

COMPLICATION

COMPLICATIONS

MANAGEMENT OF A FIXED FOOTPLATE IN CHRONIC OTITIS MEDIA

BENOIT GRATACAP, MD, ROBERT VINCENT, MD, JEAN-BERNARD CAUSSE, MD From the Jean Causse Clinic, Colombiers, France.

From the Jean Causse Clinic, Colombiers, France.

Address reprint requests to Jean-Bernard Causse, MD, Jean Causse Clinic, Traverse de Béziers, 34440 Colombiers, France.

Copyright © 1995 by W.B. Saunders Company

1043-1810/95/0601-0011\$05.00/0

The discovery of a fixed footplate is not uncommon in chronic otitis media surgery. The stapedotomy required for functional improvement cannot be performed in such a situation without considering a number of factors. Some of the factors concern the chronic otitis media and others the surgical technique. If any of these considerations are overlooked, the risk is labyrinthitis and its consequences, mainly a non-functioning ear.

The environmental condition of the ear is the most important surgical factor. A successful stapedotomy requires a closed middle ear with clean, dry, and stable external auditory canal skin. The middle ear status must be equally normal and stable, especially regarding eustachian tube function and aeration and the presence of normal mucosa without pathological secretory aspects. Middle ear conditions must be stable for years or, at the very least, 1 year. Poor contralateral conditions must be taken into consideration. There is a higher sensitivity to surgical trauma caused by patients' previous chronic otitis media, its infections and inflammatory episodes, previous surgery or surgeries, and sometimes ototoxic treatments with local topical or systemic drugs.

When all these factors are favorable, a stapedotomy is possible. During the surgery, the first step is to check the footplate with smooth palpation after cleaning the surface with instruments or a laser. It is not always easy to confirm fixation, even by means of observing the round window for transmitted movement. Observation can be enhanced by placing a drop of saline solution in the round window membrane. In the case of a real fixed footplate, the authors always require an interposition, especially with a piece of vein graft for the stapedotomy. As in the Jean-Bernard Causse technique, this creates an ultimate barrier to an always possible future inflammatory process and helps to rebuild an annular ligament.

The technique of the stapedotomy is the same as described by Jean-Bernard Causse.

CREATION OF AN 0.8-mm

DIAMETER STAPEDOTOMY

The crura are vaporized with an HGM argon laser (HGM Medical Laser Systems, Salt Lake City, UT), using the Gherini-Causse endotoprobe (HGM Medical Laser Systems), beginning with the posterior crus. In the usual situation in which the anterior crus is not visible, the fiber optic palpates the anterior crus before vaporizing it, using a setting of 2 W and 0.5 seconds pulse duration.

For creation of the fenestra with the argon laser, a round "rosette" is created in the stapes footplate with the Gherini-Causse endo-otoprobe. Settings of 1.2 W and 0.2 seconds pulse duration are used. Each laser impact site may or may not overlap the previous impact point until the shape and size of the "rosette" is complete (Figs 1 and 2).

The smoothing of the fenestra is then performed with the Skeeter Oto-tool (Xomed Treace, Inc, Jacksonville, FL). The Skeeter microdrill (Xomed Treace) with a 0.7mm diamond burr removes the remaining bone, without penetrating far into the vestibule (Fig 3).

When the stapes is strongly fixed it is also possible to omit the use of the laser. A 0.3-mm safety hole is directly drilled in the footplate with the Causse-Skeeter Oto-tool. Then the two crura, beginning with the posterior one, are abraded.

Simply breaking off the crura with a sharp pick is wrong, because this may mobilize the footplate. The safety hole is then enlarged until an 0.8-mm hole is completed. The diamond dust abrades the bone; no pressure of the burr must be applied to the stapes footplate for fear of fracturing it.

PIECE OF VEIN GRAFT INTERPOSITION

A large piece of vein graft helps to prevent excessive movement and penetration of the piston into the vestibule, as well as to reconstruct an annual ligament function' important for preserving proper impedance relationships (Fig 4). The piece of vein graft is placed adventitial or "sticky" side down on the footplate. The part of the piece of vein graft lying between the piston and the fenestra gives dissipation force and push-pull effect (elasticity) to the system. This new annular ligament avoids loss of sound conduction caused by an acoustic bridge.

