

## **Lateral Crural Retrodisplacement for Superior Rotation of the Tip in Rhinoplasty\***

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**Abstract.** Three techniques for producing superior rotation of the nasal tip are presented. One merely retrodisplaces the lateral crura on the upper lateral cartilages, one horizontally shortens the lateral crura by resection of cartilage between their anterior and posterior extremities, and one transects the cartilage in a curved fashion to allow the anterior portions of the lateral crura to be rotated on the posterior portions and upper lateral cartilages. All three techniques allow maintenance of good airways and a "strong valve" tending to prevent inspiratory collapse and visible external dimpling. The procedures are based on physiologic and anatomic principles. Details of the methods and short-term and long-term results are shown.

**Key words:** Rhinoplasty — Superior rotation — Tip shortening — Lateral crus

Superior<sup>1</sup> rotation of the nasal tip is a goal in many rhinoplasties. It may be accomplished by shortening the vertical dimensions of structures between the tip and the radix, anteriorly displacing or projecting structures located centrally and posterior to the tip, such as medial crura, and/or by horizontally shortening, retrodisplacing, or rotating the lateral structures supporting the tip (Fig. 1).

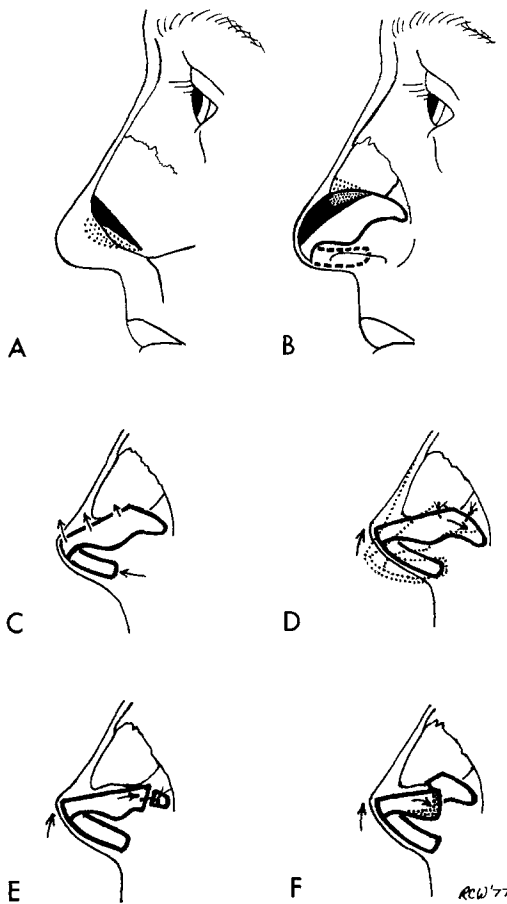
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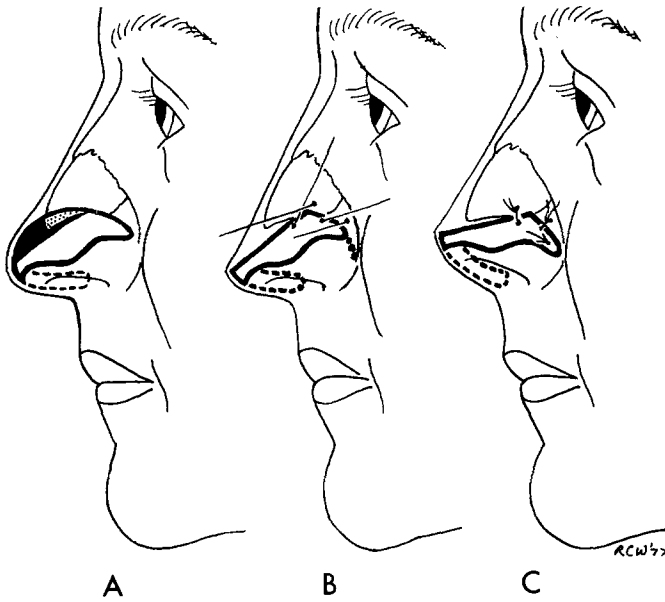
<sup>1</sup>All directional or positional terms used in this paper are based upon a patient sitting or standing with his Frankfort plane horizontal.



