P330

INNOVATIVE TECHNOLOGIES AND TRANSLATIONAL THERAPIES

The Bonebridge BCI 602 Active Transcutaneous Bone Conduction Implant in children – objective and subjective benefits

K. Cywka, H. Skarzynski, P.H. Skarzynski

Abstract

Children with conductive or mixed hearing loss have limited options available for hearing rehabilitation, yet in the pediatric population, early intervention is crucial for auditory and language development. **Many patients who suffer from these types of hearing loss may not be able to use conventional hearing aids because of medical or anatomical conditions or may be dissatisfied with them**.

Often, middle ear surgery is not indicated in this group of patients. **Bone conduction hearing systems have become the standard solution for patients suffering from conductive, mixed, and unilateral hearing loss.** Active transcutaneous BCIs have good functional outcomes and more powerful amplification while avoiding the complications associated with percutaneous abutment. The choice of a particular device depends on the patient's audiological results, anatomy, and health. Knowledge of the capabilities and limitations of these devices is essential in order to select the best solution for the patient, especially for a child. Each case needs to be considered individually.

The purpose of this study is to evaluate the objective and subjective benefits of the new Bonebridge BCI 602 in children who have hearing impairment due to conductive or mixed hearing loss. Safety and effectiveness of the device was assessed.

Objectifs

The study group included 22 children aged 8–18 years (mean age 14.7 years) who had either conductive or mixed hearing loss. All patients were implanted unilaterally with the new **Bonebridge BCI 602 implant**.

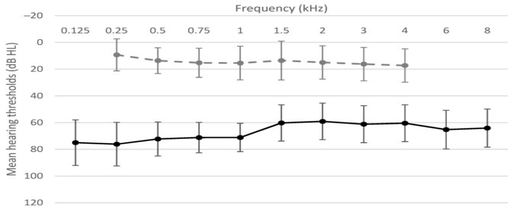

Figure 1. Pure tone audiometry performed before implantation. Mean air conduction thresholds (black solid line) and bone conduction thresholds (gray dashed line).

Méthodes et Matériels

- Pure tone audiometry, speech recognition tests (in quiet and noise), and free-field audiometry were performed **before and after implantation**.
- The subjective assessment of benefits was carried out using the APHAB (Abbreviated Profile of Hearing Aid Benefit) questionnaire **before implantation, 1, 3 and 6 months after implantation**.

Résultats

After implantation of the Bonebridge BCI 602 all patients showed a statistically significant improvement in hearing and speech understanding. The mean word recognition score (WRS) changed from 12.1% before implantation to 87.3% after 6 months. Mean speech reception threshold (SRT) before implantation was +4.79 dB SNR and improved to −1.29 dB SNR after 6 months. All patients showed stable postoperative results. The APHAB questionnaire showed that difficulties in hearing decreased after implantation, with a statistically significant improvement in global score. Pre-operative scores (M = 35.7) were significantly worse than post-operative scores at 6 months (M = 25.7).

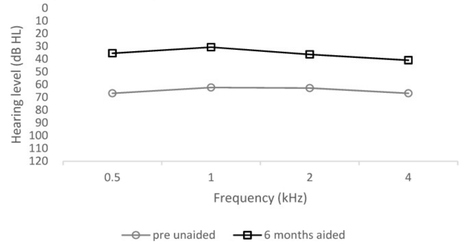

Figure 2. Functional gain; unaided and 6 months aided.

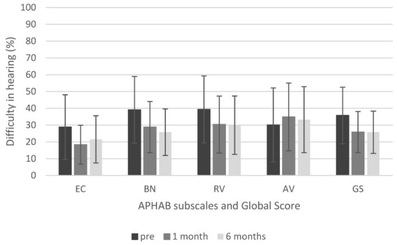

Figure 3. Results of APHAB questionnaire. EC, Ease of Communication; BN, Background Noise; RV, Reverberation; AV, Aversiveness; GS, global score.

Conclusion

The present study confirms that the **Bonebridge BCI 602 is an innovative and effective solution**, especially for patients with conductive and mixed hearing loss due to anatomical ear defects. The Bonebridge BCI 602 system provides valuable and stable audiological and surgical benefits.

Subjective assessment also confirms the effectiveness of the BCI 602. The BCI 602 offers the same amplification as the BCI601, but with a smaller size. The **smaller dimensions make it an effective treatment option for a wider group of patients**, especially children with congenital defects of the outer and middle ear.

Références

Cywka KB, Skarżyński H, Król B, Skarżyński PH. The Bonebridge BCI 602 Active Transcutaneous Bone Conduction Implant in Children: Objective and Subjective Benefits. J Clin Med. 2021 Dec 16;10(24):5916.

Dougherty W, Kesser BW. Management of Conductive Hearing Loss in Children. Otolaryngol Clin North Am. 2015 Dec;48(6):955–74.

Aldhafeeri AM, Yousef M, Alzhrani F. Osseointegrated device placement with minimally invasive surgery: Experience and audiological outcome. Saudi Med J. 2022 May;43(5):530–3.

Tharpe AM. Unilateral and mild bilateral hearing loss in children: past and current perspectives. Trends Amplif. 2008 Mar;12(1):7–15.

19›22 September 2024
Paris, France
CNIT Paris La Défense