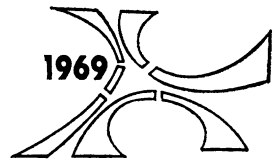
Correction of Nasal Deformities Accompanying Unilateral Cleft Lip



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Correction of the nasal deformities associated with unilateral cleft lip remains a difficult goal in rhinoplastic surgery, judging from a review of the literature and from the number and variety of surgical procedures advocated or proposed. To place the deformity in its proper perspective is difficult, for, as Gillies and Millard (*17*) have aptly stated, "it is natural for the harelip surgeon to be so pleased with a satisfactory lip result that his eyes go temporarily out of focus while gazing upon the nose". Huffman and Lierle (*18*), and more recently Stenstrom and Oberg (*38*), have described the multiple tissue defects which contribute to the deformity and have emphasized the wide variations seen in the pathological anatomy.

The basic anatomical variations associated with this condition are diagrammed in Figure 1. Specific deformities in the alar regions include caudal displacement, distortion, buckling, bending, and frequently hypoplasia of the lateral crura of the lower lateral cartilage, resulting in an overhanging alar rim and a flattened alar facial angle on this side. The cupula is distorted and the vestibule may be tight, depending in part on the severity of the deformity and the primary surgical intervention performed.

The base of the columella is displaced caudally toward the noncleft or normal side with a lowered medial crus on the cleft side. The floor of the nostril on the cleft side frequently is depressed and an oral-nasal fistula may or may not be present. The lateral vestibular nasal lining usually is short, resulting in tension on the base of the lateral crus and a secondary horizontal spreading of the involved ala.

The overall width and length of the nostril frequently is dependent upon the initial lip repair and reconstruction of the area, particularly when the vestibule is too narrow. The anterior caudal portion of the nasal septum is deviated to the noncleft or normal side presenting in the vestibule; however, the posterior bony cartilaginous segment of the septum is convex to the cleft side, causing varying degrees of obstruction here.

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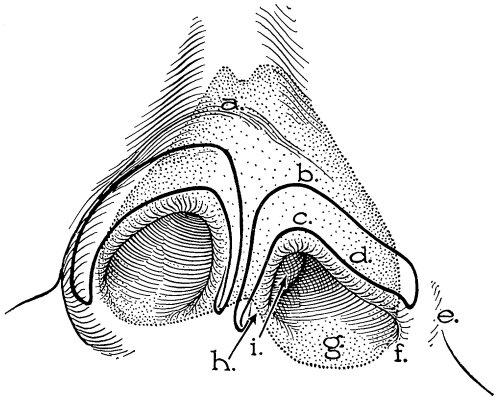

FIGURE 1. Composite of deformities frequent on the abnormal side in the cleft lip nose (after Huffman and Lierle, *18*). a. Nasal tip deviated. b. Lower lateral cartilage displaced caudally. c. Angle between medial and lateral crura more obtuse. d. Buckling in lateral crura. e. Flattened alar facial angle. f. Deficiency in bony development. g. Widened nostril floor. h. Columella and anterior caudal septal border deviated. i. Posterior septum convex on cleft side causing varying degrees of obstruction.

Finally, hypoplasia of the maxilla is a common finding and, when the palate is also cleft, may be associated with collapse of the alveolar arch on the involved side. Further complicating the surgical problem may be the inherited or genetic pattern of nasal development, that is, a hump deformity; the quality of the involved skin; and finally, the scarring resulting from earlier and sometimes multiple surgical attempts to improve appearance.

It is convenient to categorize the techniques proposed for the correction of this deformity into external excisions, with and without rotational advancements (*3*, *8*, *12*, *15*, *16*, *26*, *27*, *31*, *36*, *37*) (Figures 2 and 3); incisional approaches to the tip (*11*, *13*, *32*, *33*, *39*) (Figure 4); repositioning of the lower lateral cartilage (*1*, *2*, *4*, *5*, *9*, *17*, *19*, *20*, *24*, *25*, *34*, *35*, *37*) (Figures 5 and 6); grafting procedures to the tip, columella and/or under-