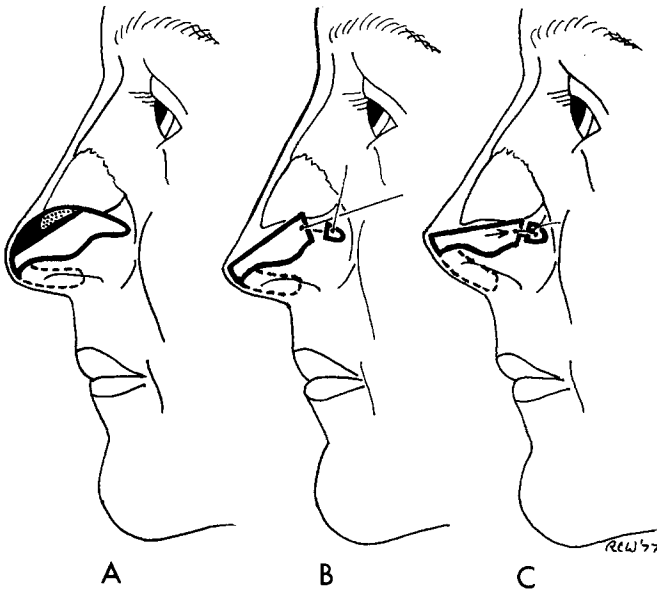
**Fig. 1.** Summarizing diagram showing techniques for superior rotation of nasal tip. **A** Black shows resection of septal cartilage and mucoperichondrium above high septal transfixion incision. Stippling shows resection of caudal septal cartilage and lining of part of membranous septum. Closure of either defect puts superior pull on columella and tip. **B** Black shows resection of part of lateral crus. Stippling shows resection of upper lateral cartilage. Each resection produces some superiorly pulling forces. However, remaining attachments of lateral crus depicted resist superior rotation. **C** Forward push on medial crus rotates complete strip as shown by arrows. **D** Dotted lines show tip and tip cartilage before lateral crural retrodisplacement. Heavy black line shows complete strip detached, retrodisplaced, and sutured. Arrows indicate superior tip rotation accompanying lateral crural retrodisplacement. **E** Horizontal shortening of lateral crus depicted. Closure of resection site produces displacement shown with arrows. **F** Transection and rotation of anterior lateral crus produces overriding and inferior bulging of lower crural margin. Stippling shows resection often performed with this technique

These lateral structures are those in the lateral walls of the nose posterior to the tip as it is visualized in profile. It is the purpose of this paper to present techniques horizontally shortening or retrodisplacing and/or rotating the lateral crura to achieve desired superior tip rotation.

All rhinoplastic surgeons recognize that resection of enough septal, upper lateral, and/or anteriorly located portions of lateral crural cartilage will introduce superiorly pulling factors that will shorten the distance between the tip and the radix. Many rhinoplastic surgeons realize that these resections also tend to diminish the size of the lumen through which air must flow and often remove or partially destroy the functional effectiveness of the anterior parts of the so-called valves. In essence, the valve consists anteriorly of the junctions of the lateral crural with the upper lateral cartilages. It is true that cosmetic needs may dictate resection of cephalic portions of lateral crura for narrowing of the tip and resection of the anteroinferior portions of the upper lateral cartilages for profile adjustment. The patient desiring tip narrowing and a better profile may have to accept the relatively slight functional impairment produced by the ma-



**Fig. 2.** Lateral crural retrodisplacement technique. **A** Narrowing resection of lateral crus shown in black. Stippling shows upper lateral cartilage. Complete strip with posterior attachments still intact resists superior rotation. Dashed line shows medial crus. **B** Incision made severing attachments of lateral crus and continued as shown by heavy dotted line. Retrodisplacing sutures demonstrated. **C** Positional changes produced by tying sutures and retrodisplacing lateral crus



**Fig. 3.** Lateral crural horizontal shortening. **A** Narrowing resection shown. **B** Lateral crural cartilage and vestibular lining excised leaving defect to be closed as shown with suture. **C** Horizontal shortening produces profile and positional changes depicted



**Fig. 4.** Modified lateral crural flap technique. **A** Narrowing resection. **B** Dotted line shows curving incision transecting complete strip. **C** Pushing tip superiorly produces overlapping and bulging shown with stippling. Overlapped or underlapped portion should be resected. Inferior bulging portion may or many not be resected depending upon whether or not surgeon wishes to retain downward thrust put on alar margin

neurers just mentioned; but we believe that he perhaps does not have to have the additional functional impairments introduced by more radical resections of cephalic lateral crural or upper lateral cartilages than those just mentioned in order to obtain superior tip rotation. Use of lateral crural flap techniques described previously [1-6] or of the lateral crural retrodisplacing or rotating techniques described in this paper will allow surgeons to rotate the tip superiorly without the grosser kinds of disturbances of the physiologic valve and areas in the lateral wall just above and below the valve that can result from radical cartilage resections and the leaving of large skeletal voids. These considerations become particularly important when the patient preoperatively already has narrow airways or a tendency toward inspiratory collapse.

