

The Reconstruction of the Unilateral Cleft Lip Nasal Deformity

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Many methods have been devised for the revision of the unilateral cleft lip nasal defect. This multiplicity testifies to the lack of universal applicability of any one procedure. The problem lies not only in the methods but in the fact that the deformities themselves, while grossly alike, are yet significantly different in detail in each instance. The surgical eclecticism thus enforced makes it hard to evaluate surgical approaches and procedures and difficult to devise new ones.

The purpose of this paper is to demonstrate a relatively uniform group of techniques applied to a series of cases and thereby to explore the limitations of these methods. A radical approach to the cleft-side alar cartilage is among the techniques included. The recognition of a specific defect in the nostril floor and philtrum contributing to the residual cleft lip appearance is noted and a method of repair is presented. A preliminary report on the application of these methods in children is also offered.

Material

Twenty-six patients were treated at Columbia-Presbyterian Medical Center and St. Albans Naval Hospital between January 1961 and March 1964. There were 14 males and 12 females in the series. The median age was 15.5 years. Five patients were in the age group four to eight years. Sixteen of the 26 patients had had previous nasal operations, including instances of complete freeing and exposure of the cleft-side alar cartilage at the time of initial lip repair. Of these 16, seven had two or more operations and one had five previous procedures recorded.

Methods

The operative techniques employed are presented diagrammatically in Figures 1-6. Briefly, the distal septum is centered, usually by a dorsally hinged flap procedure carried out through a transfixion incision.

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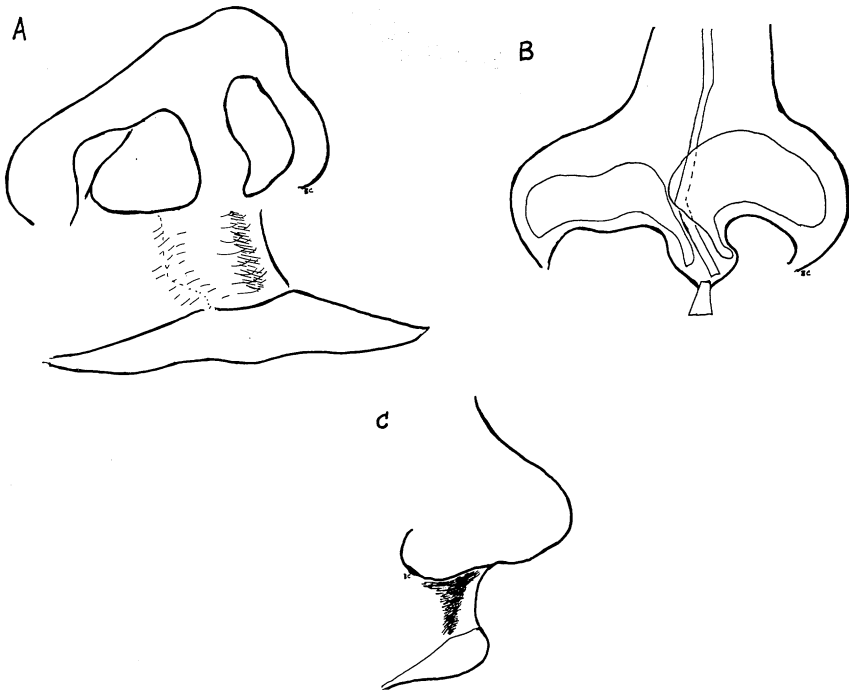


FIGURE 1. A and B: right unilateral cleft lip nasal deformity showing prominence of normal side alar cartilage dome, lateral displacement of cleft-side ala with increased width of nasal floor, S-shaped depression of the cleft-side alar cartilage, webbing of the cleft-side nostril superiorly, and displacement of the distal septum toward the normal side. C. lateral view, cleft-side, showing overhanging alar rim and the depression corresponding to absence of philtrum eminence.

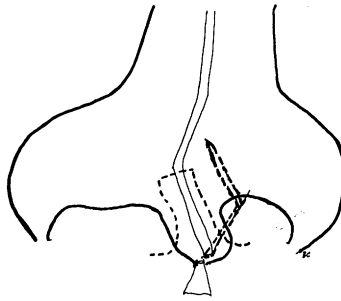


FIGURE 2. Dorsally hinged septal flap for centering of septum and columella via transfixion incision.

