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Fifth Edition

Protruding ears by S R Cohen and F D Burstein



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Protruding ears

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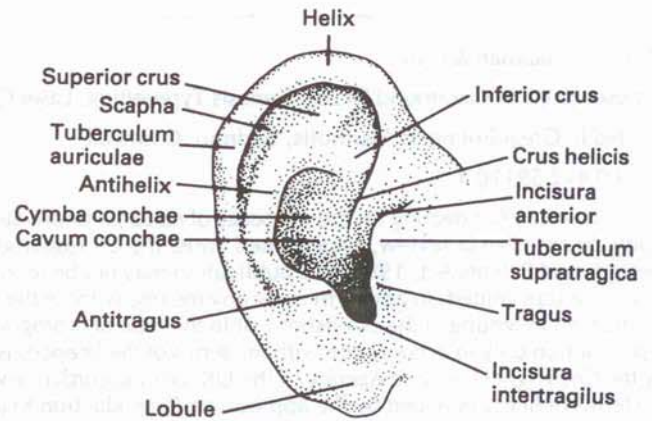
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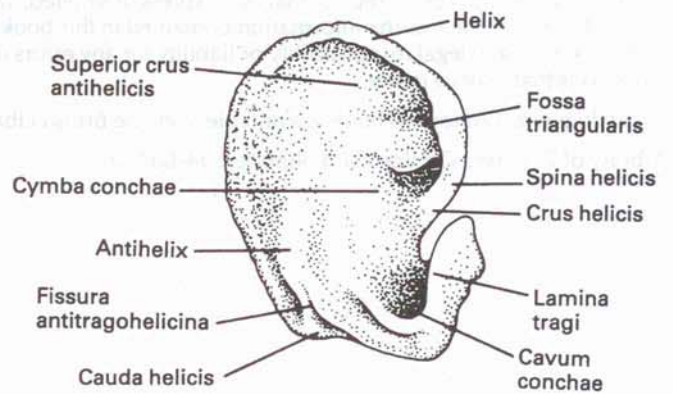
Principles and justification

Anatomy of the external ear

1a, b The auricle is approximately 6 cm long in the adult. It lies between horizontal lines at the upper rim of the orbit and nasal spine and protrudes at about 30° from the skull¹. The gap between the upper part of the helix and the skull is usually less than 2 cm. The cartilage has depressions and ridges that are easily seen in the overlying skin. The auricularis posterior is the thickest of three extrinsic muscles to the ear. It originates on the base of the mastoid and inserts onto the ponticulus, which is opposite the concha.

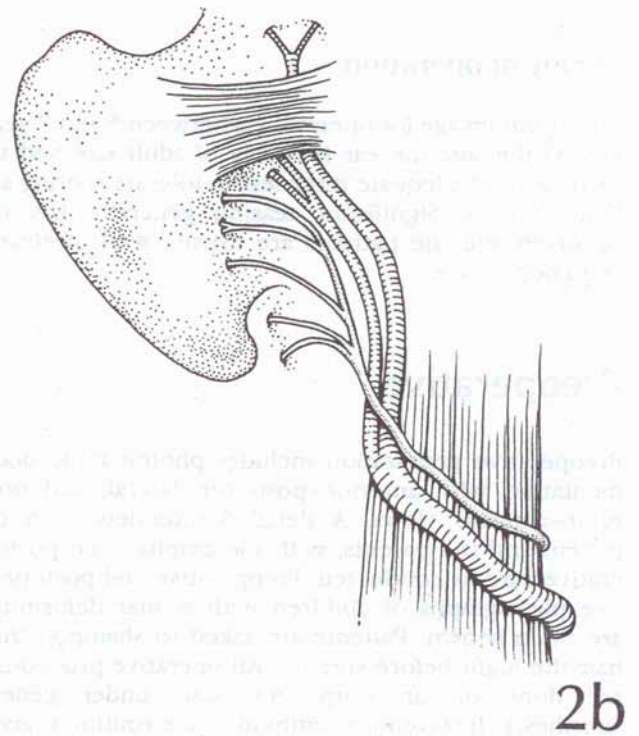
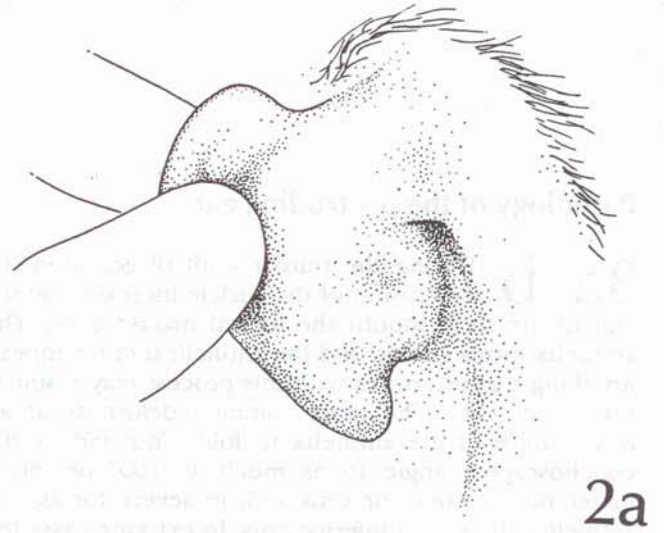