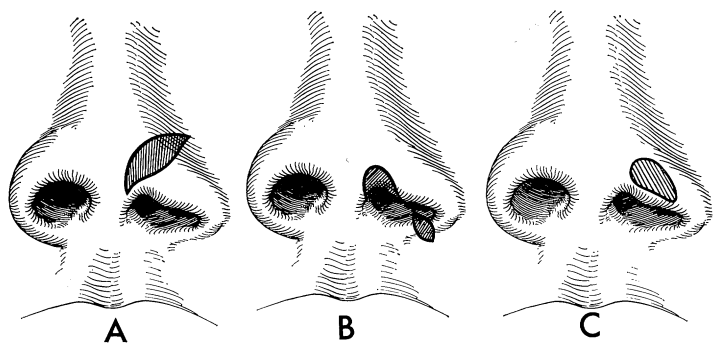

FIGURE 2. External skin and skin and cartilage excisions. a. Crikelair and others. b. Millard. c. Blair.

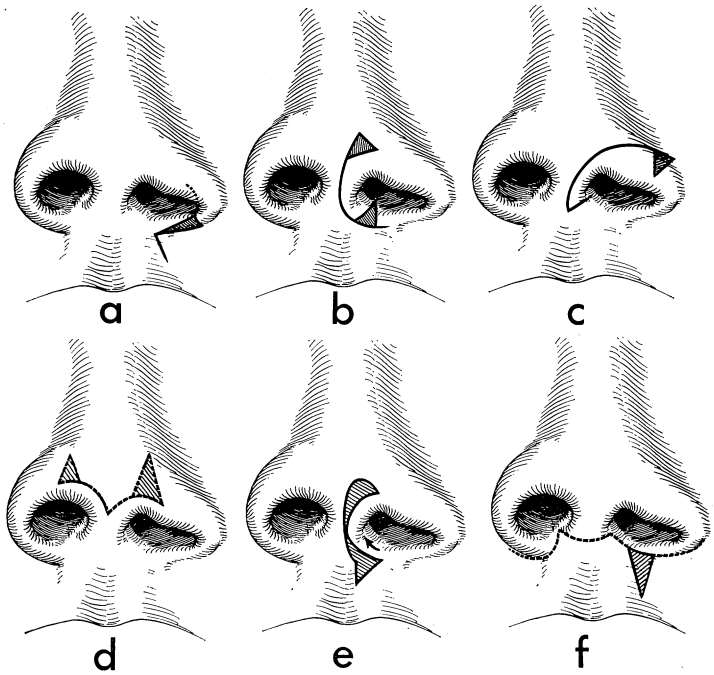

FIGURE 3. Excisions in combination with rotational advancements. a. Farrior. b. Sheehan; Schjelderup. c. Morel-Fatio. d. Gelpke. e. Padgett and Stephenson. f. Pitanguy.

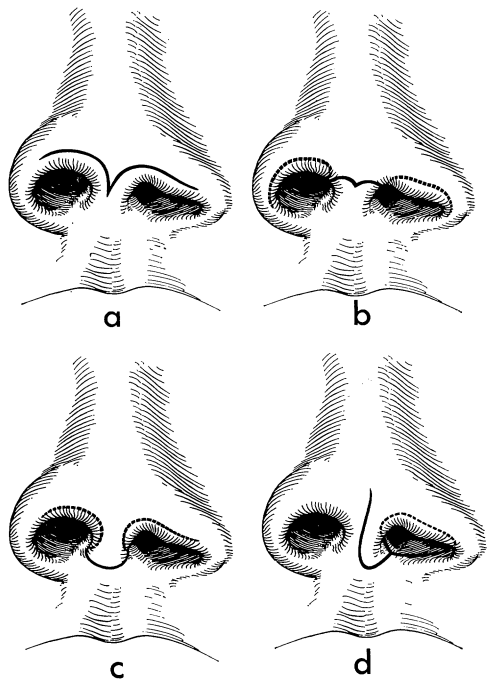

FIGURE 4. Incisions for exposure and correction. a. Erich. b. Figi. c. Potter. d. Gillies.

lying maxillary base (*6*, *14*, *17*, *21*, *28*, *29*) (Figure 7); and external and internal z-plasties to secure additional vestibular skin (*20*, *23*, *30*, *40*, *41*) (Figure 8), in addition to the routine rhinoplasty and septoplasty operation. That a general dissatisfaction with results exists among surgeons can be judged from the multiplicity of procedures advocated for correction. While a number of these are referred to in the accompanying figures the authors acknowledge that the list is by no means complete. In managing the lower lateral cartilage problem, at least nine procedures are described, from a slight alteration with repositioning by sutures, to total excision and replacement with a free graft.

