Comparing audiological outcomes between the Bonebridge and bone conduction hearing aid on a hard test band: Our experience in children with atresia and microtia

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Conclusion
In the last decade, the development of implantable hearing device has brought a slow change from once preferred atresiaplasty for patient with microtia and atresia. Our case series has shown that the Bonebridge implant is a safe and effective device for children between the ages of 5 and 15 with microtia and atresia with moderate to severe conductive hearing loss. The BB implant provided good aided benefit in terms of aided soundfield thresholds, speech reception threshold in quiet and in noise and high subjective device performance. Further long-term follow-up studies are needed to confirm our results.

Objectives
We aim to compare the audiological results of the Bone conduction hearing aid (BCHA) on hard test band and Bonebridge (BB) implant and also to demonstrate the efficacy, safety and durability of the BB as a treatment option for children and adolescents with atresia and microtia with a conductive hearing loss.

Methods
This is a retrospective review of patients with microtia and atresia who underwent BB implant insertion from September 2014 to February 2017 in Starship Children’s Hospital. Preoperative audiological testing using a powered BCHA (Oticon Medical Ponto Pro Power) on a hard test band was used to compare post-operative hearing assessments with the BB.

Results
Ten microtia and atresia patients were treated with a BB of whom three were treated bilaterally. The children were aged between 5 and 15 and all had moderate to moderately severe conductive hearing loss. Figure 2 illustrates the improvement in air-bone gap with both BCHA and BB.

Figure 1. Fitting of the audio processor a month post BB implant with a line clipped to the T-shirt for extra security

For each ear tested and subsequently implanted, BB aided speech scores were equivalent to that obtained by a BCHA (Figure 3).

The mean improvement of speech reception threshold level between unaided and BB was statistically significant ($p > 0.0001$). Aided Speech In Noise (SIN) testing values were found to range from 0.8 – 6.5 for BCHA and 0.2 – 1.2 for BB and the difference was not statistically significant with a $p$ value of 0.143 (Figure 4).

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