In this chapter, I describe operative procedures for repairing a perforation or a retraction pocket of the tympanic membrane with myringoplasty or tympanoplasty. The tissue technique for myringoplasty and tympanoplasty may be medial (underlay) or lateral (overlay, onlay), and the approach may be transcanal (transmeatal), endaural, or postauricular (see Chapter 2).

**SELECTION OF APPROACH AND TECHNIQUE**

Myringoplasty is used when there is no need to enter the middle ear, whereas tympanoplasty is indicated when the middle ear requires inspection. The myringoplasty is usually performed utilizing the transcanal approach and a medial fascia or fat-plug graft technique.

The tympanoplasty approach and graft procedure depend upon the location and extent of the defect:

- When the perforation is small and central (usually in one of the inferior quadrants), a transcanal approach is used, employing a tympanomeatal flap to enter the middle ear, and repairing the drum defect with a medial fascia graft or fat-plug.

- When the perforation is larger and in one or both posterior quadrants, especially when it is a "marginal perforation," a postauricular approach is employed with a medial fascia graft. When a retraction pocket is in this portion of the tympanic membrane, the same approach is used, but a cartilage graft is placed medial to the fascia graft to "batten" the tympanic membrane.

- When the perforation is in the anterosuperior quadrant, an endaural approach is used with a medial fascia graft. The same approach is used for a retraction pocket in this quadrant, but a medial cartilage graft is also employed to "batten" the eardrum.

- When the perforation involves most or all of the tympanic membrane (eg, subtotal or total), a postauricular approach and a lateral fascia graft are used.
Myringoplasty
Myringoplasty is a procedure used to repair a tympanic membrane perforation, without the need to examine the middle-ear. The procedure should be limited to patients who satisfy all of the following four criteria:

1. Relatively small central perforation of the tympanic membrane
2. Translucent tympanic membrane
3. No middle-ear disease is present or suspected
4. Hearing is within normal limits

When these conditions are not met, a tympanoplasty is indicated to facilitate the repair and to explore the middle ear, as described later in this chapter.

In Chapter 1, the indications and technique for removal of a retained tympanostomy tube and a paper-patch (Steri-Strip) myringoplasty were described. In the absence of a tympanostomy tube, the same paper-patch myringoplasty technique is used when a chronic small perforation is present secondary to a previously extruded tympanostomy tube, as a complication of otitis media, or following trauma to the eardrum. The surgical procedure is the same as that described in Chapter 1, and the indications are similar to those described below, when a myringoplasty is performed using a medial graft. When the Steri-Strip technique is used, the perforation should be no larger than the defect made by a grommet-type tube, because this technique has a poor success rate with larger perforations. Saito and colleagues, however, reported a 99% success rate in 108 patients, aged 2 to 68 years, using this patch.

Tympanoplasty
There is no consensus on the optimal ages for tympanoplasty (or myringoplasty) and suggestions have ranged from 2 or 3 years to puberty. Paparella states that tympanoplasty can be performed in children of almost any age, but Sheehy and Anderson do not recommend elective tympanic membrane grafting in children younger than 7 years of age because of potential postoperative otitis media. More recently, other surgeons have reported tympanoplasty outcomes that agree with the recommendation of Sheehy and Anderson. In a recent review of the long-term outcomes of tympanoplasty by Tos and associates, however, the success rate was 86% after 15 to 27 years. A recent meta-analysis of tympanoplasty in children from 1966 to 1997 by Vrabec and colleagues revealed that the success rate increased with advancing age and that none of the other parameters studied was shown to be a significant predictor of success. For a more detailed discussion of this controversy, the reader is referred to Bluestone and Klein.

In general, the indications for tympanoplasty are similar to those described in Chapter 1 when removal of a tympanostomy tube with a paper-patch myringoplasty is being considered and, as described above, when a medial graft tympanoplasty is indicated. A relatively small central perforation can be repaired successfully using the Steri-Strip technique, as described in detail in Chapter 1.