Dencke and Meyer's (*10*) review of the development of cleft lip nasal deformity operative procedures is well detailed and will serve admirably as a more complete reference to the historical background.

In agreement with Marcks and others (*22*), our method of repair preferably is undertaken in post puberty, except in the case of severe deformity with marked airway obstruction when it may be performed earlier. It is usually a one-stage procedure in which all the components of the deformity are corrected in an orderly fashion.

Under local anesthesia, a modified "flying bird" incision is employed, carried within the alar rim on the normal side but outside the rim on the

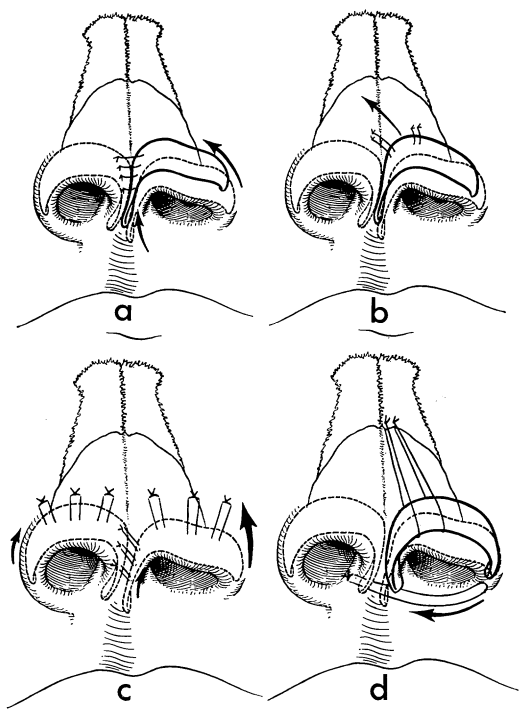

FIGURE 5. Maneuvers relocating by suturing the lower lateral cartilage on the cleft side. a. Berkeley. b. Reynolds and Horton. c. McIndoe and Rees. d. Stenstrom.

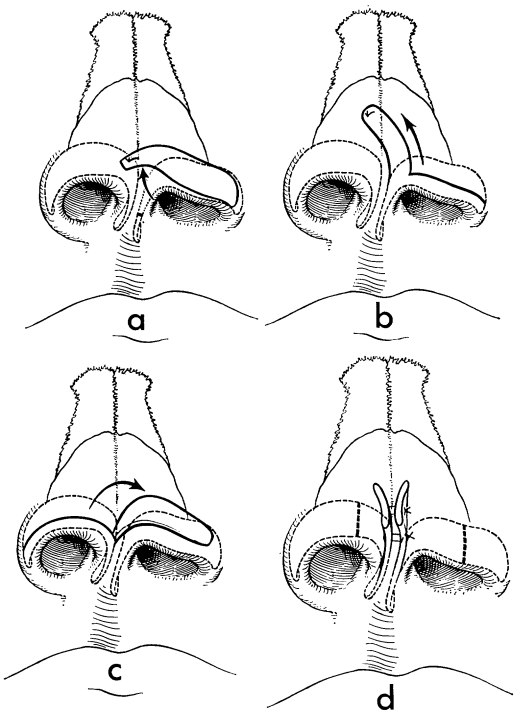

FIGURE 6. Incision and repositioning the lower lateral cartilages. a. Erich. b. Barsky. c. Humby. d. Kazanjian.

cleft side and extended laterally on this side (Figure 9). This incision will permit subsequent mobilization of the alar rim skin and rotation into the vestibule when the lateral crura is moved superiorly into a more favorable position, as described below. Where any degree of maxillary hypoplasia exists, a pocket is created below the nostril through a lateral extension of the rim incision and a graft of soft silicone rubber, silicone gel, cartilage, or bone is appropriately tailored and inserted into this space to correct any deficiency in this area. The septal deformity is corrected by a combination of septoplasty and submucous resection, relieving the obstruction posteriorly on the cleft side and repositioning the anterior caudal septal border in the midline or slightly over to the normal side. The hump deformity, if present, is then corrected by the usual osteotomy or saw technique and lateral osteotomies are carried out, again in a conventional manner, with infracturing to narrow the nasal bridge.