RECONSTRUCTION OF SOUND

TRANSMISSION (OSSICULOPLASTY)

Several types of prosthesis can be used depending on the situation encountered (presence or absence of malleus, presence or absence of incus) (Figs 5 and 6). The length of the prosthesis and its position must be adjusted perfectly. Avoiding excessive penetration of the shaft is important. Exact distance must be determined before stapedotomy, using a measuring piston (Fig 7). The anatomy of an ear cured of chronic otitis media is not the same as one cured of otosclerosis, especially regarding the ossicle status, the canal wall, and the condition of the tympanic membrane. These modifications depend on the chronic otitis lesions and/or the previous surgery.

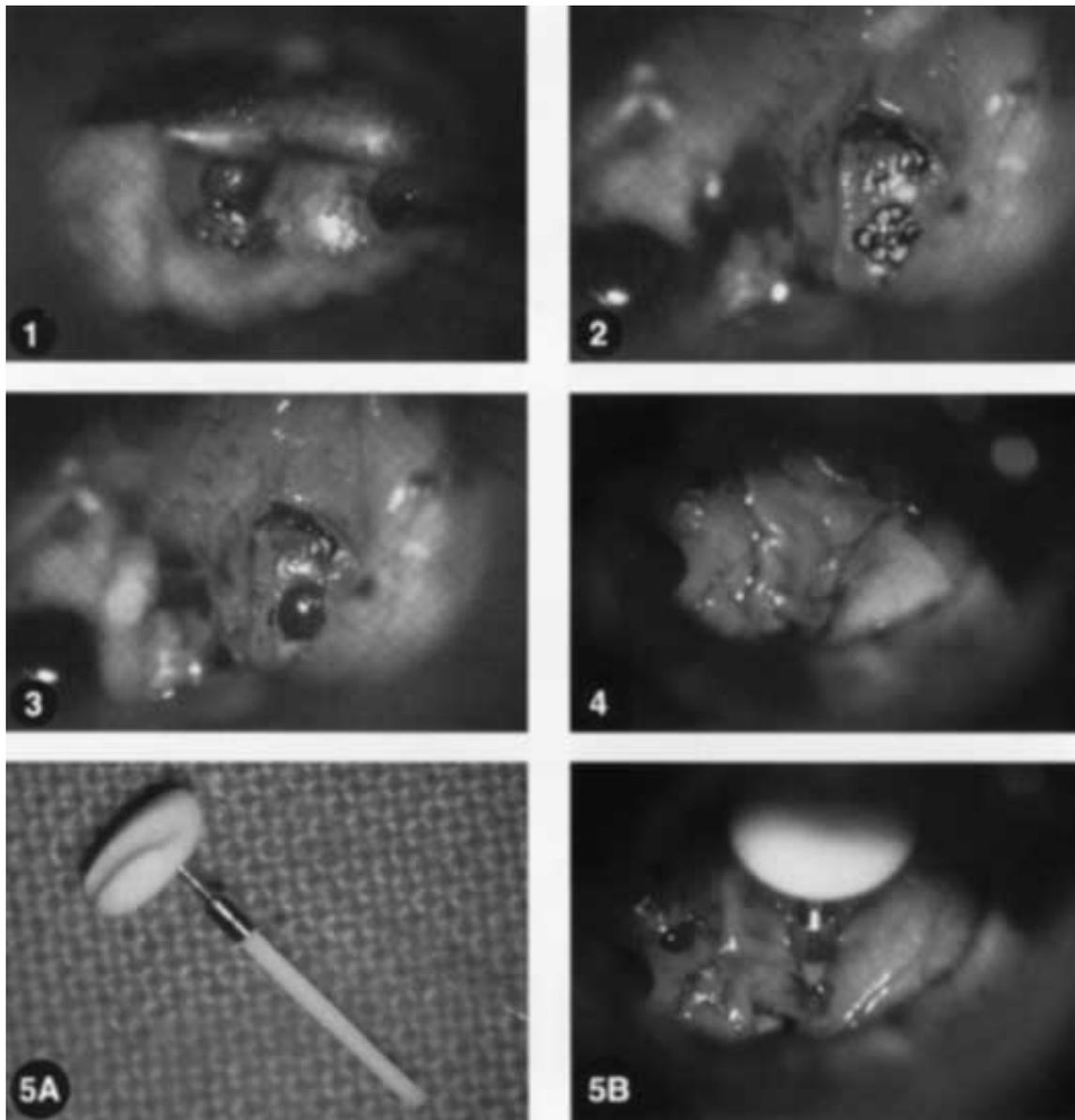


FIGURE 1. The Gherini-Causse Endo-Otoprobe creates 200- μ m spots that fragilize the stapes footplate.