A tympanoplasty, as opposed to only a myringoplasty, should be performed when there is a need to examine the middle ear, such as when there
is conductive hearing loss that cannot be attributed to the size and position of the perforation (eg, ossicular discontinuity or fixation), when a retraction pocket is present, or when an occult middle-ear cholesteatoma is suspected. Additional indications would be when the perforation is large, when its location makes it difficult to repair using a myringoplasty procedure (eg, anterosuperior quadrant), or when it is a “marginal” perforation. When the perforation is in the posterosuperior quadrant and is marginal, a tympanoplasty provides not only a higher success rate, but also an opportunity to inspect the ossicular chain and middle ear, especially the sinus tympani and facial recess, to rule out cholesteatoma.

The classification of tympanoplasty related to ideal and theoretical postoperative hearing outcomes, based on middle-ear mechanics, consists of five types, each of which is based on the most lateral intact structure that remains connected to the inner ear:

- **Type I**: Tympanoplasty (or myringoplasty) when all three ossicles are normal, which should result in normal hearing.
- **Type II**: Tympanoplastic graft (or tympanic membrane) is in contact with the incus and the stapes is present, both of which are connected and mobile, which ideally should result in a minimal hearing loss of only 2.5 dB.
- **Type III**: Tympanoplastic graft (or tympanic membrane) is in direct contact with the suprastructure of the stapes (columella effect), which should result in a hearing loss of only 2.5 dB; also known as myringostapediopexy.
- **Type IV**: Ossicular chain is absent and the tympanic membrane is in contact with a mobile stapes footplate, which theoretically should result in a 27.5 dB hearing loss; also known as a cavum minor.
- **Type V**: A window is surgically made in the horizontal semicircular canal, which should result in hearing similar to a Type IV; also known as a fenestration.

**MYRINGOPLASTY WITH MEDIAL FASCIA OR FAT-PLUG GRAFT**

**Indications**

Case selection and indications for myringoplasty with a medial fascia or fat graft are similar to those described in Chapter 1 for removal of a tympanostomy tube and paper-patch (Steri-Strip) myringoplasty, however, there are a few notable differences:

- **Site of the perforation**: The perforation should not be in the anterosuperior quadrant of the pars tensa unless the defect is very small, in which case the simpler Steri-Strip technique is usually successful. When the defect is not very small, placement of a medial graft through an anterosuperior perforation is difficult owing to the constricted space. Perforations in this quadrant are repaired more effectively using the endaural tympanoplasty technique described later (see *Endaural Medial Fascia Graft Tympanoplasty*).
Etiology: Chronic traumatic perforations can be repaired in infants and young children, as well as in older children and adolescents, as long as recurrent or chronic middle-ear infection does not coexist.

A more detailed discussion of the indications and outcomes of this operation is included in the following section (see Postauricular Medial Fascia Graft Tympanoplasty).

Selection of Tissue for the Graft
• The tissue graft that can be used is either perichondrium removed from the tragus, fascia removed from the temporalis muscle, or a fat graft from the lobule of the ear.

• Myringoplasty outcomes using any of these tissues are highly successful (with the appropriate case selection), but the fat-plug technique is the most desirable, since the fat can be rapidly harvested and the middle ear does not have to be filled with Gelfoam. In addition, the fat-plug graft may be more stable since it is half in the middle ear and half on the outer surface of the tympanic membrane.

Anesthetic Considerations
• In children, the procedure is performed under general anesthesia. In addition, infiltration of a local anesthetic (1% lidocaine with 1:100,000 epinephrine) into the ear canal and the graft site is preferred.

Preparation
• If a large speculum does not fit snugly into the external canal so that both of the surgeon’s hands are free to perform the procedure, a speculum holder attached to the operating table can be used. A speculum holder, however, is frequently unnecessary because the canal usually dilates when a smaller speculum is initially used, after which a larger speculum can be inserted.

• A small portion of the hair is shaved just above the pinna, if a temporalis graft is to be used.

Procedure
• Sites of injection of the local anesthetic agent are just lateral to the bony-cartilaginous junction at 3, 6, 9, and 12 o’clock (Figure 3–1). The anesthetic agent is also injected above the pinna, the tragus, or the lobule, when a graft is to be harvested from one of these sites.

• When a fascia graft is desired, an incision is made superior to the pinna just above the hairline (Figure 3–2A), and the graft is excised (Figure 3–2B).
Figure 3–1 Sites of injection (x) of the local anesthetic agent.

