

Another Solution for the Problem of the Prominent Ear *

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ANOMALIES of the external ear are frequent. Those defects that give the ear a protruding appearance are especially common. The social and emotional impact of this deformity is widely appreciated.⁸

Attempts at operative correction at one time included measures such as excision of postauricular skin alone or direct suture of the ear to the mastoid area. The unpleasant or temporary results of these procedures led to their abandonment. Lockett's analysis of the defect involved in the protruding ear represented a second stage in the development of otoplasty operations.¹⁰ Procedures based on his technic, however, often produce obvious operative stigmata.¹⁴

Methods more recently introduced have attempted to achieve correction of the outstanding ear deformity without the appearance of operation.^{2-5, 7, 11-16} The multiplicity of technics testifies to the difficulty of achieving this end. In the last ten years an otoplasty procedure coming close to this goal has been evolved at the Columbia-Presbyterian Medical Center. Several of its features have received but slight previous emphasis. This paper details these items of technic and presents a critical review of the results achieved in a recent five-year period.

Technic

A postauricular incision is outlined parallel to the free border of the helix and about 1 cm. from it (Fig. 1, 2). The incision extends from the cephaloauricular angle superiorly, to within the fleshy lobule infe-

riorly. Using this line as the outer border, an ellipse of skin can be removed. The skin excision is an advantage in exposure but is not essential for this nor is it necessary to keep the ear in position postoperatively.

Needles are passed posteriorly from the anterior surface of the ear just beneath the helix overhang, tipped with Methylene Blue and withdrawn. After the initial skin incision the wound edges are slightly under-

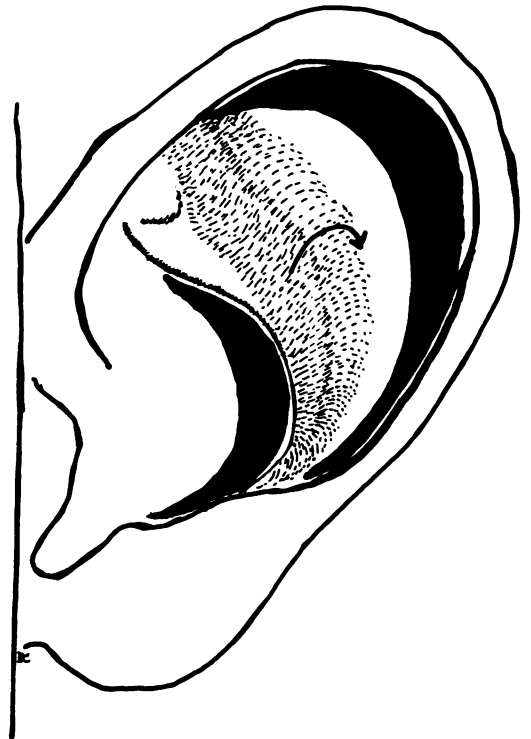


FIG. 1A. Prominent ear with combined concha and antihelix deformity. The darkened ellipses indicate desirable reductions in size; the arrow indicates the antihelix with superior crus to be constructed.

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mined and the Methylene Blue markings are identified in the cartilage. The auricular cartilage is cut through along this line from superiorly at the cephalo-auricular angle to inferiorly where the tail of the helix begins (Fig. 3). This separates the rim of the ear from the major ear cartilage.

The auricular cartilage is then freed sub-perichondrially on its *anterior surface* (Fig. 4). It is to be noted that the posterior perichondrium is not disturbed. The anterior dissection is carried forward in the upper part of the ear until the inferior crus of the antihelix is exposed. In the middle and lower portion of the ear the edge of the cavum concha is similarly exposed. If the cavum is significant in the ear protrusion its exposure is made more nearly complete. Despite this freeing, the cartilage still maintains a protruding position (Fig. 4C).

The anterior cartilage surface is now lightly striated in at least three or four directions (Fig. 5). The striations do not extend through the full thickness of the

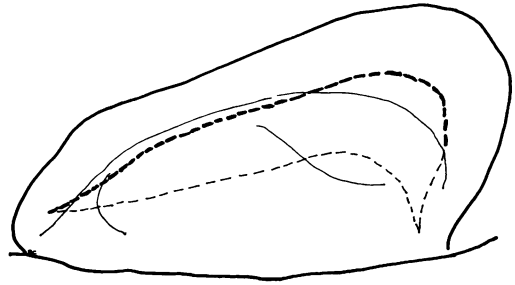


FIG. 2A. Postauricular incision indicated. Possible elliptical skin excision also outlined.

cartilage. As this is done the cartilage will be observed to bend back on itself forming the smooth roll of the antihelix with its superior crus, both in proper position (Fig. 6). The location of the antihelix bend is independent of the location of the striations and appears to be inherent to the cartilage. The acuteness of the roll can be increased by increasing the number and decreasing the spacing of the striations.

