Indian Journal of Otolaryngology and Head & Neck Surgery
https://doi.org/10.1007/s12070-026-06329-7

OTHER ARTICLES

How I Do It: Double Flap Incision in Cochlear™ Osia® Implant Placement Surgery

Antonio Frisina[1]

Received: 23 July 2025 / Accepted: 2 January 2026
© Association of Otolaryngologists of India 2026

Abstract

Background The Cochlear™ Osia® system is an active bone conduction implant indicated for patients with conductive or mixed hearing loss.

Method We describe a refined surgical technique using a double flap incision cutaneous and musculoperiosteal to improve exposure and reduce complications. Five patients were treated with this method.

Conclusion The dual-layer approach provided improved surgical access, optimal implant placement, and superior wound healing with no complications. We recommend the double flap incision as a safe and effective alternative to the standard single-flap technique.

Keywords OSIA · Bone conduction hearing device · Conductive hearing loss · Piezoelectric stimulation

Introduction

The Cochlear Osia OSI300 implant is a next-generation active bone conduction hearing device that employs piezoelectric stimulation to transmit sound vibrations directly to the cochlea [1–4]. It is indicated for patients with conductive or mixed hearing loss presenting with an air-bone gap greater than 30 dB HL and bone conduction thresholds at or below 55 dB HL. Surgically, the Osia system is placed in the retro auricular area in a subperiosteal pocket. The implant comprises a receiver coil that captures the external audio signal and transmits it to a piezoelectric actuator. This actuator is coupled to the osseointegrated BI300 titanium implant, which transduces mechanical vibrations to the inner ear through bone conduction.

Cochlear's standard surgical protocol recommends a single incision extending down to the periosteum to access the implantation site [5–8]. While effective, this approach may limit surgical exposure and pose a higher risk of soft tissue complications, such as wound dehiscence or device extrusion. This report presents a refined technique involving a double flap incision—cutaneous and musculoperiosteal—designed to enhance operative visualization, facilitate precise implant positioning, and reduce postoperative complications through a staggered, double-layer closure.

Materials and Methods

Between March 2024 and April 2025, five patients underwent Osia implant surgery at our tertiary referral center. Patient demographics and indications were as follows: three patients presented with mixed hearing loss secondary to canal wall-down tympanoplasty for cholesteatoma; one patient required simultaneous petrosectomy for chronic cholesteatomatous otitis media with associated hearing loss; and one patient with bilateral congenital aural atresia underwent a conversion from Baha® to Osia due to complete soft tissue overgrowth of the Baha abutment.

Surgical Technique

Preoperatively, implant positioning was planned using the manufacturer-provided template, ensuring optimal actuator placement in line to or slightly superior to the external auditory canal without contacting the auricle. Soft tissue thickness at the anticipated receiver site was measured using a hypodermic needle.

✉ Antonio Frisina
dott.antoniofrisina@gmail.com

[1] ENT Complex Operative Unit-Western District AULSS8 Berica Hospital, Valdagno, Italy

Published online: 02 February 2026

Fig. 1 **a** Anterior retroauricular incision with inferior extension (left ear). **b** Elevation of cutaneous and subcutaneous flap (left ear). **c** Dissection of the musculoperiosteal flap (left ear)

The incision was made approximately 15 mm from the device outline, tailored either anteriorly or posteriorly in the retroauricular region depending on anatomical considerations. In four cases, an anterior retroauricular incision with an inferior extension was used (Fig. 1a), while the Baha-to-Osia conversion case employed a posterior approach.