1a



1b

2a, b Clinically, the auricularis posterior is demonstrated by pulling the ear forward. It is innervated by the posterior auricular branch of the facial nerve. The posterior auricular veins travel just deep to the great auricular nerve and are commonly encountered during deep dissection to expose the concha. To avoid bleeding the auricularis posterior muscle is best divided with electrocautery.



Pathology of the protruding ear

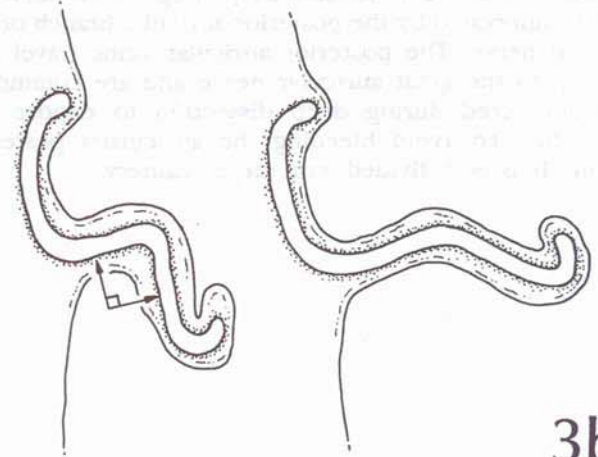
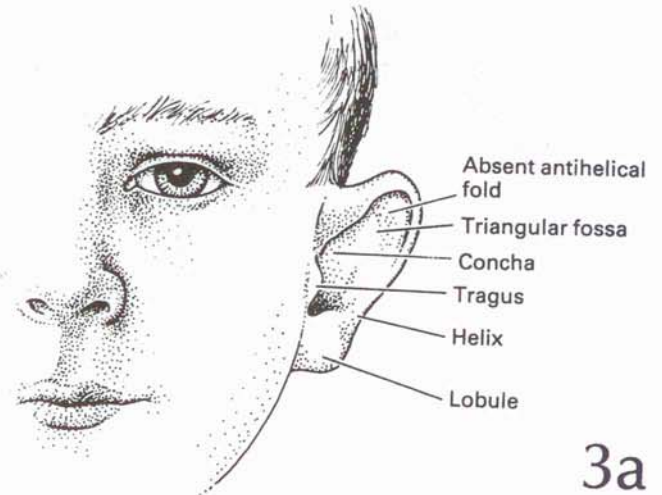
3a, b During the third month of gestation the protrusion of the auricle increases; by the end of the sixth month the helical margin curls. The antihelix forms its fold and the antihelical crura appear. Anything that interferes with this process may result in prominent ears. The most common deformity arises from failure of the antihelix to fold. This widens the conchoscaphal angle to as much as 100° or more, flattening the superior crus and, in severe forms, the antihelical body and inferior crus. In extreme cases the helical rim may be absent, producing a flat, shell-like ear. The normal ear has a conchoscaphal angle of 90° or less, while the prominent ear has more obtuse angulation. Abnormalities are often bilateral and frequently present with variable degrees of symmetry.