The tip cartilages are attached to each other with fibrous tissue components anterior and inferior to the more fixed nasal skeleton consisting of upper lateral and septal cartilages. They are attached to the more fixed skeleton by lining tissue and by fibrous tissue elements as well. When minimal resections of upper lateral and septal cartilage required for profile adjustment have been performed

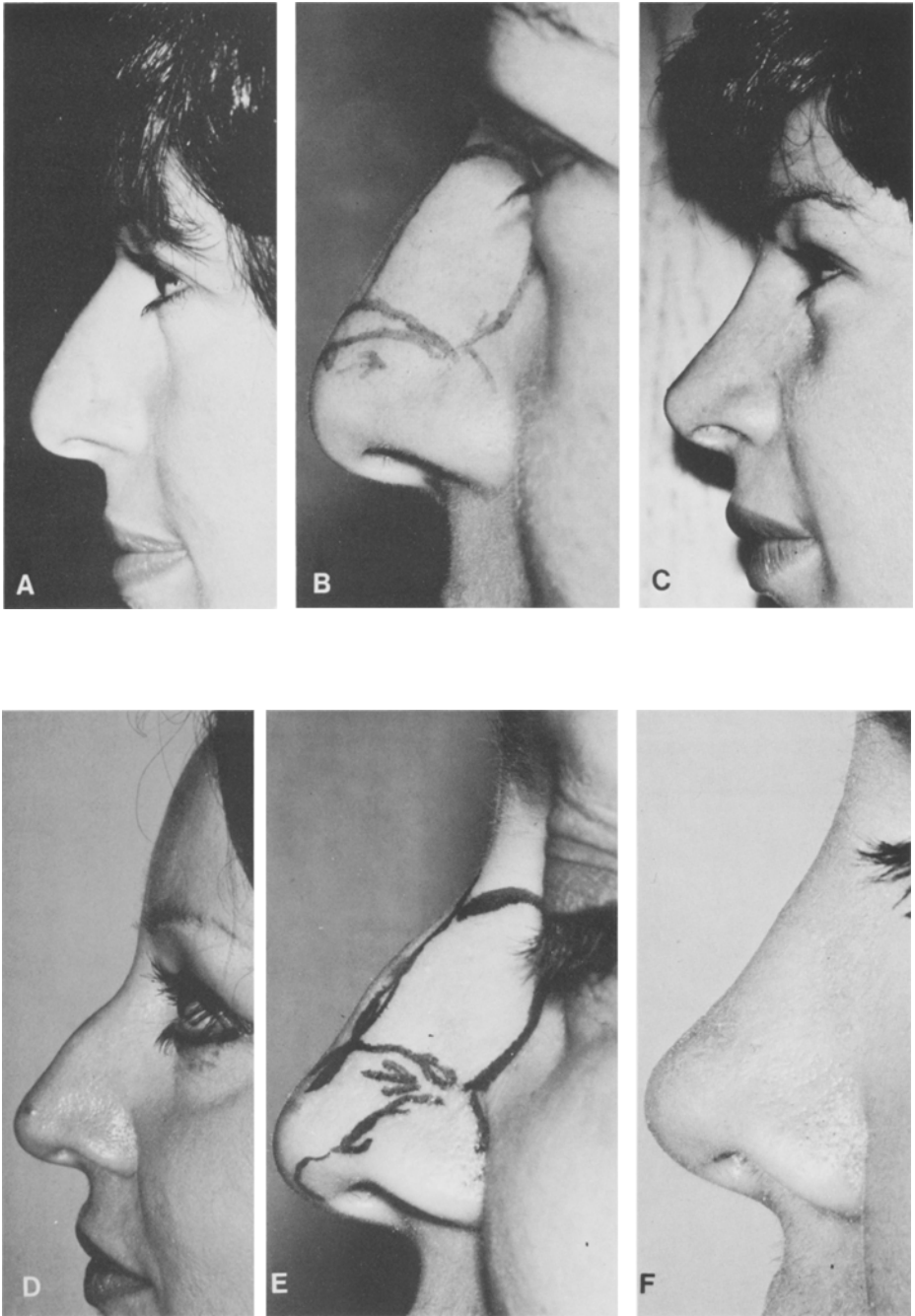


**Fig. 5.** Lateral crural retrodisplacement. **A** Preoperative. **B** Markings shown. Stippled portion shows narrowing resection. Curved lateral osteotomy marked. **C** Result. **D** Early version of profilometer in position. Note location of tip.

