

Cochlear implant surgery for bilateral hearing loss

Clinical case presented by Leonel Luís, MD PhD

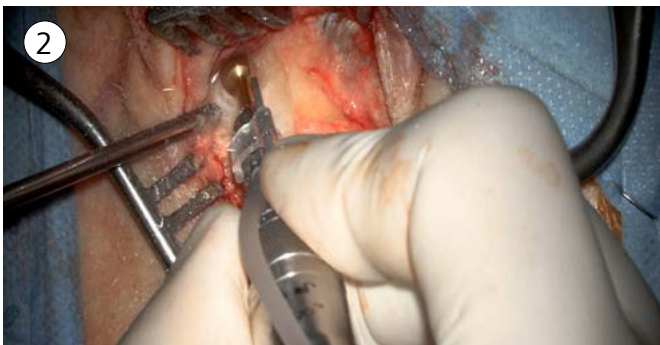
Case report

Case of a 68-year-old female was presented with progressive bilateral hearing loss for 20+ years. The majority of her hearing capacity had been compromised. The patient received a Cochlear implant (CI) in her right ear in 2022 with excellent results. The audiogram shows a cophosis on the right ear and a profound hearing loss on the left ear. The decision was taken to implant a second CI in the left ear to provide binaural hearing.

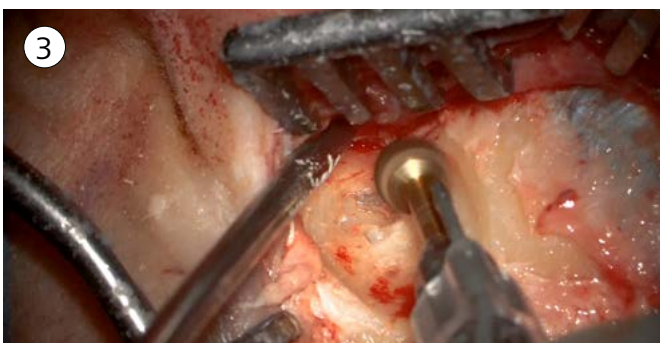
Intraoperative summary



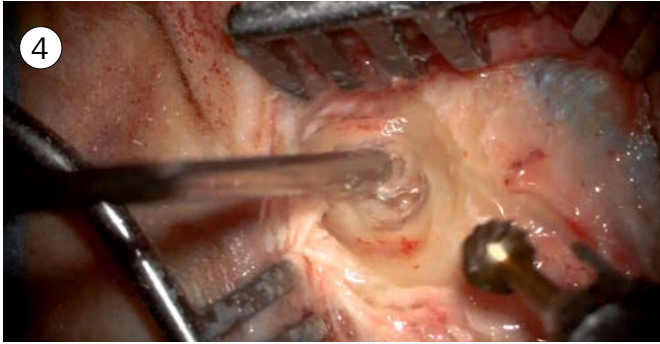
Postauricular and subcutaneous incision to expose the planum mastoideum.



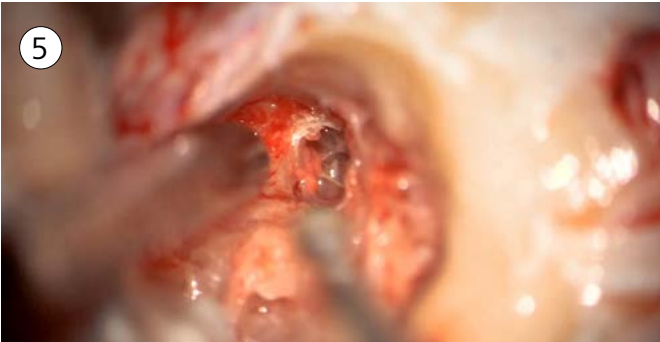
Mastoidectomy started by drilling the cortical bone.



After drilling through the cortical bone, the first cells are visible. Special care should be taken when skeletonizing the posterior canal wall.



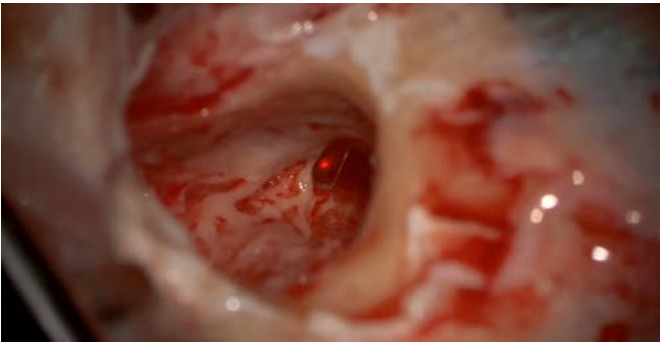
It is important not to expose skin from the canal during this stage, but in order to control the posterior tympanotomy and identify the round window, it is crucial to have a thin posterior canal wall.