Timing of operation

The optimum age for operation is between 5 and 7 years old. At this age the ear is nearly of adult size and the cartilage is of adequate thickness to tolerate scoring and hold sutures. Significant teasing generally has not occurred and the patients are usually well motivated and cooperative.

Preoperative

Preoperative preparation includes photographic documentation with anterior–posterior, lateral, and posterior–anterior views. A detailed interview with the patient and the parents, with the emphasis on postoperative care, is conducted. Preoperative and postoperative photographs of children with similar deformities are often shown. Patients are asked to shampoo their hair the night before surgery. All operative procedures are done on an outpatient basis under general anesthesia. Intravenous antibiotics are routinely given before skin incision.

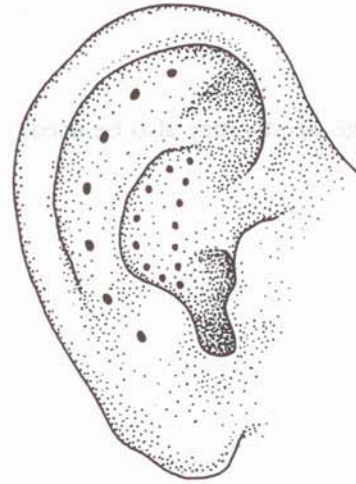


Operations

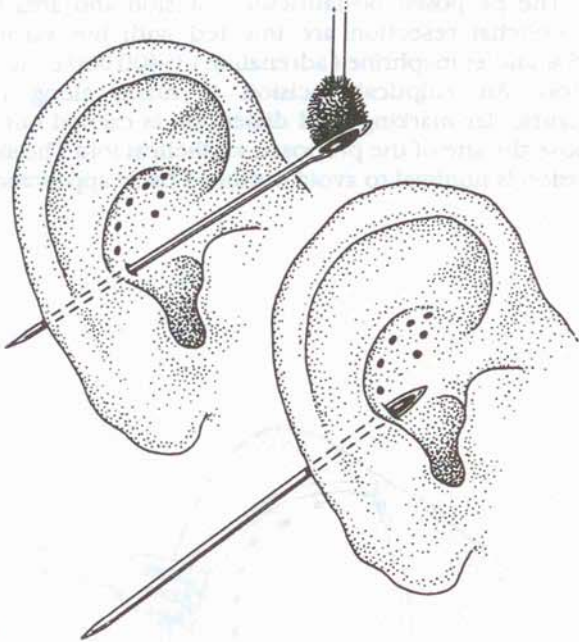
MUSTARDÉ'S PROCEDURE

Correction of the ear with either normal or absent antihelical fold is known as Mustardé's procedure².

4 The desired location of the antihelical fold and, if indicated, the amount of conchal resection, are marked using methylene blue.



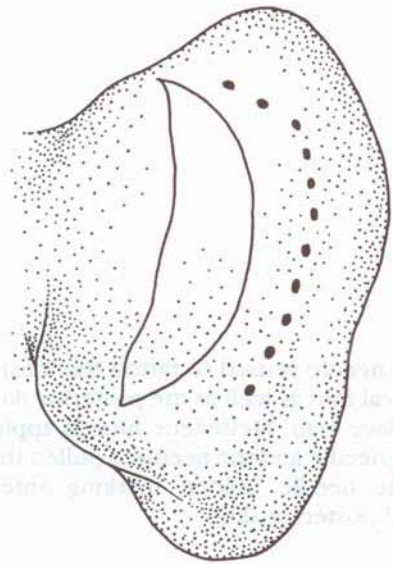
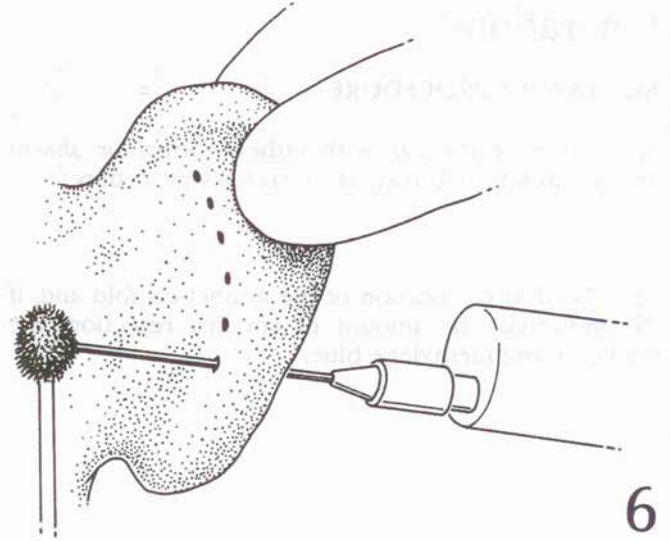
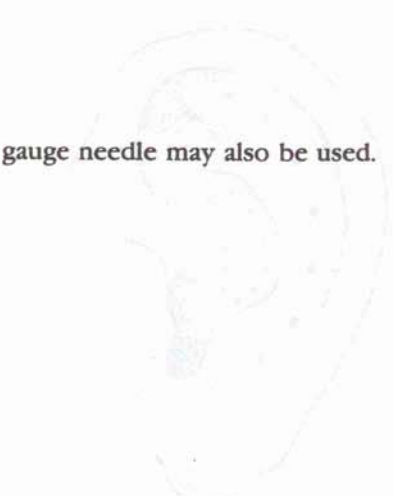
4



