**Malleo-Stapedotomy**

**Surgical Technique**

In the first edition of this book, we stated that the elevation of a wide tympanomeatal flap exposing the lateral process of the malleus (see Fig. 109C) permits reliable assessment of malleolar mobility at the beginning of stapedotomy. Failure to initially expose the short process of the malleus has led the first surgeon to overlook malleus and/or incus fixation in 10% of the cases (see Table 33). MS (previously incus replacement with stapedotomy [IRS]) was the method of choice for the functional repair of malleus and/or incus fixation in otosclerosis.

In the past 10 years it became apparent that the anterior malleolar ligament may undergo severe hyalinization and ossification in 30% of otosclerotic patients (Nandapalan et al. 2002, 18-R). The increasing stiffness of the anterior malleolar ligament produces a partial fixation of the malleus with impairment of sound transmission in frequencies above 1000 Hz (Huber et al. 2003, 9-R). The analysis of 80 patients undergoing revision surgery after stapes surgery demonstrated that partial malleus fixation was present in 37% (Fisch et al. 2001, 3-R). The impressive frequency of malleus fixation led us to systematically investigate the condition of the anterior mallear ligament and process in patients presenting with stapes fixation, particularly of otosclerotic origin.

**Surgical Highlights**

- Local or general anesthesia.
- Endaural incision.
- Elevation of meatal skin flap.
- Anterosuperior canalplasty.
- Exposure of anterior tympanic spine and assessment of malleus mobility.
- Removal of incus.
- Drilling away ossified anterior mallear ligament and removal of malleus head, preservation of chorda tympani nerve.
- Introduction of TSP (straight or angled) between malleus handle and stapes footplate.
- Stapedotomy with manual perforators.
- Removal of stapes arch with crurotomy scissors.
- Introduction of piston into vestibule.
- Fixation of titanium loop to malleus handle.
- Sealing of stapedotomy opening.

*Fig. 118 Typical sites of malleus and/or incus fixation in otosclerosis*

The most common mallear fixation occurs through ossification of the anterior mallear ligament (1). Hyalinization and ossification of the anterior mallear ligament are related to the duration of the otosclerotic fixation and independent of the age and gender of the patient. Fixation of the malleus head (2) and incus body (3) are usually found in narrow external canals.
Surgical Steps
The surgical steps will be demonstrated for the Teflon platinum prosthesis used until 1996. The modifications which have occurred since its introduction will be noted in italics.

Assessment of malleolar mobility
The narrow external canal is widened as shown in Figures 108A, B. The tympanomeatal flap is then elevated over the lateral process of the malleus (see Fig. 107G). Palpation with a 1.5-mm, 45° hook shows that the malleus is fixed.

Fig. 119A,

Incisions for the meatal part of the tympanomeatal flap
Endaural incision (A–B); posterior limb of meatal incision (B–C); anterior limb of meatal skin incision (B–D). The narrow external canal prevents visualization of the malleus handle. This is often the case in partial or total malleus fixation.

Anterosuperior canalplasty
The skin of the tympanomeatal flap is elevated from the tympanosquamous suture and the surrounding bone with the Fisch microraspatory (23-I, 24-I). The anterosuperior excess bone is removed until the anterior tympanic spine becomes visible. The tympanic portion of the tympanomeatal flap remains attached to the bone until completion of the canalplasty to avoid contamination of the middle ear while rinsing with saline during drilling.

Modifications:
The tympanomeatal flap has become much larger anterosuperiorly to give sufficient view of the anterior malleolar process and ligament.