This is ordinarily the first step, though alar resections can be carried out first also. These excisions are of the prominent dome of the normal lower lateral or alar cartilage and of the entire lateral crus of the cleft-side alar cartilage. The former is accomplished via an intercartilaginous incision, the latter via a rim incision. The cleft-side alar base is then cut free, partially resected when needed, the nostril floor incised, and the

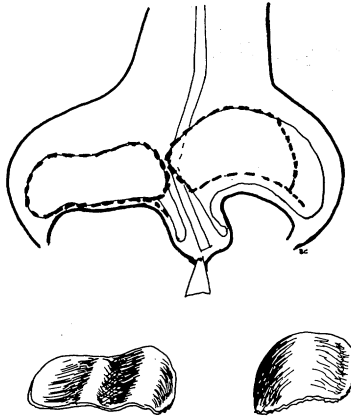


FIGURE 3. Total excision of lateral crus of cleft-side alar cartilage via rim incision. Inset shows S-shaped buckling of cartilage. Partial excision of dome of normal alar cartilage via intercartilaginous incision.

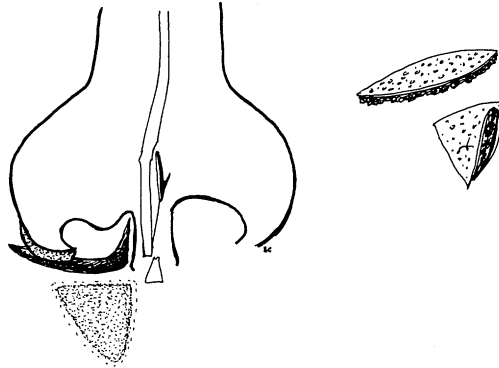


FIGURE 4. Septum straightened, cleft-side ala cut free, and nasal floor incised prior to medial rotation of the ala. Recipient site has been prepared via this incision and a triangular dermal fat graft has been inserted. Inset shows folding over of elliptical dermal fat graft giving required shape and exposing dermal surfaces to recipient site vessels.

ala rotated medially. Where indicated by flatness of the philtrum and nostril floor, the floor incision is used to undermine a recipient site for a dermal fat graft obtained from the inguinal area in men and children, and from the inframammary fold in women. The normal alar base is now reset and/or resected as required. The alar cartilages which were removed are sutured together as shown and trimmed. They are inserted as a graft to give height to the ala on the cleft side. Their holding suture is tied over a bolus. The alar rim on the cleft side is then trimmed on its edge using the rim incision as the vestibular margin of the excision. After suturing, rubber tubes are inserted beneath the inferior turbinates on each side and their free ends allowed to spring upward to support the nostrils superiorly where light packing is also used.

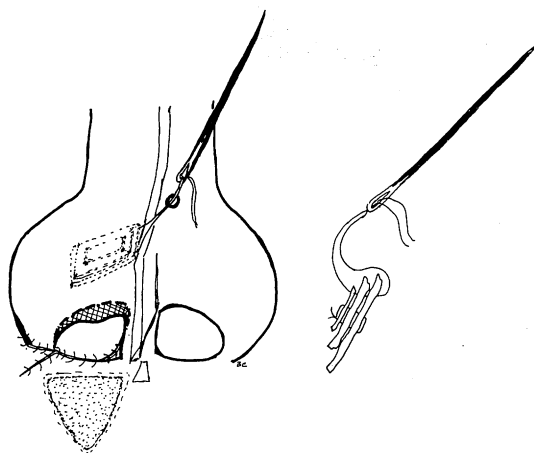


FIGURE 5. Ala rotation completed. Free alar cartilage graft prepared as shown and inserted so as to lie next to superior septal edge. Holding suture will be tied over a bolus. Cross-hatched area is that of proposed alar rim excision.

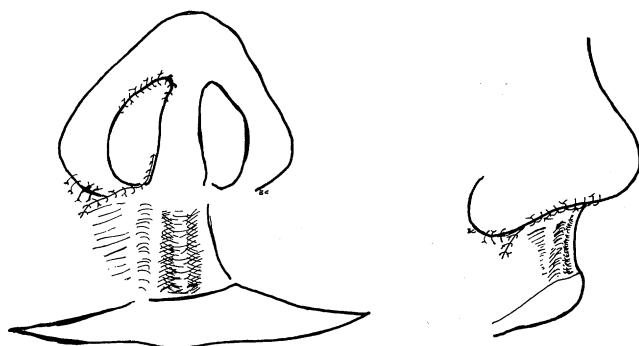


FIGURE 6. Completed suturing of ala rotation-advancement and rim excision. Dermal fat graft in place.

The actual procedures in each patient are noted in Table 1. The most frequently used technical steps are listed in Table 2.