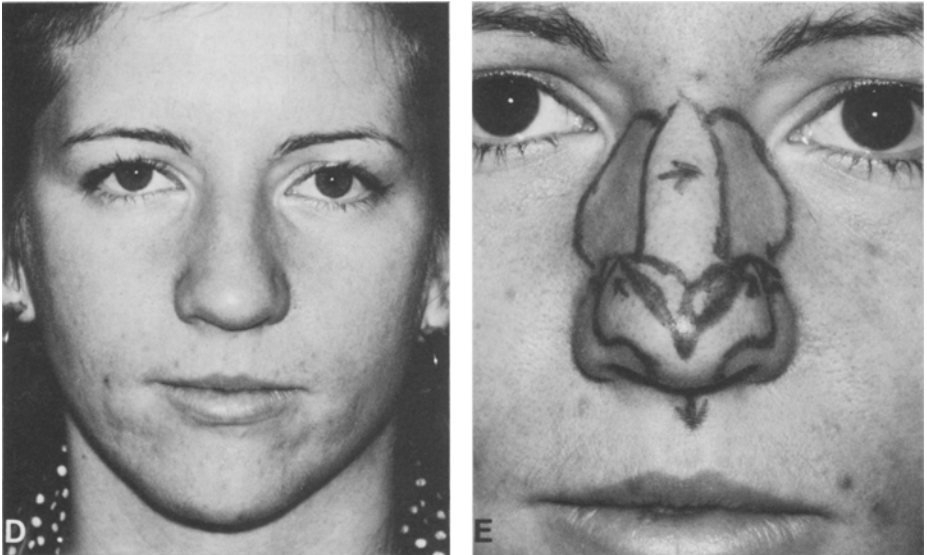
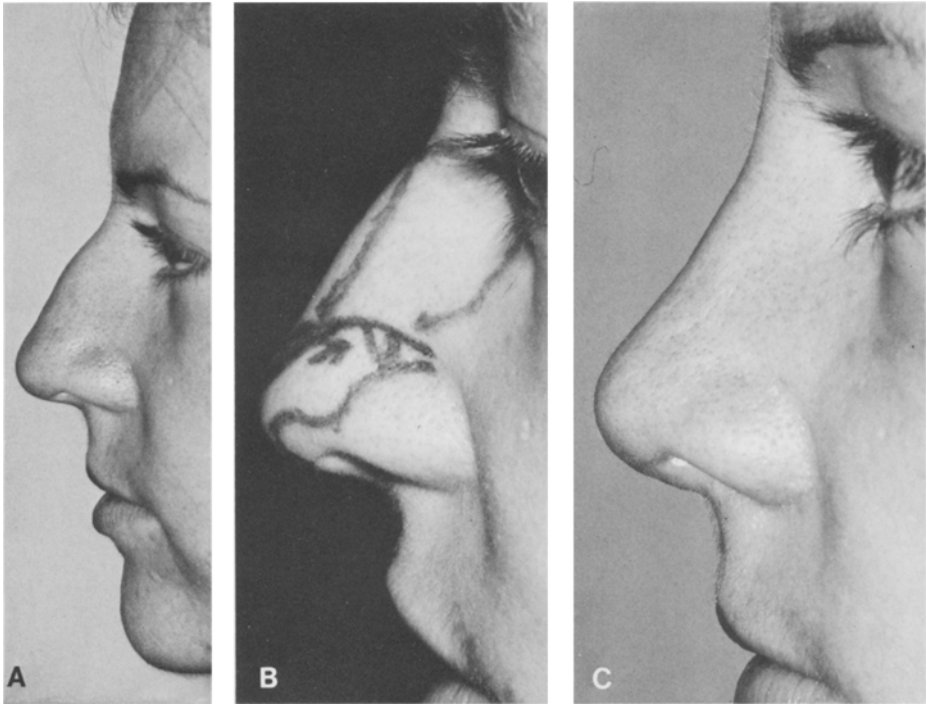