FIGURE 2. A rosette of spots determines the 0.8-mm stapedotomy.

FIGURE 3. An 0.8-mm stapedotomy is performed with the Skeeter oto-tool in the posterior part of the footplate.

FIGURE 4. The piece of vein graft rests, with the external aspect (sticky connective side) on the stapes footplate covering the facial nerve.

FIGURE 5. (A) Jean-Bernard Causse composite total ossicular replacement prosthesis (Miretek, Columbus, MS) with a 0.4-mm diameter fluoroplastic shaft. (B) Same prosthesis

placed between the malleus and the stapedotomy with a vein graft interposition.

In the case of a simple perforation 1 year after the myringoplasty, if all conditions are present the classic transcanal approach for stapedotomy can be performed. The interposition of vein and placement of the piston up to the incus or the malleus is accomplished.

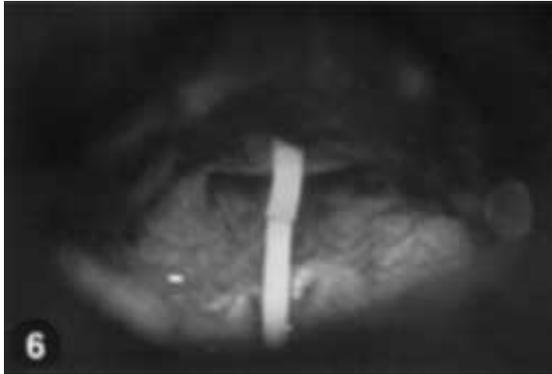


FIGURE 6. Causse-Malleus Loop prosthesis (totally fluoroplastic, Pouret-Mecanurgie, Paris, France) placed between the malleus and the stapedotomy with vein graft interposition.

FIGURE 7. Measuring piston placed between the malleus and the footplate to determine the exact length to the prosthesis.