Results

Evaluation was by the following criteria: achievement of alar dome symmetry; attainment of a natural appearing alar rim; good centering of the columella; presence of alar base symmetry; and obliteration of the cleft-side philtrum hollow. An excellent result (see Figure 7) met these goals. A good result shows minor degrees of failure in one or more areas. The fair result shows one major area of failure, and the poor result shows more than one major deficiency. Results for the group are

summarized in Table 3. Causes of poor and fair results are listed in Table 4.

Discussion

The nasal tip of the patient with a repaired unilateral cleft lip often presents a characteristically deformed appearance composed of a variety of specific defects. Their variations have been detailed by Huffman and Lierle (7). The alar cartilage dislocations involved have been simulated in cadaver preparations (16). In general, there is lateral displacement of the cleft-side alar base, increased width of the cleft-side nasal floor, an S-shaped depression and posterior rotatory displacement of the involved alar cartilage, webbing of the involved naris superiorly, and displacement of the distal septum toward the normal side (Figure 1).

Three approaches to treatment may be distinguished. There is the subtotal approach in which isolated defects of nose and residual lip abnormalities are treated separately at separate times. There is the total, synchronous approach in which lip and nose are literally taken apart and put together again offering, as it were, a fresh start. Lastly, there is the composite approach employing multiple separate operative techniques directed against the several defects all applied during the single operative procedure.

It is generally agreed that the first approach is unsatisfactory in that the interdependence of the defects precludes the success of isolated revision of any one; the failings of each procedure complicate the surgery of the next. The total, synchronous approach has not gained many adherents. It is a procedure of considerable magnitude and has had little recent advocacy (11). One or another form of composite approach has been the choice of most authors (2, 3, 5, 10, 13).

The goal of revisional surgery in the cleft lip patient is elimination of the stigma of the defect. The procedures employed must be judged by their success in achieving this end. Yet the evaluation of any one, or any group of techniques is made difficult both by the variation in the defects treated and by the tendency to present the successes of a technique or group of procedures rather than the range of the results. It seemed worthwhile, therefore, to apply a relatively standard constellation of procedures to a group of unilateral cleft lip patients whose only selection was that they could benefit by nasal revision. Evaluation of the results could then help to establish the applicability of the techniques used.

The choice of procedures was guided by the need in each case, in greater or lesser degree, to achieve straightening of the septum, symmetry of the alar domes, symmetry of the alar bases, elimination of the overhanging cleft alar rim, and revision of lip defects. Techniques used in lip revision are not emphasized in this report except to point up one lip defect that has received little previous notice. In forms of lip repair

TABLE 1. Nasal revision in unilateral cleft lip nasal deformity.

Patient	Sex	Age	Previous nasal surgery	Osteotomy	Septum	Alar cartilage excision		Free alar cartilage graft	Alar rim cartilage	Alar rotation		Alar base excision		Dermal fat graft	Results
						Ab-normal	Normal			Ab-normal	Normal	Ab-normal	Normal		
1	F	18	Alar cartilage freed at primary repair	0	Excision medial crus, alar cartilage	total	partial	+	+	0	0	0	0	+	Good. Alar rim slightly indented
2	F	14	Alar floor narrowed Tip rhinoplasty with partial excision both lower lateral cartilage	0	Flap, SMR	total	total	+	+	+	0	0	0	+	Good. Right alar base low
3	M	16	Total rhinoplasty with rim incisions and SMR Alar base excision	0	Flap	total	partial	+	0	0	+	0	+	+	Good. Rim excision should have been done
4	F	15	Alar cartilage freed at primary repair	0	Septum edge trimmed	total	partial	+	+	0	0	0	0	+	Good. Slight rim angulation
5	M	12	Septal flap	0	Flap	0	0	0	+	0	0	0	0	+	Good. Slight rim flatness
6	M	16	Septal flap	+	Flap, SMR	total	partial	+	+	+	0	0	0	0	Poor. Ala elevation, septal straightening, rim line deficient
7	M	17	0	0	Septum edge trimmed	total	partial	+	+	0	0	0	0	+	Good
8	F	16	Ala rotation, excision medial crus lower lateral cartilage	0	0	0	0	0	0	+	0	0	0	+	Excellent