The invariability of this phenomenon must be experienced to be believed. Intrinsic forces within the auricular cartilage similar to those described for rib cartilage appear to be involved.⁶ The observation was made several years ago that anterior dissection of the auricular cartilage is asso-

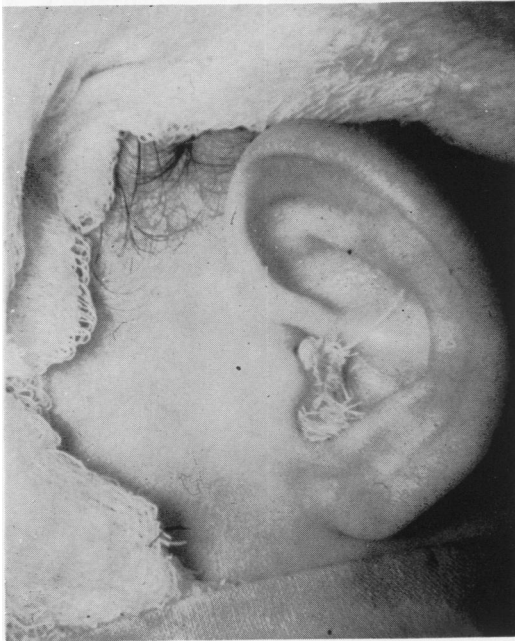


FIG. 1B. Prominent ear at start of operation.
(See Fig. 10.)



FIG. 2B. See legend for Figure 2A.

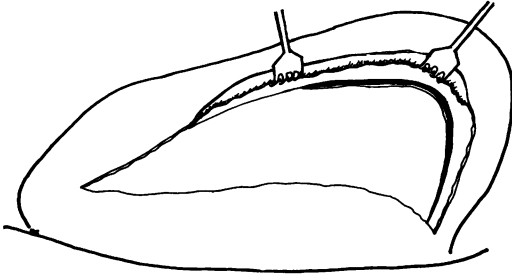


FIG. 3A. Auricular cartilage cut through to anterior surface.

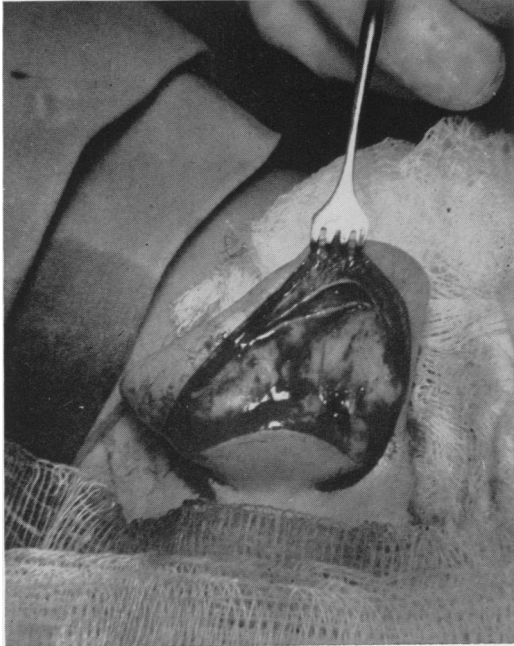


FIG. 3B. See legend for Figure 3A.

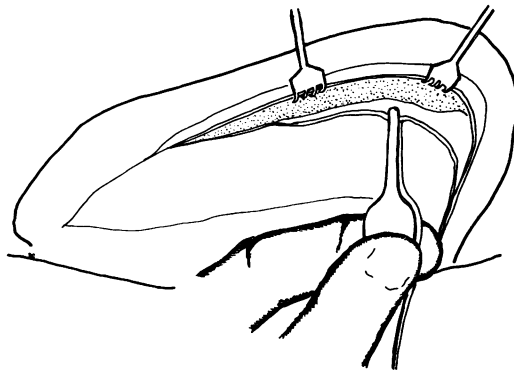


FIG. 4A. Subperichondrial auricular cartilage dissection on anterior surface.

ciated with some backward bending and that striation could accentuate this.^{2, 5} The intentional use of anterior dissection and striation as the basis of an otoplasty technic has been the subject of one very recent report.¹

The now redundant auricular cartilage edge can be trimmed. The amount to be excised can be determined by replacing the helix over the auricular cartilage and observing the excess from behind. The width removed affects the width of the new scaphoid fossa. The amount trimmed from the superior pole affects the vertical length of the ear (Fig. 6).