The most important portion of the operation, which is the tip correction, is left for last. The lower and upper lateral cartilages already have been exposed bilaterally through the initial incision. Based on Stenstrom's findings (*39*) and the technical modifications described by Reynolds and Horton (*35*), only enough of the medial portion of the lateral crura of the lower lateral cartilage is mobilized to permit an upward medial rotation of the

alar rim. For this purpose 4-0 white Mersilene sutures are employed to suture the cupula portion of the cartilage to the upper lateral cartilage on the opposite side, while the body of the lateral crura of this same lower lateral cartilage is sutured to the upper lateral cartilage as it abuts the nasal bone on the same side. Care is taken to include the entire thickness of cartilage in the suture. If properly placed, the suture will, when tightened and adjusted, elevate the depressed alar rim, rotating rim tissue into the vestibule to bring the eventual scar of the "flying bird" incision into an unobtrusive position and provide the additional lining medial to this area or at this site (Figure 9).

Where the crura are attenuated or buckled and inadequate bulk is present, septal cartilage is employed as an overlay graft per Musgrave's technique (*29*). The nostril floor is adjusted to conform to the normal side and any fistula present is closed.

Postoperatively, the routine tape and metal splint dressing is employed, together with nasal packs. The packs are removed between the fourth and fifth days after surgery, the tape splint two or three days later, and the metal splint is maintained at night for another two weeks to obviate possible injury during sleep.

The technique and the pre- and postoperative appearances of three

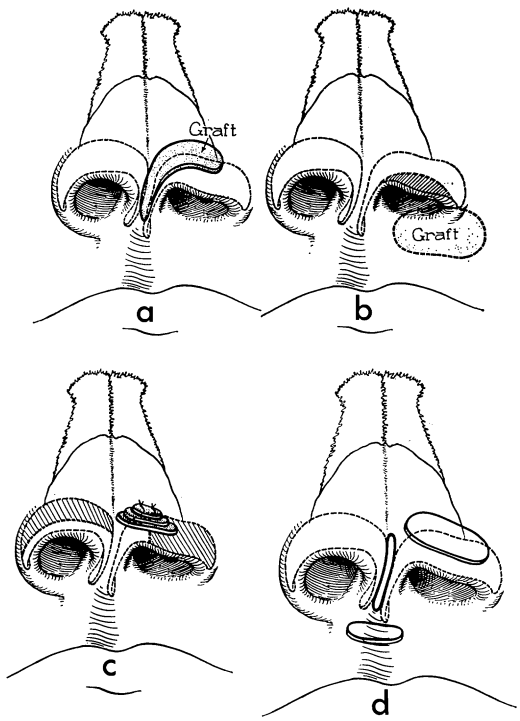

FIGURE 7. Augmenting the deficient contour. a. Gillies and Millard. b. Converse; Longacre and others. c. Musgrave. d. Foman and others.