Figure 3–2 A. An incision for a fascia graft is made superior to the pinna just above the hairline. B. The fascia graft is excised.
As an alternative to a fascia graft, a perichondrial graft can also be used. An incision for the perichondrial graft is made in the tragus, slightly toward the meatus, which leaves the tiny scar hidden (Figure 3–3A), and the perichondrial graft is excised (Figure 3–3B).

Figure 3–3  A. An incision for a perichondrial graft is made in the tragus. B. The graft is excised from the posterior surface of the tragus.
Still another highly successful alternative is to remove a small piece of fat from the ear lobule. The incision is made on the posterior surface of the lobule to hide the scar, but caution should be exercised while dissecting the fat with scissors so as to prevent a “button hole” perforation of the lobule (Figure 3–4).

A small central perforation is ideal for this procedure (Figure 3–5).

Figure 3–4 A fat graft is taken from the lobule through an incision on the posterior surface.

Figure 3–5 A small central perforation is present.
• The rim of the epithelium at the edge of the perforation is removed with a pick. A cup forceps will also facilitate this stage (Figure 3–6).

Figure 3–6 The rim of the epithelium at the edge of the perforation is removed with a pick.

When a *fascia* or *perichondrial graft* is used to repair the perforation

• The middle ear is filled with Gelfoam (Figure 3–7) and the graft is placed medial to the tympanic membrane (Figure 3–8).

Figure 3–7 The middle ear is filled with absorbable gelatin sponge (Gelfoam) (The Upjohn Company, Kalamazoo, MI).

Figure 3–8 A tissue graft is placed medial to the tympanic membrane.
• A Steri-Strip is placed over the perforation and tissue graft (Figure 3–9). If any bleeding occurs in the operative site, epinephrine applied to a piece of Micro Eye Sponge (Storz Ophthalmics, Inc, Clearwater, FL) is used prior to placement of the Steri-Strip.

• An antibiotic ointment is instilled into the external auditory canal using a syringe and plastic needle tip (Figure 3–10).

Figure 3–9  A Steri-Strip is placed over the perforation and tissue graft.

Figure 3–10  An antibiotic ointment is instilled into the external auditory canal using a syringe and plastic needle tip.
When a fat-plug graft is used to repair the perforation:

- The graft is inserted tightly into the perforation (Figure 3–11A), with half of the fat in the middle ear and half on the outer surface of the tympanic membrane (Figure 3–11B).
- No Gelfoam is needed in the middle ear, but a Steri-Strip is applied to the outer surface of the graft and antibiotic ointment is instilled into the ear canal similar to that shown in Figure 3–10.

Postoperative Care

- Postoperative care is similar to that described in Chapter 1 under *Removal of Tympanostomy Tube and Myringoplasty.*

Figure 3–11  A. A fat-plug graft is tightly inserted into the perforation. B. The plug should be half in the middle ear and half out on the lateral surface of the tympanic membrane.
TRANSCANAL MEDIAL FASCIA OR FAT-PLUG GRAFT TYPANOPLASTY

When the perforation is central and relatively small but exploration of the middle ear is desired, a transcanal approach can be used and a medial tissue graft can be employed in a manner similar to that described above for a myringoplasty; however, the graft is more precisely placed medial to the perforation than is possible when only a myringoplasty is performed. The middle ear is opened and explored using a tympanomeatal flap as previously described in Chapter 2 (see Figures 2–1 to 2–7).

POSTAURICULAR MEDIAL FASCIA GRAFT TYPANOPLASTY

In my experience, when the perforation is in one or both of the posterior quadrants (including the so-called “marginal” perforation) of the pars tensa of the tympanic membrane, the defect can be repaired in children with a very high success rate using a medial graft and the postauricular approach.

When a subtotal or total perforation is present, however, this author prefers to repair the tympanic membrane with a lateral graft, which also utilizes the postauricular approach (see Lateral Fascia Graft Tympanoplasty below). The problem of using a medial graft with these large defects, even when the middle ear is fully exposed through a postauricular approach, is securing the graft onto the anterior canal wall. Conversely, when the perforation is limited to the posterosuperior, posteroinferior, or both quadrants, a medial graft can be utilized. The graft is placed over the superior, posterior, and inferior portions of the canal wall, and also anteriorly over the malleus; the tympanic membrane remnant must be elevated off of the malleus. Thus, the medial graft will have all four portions of the graft secured.