The edge of the cavum concha is now trimmed (Fig. 6B). Striating the edge of the concha does not cause it to bend as does the auricular cartilage superior to it. The cartilage in this area is thick enough, however, so that the trimmed edge is not sharp. If the conchal width and height are not great this trimming may be all that is needed. If greater reduction is desired an ellipse of cartilage can be excised from the concha. The ellipse lies just beneath the

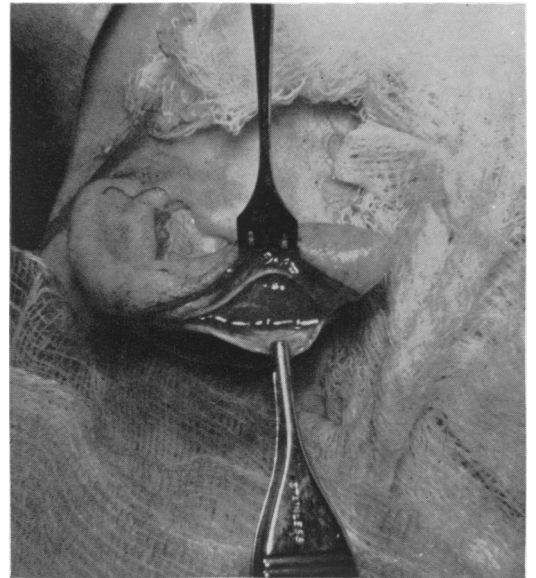


FIG. 4B. See legend for Figure 4A.

concha edge and the overhanging rim of the inferior crus of the antihelix (Fig. 7, 8).

The tail of the helix is next dissected free and excised. This reduces protrusion of the lobule. If the antitragal cartilage contributes to lobule protrusion or if it is prominent in its own right, it is dissected free and trimmed appropriately (Fig. 6, 7, 8).

The anterior skin flap is then replaced on the cartilage and moulded into its new contours. The anterior aspect is examined. Residual prominence of the conchal edge can be excised. Following this the superior crus of the helix may be cut through at the cephaloauricular angle superiorly and/or a triangle of cartilage excised there. This makes the helix a *bucket handle* that can both turn back with the new antihelix and lie against it, conforming to the latter's reduction in size (Fig. 7, 8, 9).

The cartilage maintains the new position without any suturing (Fig. 9). The post-auricular incision is now closed. At this point, modification of the lobule end of the incision by variably shaped excisions can conveniently reduce a large lobe. A carefully moulded dressing completes the pro-

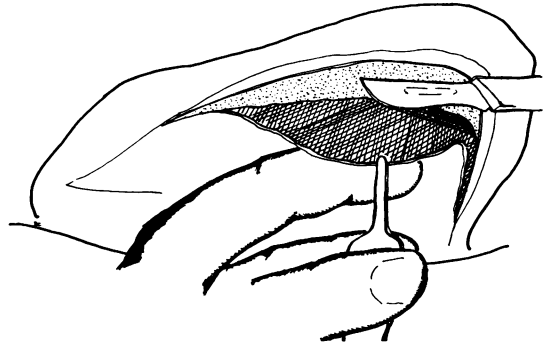


FIG. 5A. Striation of anterior surface of cartilage.

cedure (Fig. 10). The method has applicability in some cases of *cup ear* (Fig. 11). An anterior approach utilizing this basic technic has been presented recently.⁹

Operative Series

116 patients had otoplasties performed by the Plastic Surgery Service, Presbyterian Hospital, in the period 1957 to 1961. Of these patients 65 were males and 51 females. The average age of the males was 9.4 years;

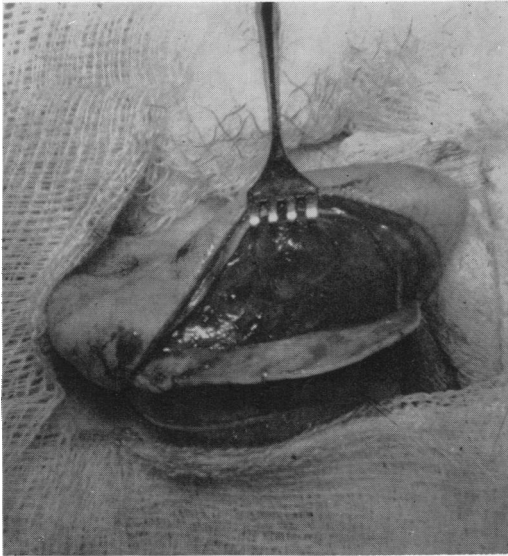


FIG. 4C. Fully exposed cartilage maintains protruding position.

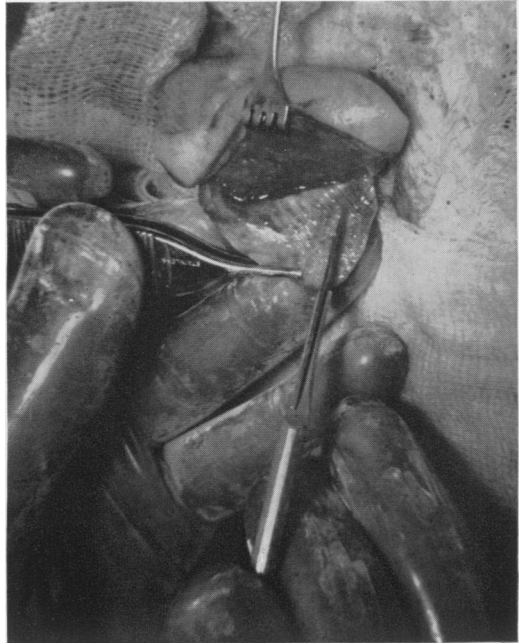


FIG. 5B. See legend for Figure 5A.