9	F	15	Alar cartilage freed at primary repair	+	Flap	total	partial	+	+	+	0	0	0	0	Excellent. Osteotomy followed tip operation
10	M	32	0	+	Flap, SMR	total	partial	+	+	+	0	0	0	0	Fair. Ala elevation, and ala base symmetry not good
11	F	15	Ala rotation Ala rotation	0	0	0	0	0	+	+	0	0	0	0	Poor. Should have had excisions and graft
12	F	17	Alar cartilage freed at primary repair Ala rotation and cartilage freed External alar excision External alar excision, ala rotation Ala rotation	+	Flap	total	partial	+	0	0	0	0	0	0	Good. Septum still not centered
13	M	13	0	0	Flap	0	partial	+	+	0	0	0	0	0	Good. Minimal initial deformity
14	M	8	External alar excision	0	Flap	0	partial	+	+	0	0	0	0	0	Fair. Ala elevation lacking
15	F	8	0	0	0	total	partial	+	+	+	0	0	0	0	Fair. Bifid columella, rim indentation and overhang
16	M	19	0	0	Excision medial crus, alar cartilage	total	partial	+	+	+	0	0	0	0	Excellent
17	M	15	Alar cartilage freed at primary repair Ala rotation, alar cartilage freed Ala rotation, rim excision	0	Excision medial crus, alar cartilage	total	partial	+	+	0	0	0	0	+	Fair. Excessive alar rim excision, should have had ala rotation, columella still deviated

TABLE 1—Continued

Patient	Sex	Age	Previous nasal surgery	Osteotomy	Septum	Alar cartilage excision		Free alar cartilage graft	Alar rim cartilage	Alar rotation		Alar base excision		Dermal fat graft	Results
						Ab-normal	Normal			Ab-normal	Normal	Ab-normal	Normal		
18	M	6	0	0	Flap	total	partial	+	+	+	0	0	0	0	Excellent
19	F	15	Alar cartilage freed at primary repair Ala rotation Alar cartilage excision, septal flap Alar cartilage excision, septal flap, SMR Ala rotation, base incision	0	Flap	total	total	+	+	+	0	0	0	0	Excellent
20	M	17	0	0	Flap	total	partial	+	+	+	0	+	0	0	Fair. Insufficient ala elevation, septal centering
21	F	14	Ala rotation Alar cartilage freed at primary repair Ala rotation and freeing Septal flap, ala rotation, freeing, and base excision	0	0	total	partial	+	+	+	0	+	0	0	Poor. Excessive alar rim excision, alar rim indentation, alar base too wide
22	F	32	0	0	0	total	partial	+	+	0	0	0	0	0	Excellent
23	F	23	0	0	Flap, SMR Septal cartilage graft to septum Flap, SMR	total	partial	+	+	+	0	+	0	0	Good. Slight ala elevation deficiency
24	M	21	0	+	0	total	partial	+	+	+	+	+	0	0	Excellent
25	M	4	Alar rotation, cheek flap	0	0	total	partial	+	+	+	0	0	0	0	Excellent
26	M	5	0	0	Flap	total	partial	+	+	+	0	0	0	0	Excellent

that fail to respect the philtrum, a flattening or hollowing of the area beneath the nostril and extending down to the vermillion is to be noted. Examination reveals this additional facet of the residual cleft lip appearance to be the result of the absence of the normal philtrum eminence on the cleft-side. Comparison between the cleft and normal sides makes the difference even more striking than when the cleft-side is viewed alone (Figures 1 and 8).

TABLE 2. Most frequently used techniques.

<i>Technique</i>	<i>Number of Cases</i>
Free alar cartilage graft to cleft-side.....	23
Alar rim excision of cleft-side.....	23
Alar cartilage excision	
Total, cleft-side.....	22
Partial, normal side.....	21
Ala rotation on cleft-side.....	17
Septal hinge flap.....	15
Dermal fat graft.....	10