Indications

• Perforations limited to the posterior quadrants of the tympanic membrane

• Retraction pocket of the posterior quadrants that are chronic but mild (as opposed to severe), however, even these pockets are best repaired using a cartilage graft, in addition to a fascia graft (see Cartilage Graft Tympanoplasty below)

Anesthetic Considerations and Preparations

• The anesthesia for the ear canal is shown in Figure 3–1, and the postauricular anesthesia is shown in Chapter 2, Figure 2–17.

Procedure

• The epithelium is cleaned off the margin or rim of the perforation as shown in Chapter 1, Figure 1–15. The canal and postauricular incisions and approach are shown in Chapter 2, Figures 2–18 to 2–27.
Following elevation of the tympanomeatal flap off the malleus (Figure 3–12A), the middle ear is filled with Gelfoam, and the fascia graft, which has been harvested from the temporalsis muscle, is placed anteriorly over the malleus, and onto the superior, posterior, and inferior medial portions of the ear canal (Figure 3–12B).

Figure 3–12.  
A. The tympanomeatal flap is elevated and dissected off the malleus so that the graft can be placed over it and the entire middle ear can be explored.  
B. The fascia graft is placed medially overlying the superior, posterior, and inferior canal walls, and over the malleus.
• The tympanomeatal flap is replaced to its original position (Figure 3–13A), and the Koerner flap is then replaced to its original position (Figure 3–13B), making certain that the medial edge of the flap is not curled under, but lies completely unfurled; if it is not, a postoperative iatrogenic cholesteatoma may occur in the posterior ear canal.

• Gelfoam is placed lateral to the flaps in the medial one-third of the ear canal, and two adaptic (Johnson & Johnson Medical Inc, Arlington, TX) strips, impregnated with an antibiotic ointment, are inserted into the outer two-thirds of the ear canal. The postauricular wound is closed with absorbable suture and a Glasscock pressure dressing (Glasscock Ear Dressing, Oto-Med, Lake Havasu City, AZ) is then applied.

**Postoperative Care**

• The postoperative care is described in Chapter 2 under *Postauricular Approach*.

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**Figure 3–13**  

_A, The tympanomeatal flap is replaced.  
B, The Koerner flap is replaced._
ENDAURAL MEDIAL FASCIA GRAFT TYMPANOPLASTY

Attempts to close perforations in the anterosuperior portion of the pars tensa of the tympanic membrane using traditional transcanal myringoplasty or tympanoplasty procedures frequently fail because they are difficult to perform in the constricted space between the anterosuperior portion of the scutum and the malleus. Even though some surgeons have reported success using a medial graft via a postauricular approach,\textsuperscript{10} this method usually does not adequately expose the anterosuperior canal wall to enhance a complete take of the graft and closure of the perforation.

This author has found the endaural approach to be the most feasible and successful method to repair perforations in the anterosuperior quadrant of the pars tensa because it provides excellent access to the area and the exposure provides an opportunity to visualize the mesotympanum as well as place a medial graft on three areas of attachment: the anterior and superior canal walls, and the malleus. In addition, the fascia graft from the temporalis muscle can be harvested from the operative site. This technique is also used to repair a retraction pocket in the anterosuperior quadrant of the pars tensa, which is usually a sequela of spontaneous extrusion of a tympanostomy tube (see \textit{Cartilage Graft Tympanoplasty} below). Also, this approach is used for small congenital cholesteatomas that are in the anterosuperior portion of the mesotympanum; when there is extension into, but limited to, the anterior attic, an atticotomy can be performed (see Chapter 5). The endaural approach described below is a modification of the one originally described by Lempert.\textsuperscript{11}

\textbf{Indications}

- Perforation in the anterosuperior quadrant of the pars tensa
- Retraction pocket in the anterosuperior quadrant of the pars tensa that is chronic but mild (as opposed to severe), but even these pockets are best repaired using a cartilage graft, in addition to a medial fascia graft (see \textit{Cartilage Graft Tympanoplasty} below)
- Congenital cholesteatoma limited to the anterosuperior mesotympanum

\textbf{Anesthetic Considerations and Preparation}

- The anesthesia and the preparations for this procedure are described in Chapter 2 under \textit{Endaural Approach}. 
Procedure

- Perforation occurs in the anterosuperior quadrant of the pars tensa (Figure 3–14).