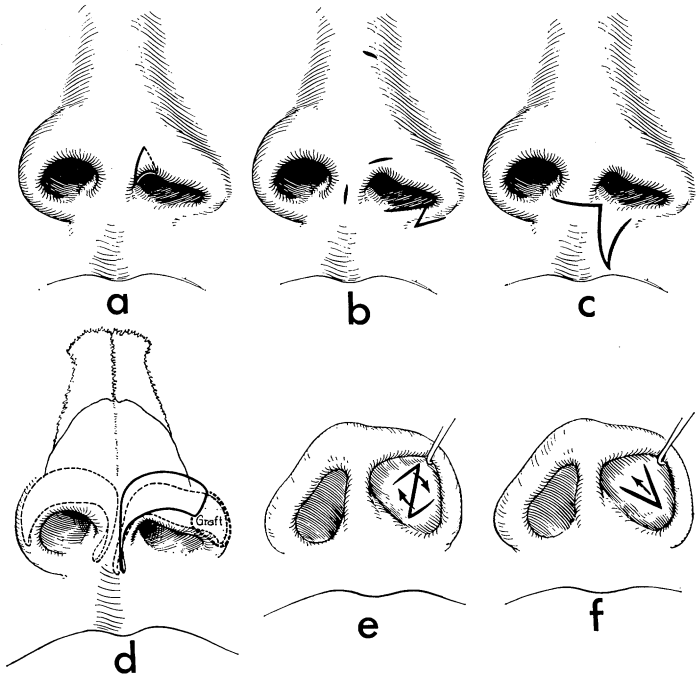

FIGURE 8. Other techniques, including z-plasties, to approach and recontour the cleft side of the nose. a. Straith. b. Stenstrom. c. Trauner. d. Rees and others. e. O'Connor and others. f. Mathews.

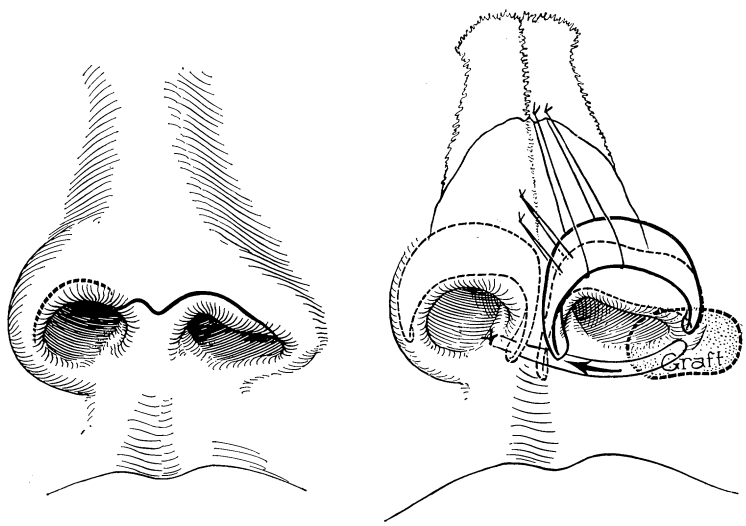

FIGURE 9. Authors' technique illustrated. As described in the text.