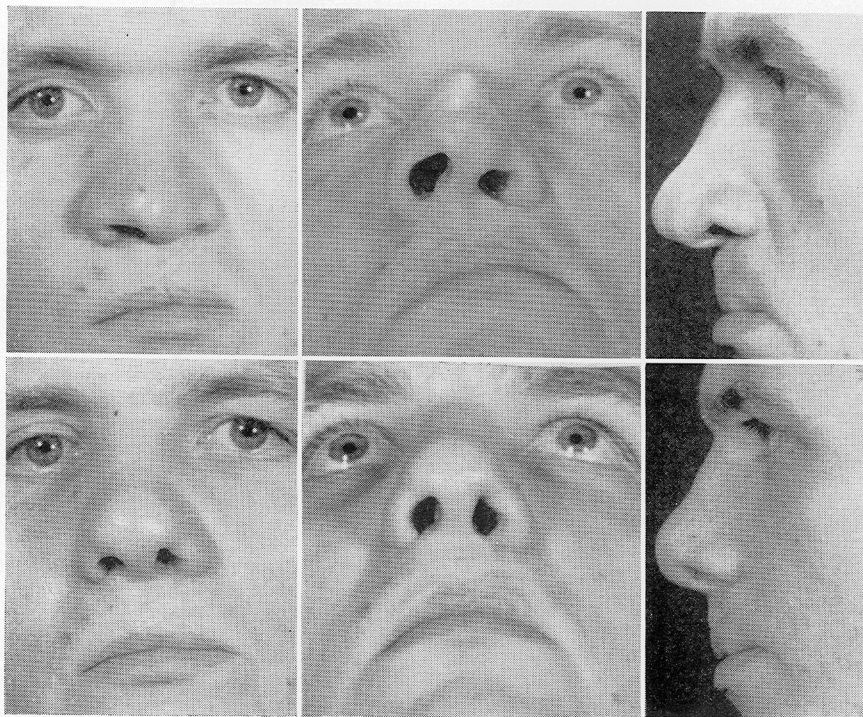


FIGURE 7. Examples of results termed excellent. A: case 24, Table 1. B: case 9, Table 1.

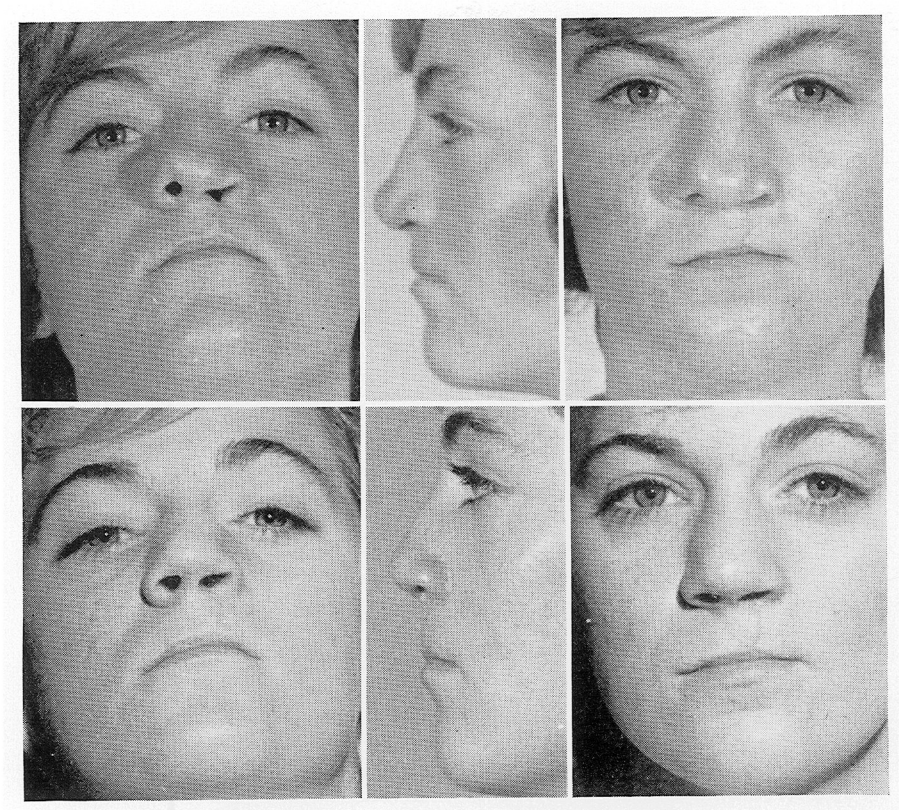


FIGURE 7B.

TABLE 3. Overall results.

<i>Type of Result</i>	<i>Number</i>
Excellent.....	9
Good.....	9
Total.....	18 (69%)
Fair.....	5
Poor.....	3
Total.....	8 (31%)

Medially based turnover flaps of muscle and fibrous tissue raised from the lateral lip and rolled on themselves along the philtrum line did not produce satisfactory results in previous attempts to repair this defect. The addition of a substantial amount of new tissue seemed necessary. The use of a dermal fat graft to create a philtrum eminence in these cases seemed a logical development and its placement via the incision in the nostril floor which was needed to rotate the ala seemed especially ap-

TABLE 4. Causes of poor and fair results (N = 7).