5

5 A Keith needle is used to tattoo the location of the antihelical fold as well as the posterior skin incision on the cartilage wall. Methylene blue is applied to the eyelet of the needle and the needle is pulled through the ear with the needle holder, marking anterior skin, cartilage and posterior skin.

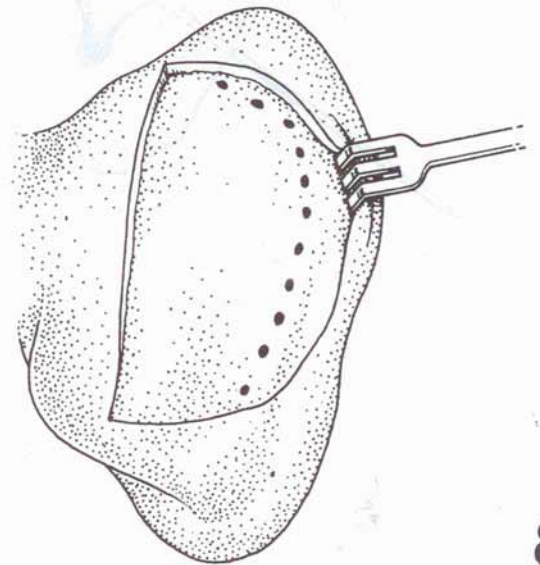
6 A 22 gauge needle may also be used.



7 The proposed postauricular incision and area for conchal resection are injected with bupivacaine 0.25% and epinephrine (adrenaline) 1:400 000 concentration. An elliptical incision is made along the postauricular markings and dissection is carried out to expose the site of the proposed antihelical fold. The skin excision is minimal to avoid a 'pinned back' appearance.

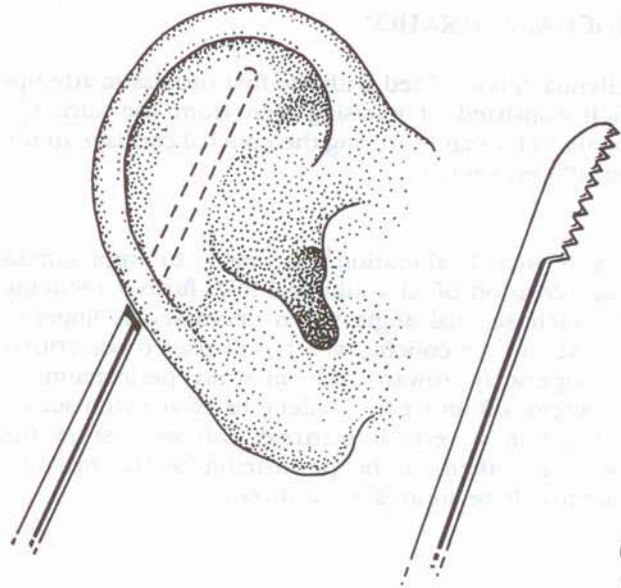
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8 The dissection is carried out directly over the cartilage with an Iris scissor, or in the subcutaneous plane using electrocautery. The previously placed methylene blue tattoos along the line of the antihelical fold are directly visualized.