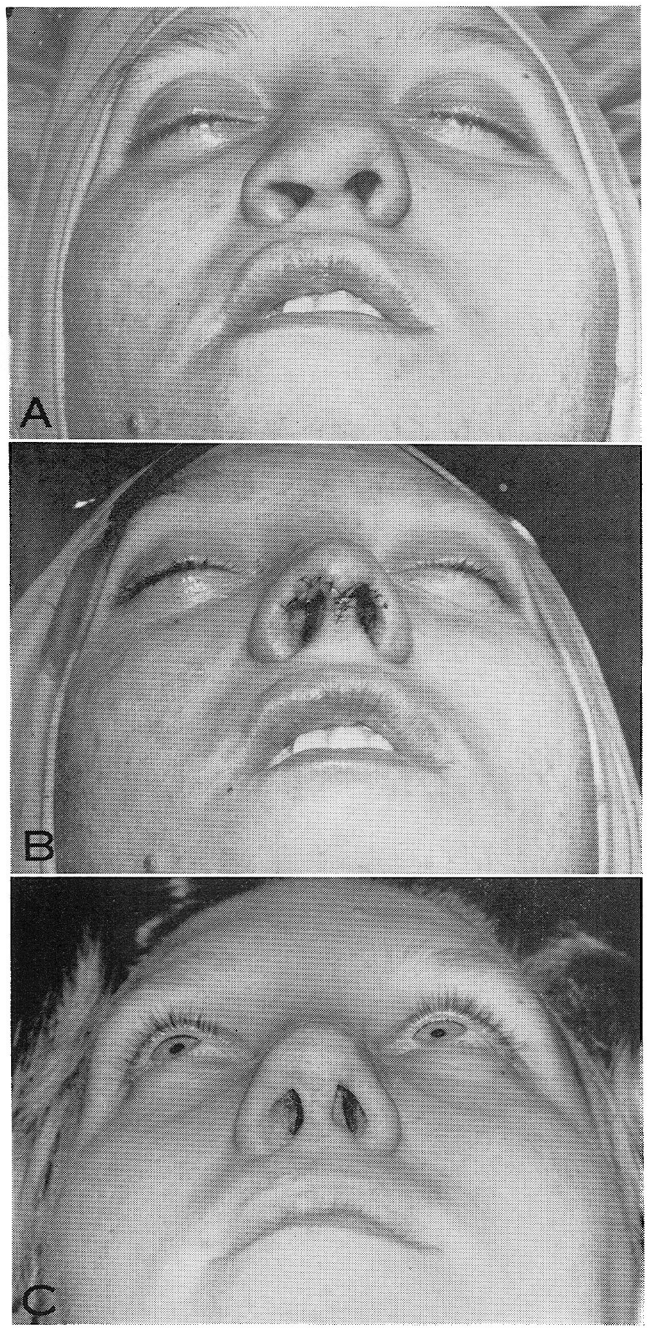

FIGURE 10. a. Deformity with incisions marked. b. Correction achieved at closure. c. Eight months later. Incision on cleft side originally too far outside alar rim—scar visible.

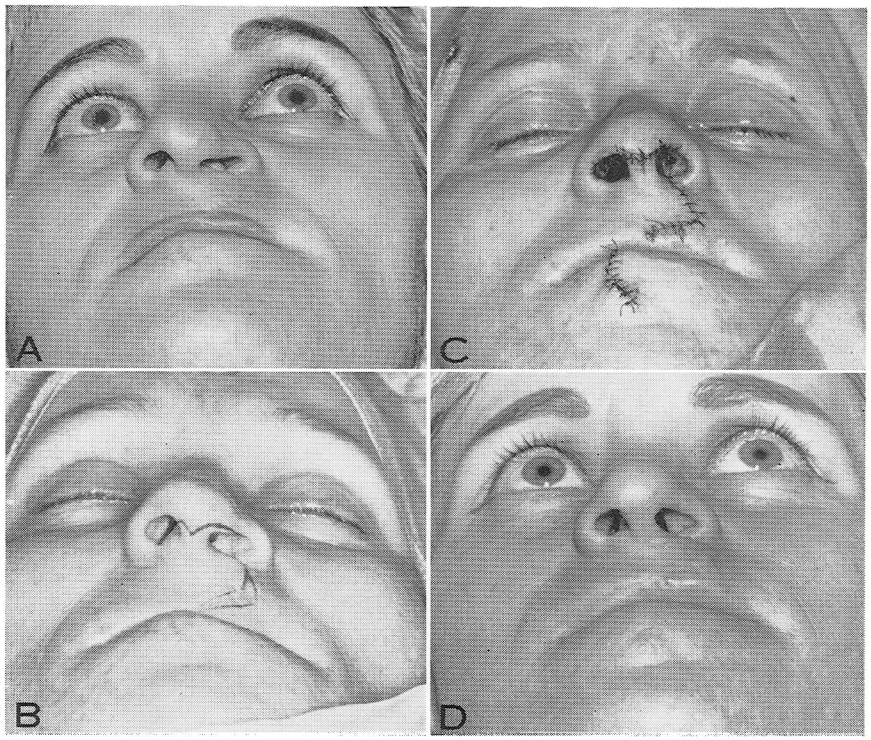

FIGURE 11. a. Classical deformity. b. Incision outlined to include lip scar revision c. Correction at closure. Silastic implant under floor of nose on cleft side d. Four months later.

representative cases are seen in Figures 10 through 12. The scars resulting from the columella portion of the "flying bird" incision heal well and remain relatively inconspicuous.

Overcorrection is a salient point in this type of surgery. Since septal displacement tends to recur, the septum is usually repositioned well towards the noncleft side within the nasal fossa. Where a significant degree of maxillary hypoplasia exists, slightly increased bulk is added to the graft in the floor of the nostril to compensate for the probability of some resorption if an autogenous implant is employed. Finally, the lateral crura elevation is overcorrected, with the cupula raised above the level of the noncleft side. During the postoperative period, "settling" does occur and not infrequently, a "perfect" correction at surgery becomes less than optimal postoperatively. A review of our own cases reveals that less-than-ideal results, including a deviated nasal bridge, persistent nasal obstruction, depressed ala, alar base asymmetry, and maxillary depression, could have been improved by overcorrection at the time of original surgery.