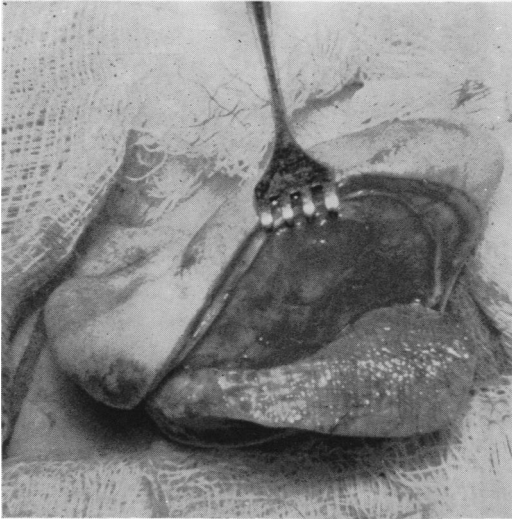


FIG. 6A. Smooth antihelix roll formed by the cartilage after anterior striation. Compare with Figure 4C.

that of the females was 14.5 years. This age differential has previously been noted.⁸ The youngest patient operated upon was 3½ years old. 97 of these patients had their procedures done by the method described. In 45 of these 97 patients involving 89 ears, pre- and postoperative photographs and

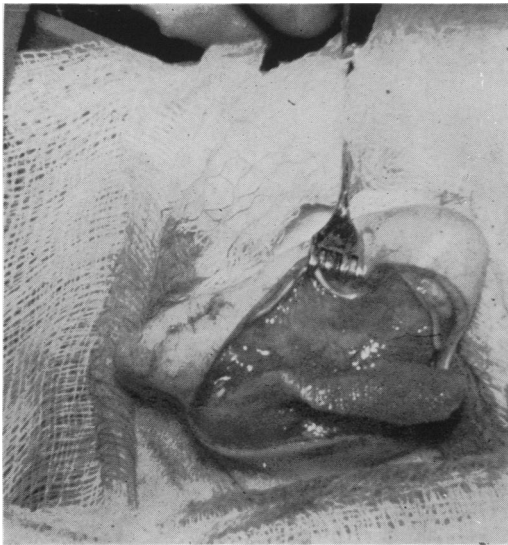


FIG. 7A. Appearance after trimming of auricular cartilage edge and excision of a helix wedge.

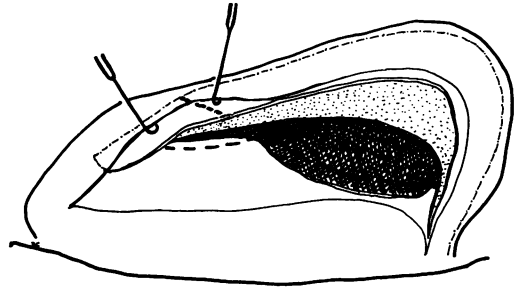


FIG. 6B. Trimming of auricular cartilage and concha edge to be carried out as indicated by heavy dash lines. Tail of helix excision is similarly indicated.

adequate follow-ups were available. The average length of follow-up in this group was 18 months with 22 patients followed 12 months or longer. Table 1 shows the nature of the defects causing the ear protrusion in this series. Table 2 lists the relatively few complications encountered.

Criteria of Results

Within the broad limits allowed by the normal variation between the ears of different individuals as well as between the ears of a single individual, criteria can be established to evaluate operative results. Factors of general appearance and of specific detail are involved. Within the first category it is axiomatic that the appearance of protrusion must be corrected. The ear

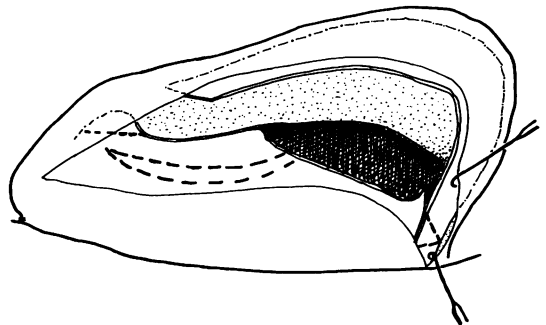


FIG. 7B. Tail of helix excised. Tentative excisions of superior helix wedge, concha ellipse, and antitragus prominence indicated by heavy dash line.