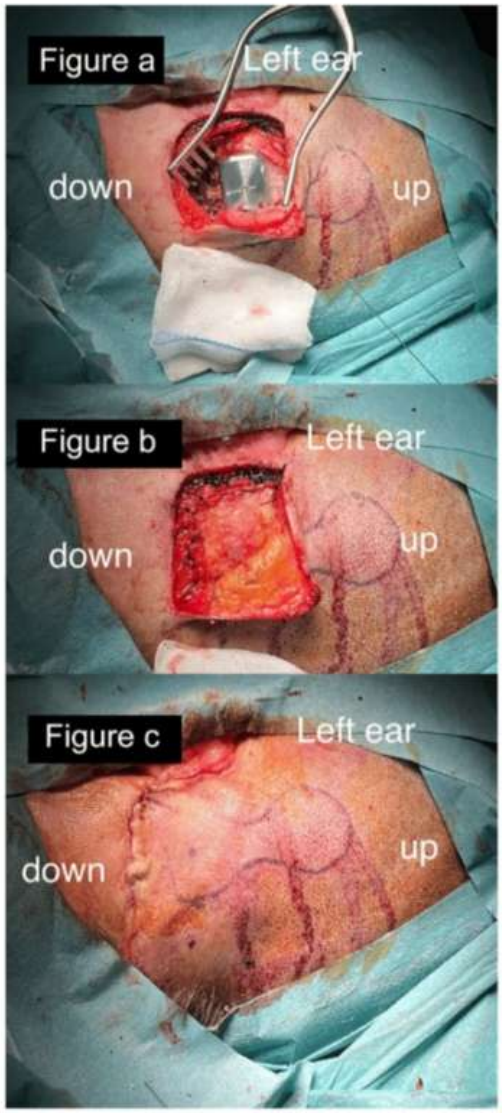

Fig. 2 **a** Fixation of Osia to BI300 implant (left ear). **b** Muscle plane suture (left ear).**c** Subcutaneous and intradermal suture (left ear)

A full-thickness skin and subcutaneous flap was first elevated to expose the periosteum (Fig. 1b). After achieving hemostasis, a second incision, offset slightly from the first, was made through the musculoperiosteal layer (Fig. 1 c), which was then pulled back to reveal the underlying bone.

This approach enabled accurate localization for the craniotomy site of the Baha BI300 implant and allowed for easier contouring of the bone surface where needed. The subperiosteal pocket for the receiver coil was prepared with improved control, aided by the broad exposure provided by the dual flap technique. The BI300 implant was fixed, and the actuator of the Osia system was mounted securely (Fig. 2a).

Closure was performed in two distinct layers. The musculoperiosteal flap was sutured first using absorbable sutures, followed by closure of the subcutaneous layer and a final

intradermal skin suture (Figs. 2b and c). This staggered, layered closure technique reduces the risk of device extrusion and enhances wound stability.

This double flap technique was particularly useful in the Baha-to-Osia conversion, where the Osia actuator was directly affixed to the previously osseointegrated BI300 implant (Figs. 3a and b). It was also effectively employed in the case requiring simultaneous petrosectomy, allowing for a unified surgical field and optimal access.

Results

All five patients demonstrated uneventful wound healing, with no signs of infection, hematoma, or implant extrusion. Device activation occurred approximately 30 days postoperatively in all cases. The intradermal skin closure contributed to improved cosmesis and eliminated the need for suture removal.

Discussion

The Osia OSI300 device requires precise subcutaneous placement in the retroauricular region and secure fixation to the osseointegrated BI300 implant. This necessitates a wide and stable surgical field, which can be challenging to achieve using a single flap approach, particularly in patients with prior otologic surgeries or altered anatomy.

The double flap technique described herein offers several advantages. First, it enhances surgical exposure while minimizing tension on the flaps. Second, it permits more accurate placement of the craniotomy site for the BI300 implant. Third, the staggered closure reduces the risk of wound dehiscence and device extrusion, as well as improving the cosmetic outcome.

This technique has been safely applied in both routine Osia placements and more complex cases, such as revision surgeries and combined petrosectomy procedures. Our experience suggests that the double flap incision is a reliable and effective alternative to the standard approach, particularly in patients at increased risk of soft tissue complications.

Summary 10 Key Points

1. Double flap technique enhances retroauricular exposure.
2. Incisions are offset to reduce implant extrusion.
3. Facilitates accurate placement of BI300 and actuator.
4. Suitable for complex cases including revisions and petrosectomy.
5. Two-layer closure improves wound stability.