- The epithelium at the rim of the perforation is removed with a pick, and a cup forceps is also used (Figure 3–15).

Figure 3–14 Perforation in the anterosuperior quadrant of the pars tensa.

Figure 3–15 The epithelium at the rim of the perforation is dissected with a pick.
• An endaural incision and approach are completed (see Chapter 2 under *Endaural Approach*); the anterior relaxing incision is extended inferiorly on the anterior canal wall (Figure 3–16).

• The fascia graft is harvested from the temporalis fascia (Figure 3–17).
• The tympanomeatal flap is elevated from the superior portion of the posterior canal wall, the superior canal wall, and the superior portion of the anterior canal wall (Figure 3–18).

• The tympanomeatal flap is elevated and dissected off the malleus; depending upon the lower extent of the perforation and the extent of the middle ear to be assessed, the flap can either be partially or totally dissected from the malleus; when totally separated from the malleus, the flap can be reflected inferiorly to visualize the mesotympanum and the rest of the ossicular chain (Figure 3–19).
• A fascia graft is placed over the superior and anterosuperior canal walls and the malleus; Gelfoam fills the middle ear prior to placement of the graft (Figure 3–20).

• The tympanomeatal flap is replaced (Figure 3–21).
• Adaptic packing is inserted into the external canal; a layer of Gelfoam is placed over the tympanic membrane (Figure 3–22).

• The endaural incision is closed with an absorbable suture (Figure 3–23).

Postoperative Care
• The postoperative care is described earlier in Chapter 2 under *Endaural Approach.*
LATERAL FASCIA GRAFT TYPANOPLASTY

The lateral graft tympanoplasty is primarily employed to close relatively large perforations, and this author has found this method to be more successful in children than any of the medial graft techniques for subtotal or total perforations. The reason why the lateral graft technique has a better long-term success rate than the medial graft technique is wider attachment of the lateral graft to all four portions of the canal wall. Also, persistent or recurrent negative middle-ear pressure, which is usually present in children who have middle-ear disease, is probably deleterious to a medial graft during the immediate postoperative period, whereas negative middle-ear pressure is an advantage when a lateral graft is used. An additional application for the lateral graft occurs when there is generalized atelectasis of the pars tensa.

This procedure uses the postauricular incision and approach, but the Koerner flap is longer than that described in Chapter 2 under Postauricular Approach. The posterior canal incision is made only a few millimeters from the annulus, because the skin adjacent to the annulus and the outer epithelial layer of the tympanic membrane are discarded; as little skin as possible is removed from the external canal, to facilitate rapid postoperative healing. The procedure is designed to create two laterally based pedicle flaps, one posterior (ie, the “long” Koerner flap) and one anterior. The entire external canal is exposed, which facilitates the procedure. Also, if needed, a canalo-plasty can be performed.

Indications
• Large central perforations of the pars tensa
• Extensive atelectasis of the pars tensa, for which most of the tympanic membrane is replaced with tissue graft

Anesthetic Considerations and Preparation
• The anesthesia and preparations for this procedure are described in Chapter 2 under Postauricular Approach.

Procedure
• This procedure is ideal for a large central perforation (Figure 3–24).
• An incision for a “long” Koerner flap is made closer (approximately 2 mm) to the posterior annulus than the usual incision (Figure 3–25).

• The postauricular incision and approach are completed (see Chapter 2 under *Postauricular Approach*), and a fascia graft is taken from the temporalis muscle (Figure 3–26).
• A “T” incision is made in the postauricular soft tissue (Figure 3–27).
• A Penrose drain is placed for retraction of the Koerner flap (Figure 3–28).

Figure 3–27 A “T” incision in the postauricular soft tissue.

Figure 3–28 A Penrose drain is placed for retraction of the “long” Koerner flap.
• An anterior incision for the anterior flap is made approximately 2 mm lateral to the anterior annulus and is connected to the Koerner flap incision (Figure 3–29). If the ear canal is too narrow to visualize the anterior canal wall and annulus, a canaloplasty (primarily in the lateral portion of the posterior canal wall), using an air drill, is helpful; the canaloplasty is readily performed, since the two pedical flaps are retracted out of the field and the bony canal is completely exposed.