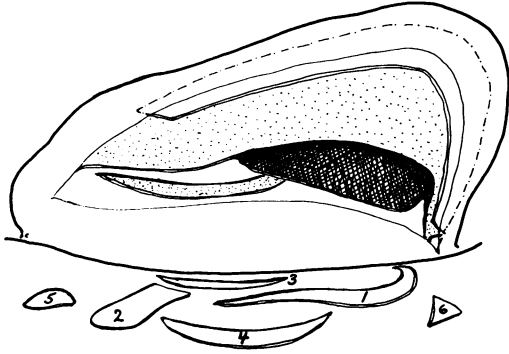


FIG. 8A. Pieces of cartilage excised in maximum reduction: 1—auricular cartilage edge; 2—tail of helix; 3—edge of concha; 4—ellipse of concha; 5—antitragus prominence; 6—helix wedge. The first three are the usual excisions; the remainder are excisions dictated by the individual case.

should lie parallel to the mastoid area but without loss of the cephalauricular sulcus.

In the second category five areas must be considered. The helix is one. Its curve should be smooth without buckling or overhang. The superior crus of the antihelix should be softly rounded and with prominence equal to or slightly less than that of the helix. The sharp fold produced by some otoplasty technics is an operative defect

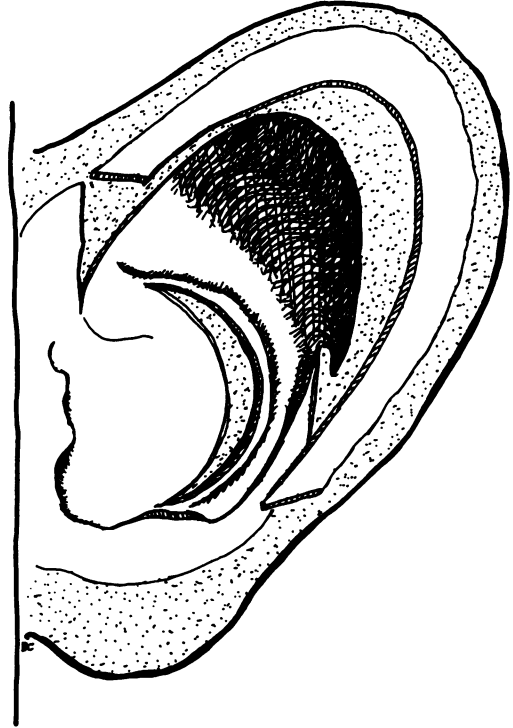


FIG. 9A. Anterior cut-away view showing effect of cartilage excisions with formation of free helix *bucket-handle*.



FIG. 8B. Location of elliptical excision in concha.

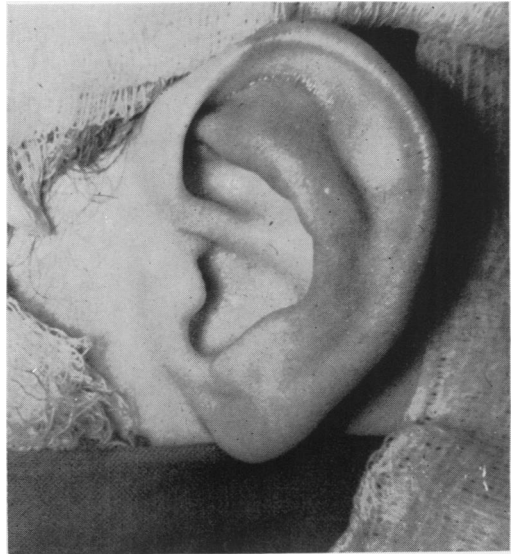


FIG. 9B. Immediate postoperative result in the ear shown in Figure 1B. Cartilage striation and excision has been carried out as depicted. Post-auricular incision has been closed with 5-0 plain catgut. Note how the ear maintains the new position.



FIG. 9C. See legend for Figure 9B.

specifically to be avoided. The cavum concha should be neither excessively wide nor deep. The antitragus should be in line with the antihelix curve and not unduly prominent. The lobule should be in line with the helix, not outstanding, and not oversized for the rest of the ear.

A result satisfying these criteria was termed excellent. Minor deficiency in up to three of these areas was compatible with a good result. If more minor deficiencies were present or if one major defect was noted in the helix, antihelix, or concha, the result was termed fair. More major defects led to classification as poor. Failure to cor-