**Fig. 5 (continued).** E Superior rotation demonstrated. Hump resected. Lateral crus retrodisplaced. F Plumping cartilage grafts placed posterior to medial crura

and the remaining upper lateral cartilages are brought into contact with the septal cartilage, fibrous tissue attachments of the tip cartilages to these structures may still be intact, particularly if suggestions made by us in the past [1-6] have been followed. The tip with these attachments intact will tend to remain in its preoperative position. Outwardly or laterally flaring portions of anterior and superior medial and/or lateral crural cartilage may have to be resected or morselized or otherwise changed to allow reshaping and narrowing of the tip itself. These actions may disturb or remove fibrous tissue attachments where the maneuvers take place, but still the tip will tend to remain in its earlier position because of the attachments behind and below the action sites. Gently curving incisions now made through the lining and the fibrous tissue attachments of the lateral crura to the posterior parts of the upper lateral cartilages and to bone in the pyriform aperture region will allow the operator to push the tip superiorly with less resistance than before the gently curving incisions were made. Slight undermining carried out below the incisions to separate the cartilages from nasal skin will allow superior tip rotation to take place more easily. The lateral crus rotates slightly and retrodisplaces somewhat as the tip is pushed up. To achieve this effect more easily, it may be necessary to sever some of the



**Fig. 6.** Lateral crural retrodisplacement. A Preoperative. B Operative markings. C Result. D Pre-operative. E External markings. F Result



**Fig. 7.** Lateral crural horizontal shortening. **A** Preoperative. **B** Marking showing resection site. **C** Result. **D** Preoperative. **E** Marking