<i>Causes</i>	<i>Number of Cases</i>
Poor alar dome symmetry.....	4
Unnatural alar rim appearance.....	3
Poor columella centering.....	2
Poor alar base symmetry.....	2
Persistent philtrum hollow.....	0

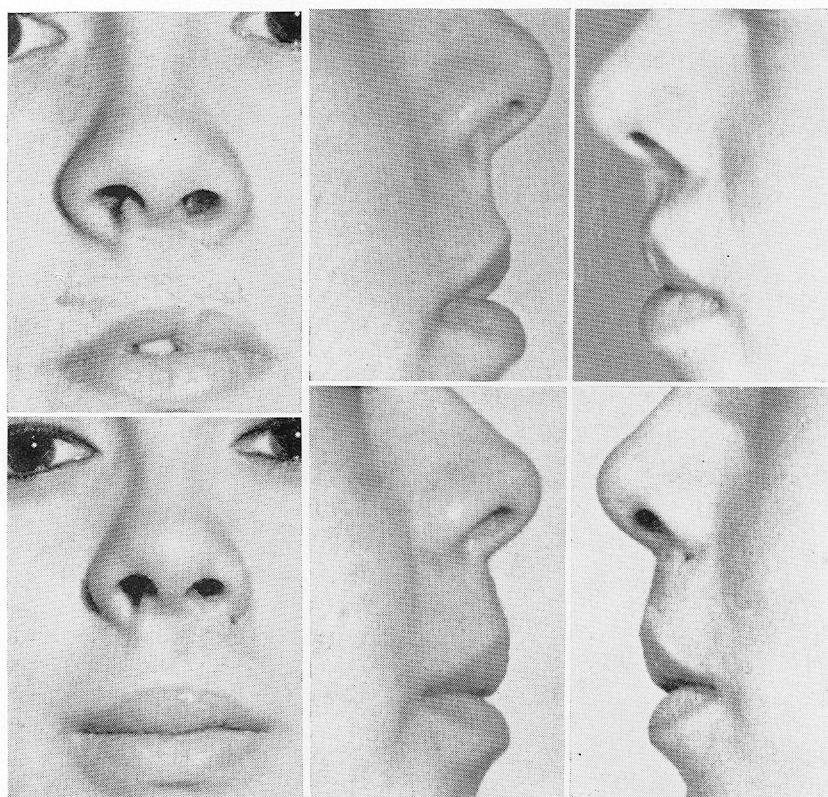


FIGURE 8. Comparison between cleft and normal sides showing absent philtrum eminence on cleft side and result following dermal fat graft. A: case 8, Table 1. B: case 16, Table 1.

propos as the material inserted also served to fill the space bridged over by the rotated alar base. The philtrum defect involved here is to be distinguished from the premaxillary flattening on the cleft side pointed out by Farrior and treated by him with septal cartilage implants (5). The results of the dermal fat grafts used in this way have thus far been very satisfactory. Although tendon and fascia have been used to plump

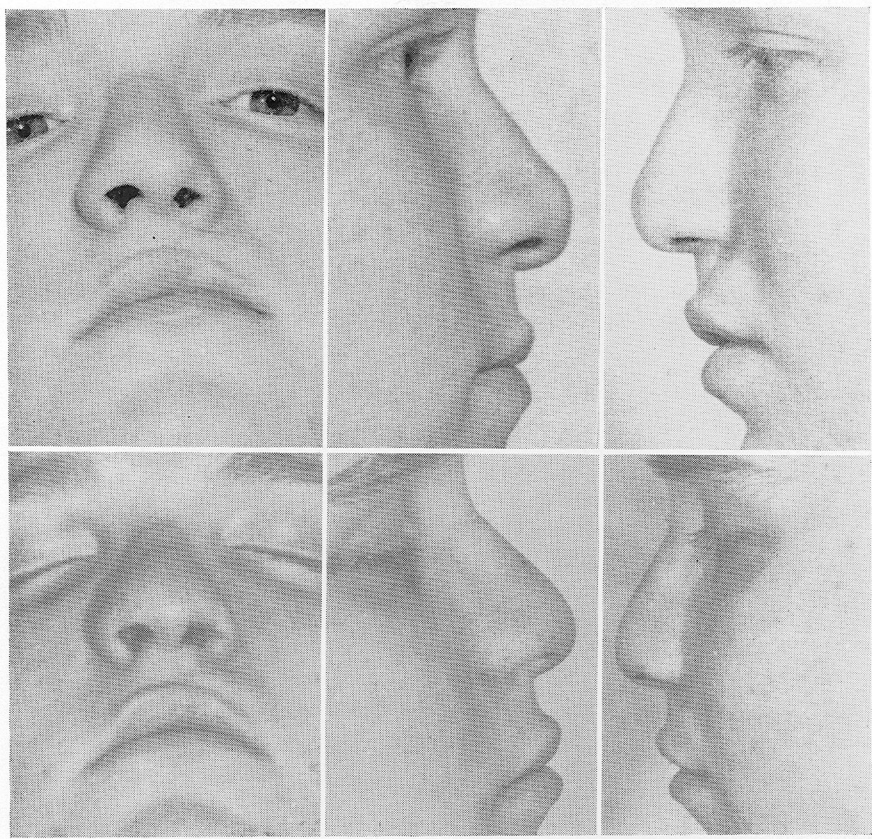


FIGURE 8B.

out deficient free lip borders and dermal grafts have been inserted for general lip plumping, this particular defect and method of treating it do not seem to have received prior emphasis (9, 14).

