

Editorial

Bonebridge Bone Conduction Implant

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In this issue, we have an interesting review article by Dr. Mario Zernotti and his team in Cordoba on the Bonebridge bone conduction implant.

Bone conduction implants are indicated for patients with conductive, mixed, or unilateral hearing loss. The transcutaneous technology employed avoids common complications such as cutaneous reactions, skin covering the abutment, local infection, or extrusion.

The aim of this systematic review was to evaluate the hearing gain through speech perception tests and word recognition scores in 20 patients implanted with the Bonebridge device. Furthermore, the authors analyze the functioning of this bone conduction implant, as well as three possible surgical techniques.¹

The Bonebridge is the first active bone conduction implant system in the world. It is a semi-implantable device consisting of a sound processor and a coil that generate vibration in the bone, transmitted through screws fixed to the mastoid. The system for securing the screws to the bone does not require osseointegration and should be activated within two to three weeks after implantation.

The use of this implant is indicated for children older than five years of age, with conductive or mixed hearing loss according to audiometric tests, and bone conduction threshold above 45 dB at 500 Hz, and 1, 2, and 3 KHz. The contraindications in these cases are related to the presence of retrocochlear lesions. As for unilateral hearing losses, the use of this implant is indicated when this condition is severe or profound in one ear, while the other presents a bone conduction threshold above 20 dB from 500 Hz to 3 KHz.²

Before the surgery, the patient should undergo a radiological tomography with tridimensional analysis to determine the exact location where the implant should be placed, thus preventing possible complications.^{3,4}

In cases where it is not possible to place the implant on the mastoid because either the sigmoid sinus is too anterior, the dura mater in the middle cranial fossa is too low, or the

patient has undergone mastoidectomy previously, the suggested routes for implant placement are through the retro-sigmoid or the middle fossa. In these cases, the exposure of the dura mater with its depression for the positioning of the bone conduction floating mass transducer (BC-FMT) does not lead to any sequelae.^{5,6}

Nevertheless, this technique has a few disadvantages. First, surgery requires more extensive drilling, and can lead to lesions in the dura mater and sigmoid sinus that should be managed with synthetic hemostatic materials or sutures. Besides, there is risk of necrosis or local infection, which can be decreased by performing a double flap, which provides better vascularization than a simple incision.^{2,7,8}

In the systematic review in question, conducted between May 2012 and July 2014, the initial search in MedLine identified 19 studies; however, only five described the surgical technique employed. Thus, these were included in the study, involving 20 patients with different pathologies. In the authors' experience, 90% of patients with conductive hearing loss showed a reduction of 30 to 60 dB in the air-bone gap after implant placement. This finding is in line with the results reported in the studies included in this systematic review, where the functional gain varied between 24 and 43 dB, and in 50%, functional gain was greater than 30 dB.⁹

Finally, we have concluded that the Bonebridge implant is an innovative solution for patients with conductive or mixed hearing loss and unilateral loss, who did not show good response to other forms of treatment. Different surgical techniques can be used for implant placement, depending on the patient's anatomy. Studies show higher functional gain, better speech perception, and lower rates of percutaneous complications associated with this implant.

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