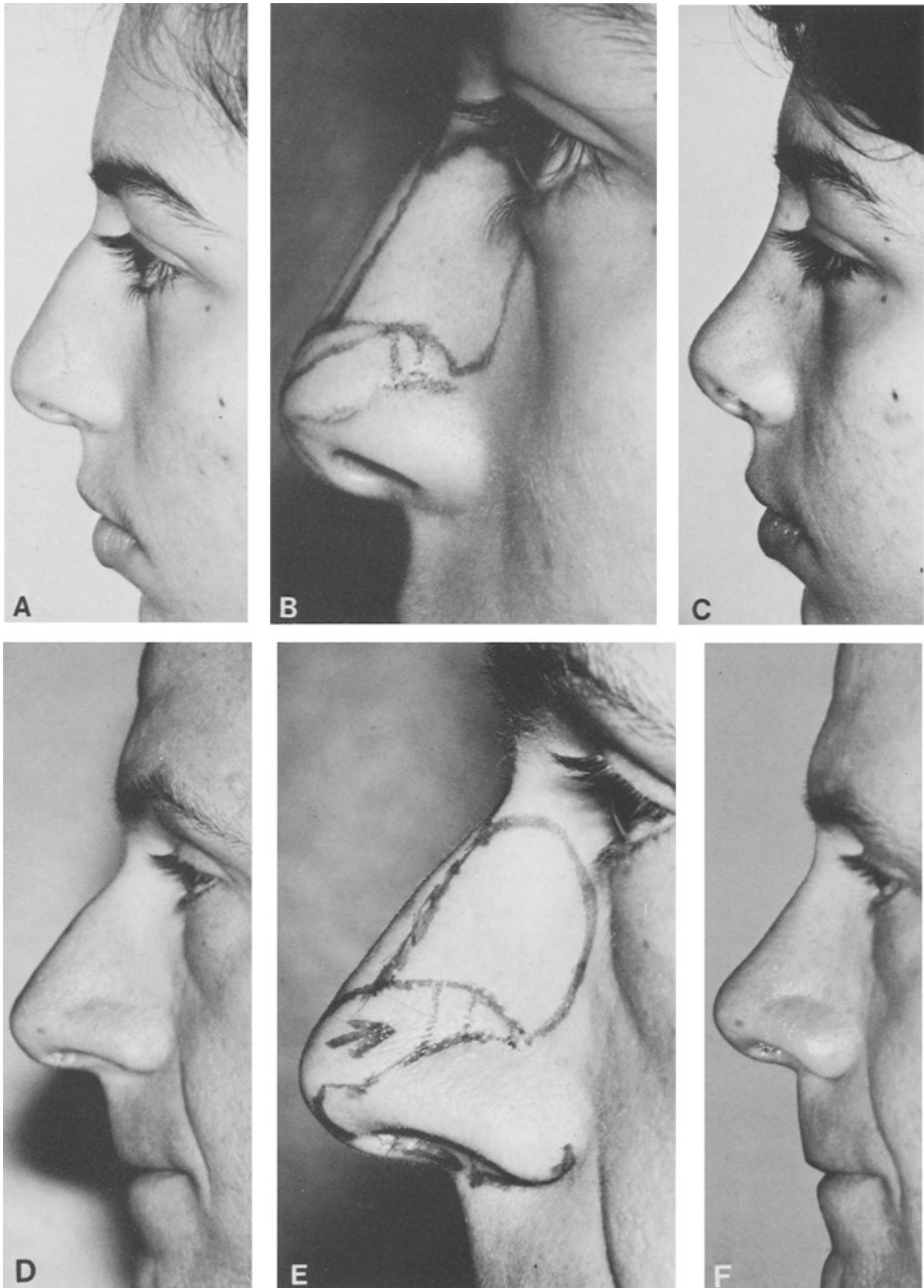


Fig. 7. (continued) F Result

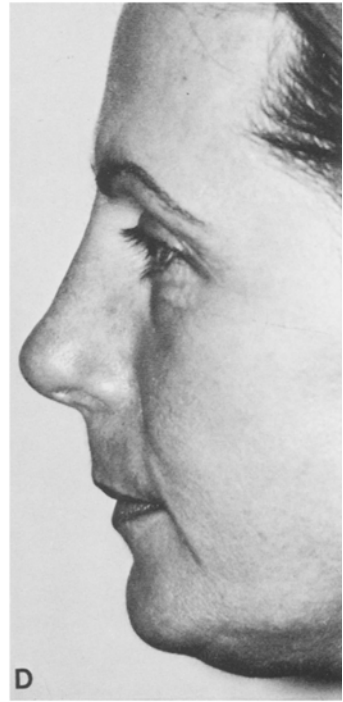
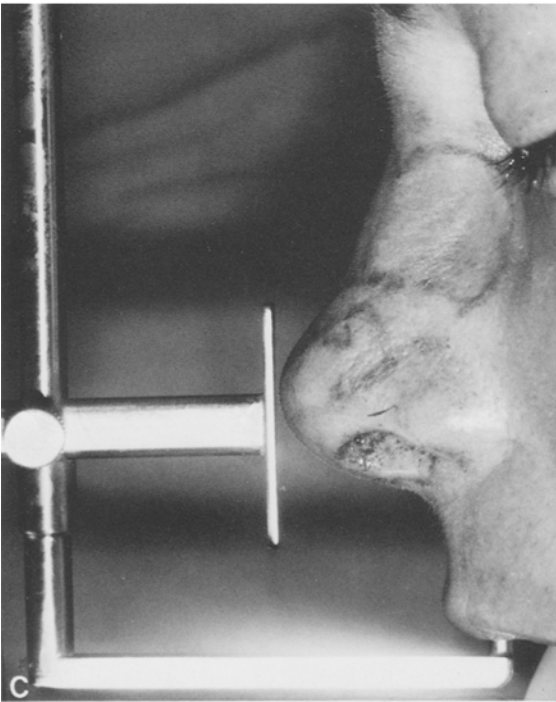
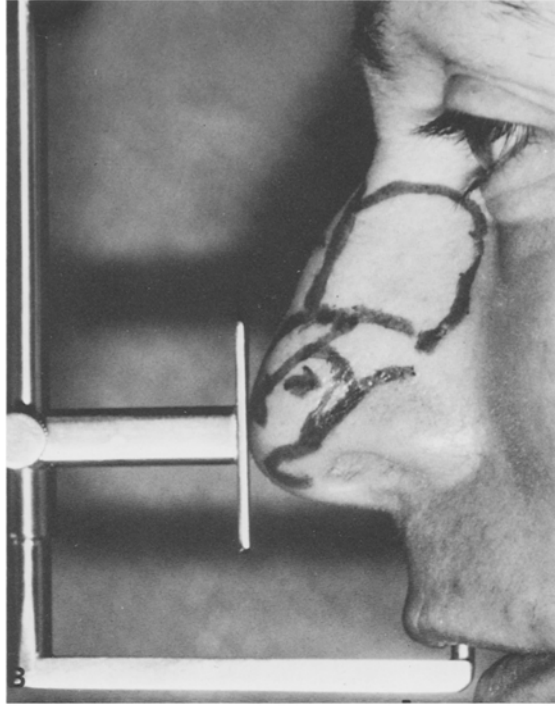
fibrous tissue attachments between the tip cartilages anteriorly so that these cartilages can separate without resistance as they override the upper lateral cartilages. If the desired superior tip rotation is accomplished, permanent sutures of a material like 5-O white Tevdek<sup>®</sup> may be applied between the lateral crural cartilage and the upper lateral cartilage and fibrous tissue just behind the upper lateral cartilage to keep the lateral crus in this position (Fig. 2). A strong “valve” is maintained.