So far as the chosen nasal procedures themselves are concerned, with one exception, they are well accepted and widely practiced. The exception is the treatment accorded to cleft-side alar cartilage in an attempt to achieve cleft and normal side alar symmetry. Standard methods for this involve one or more of the following techniques: the addition of cartilage on the superior surface of the abnormal alar cartilage while removing cartilage on the normal side; the raising of the abnormal alar cartilage by suturing it to the higher normal side; producing the illusion of elevation by excision of the overhanging alar rim or Z-plasty on its medial edge (3-5, 12, 15, 17). In previous experience, simple addition, while partially successful, did nothing to remove the buckle in the middle of the depressed S-shaped abnormal ala. The same objection seemed to apply to methods of suturing the alar cartilages to each other. A pronounced

tendency for the recurrence of this defect seemed to exist even when the alar cartilage was dissected free on both surfaces and reset. Alar rim excisions alone did not give elevation but often gave the appearance of excavation. The two-plane Z-plasty led to unpleasant medial alar notching. In revisions of the problems produced by these procedures it was noted that essentially a total lateral alar crus removal was achieved piecemeal. No collapse was observed. Accordingly, it was determined to utilize this aggressive removal of the entire alar cartilage and to combine this with the addition of a repositioned 'dome' via a suspended cartilage graft, and with a rim excision of the superior nostril web.

The results of this composite procedure justify its continuing use. Among the general impressions gained in this experience is that of the importance of organizing the sequence of operative steps logically. The interdependence of the defects makes this a necessity if the sequential changes in appearance are not to delude the operator in the evaluation of degrees of needed revision. It seems best to establish the midline position of the columella and distal septum as the first step. The alar resections can then follow. Rotation of the cleft-side ala medially seems easier and more effective when all the cartilage of the alar cartilage has been removed first. Replacement of the alar dome on the cleft-side by a free cartilage graft should precede the alar rim excision if the latter is to be accurate. The rim excision should be carried out with an eye not only to the level of the normal nostril opening as seen from the front but also with a view from the side to re-establish the proper alar rim slope.

The problem in judging these fine adjustments if obscured by swelling and bleeding is such as to suggest the advisability of carrying out any necessary osteotomy prior to the tip rhinoplasty itself. While one patient achieved an excellent result with simultaneous osteotomy, the completion of this step prior to the tip revision would seem to be the wisest course.

The radical cleft-side alar cartilage excision and graft replacement seems of especial value in the multiply operated nose. Scar and remains of previous cartilage work serve to perpetuate the defect but offer no material to be manipulated by accepted standard means (Figure 9). On the other hand, in instances where the lower lateral cartilages were widely separated at the midline presenting the appearance of a bifid tip, this approach to the alar domes was not satisfactory and the symmetry of the alae which was obtained was accompanied by a further flattening of a structure that already lacked height. It would seem better in such instances to use one of the techniques of suturing the alar cartilages together centrally.

Too great a rim excision gives an unpleasant effect of nostril size. Instances where previous surgery had markedly reduced the size of the cleft-side nostril were liable to this error. Too traumatic a rim dissection



FIGURE 9. Patient (Case 2, Table 1) with deformity persistent after multiple previous operations improved by composite procedure.

with subsequent scarring may be the cause of the ala indentation which occasionally marred the result in that area. Those instances where the cleft-side alar base remains too far lateral indicate lack of surgical alertness in judging the necessary movement. In the cases in which this was noticed it was seen immediately post-operatively and did not represent late drifting of the alar base.

So far as the application of this procedure in children is concerned, it is clear that some striking results can be obtained (Figure 10). It remains to be seen whether these results will pass the test of time. Limited septal surgery in children has proven acceptable with no evidence of subsequent nasal growth disturbances (8). Further, the extensive nasal tip surgery carried out by many at the time of initial cleft lip repair—freeing the cleft-side alar cartilage on both sides and treating it essentially as a free graft—has not been followed by any observable growth disturbance (1, 6, 8). This was true of the patients in our series in whom such initial procedures had been recorded. Their nasal deformities were