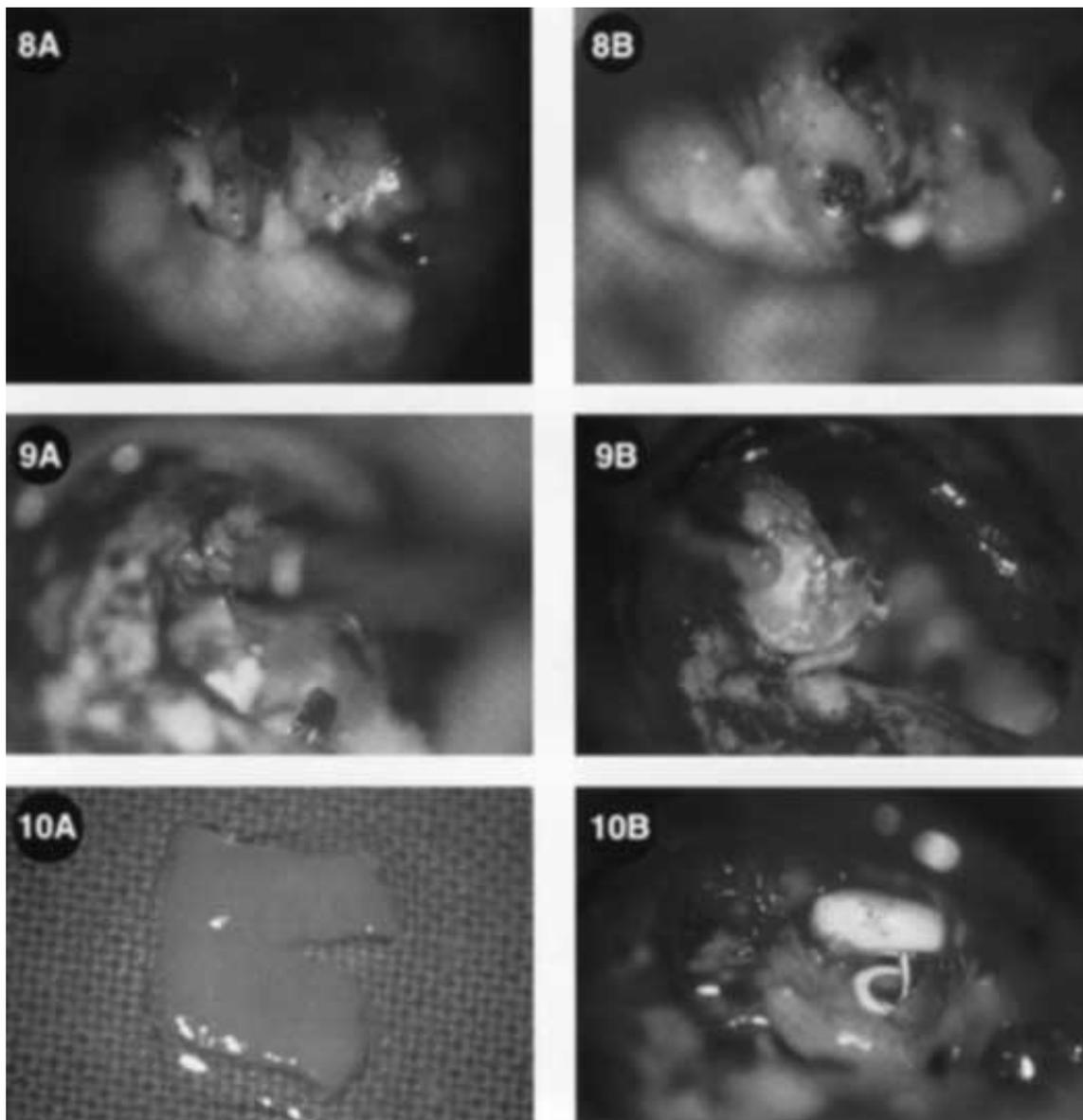


FIGURE 8. (A) Tympanosclerotic fixation of the stapes. (B) The footplate is completely involved by tympanosclerosis. Rosette spots are made with argon laser and Gherini-Causse endo-otoprobe, to prepare the stapedotomy.

FIGURE 9. (A) The neck of the malleus is sectioned in case of attic malleus fixation. (B) The head of the malleus is then removed and the handle recovers mobility.

FIGURE 10. (A) Preparation of the vein graft. Two thirds of the graft is sectioned transversely. (B) The vein graft is slid under the head from each side of the metallic link, the "sticking" connective layer facing the tympanic membrane.

In the case of a simple perforation 1 year after the myringoplasty, if all conditions are present the classic transcanal approach for stapedotomy can be performed. The interposition of vein and placement of the piston up to the incus or the malleus is accomplished (Fig 8). In case of incus fixation the incus has to be removed, and in case of malleus fixation the head of malleus has to be removed after sectioning the neck (Fig 9). More difficult is the absence of the malleus; in this case, a prosthesis with a large head must be used. The prosthesis length must be particularly adapted and the head must be stabilized by a second piece of vein graft, partly cut and placed under the head with the rough outer connective tissue layer facing the tympanic membrane (Fig 10).

The situation is rather the same in a canal-wall-up technique performed for a retraction pocket or a cholesteatoma, but in those patients the malleus is often lacking. The stapedotomy can only take place at the second stage after absence of residual or recurrent disease.

In case of a canal-wall-down technique without a remaining malleus, the functional procedure must be canceled. The risk for the prosthesis to be driven into the vestibule is too high.

CONCLUSION

Dealing with a fixed footplate in the management of chronic otitis media is one of the most difficult situations, especially from a functional point of view. The conditions required for a stapedotomy are extremely demanding, and will challenge even the most experienced surgeon. Extreme caution must be stressed, and if unsure of all the elements previously discussed, it is probably better to prescribe a good hearing aid than to take great risks. Here more than elsewhere, the well-known saying must be kept in mind: "One needs 1 year to learn a technique, 5 years to know when to do it, and a lifetime to know when not to do it!"