When the antrum is opened, the first structure that can be visualized is the lateral semicircular canal, which is a major landmark during any mastoidectomy.



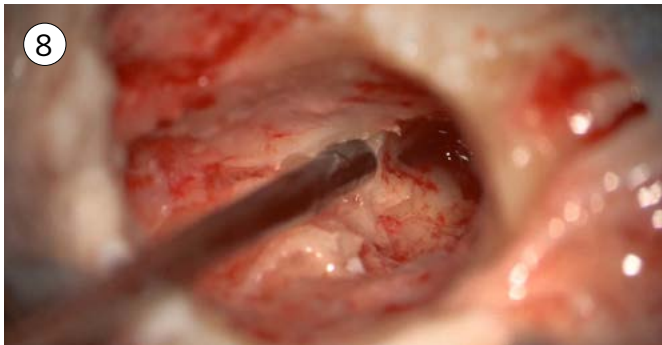
By widening the antrum, the lateral semicircular canal can be fully identified. When moving more inferiorly, the lateral process of the incus can be identified.



Tip: When testing the short process of the incus, the autofocus function of the microscope can help to save time during surgery.



The facial nerve can be visualized through the microscope and identified by intraoperative electromyography to prevent any damage.

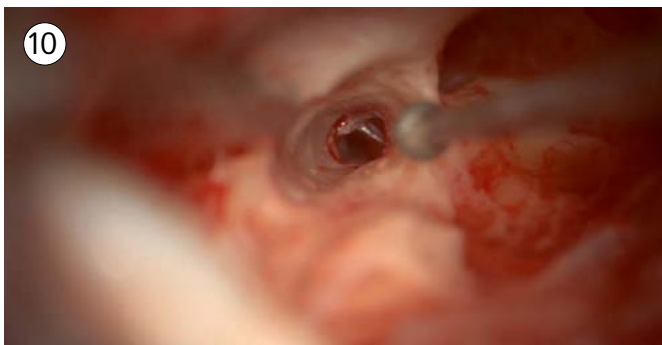


The lateral semicircular canal, the short process of the incus, and the horizontal part of the facial nerve provide the most important landmarks. The posterior tympanotomy is opened.

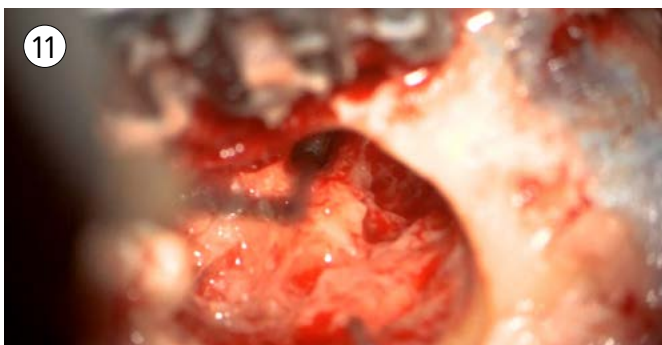
Tip: Using enough irrigation is crucial at this point to preserve the facial nerve.



The middle ear can be visualized.

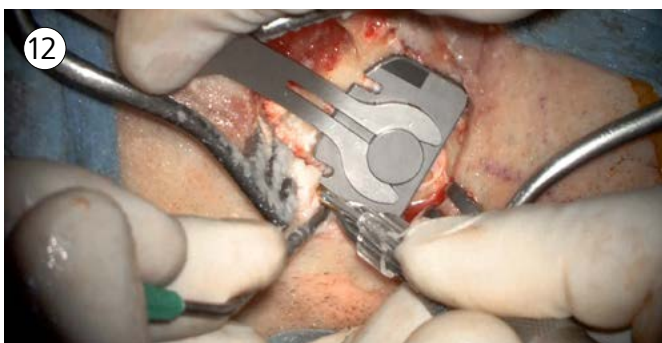


The posterior tympanotomy is extended caudally to expose the round window niche. It is important to irrigate using saline during the posterior tympanotomy in order to protect the facial nerve.