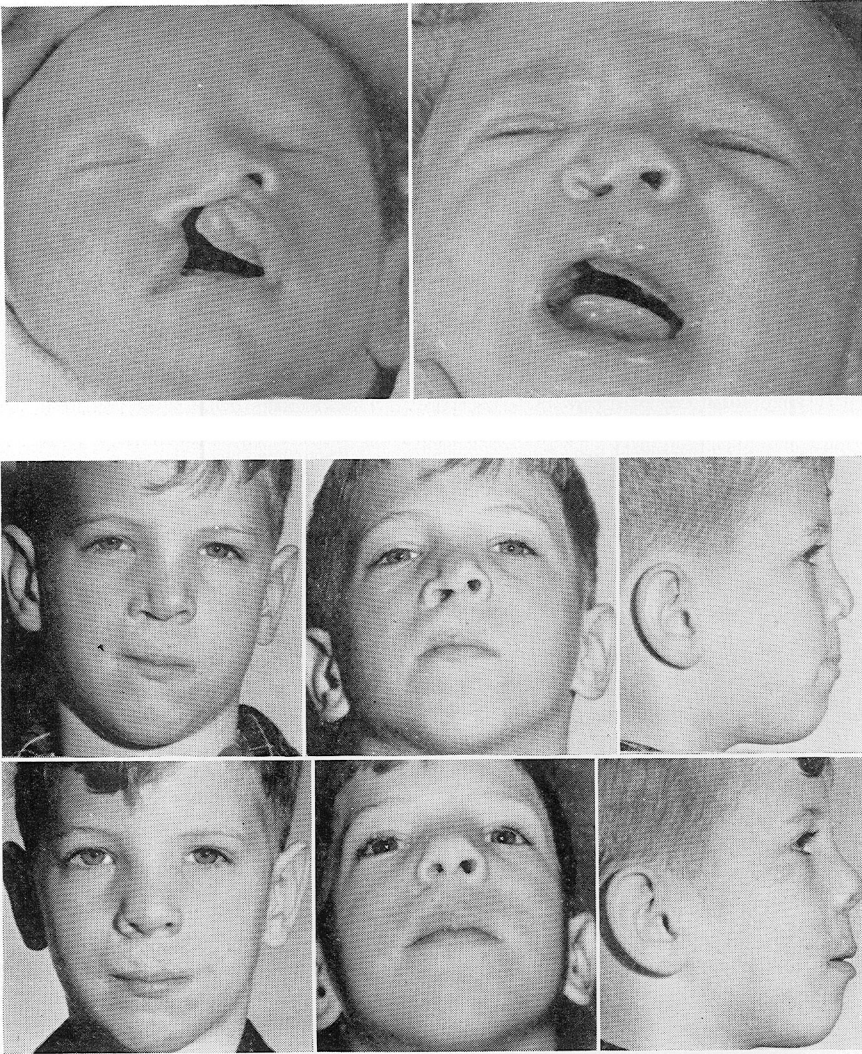


FIGURE 10. A: striking nasal deformity after a cleft lip repair in which the ala on the cleft side was simply undermined and its rotation attempted. B: the same nasal deformity as seen at age 6 (Case 18, Table 1) and improved by composite procedure.

no more nor no less marked than the others. In any traumatic defect with as much displacement as is seen in the cleft lip nose one would not hesitate to perform enough surgery to achieve normal position. If such revisional surgery can be shown to be lasting in its results and without late ill effects, it will justify treating the cleft lip nasal deformity with the goal of early alleviation instead of, as now, asking the child to suffer his congenital defect throughout the years of his growing up.

Conclusion

Within the general outline of the unilateral cleft lip nasal deformity there is much individual variation. This variability together with the multiplicity of measures used in treatment has made evaluation of surgical approaches and procedure difficult. To make such a study possible, a relatively uniform series of technical procedures was applied to a group of 26 patients with unilateral cleft lip nasal defects.

The procedures employed included dorsally hinged septal flaps; excision of the dome of the normal alar cartilage and total excision of the lateral crus of the cleft-side alar cartilage; free alar cartilage graft to the cleft-side alar dome area; alar base rotations and excisions; and cleft-side alar rim excisions. The rationale for the radical approach to the cleft-side alar cartilage was presented. In addition, note was made of a deficit in the cleft-side nostril floor and lip which was essentially that of the absence of the philtrum eminence on the repaired side. The reconstruction of this defect with a dermal fat graft was shown.

The composite operative procedure was diagrammed and discussed. The cases in the series were individually listed and the results presented. The importance of the sequence of the operative steps was emphasized. Some advantages and disadvantages of the radical alar cartilage excision were noted. The overall results of the composite procedure were gratifying. The application of these measures in children can produce striking results but further time must pass before the permanence and the consequences of this early success can be judged.

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