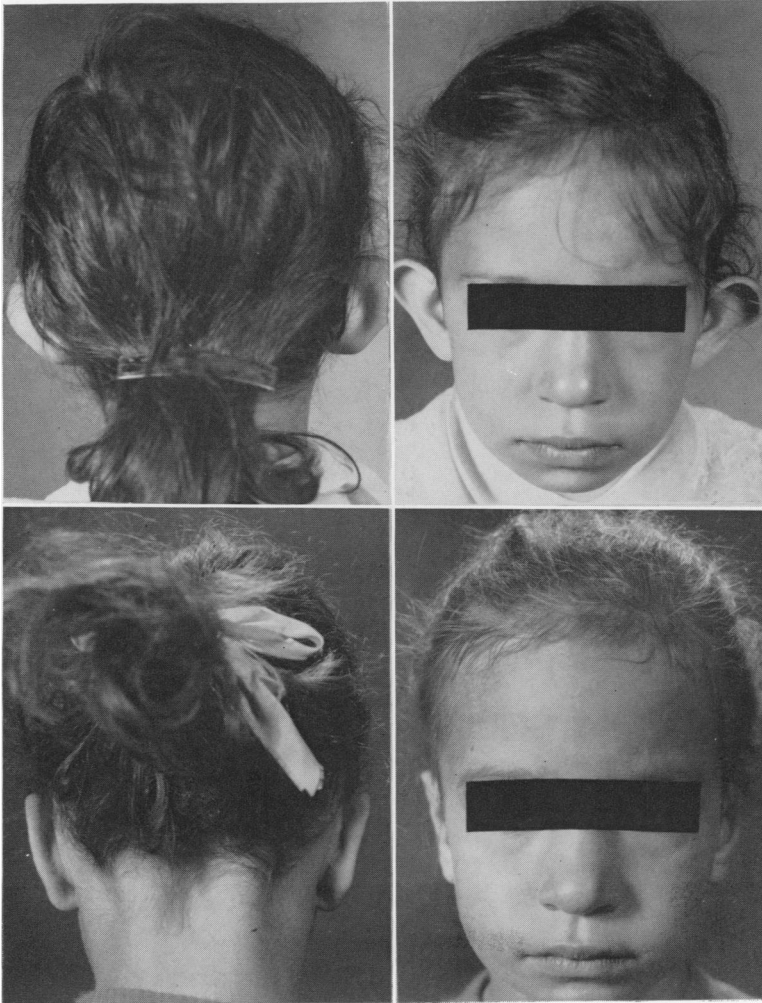


FIG. 10A. Pre- and postoperative views of patient whose operation was depicted. Good correction of both concha and antihelix deformity with little evidence of operation. Right ear excellent, left ear good.

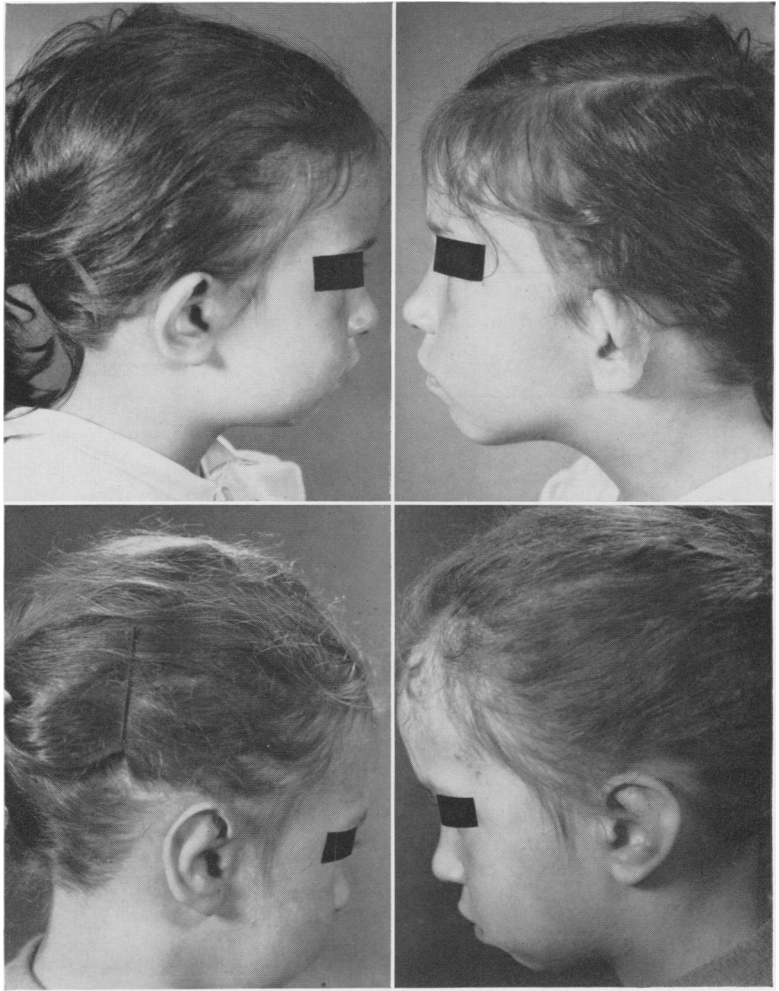


FIG. 10B. See legend for Figure 10A.