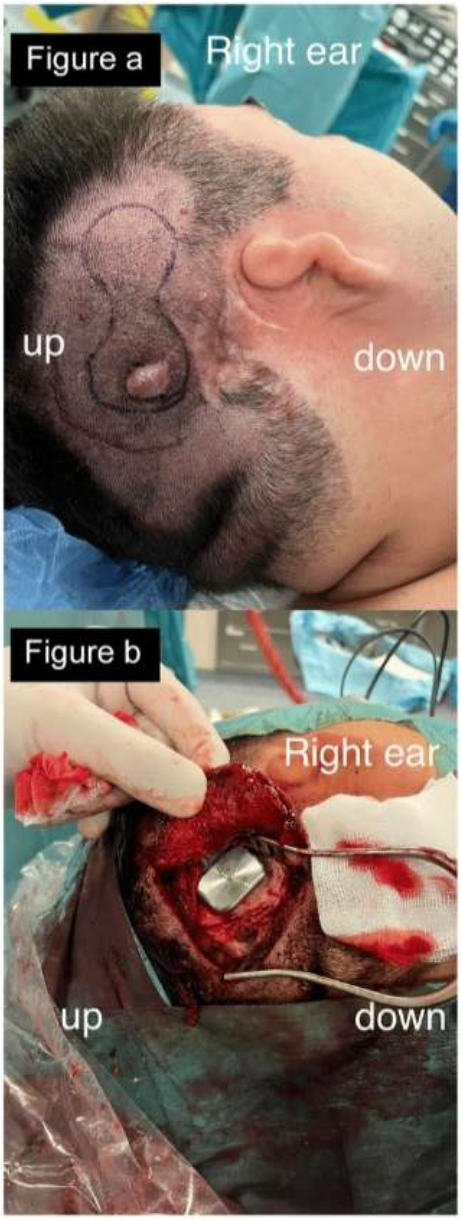

Fig. 3 **a** Clinical case of conversion from Baha to Osia (right ear). **b** Double flap technique in the Baha to Osia conversion (right ear)

6. Reduces risk of soft tissue complications.
7. Yields superior cosmetic outcomes with intradermal closure.
8. Requires precise anatomical knowledge and planning.
9. Preoperative soft tissue thickness measurement is critical.
10. Proven safe and effective in early patient cohort.

Declarations

Conflict of interest The autor have no conflict of interest to declare.

Informed consent Written informed consent was obtained from the

patient for the publication of this case report and any accompanying images.

Object of the research The work concerns the surgical technique of applying the Osia implantable hearing aid on humans.

References

1. Goycoolea M, Ribalta G, Tocornal F, Levy R, Alarcón P, Bryman M, Cagnacci B, Catenacci C, Oyanguren V, Vilches I, Briones V, García R (2020) Clinical performance of the Osia™ system, a new active osseointegrated implant system. Results from a prospective clinical investigation. Acta Otolaryngol 140(3):212–219. https://doi.org/10.1080/00016489.2019.1691744
2. Goldstein MR, Bourn S, Jacob A (2021) Early Osia® 2 bone conduction hearing implant experience: nationwide controlled-market release data and single-center outcomes. Am J Otolaryngol 42(1):102818. https://doi.org/10.1016/j.amjoto.2020.102818
3. Gawęcki W, Gibasiewicz R, Marszał J, Błaszczyk M, Gawłowska M, Wierzbicka M (2022) The evaluation of a surgery and the short-term benefits of a new active bone conduction hearing implant - the Osia®. Braz J Otorhinolaryngol 88(3):289–295. https://doi.org/10.1016/j.bjorl.2020.05.021
4. Willenborg K, Avallone E, Maier H, Lenarz T, Busch S (2022) A new active osseointegrated implant system in patients with single-sided deafness. Audiol Neurootol 27(1):83–92. https://doi.org/10.1159/000515489
5. Cochlear Osia OSI300 Implant Physician's Guide (2023). 2023 Edition.
6. Soloperto D, Dallari V, Molteni G (2023) How i do it: cochlear Osia 2 system surgery placement. Eur Arch Otorhinolaryngol 280(2):929–933. https://doi.org/10.1007/s00405-022-07708-w
7. Briggs R, Birman CS, Baulderstone N, Lewis AT, Ng IHY, Östblom A, Rousset A, Tari S, Tong MCF, Cowan R (2022) Clinical performance, safety, and patient-reported outcomes of an active osseointegrated steady-state implant system. Otol Neurotol 43(7):827–834. https://doi.org/10.1097/MAO.0000000000003590
8. Deep NL, Johnson BJ, Kay-Rivest E, Carlson ML, Friedmann DR, Driscoll CLW, Thomas Roland J Jr, Jethanamest D (2022) Modifications to implanting the OSIA® 2 bone conduction hearing implant: how i do it. Laryngoscope 132(9):1850–1854. https://doi.org/10.1002/lary.30153

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Springer Nature or its licensor (e.g. a society or other partner) holds exclusive rights to this article under a publishing agreement with the author(s) or other rightsholder(s); author self-archiving of the accepted manuscript version of this article is solely governed by the terms of such publishing agreement and applicable law.