Acta Otorrinolaringol Esp. 2017;68(6):344–348

Acta Otorrinolaringológica Española

www.elsevier.es/otorrino

BRIEF COMMUNICATION

Audiologic and Subjective Evaluation of Baha® Attract Device☆

Tomàs Pérez-Carbonell,* Ignacio Pla-Gil, Jaume Redondo-Martínez, Antonio Morant-Ventura, Francisco Javier García-Callejo, Jaime Marco-Algarra

Servicio de Otorrinolaringología, Hospital Clínico Universitario, Universidad de Valencia, Valencia, Spain

Received 1 August 2016; accepted 23 November 2016

KEYWORDS
Conductive hearing loss;
Hearing aids;
Bone conduction;
Osseointegration;
Audiometry

Abstract We included 9 patients implanted with Baha® Attract. All our patients were evaluated by free field tonal audiometry, free field verbal audiometry and free field verbal audiometry with background noise, all the tests were performed with and without the device. To evaluate the subjective component of the implantation, we used the Glasgow Benefit Inventory (GBI) and Abbreviated Profile of Hearing Aid Benefit (APHAB).

The auditive assessment with the device showed average auditive thresholds of 35.8 dB with improvements of 25.8 dB over the previous situation. Speech reception thresholds were 37 dB with Baha® Attract, showing improvements of 23 dB. Maximum discrimination thresholds showed an average gain of 60 dB with the device.

Baha® Attract achieves auditive improvements in patients for whom it is correctly indicated, with a consequent positive subjective evaluation. This study shows the attenuation effect in transcutaneous transmission, that prevents the device achieving greater improvements.

PALABRAS CLAVE
Hipoacusia de transmisión;
Ayudas auditivas;
Transmisión ósea;
Osteointegración;
Audiometría

Valoración audiológica y subjetiva del dispositivo Baha® Attract

Resumen Se incluyeron en el estudio 9 pacientes implantados con el dispositivo Baha® Attract. A todos los pacientes se les realizó, con y sin el dispositivo, una audiometría tonal en campo libre, una audiometría verbal en campo libre, y una audiometría verbal con ruido de fondo, así como la aplicación de los cuestionarios *Glasgow Benefit Inventory* (GBI) y *Abbreviated Profile of Hearing Aid Benefit* (APHAB).

☆ Please cite this article as: Pérez-Carbonell T, Pla-Gil I, Redondo-Martínez J, Morant-Ventura A, García-Callejo FJ, Marco-Algarra J. Valoración audiológica y subjetiva del dispositivo Baha® Attract. Acta Otorrinolaringol Esp. 2017;68:344–348.

* Corresponding author.
E-mail address: tperezcarbonell@gmail.com (T. Pérez-Carbonell).

Las valoraciones audiológicas con el dispositivo mostraron unos umbrales auditivos promedios de 35,8 dB, con ganancias medias de 25,8 dB. El umbral de recepción verbal promedio con el dispositivo se situó en 37 dB, mostrando una ganancia de 23 dB. Los resultados promedio del umbral de discriminación máxima fueron de 60 dB con el dispositivo.

El Baha® Attract logra alcanzar unas ganancias auditivas en los pacientes indicados correctamente, con una consiguiente valoración subjetiva positiva por parte de los pacientes, presentando no obstante un efecto atenuativo en su transmisión transcutánea, que le impide alcanzar mayores ganancias.

Introduction

Osseointegrated hearing devices can be divided into two large groups: percutaneous and bone conduction through the skin, which in turn are divided into active and passive. The latter group includes the Baha® Attract (Bone Anchored Solutions AB, Cochlear Ltd., Göteborg, Sweden).[1] In these types of devices the stimulus is transmitted through a system of magnetic couplings placed either side of the skin, one of which is anchored to the skull surface via an osseointegrated implant at the level of the temporal bone and the other on the skin of the same region to which the sound processor is connected.[2] The soft tissue between each magnet has an attenuating effect on the sound signal that varies according to the thickness, width and characteristics of this tissue.[3] This attenuation of the signal should limit the indications for Baha® Attract compared to its percutaneous counterpart. The Baha® Attract devices have more limited indications for conductive hearing loss (CHL) with bone conductions of up to 25–30 dB and single sided deafness (SSD).[4] This system has less aesthetic impact than the percutaneous systems, the implant does not protrude through the scalp. The surgical procedure for placing the osseointegrated implant is very similar to that of its percutaneous counterpart, and similarly there are numerous variations in technique. The subcutaneous site where the osseointegrated implant and the subcutaneous magnetic coupling are to be placed is marked, and anterior to or posterior to this mark a C or S incision is made of the longitudinal length of the magnet. Along this incision, which should reach the periosteum in depth, a flap is made which should occasionally be honed in thickness to reduce any impedance that the tissue might cause between each of the system's magnets. The implant is then placed on the marked area removing the periosteum, and then it is joined to the magnet.

Methods

We present a series of cases attended between 1 January 2014 and 30 November 2014 in our centre, where elective surgery for implantation of the Baha® Attract device was indicated and performed in 9 patients.

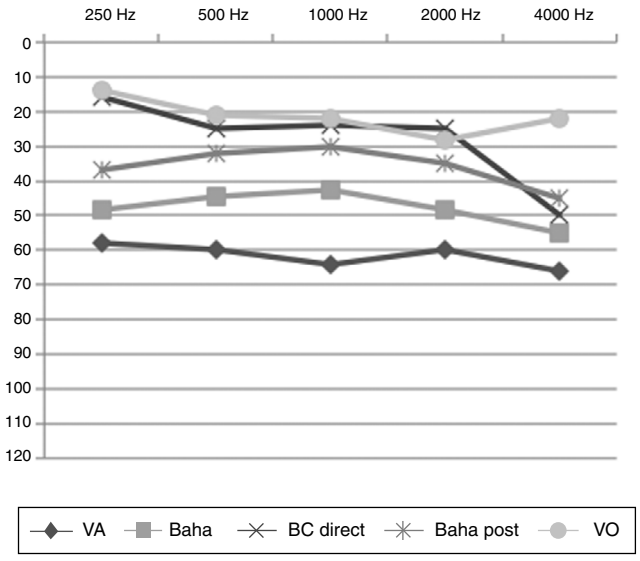

Figure 1 Graphic average audiometric results obtained by free field tonal audiometry. Baha: free field results with the device after correcting incidents; BC Direct: bone conduction via the Baha® Attract; AC: air conduction after fitting; BC: bone conduction after fitting.

The inclusion criteria for this study were that the patients should be over the age of 18 years, with a diagnosis of CHL – a bone conduction threshold lower than 30 dB was accepted as the limit–they had to have agreed to the surgical intervention and to be fitted with this hearing device.

All the patients were implanted, following the manufacturers' recommendations; with the same type of osseointegrated implant, the same magnetic coupling system, and the same type of processor, the Baha® 3 BP100.

The patients were asked to complete two questionnaires, the Glasgow Benefit Inventory (GBI) and the Abbreviated Profile of Hearing Aid Benefit (APHAB) (Figs. 2 and 3), so that we could assess their subjective evaluation of their hearing device fitting and the beneficial effect of the intervention on their quality of life.

All the participants underwent hearing screening without the Baha® Attract, comprising pure tone audiometry (PTA), free-field PTA (FF), and verbal audiometry (VA); with