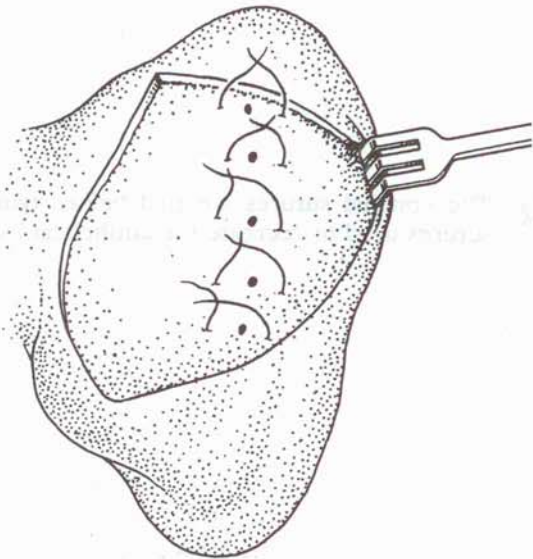


8

9 A small incision is made in the cartilage near the cauda helicis and a subperichondrial tunnel is made along the anterior surface of the cartilage with a Joseph elevator. An otoprader is then introduced along the same tunnel and gentle scoring of the cartilage is performed in a 5-mm wide strip until the antihelical fold can be produced with minimal fingertip pressure. Caution must be exercised to prevent lacerating the cartilage, which will result in too sharp a fold.



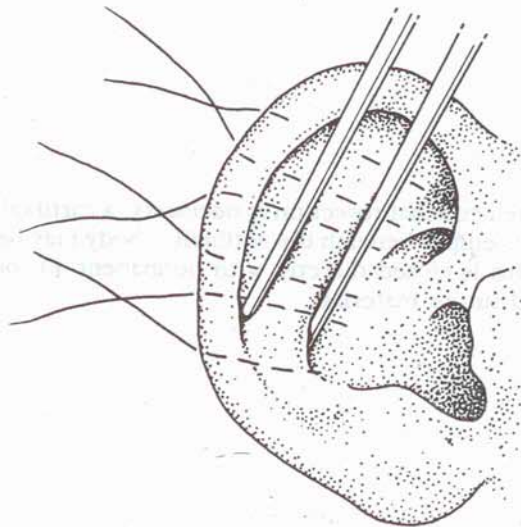
9



10

10 The tattoo marks are then used to guide the placement of permanent undyed 4/0 or 5/0 sutures (Mersilene or clear nylon are often used). These sutures are placed in a horizontal mattress fashion through the perichondrium and cartilage. The sutures are placed approximately 2 mm on either side of the tattoo marks along the antihelical fold. Generally four or five sutures are employed.

11 The sutures are then tightened until the antihelical fold is well defined.

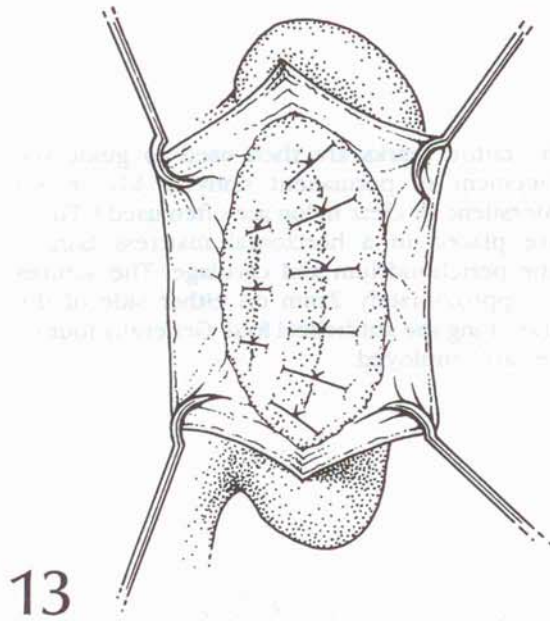
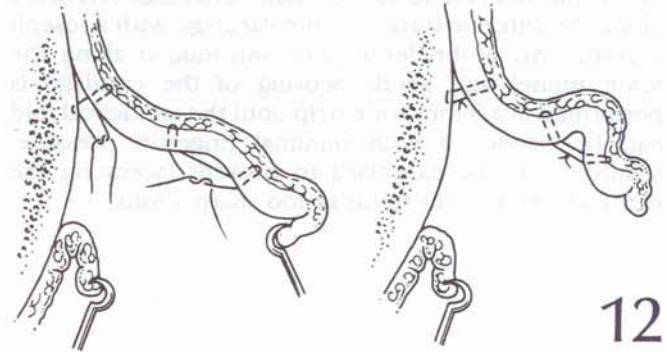