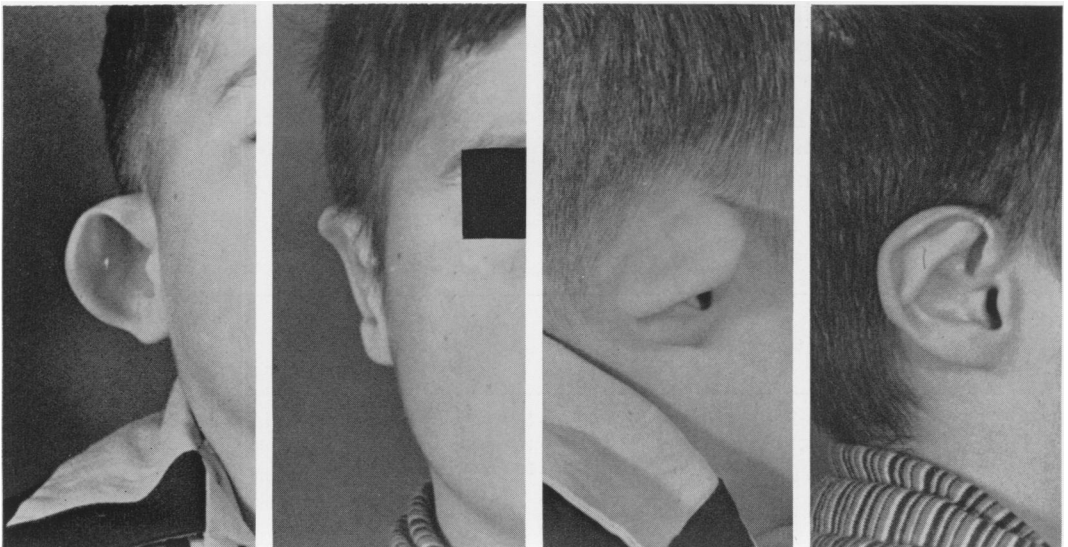


FIG. 11. Pre- and postoperative photographs showing result of the described technic in a case of *cup ear*.

TABLE 1. *Deformities Causing Protrusion—89 Ears*

Antihelix, failure of formation, predominately	21
Concha, excessive depth and width, predominately	6
Antihelix and concha deformity combined	32
Antihelix, concha and lobule deformity	20
Cup deformity	10

TABLE 2. *Complications—89 Ears*

Hematoma	1
Suture line opening with spontaneous healing	1
Crusting on antihelix	2
Hypertrophic scar	1

TABLE 3. *Results—89 Ears*

	Excellent	Good	Fair	Poor
No.	20	39	16	14
%	22.5	43.8	18	15.7

rect the overall impression of protrusion was in itself ground for terming the result poor. Based on these criteria the results in 89 ears are listed in Table 3.

Discussion of Defects

With the exception of one instance of slight protrusion developing in the second postoperative month, the faults seen late were those found immediately after operation. Late adverse changes did not occur in any significant degree. The distribution of defects is shown in Table 4.

Significant residual protrusion was caused in some cases by insufficient striation of the antihelix but in more instances by fail-

ure to reduce a wide deep concha (Fig. 12A). A revision operation was carried out in three cases. The improvement achieved indicated that the defects were the result of an initial technical error.

The commonest faults involving the helix were slight overhang of the upper third and some buckling in that area or in the middle third (Figure 12B, C). The overhang seemed to be caused by leaving too wide a rim of helix. The buckle or notch occurred when the ear size reduction was very great, when the cut through the superior hinge of the *bucket handle* was performed in the visible part of the helix rather than at the cephalauricular base of the superior helix crus, or when no division was made at all. Alone among the defects discussed here, the passage of time tended to ameliorate helix buckling (Fig. 12, C, D).

Undue prominence of the antihelix was the most frequent fault in that area. Some cartilages shows so pronounced a tendency to curl when anteriorly striated that too great a backward bend is formed. Failure to reduce the concha also gives rise to apparent prominence of the antihelix roll (Fig. 12E, F, G). The ease of forming this curl is indicated in the infrequent occurrence of a flat or poorly formed antihelix.

Too great reduction of the middle portion of the antihelix results in the *telephone ear* deformity in which relative superior helix and inferior lobule prominence is associated with a depressed mid-portion of the ear. Esthetic sense must guard against this error (Fig. 12H). Too sharp an antihelix

TABLE 4. *Postoperative Defects—89 Ears*

Significant Residual Protrusion	Helix	Antihelix	Concha	Antitragus	Lobule
10	overhang 15 buckle 16	too prominent 9 too reduced 2 too sharp 1 cartilage spur 1 poorly formed 1	too deep 10 too wide 5 too reduced 1	too prominent 2 cartilage spur 1	too prominent 12 too large 2

was noted in one instance only and it seems likely that in this case the cartilage was cut through rather than striated. Cartilage beading does not occur on the striated surface and in those cases revised the area has been found to be smooth.