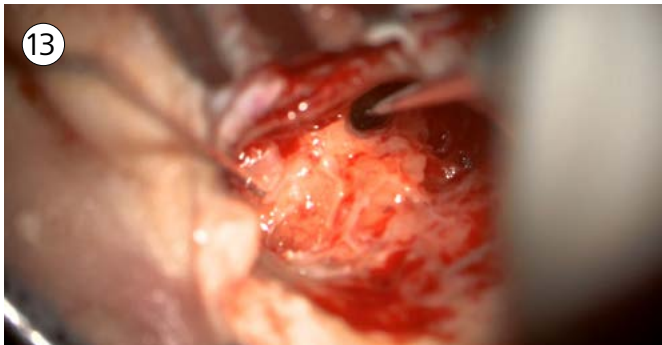


The superior bony overhang is drilled to expose the entire membrane of the round window.

Tip: It is not necessary to extend the round window as this would be a type of cochleostomy, which is harmful in terms of hearing preservation.

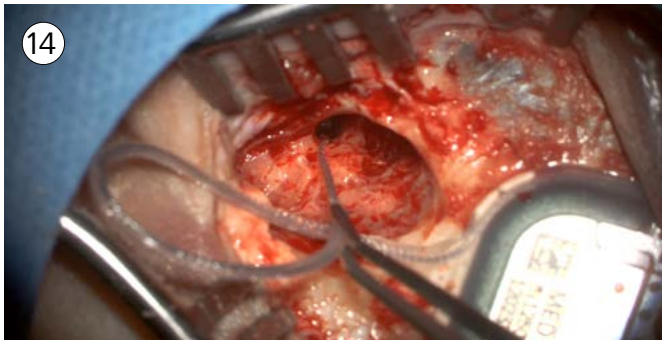


After the entire membrane of the round window is fully exposed, a bony well is drilled to place the receiver simulator.

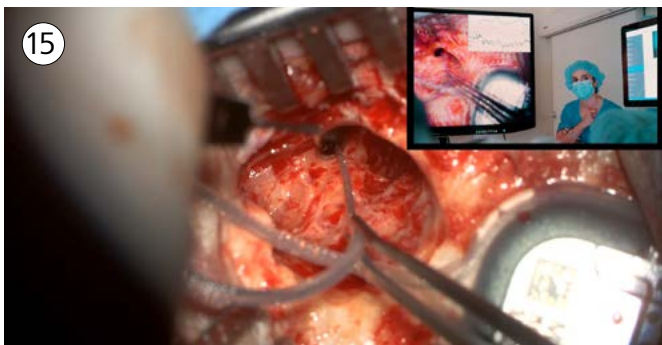


The cochlea round window is now opened antero-inferiorly.

Tip: Suctioning should be avoided at this stage. Hyaluronic acid gel is used to prevent leaking of the underlying endolymph and to facilitate the introduction of the electrode array.

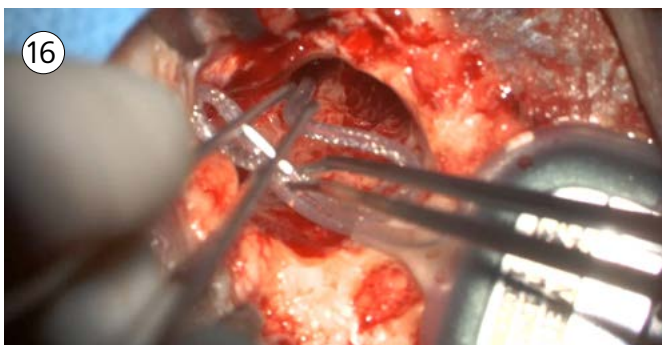


The lateral array is inserted using an exoscopic 3D view. Intracochlear electrocochleography allowing for continuous monitoring is used.



In the event that the cochlear microphonics amplitude decreases, the assertion can be retracted or moved a little slower.

In the event that it steadily increases, the surgeon can move on with confidence.



After a full insertion, the electrode array has to be stabilized.

Tip: While moving the lateral array, an additional pair of surgical forceps helps maintain stability by preventing the transmission of forces into the cochlea. A transmission of forces would result in severe consequences. Cochlear health can be verified by intraoperative electrocochleography.



A small piece of aponeurosis and biological glue ensure that the electrode will stay in place.

Results

The patient was discharged four hours after undergoing outpatient surgery. Three months post-surgery, the patient's hearing is now binaural with 25 dB Pure Tone Average (PTA) and she is currently working with a speech therapist.



Leonel Luis, MD

Director Otorhinolaryngology
Deputy Clinical – Surgical Specialties
Hospital de Santa Maria
Lisbon, Portugal

Do you want to know more?



Visit the ZEISS KINEVO 900 website
<https://zeiss.ly/kinevo-900-cochlear-implant-surgery>