The lateral crus moved in this fashion tends to bend into the nostril at a location just above the lobular structure of the ala close to the dimpled area observed on the outside of the nose (the dimpled area at the junction of the ala with the lateral wall above). We call this the lateral crural hinge and recommend resection of the cartilage and attached vestibular skin pushed or bulged into the vestibule by the push upward on the tip. Healing will tend to maintain in the desired position the retrodisplaced and rotated lateral crus anterior to this resection site, even without permanent or absorbable sutures attaching the anterior segment of the lateral crus to the upper lateral cartilage or to the posterior portion of the lateral crus. In addition, a possible impingement on the more important part of the airway and a lumpy source of “bother” (from a palpable or visible lump just inside the nostril edge) to the patient will be eliminated (Fig. 3).

By terminology that we have suggested [1-6], what we have described so far is a complete strip technique in which the strip is then detached posterosuperiorly, retrodisplaced, and allowed to form new attachments to the more fixed structures or, when the resection is carried out in the hinge area, a greatly modified lateral crural flap technique with that portion of the lateral crus behind the resection site being considered the lateral crural flap portion.



**Fig. 8.** Lateral crural horizontal shortening. **A** Preoperative. **B** Marking. **C** Result showing tip rotation. **D** Excessive projection of tip. **E** Horizontal shortening of lateral crus and deliberate retrodisplacement of medial crura will allow lessening of projection while limiting superior tip rotation in this male patient. **F** Result



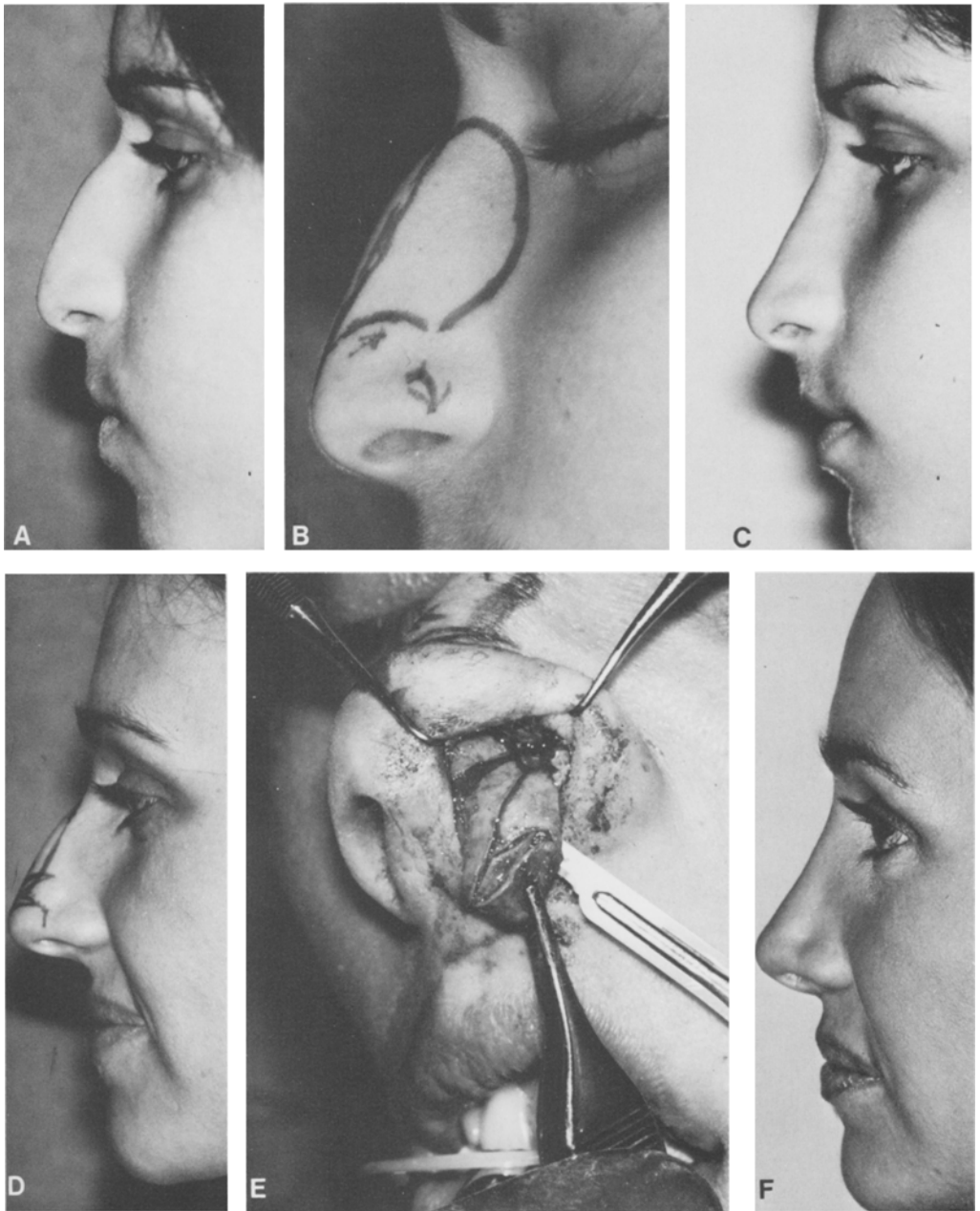
**Fig. 9.** Modified lateral crural flap technique. **A** Preoperative. Note acute arching of alar margin with forward and downward inclination of anterior part of margin. **B** Observe markings and position of tip related to second prototype profilometer. **C** Tip rotated superiorly and retrodisplaced slightly. **D** Result



