

Navigated positioning of bone anchored hearing aids

Purpose:

BAHA (Bone Anchored Hearing Aid) is a partially implantable hearing aid which functions through direct bone conduction. Patients with severe bilateral or unilateral conductive hearing loss who can not benefit from middle ear reconstructive surgery or conventional hearing aids can benefit from BAHA. Furthermore, BAHA can be used in patients with unilateral deafness as an alternative to traditional CROS hearing aids. This titanium prosthesis can usually be implanted on the skull bone behind the ear. The implantation of this osseointegrated implant is usually a low risk and uncomplicated procedure. Prerequisites are normal anatomy of the retroauricular region as well as normal bone structure and thickness (at least 5 mm skull thickness). The thin skull bone in young children, and altered anatomy of the retroauricular area in patients who have underwent radical ear surgeries, make it challenging to find the right place with adequate skull thickness for implantation and increases the risk of dura damage and intracranial complications (infection and bleeding). This justifies, the application of intraoperative navigation technology in these cases in order to minimize the complication rate.

Method:

We performed 15 BAHA implantations with the aid of the electrooptical VectorVision² navigation system (BrainLAB, Heimstetten, Germany). A software feature called "tip elongation" allows to virtually elongate the tip of the pointer or the navigated instrument with the objective of a simple intraoperative simulation of implantation depth. We will demonstrate the usefulness and mode of handling of this technique in our patients.

Results:

The first clinical results show the advantages of the navigation for correct positioning of BAHA implants. The surgical procedures were minimally prolonged due to the use of the intraoperative navigation but ensured a successful postoperative result especially in problem cases with complex postoperative anatomical changes and in children with thin skull bone or anatomical malformations.

Conclusion:

Intraoperative navigation reduces the risk of complications resulting from implantation of osseointegrated implants.

Keywords:

bone anchored hearing aids, intraoperative navigation, osseointegrated implants