11

CONCHAL ALTERATION

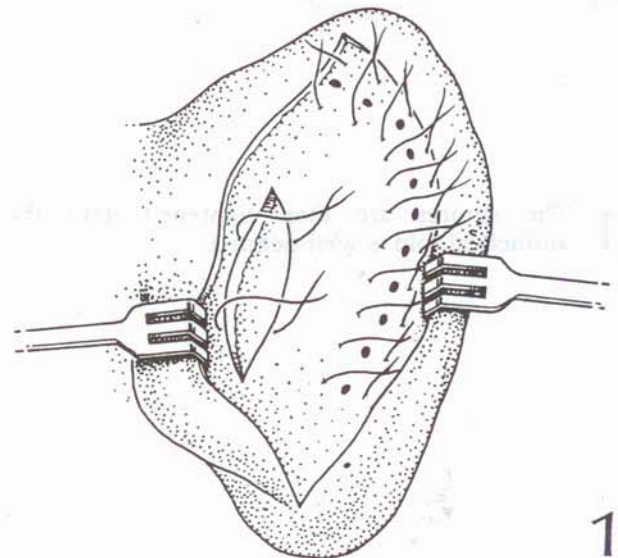
Dieffenbach is credited with the first otoplastic attempt which consisted of excising skin from the auriculocephalic sulcus and suturing the conchal cartilage to the mastoid periosteum³.

12 Conchal alteration⁴ is used to supplement creation of an antihelical fold, further reducing the conchoscaphal angle when necessary. A finger is inserted into the concha, which is displaced posteriorly and superiorly toward the mastoid periosteum. A permanent 4/0 undyed Mersilene or clear nylon suture is placed in a vertical mattress fashion, first in the concha and then in the periosteum of the mastoid. Generally three sutures are utilized.

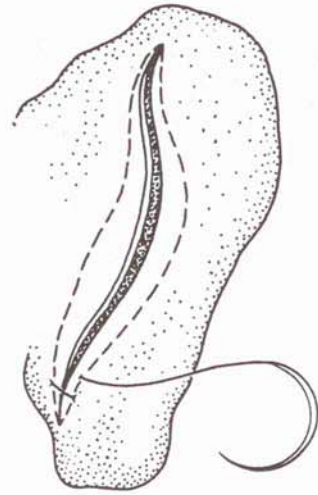


13 The conchal sutures are tied before tying the sutures used to recreate the antihelical fold.

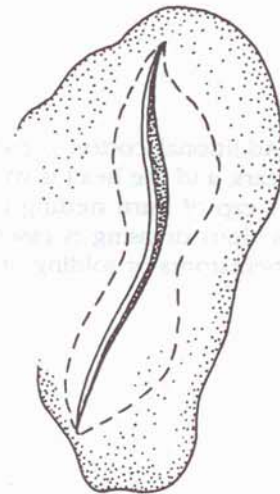
14 When conchal resection is necessary, a cartilaginous ellipse beneath the antihelical body may be excised. This is closed directly with permanent 4/0 or 5/0 undyed suture material.



15a, b Skin closure is carried out using a continuous 5/0 plain catgut suture. When the superior or inferior poles are protruding beyond the central one-third of the ear, a dumb-bell shaped skin excision may be carried out (*Illustration 15b*).



