conduction thresholds
- ✓ Pre-operative testing can be used to predict post-operative benefit[2]
- ✓ Use of Baha is associated with high user satisfaction and good long-term benefit[3,4]

1 - Bouhabel S, Arcand P, Saliba I. (2012) Congenital aural atresia: bone-anchored hearing aid vs. external auditory canal reconstruction. Int J Pediatr Otorhinolaryngol. 76(2):272-7.
2 - Morrin S, Filippi C, Attura F, Biagini M, Lazzarino AI, Barbara M. (2015) Individualised headband simulation test for predicting outcome after percutaneous bone conduction implantation. Acta Otorhinolaryngol Ital. 35(4):258-64
3 - Gardell ISK, Andresen K, Faber CE, Wanscher JH. (2015) Bone-anchored hearing aids are effective and associated with a high degree of satisfaction. Danish Medical Journal, 62(7):A5108
4 - Rasmussen J, Olsen S, Nielsen LH. (2012) Evaluation of long-term patient satisfaction and experience with the Baha bone conduction implant. Int J Audiol. 51(3):194-9.

Baha Solutions vs Hearing Aids

Comparative Benefits of Baha vs Hearing Aids for Mixed Hearing Loss[1]



Hearing Aid

- The greater the air-bone gap, the more a Baha system will outperform hearing aids[2]
- Hearing aid prescriptions for conductive and mixed hearing loss require more gain and receive less clinical research than for sensorineural hearing loss[3]
- Hearing aid fitting can be difficult if there is drainage from the ear, ear pain or a mastoid cavity present after mastoidectomy[4]

1 - Snik AF et al. (2005) Consensus Statements on the BAHA System: Where Do We Stand at Present? Annals of ORL 114(12S). 195:1-12
2 – Mylanus EAM, van der Pouq K, Snik M (1998) Intraindividual comparison of the bone-anchored hearing aid and air-conduction hearing aids. Arch Otolaryngol Head Neck Surg, 124(3):271-276
3 - Johnson EE. (2013) Prescriptive amplification recommendations for hearing losses with a conductive component and their impact on the required maximum power output: An update with accompanying clinical explanation. J Am Acad Audiol, 24(6):452-60.
4 - Gluth MB, Friedman AB, Atcherson SR, Dornhoffer JL. (2013) Hearing aid tolerance after revision and obliteration of canal wall down mastoidectomy cavities. Otology & Neurotology, 34(4):711-4.

Baha System Indications

Conductive & Mixed Hearing Loss

Candidacy is based on bone conduction thresholds

Bone Conduction PTA equal to or better than 65 dB at 0.5, 1, 2 & 3 kHz

Bilateral fitting requires symmetric bone conduction thresholds

Less than 10 dB difference on average (0.5, 1, 2 & 3) or less than 15 dB difference at individual frequencies

Single-Sided Deafness

Normal hearing in the good ear

Defined as Air Conduction PTA equal to or better than 20 dB at 0.5, 1, 2 & 3 kHz

Surgery can be considered for children 5 years of age or older

Baha Systems for Children: Non-surgical

- Non-surgical alternatives are available for children who are under 5 years old and not yet ready for surgery
- Softband is ideal for babies and toddlers
- Baha SoundArc is an effective and stylish alternative for young children
- Natural progression from non-surgical option to surgical option for consistent and reliable access to sound[1]

1 – Flynn MC. Design concept and technological considerations for the Cochlear Baha 4 Attract System. Cochlear Bone Anchored Solutions AB, E82744, Nov 2013.

Baha Systems for Children: Surgical

Baha Attract Baha Connect

- The Baha Attract provides clinically proven performance with nothing through the skin[1]
- The Baha Connect's direct connection provides the maximum possible gain[2]
- Two systems with one strong foundation[3]

1 – Briggs R, Van Hasselt A, Luntz M, Goycoolea M, Wigren S, Weber P, Smeds H, Flynn M, Cowan R. Clinical performance of a new magnetic bone conduction hearing implant system: results from a prospective, multicenter, clinical investigation. Otol Neurotol. 2015;36(5):834-41.
2 - Clinicaltrials.gov ID NCT01796236. Clinical and Health Economic Evaluation With a New Baha® Abutment Combined With a Minimally Invasive Surgical Technique
3 - Nelissen RC, Stalfors J, de Wolf MJ, Flynn MC, Wigren S, Eeg-Olofsson M, Green K, Rothera MP, Mylanus EA, & Hol MK. Long-term stability, survival, and tolerability of a novel osseointegrated implant for bone conduction hearing: 3-year data from a multicenter, randomized, controlled, clinical investigation. Otol Neurotol. 2014; 35(8): 1486-91.

Baha 5 Sound Processors: Small. Smart. Powerful.

Baha 5 sound processors share the same unique technology building blocks to deliver a smart and seamless hearing experience to all patients.

- The industry's smallest sound processor.[1]
- The only smart processors with direct-to-device wireless streaming and control.
- Two power sound processors including the industry's most powerful solution.[2]

1. Flynn MC. Smart and Small – innovative technologies behind the Cochlear Baha 5 Sound Processor. Cochlear Bone Anchored Solutions AB, 629761, 2015.
2. Norrman, J. Review of fitting ranges. Cochlear Bone Anchored Solutions AB, D773528, 2015.

Bluetooth | Made for iPhone | iPad | iPod

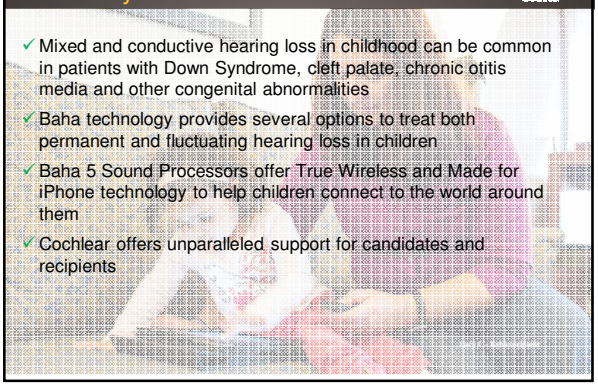
Baha 5 Sound Processors for Children

- Made for iPhone compatibility to allow connection to iOS devices
- Baha 5 Smart App for iOS and Android™ allows parents to control and monitor their child's device
- Full FM compatibility with the amazing Mini Microphone 2+
- Various retention options and colors allow recipients to personalize their device for their needs
- Datalogging in all processors

Support and Resources

- Request free information packs for yourself or your candidates at our website — www.cochlear.com/us
- Candidates may contact our innovative Concierge group for answers to their questions and to connect with a local volunteer if desired — 1-877-897-4474 or concierge@cochlear.com
- Parents and educators can find resources for rehabilitation online at our Communication Corner — www.cochlear.com/us/Communication-Corner

Summary



- ✓ Mixed and conductive hearing loss in childhood can be common in patients with Down Syndrome, cleft palate, chronic otitis media and other congenital abnormalities
- ✓ Baha technology provides several options to treat both permanent and fluctuating hearing loss in children
- ✓ Baha 5 Sound Processors offer True Wireless and Made for iPhone technology to help children connect to the world around them
- ✓ Cochlear offers unparalleled support for candidates and recipients

Cochlear®

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