It must be emphasized, as Cosman and Crikelair did in their excellent review (7), that there is no "typical" method of surgically correcting this

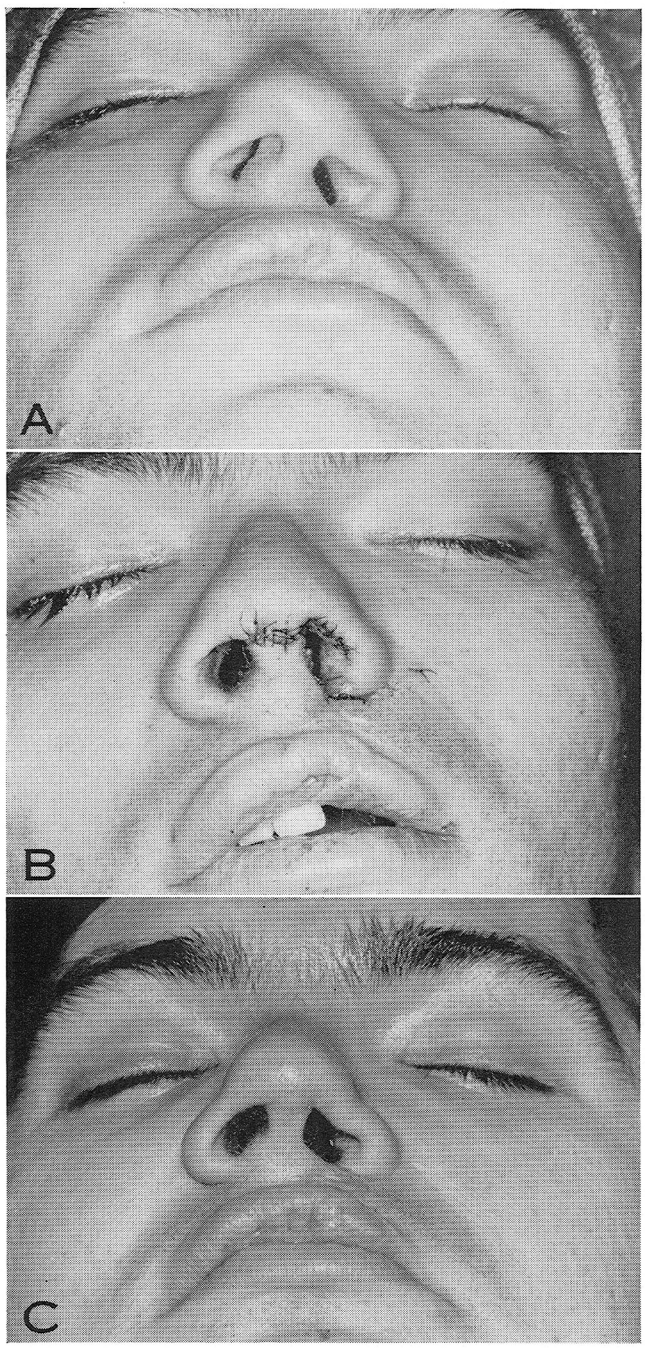

FIGURE 12. a. Deformity at surgery. b. Correction achieved. Implant used to correct maxillary hypoplasia. c. Five months later. Minor trimming of alar rim on cleft side could improve appearance.

extremely variable type of deformity. The authors, for example, rarely find need for external excisions; however, where redundancy of skin does exist they have no hesitation in employing them, through the removal of discrete wedges combined with external rotations where indicated.

Summary

The pathological anatomy of the cleft lip nose has been described and a few of the wide variations in surgical correction techniques briefly mentioned. Our technique, which employs a modified "flying bird" incision and depends primarily on repositioning the lower lateral cartilage on the cleft side by immobilization and suturing, correcting maxillary hypoplasia, if present, together with septal straightening and external rhinoplasty, where they are indicated, is given. The need for tailoring the method to correct the deformity is stressed.

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