15a



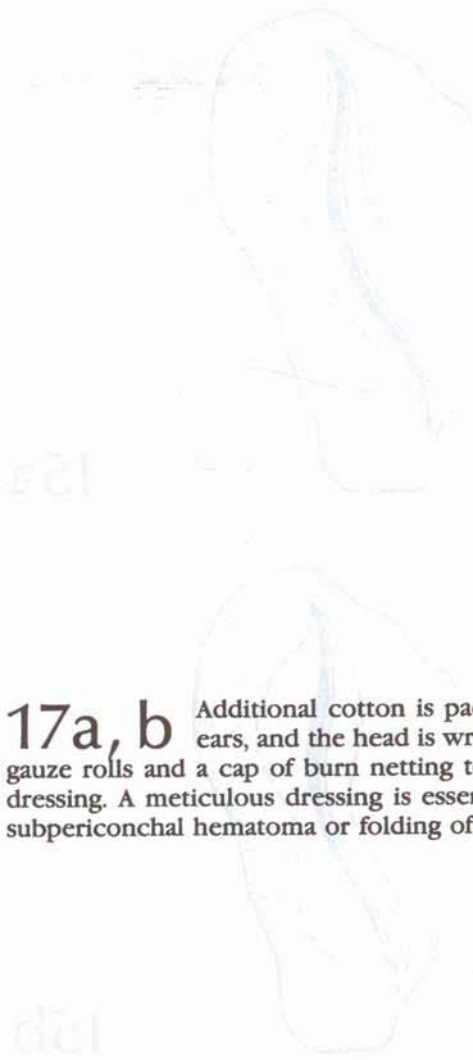
15b



16

Dressings

16 Xeroform petrolatum dressing impregnated with an antibiotic ointment is placed within the contours of the ear and used to fill the conchal bowl. Moistened cotton is then rolled behind the ear and used to supplement the Xeroform within the conchal bowl.



17a, b Additional cotton is packed over both ears, and the head is wrapped with soft gauze rolls and a cap of burn netting to complete the dressing. A meticulous dressing is essential to prevent subpericonchal hematoma or folding of the ear.



17a



17b

Postoperative care

The dressing is removed on the third postoperative day, and the postauricular incision is cleaned with peroxide; a small amount of topical antibiotic is applied to the incision twice daily. The patient is asked to bring a terry-cloth tennis-type headband with them at the time of dressing removal and this is worn night and day for 3 days and then only at night for another 2 weeks. This prevents inadvertent trauma to the ear during sleep. The patient is allowed to wash their hair and swim after the third postoperative day. A first-generation cephalosporin is administered, beginning at the time of surgery and continuing for a total of 5 days. Contact sports are allowed after 4 weeks.

Complications

Any hematoma should be promptly drained using a 19 gauge needle to prevent organization and a 'cauliflower ear'. If this occurs a conforming dressing is reapplied for an additional 3 days.

Infection with chondritis should be suspected if there is fever, a loss of ear definition or a sudden increase in postoperative pain. Prompt drainage, culture and appropriate antibiotic therapy are essential to prevent cartilage loss.

Streptococcus and *Staphylococcus* usually account for early acute infections while *Pseudomonas* may present with chronic drainage. Rarely it may be necessary to debride devitalized cartilage and treat with intravenous antibiotics.

Late deformities are usually due to surgical error. A 'telephone ear' may result from over-zealous skin excision from the middle third of the ear with or without over-resection of the conchal cartilage. Correction involves resection of skin from the upper and lower thirds of the ear and/or adding a full-thickness skin graft to the middle third of the ear. A very sharp antihelical fold with prominent cartilage edges may result from cartilage lacerations from exaggerated pressure on the otobradler or from over-tightening of the horizontal mattress sutures used to create the fold. Some correction may be achieved by releasing one or more of these sutures. In severe cases, a thin temporalis fascia graft can be tunneled over the antihelical cartilage to soften the irregularities. Slight asymmetries may become evident after all of the postoperative edema subsides. These can usually be corrected by judicious postauricular skin excision.

Keloid formation is rare and should be treated with steroid injections and massage. Excision may require a full thickness skin graft to prevent obliteration of the postauricular sulcus with a 'plastered down appearance'.

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