**Fig. 9 (continued).** E Front view preoperatively. F Postoperative

Another modified lateral crural flap approach allowing some retro-displacement of the anterior portion of the lateral crus along with rotation of this anterior portion is the technique to be described next. Here, an incision is carried out, in a curved fashion, downward and posteriorly and then forward a short distance, as shown in Fig. 4, to transect the lateral crus anterior to the "hinge" site. Undermining is carried out inferior and anterior to this incision to separate the lateral crus from the external skin. The tip is rotated by the operator's finger superiorly to the desired position. Then, the lateral crus immediately adjacent to the incision is observed. It will be found that some overriding will be present and the inferior margin of the lateral crus anterior to the incision often will project downward not far from the alar margin. Overriding of one portion of the lateral crus by the other is corrected by trimming either the overridden or underridden cartilage and lining until a butt joint is obtained. If that portion of the lateral crus projecting downward near the alar margin will produce either too much inferior displacement of the alar margin or an appreciable bulge into the vestibule, this portion with its attached vestibular lining is excised.

Many years ago when we first used these techniques, we routinely put in permanent sutures. We must admit that today, with experience and with appropriate trimming of cartilage and lining, we first see what taping and splinting will do. If the cartilage and lining meet in good butt joint arrangements, we often apply no sutures. If they do not, we usually put just one or two 4-0 to 6-0 chromic catgut sutures into the lining, reserving for permanent suturing only those cases where required superior tip rotation is marked or where it seems difficult to get a good butt joint attachment.



**Fig. 10.** Lateral crural flap techniques. **A** Preoperative. **B** Marking. **C** Modified lateral crural flap procedure used. Entire anterior lateral crus rotated on portion left posteriorly. **D** Typical lateral crural flap to be used. Marking shown. **E** Lateral crus and lining delivered. Rim strip portion held in forceps. Lateral crural flap just above scalpel blade. Resection of cartilage just above and below and anterior to lateral crural flap will allow rim strip and tip to rotate superiorly. **F** Predictable and controlled rotation achieved

It may be asked why this rotating technique is described in a paper on lateral crural retrodisplacement. Actually, as soon as the lateral crus has been transected, retrodisplacing factors are introduced and the portion of lateral crural cartilage anterior to the transection site tends to displace posteriorly somewhat.

These techniques have been used for over 30 years. When properly selected, they have worked well and predictably (Figs. 5–10). Asymmetries, notching, and dimpling noted at times with other techniques are minimized. Valves and airways are protected and the superior tip rotations desired have been achieved. The techniques are simple and have much to commend them.

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