• The anterior flap is elevated, rolled, and tuck laterally out of the medial portion of the canal (Figure 3–30).

Figure 3–29 An anterior incision is made approximately 2 mm lateral to the anterior annulus.

Figure 3–30 The anterior flap is elevated.
A medial strip of canal skin is adjacent to the annulus, and the entire outer epithelial layer of the tympanic membrane is elevated using a moon elevator and discarded (Figure 3–31).

The canal wall is curetted to remove any remnants of canal skin; a microdrill is another option. When indicated, a canaloplasty can be performed at this stage (Figure 3–32).

Figure 3–31 The remaining medial strip of canal skin and the entire outer epithelial layer of the tympanic membrane are removed.

Figure 3–32 The canal wall is curetted to remove any remnants of canal skin.
• The annulus is elevated to examine the mesotympanum and the ossicles (Figure 3–33).

• The middle ear is filled with Gelfoam (Figure 3–34).
A fascia graft is placed over the tympanic membrane remnant, overlapping onto the medial canal wall; four pieces of Surgicel are placed over the edge of the graft and onto the canal wall to “fix” the graft (Figure 3–35).

The anterior pedicle flap is replaced and overlaps the lateral edge of the anterior portion of the fascia graft (Figure 3–36).
• The Penrose drain is removed, and the Koerner flap, which overlaps the lateral edge of the posterior portion of the fascia graft, is replaced (Figure 3–37).

• A layer of Gelfoam is placed over the tympanic membrane remnant and graft, and two strips of Adaptic gauze impregnated with antibiotic ointment are inserted into the external canal (Figure 3–38).

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**Postoperative Care**

• The postauricular wound is closed with an absorbable suture, and a Glasscock pressure dressing is applied. The postoperative care is described in Chapter 2 under *Postauricular Approach*.

• Postoperative “blunting” in the anterior sulcus and lateralization of the graft are rarely observed, but an iatrogenic implantation cholesteatoma,
between the graft and the remnant of the tympanic membrane or in the canal wall, is not an uncommon postoperative sequela; occurrence is frequently related to the inexperience of the surgeon.

- When lateralization of the graft is a postoperative complication, it usually can be attributed to external otitis, otitis media, or both, that occur in the postoperative period.
- Compared to a medial graft, a lateral graft may require up to several months longer for the tympanic membrane to assume a “normal” appearance.

**CARTILAGE GRAFT TYMPANOPLASTY**

Cartilage graft tympanoplasty is indicated whenever a defect in the tympanic membrane or canal wall requires a stronger support than just a soft-tissue (eg, fascia) graft to prevent future retraction. A cartilage graft is required if an atticotomy is performed for a retraction pocket or cholesteatoma in the pars flaccida, which is described in detail in Chapter 5. The most common reason for requiring a cartilage graft is a retraction pocket (with or without cholesteatoma) of the tympanic membrane-middle ear that is to be excised and a tympanoplasty performed.

Although some surgeons favor simple excision of a retraction pocket of the pars tensa in conjunction with placement of a tympanostomy tube, persistent perforation and recurrence of the retraction pocket are potential unfavorable outcomes. Also, tympanostomy tube insertion does not reverse the process in the attic when the pars flaccida is involved. The cartilage graft prevents the retraction pocket (and subsequent cholesteatoma) from recurring.

Retraction pockets can occur in any portion of the tympanic membrane, but, when not associated with a healed perforation or as a sequela of tympanostomy tube placement, they usually occur in the posterosuperior quadrant of the pars tensa or in the pars flaccida. When a retraction pocket develops at the site of a healed perforation or following extrusion (or removal) of a tympanostomy tube, the pocket can be anywhere in the pars tensa; usually a dimeric membrane is present at the site prior to the development of the retraction pocket. Retraction pockets develop in middle ears that become atelectatic, and are classified based on location, extent (localized vs. generalized), duration (acute vs. chronic), and severity (mild, moderate, or severe). These defects can progress into a cholesteatoma, and the two are often indistinguishable.