Failure to correct the depth or width of the concha was a frequent error until the need for excision of a concha ellipse was accepted. Careful initial dressing obviates the skin folds that might be anticipated with this maneuver. Placing the elliptical excision within the conchal edge rather

than in the cephaloauricular sulcus preserves the sulcus better. Too great excision of the concha can also lead to *telephone ear* deformity.

Antitragal prominence was rare. However, it was observed that the antitragal cartilage sometimes played a part in lobule prominence persisting after the tail of the helix was excised. Removal of a portion of the antitragus when needed, lobule soft tissue excision, and careful removal of the helix tail should prevent the defect of lobule prominence.

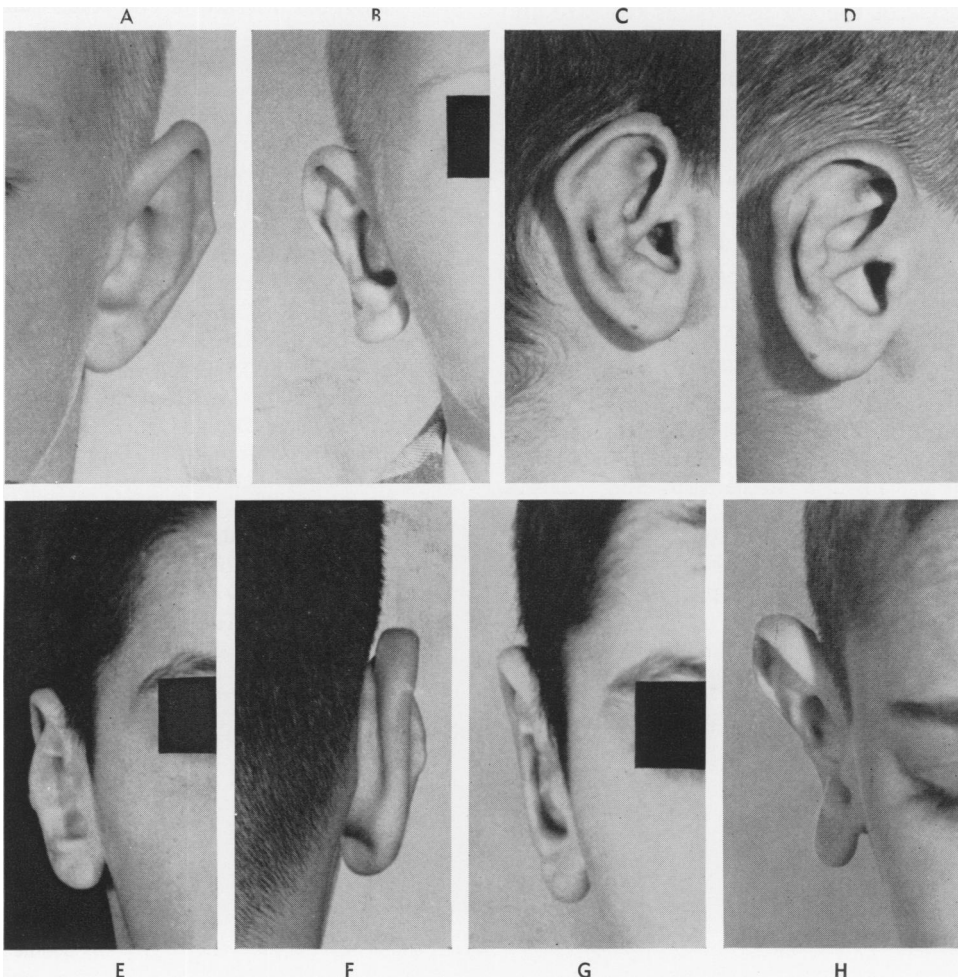


FIG. 12. A) Residual protrusion due to insufficient reduction of a wide concha. B) Slight helix overhang together with failure to reduce lobule producing "telephone ear" deformity. C-D) Helix buckle 1 month postoperation with improvement in six months. E-F) Prominent antihelix associated with pronounced antihelix bend and failure to reduce concha adequately. G) Ear seen in E-F after revision of cartilage. H) *Telephone ear* deformity associated with too great reduction at concha edge, helix overhang, and failure to reduce lobule.

Summary

The goal of operation for prominent ears is correction of the deformity without signs of the operation. A technic is presented which in large measure achieves this goal. The use of striation on the anterior surface of the cartilage to achieve a softly rounded antihelix without the use of sutures, as well as alteration of the concha by elliptical excision beneath the conchal edge appear to be individual technical features deserving emphasis. The entire procedure permits great flexibility in the manipulation of the total size of the ear as well as the size and shape of its component parts.

The use of this method in 89 ears has been reviewed and errors discussed. It is felt that the defects noted represent mistakes in the application of the technic rather than faults inherent to it. In the great majority of cases a satisfactory result is obtained which successfully avoids the stigmata of operation.

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