Retraction pockets are most likely the result of two major factors: anatomy of the tympanic membrane, and eustachian tube dysfunction. A pars flaccida retraction pocket is related to the highly compliant (floppy) nature of the normal tympanic membrane in this location and to eustachian tube dysfunction. A pars tensa retraction pocket usually occurs in the posterosuperior quadrant, which is the most compliant because of the long distance between the attachment of the tympanic membrane to the anterior edge of the malleus and the posterosuperior portion of the annulus. Persistent high negative middle-ear pressure could cause retraction in this area, with potential adherence of the tympanic membrane to the underlying stapes and long process of the incus.
Using the endaural approach, repair of a retraction pocket of the pars flaccida or the anterosuperior portion of the pars tensa using a cartilage graft is essentially the same as when a cholesteatoma is present in these areas, which is described in detail in Chapter 5.

**POSTAURICULAR MEDIAL CARTILAGE-FASCIA GRAFT TYMPANOPLASTY**

The most effective approach to perform a cartilage graft for a retraction pocket in the posterosuperior quadrant is postauricular. Elevation of the Koerner and tympanomeatal flaps provides adequate exposure to visualize a small retraction pocket, but if there is an extension into the facial recess and sinus tympani, as is commonly encountered, a 2.7-mm 70° Hopkins rod-lens telescope is placed in the hypotympanum to visualize these areas; the telescope is positioned in the middle ear in the area least likely to injure the ossicles, but can be rotated to inspect all areas of the middle ear. A less effective alternative is the use of the Buckingham mirror. A medial fascia graft is placed to close the defect. To prevent a recurrence of the retraction pocket, a conchal cartilage-perichondrial graft is also used, since it is in the surgical field. A tympanostomy tube is usually also inserted, since eustachian tube dysfunction has been found to be present in children who have retraction pockets.18

**Indications**

The indications for surgical repair of a retraction pocket are as follows:

- Inability to fully visualize the extent of the pocket with the otomicroscope
- Inability to expand the pocket using the Bruening otoscope, with the nonmagnifying lens and the otomicroscope
- Failure to expand the pocket during nitrous oxide anesthesia
- Failure of the tympanic membrane at the site of the pocket to return to a normal position 2-4 weeks following the insertion of a tympanostomy tube placed in another site
- Recurrent or chronic infection within the pocket
- Difficulty in determining whether a cholesteatoma is present

**Anesthetic Considerations and Preparation**

- The anesthesia and the preparations for these procedures are described in Chapter 2 under Postauricular Approach. If relatively extensive disease is anticipated, a facial nerve monitor is used during the procedure.
Procedure

- A retraction pocket defect is identified in the posterosuperior quadrant of the pars tensa, with a probable extension into the facial recess and the sinus tympani (Figure 3–39).

- Using a postauricular approach (see Chapter 2), incisions for the Koerner flap are made (Figure 3–40).
- The postauricular approach is completed, and the Koerner flap is retracted anteriorly (Figure 3–41).
- The tympanomeatal flap and retraction pocket are elevated (Figure 3–42).
- A portion of the posterosuperior scutum is removed with a curette to visualize the ossicles and the surrounding area. The tympanic membrane and the retraction pocket are dissected from attachments medial and posterior to the annulus (Figure 3–43).
- A 2.7-mm 70° Hopkins rod-lens telescope (Hopkins-Karl Storz, Endoscopy-America Inc, Culver City, CA) is placed in the hypotympanum to visualize the facial recess and the sinus tympani for residual epithelium (Figure 3–44).
- A Buckingham mirror is used as an alternative to the telescope (Figure 3–45).
• A cartilage-perichondrial graft is taken from the conchal cartilage (Figure 3–46).

• The conchal cartilage graft is placed over the long process of the malleus and overlapping the posterior canal wall. A fascia graft is also used to repair the defect and is lateral to the cartilage graft, but medial to the tympanic membrane (Figure 3–47).
• The tympanomeatal flap is replaced. A tympanostomy tube is inserted into the tympanic membrane if eustachian tube function is still poor in order to prevent middle-ear effusion or another portion of the tympanic membrane from retracting (Figure 3–48).

• A layer of Gelfoam is placed over the tympanic membrane and graft. Two strips of Adaptic gauze impregnated with antibiotic ointment are inserted into the external canal.

Figure 3–48  A tympanostomy tube is inserted into the tympanic membrane.

Postoperative Care
• The postoperative care is the same as that described in Chapter 2 under Postauricular Approach.
REFERENCES


