

# Animation and Cosmetic Balance in Repair of Congenital Bilateral Cleft Lip: A Modified Technique

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The quality of the surgical repair of the bilateral cleft lip is judged by the criteria of function and cosmetic appearance. To meet acceptable standards, the plastic surgeon must fashion a reconstruction in which the lip is uniformly mobile and also balanced in appearance. The congenital bilateral cleft lip presents unusual problems: the abnormality precludes the presence of any striated muscle fibers (7), as well as the usual sparsity of vermillion and mucosal lining in the prolabium. Reconstruction of the upper lip proceeds from the existing prolabium.

Since the dynamics of the overlying facial musculature affect the growth and development of facial bone structures (6), the absence of striated muscle in the middle of the upper lip potentiates deformation of the central portion of the face. Techniques for repair of the upper lip—including a slim muscle band constructed in the region of the vermillion border—have tended to result in angulation of the premaxillary bone, and subsequently, retrusion of the upper central teeth. Such a lip repair was reported by Federspiel (3), in 1927, and recently by Yarrington (8) in 1973. Both surgeons described similar procedures that require long-term observation. Subsequent growth produces a disproportionally long upper lip, together with an adverse effect on the development of the underlying bony structures. The repaired lip has no continuous functioning muscle throughout the vertical expanse of the upper lip and mobility is extremely limited.

To provide central lip mobility with the lateral components, two methods are available to the surgeon: transfer of the Abbe (1) type of pedicles, and transfer of "pendulum" pedicles (4). The Abbe procedure transfers the pedicle from the lower lip to the center of the upper lip, supplying continuous muscle, but the resulting deformation of the lower lip is difficult to camouflage. The pendulum pedicles (island pedicles which include mucosa and a layer of the lateral musculature) can be taken from the

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Presented at 1973 Annual Meeting of American Cleft Palate Association, May 10, 1973, Oklahoma City, Oklahoma.

lateral segments of the upper lip and be brought centrally to produce the oral muscle ring found in normal lips. When first performed, this procedure improved speech, especially plosives. Subsequent modifications in technique have made it possible to form a tubercle in the central portion of the upper lip and philtrum columns around a lip dimple. In this fashion, the pleasing curves of the vermillion border and the mucosa are established for the patient born with a bilateral cleft of the upper lip. Precise formation of this portion of the anatomy helps to camouflage the presence of vertical scarring of both sides of the lip.

This report concerns the use of pendulum pedicles to bring about cosmetic balance and functional mobility in the repair of the congenital bilateral cleft lip. I have used this technique with successful results in 24 patients.

### **Operative Technique**

To correct the "whistling" deformity of the upper lip, pendulum pedicles are outlined on the lateral segments of the upper lip, a usual site of surplus tissue (Figure 1). The mucosal wounds are cut to an extremely shallow depth (Figure 2), since the submucosal tissues are easily mobilized. The anterior vermillion incision is carried between the muscle fibers to move only a portion of the muscle. The pendulum pedicle carries the full thickness of the muscle medially, but only half of the thickness laterally. The width of mucosa should be kept narrow to avoid overcorrection. The vascular pedicles are carefully stretched. In the medial portion of the muscle pedicle, a back-cutting incision is made (Figure 3) to increase the height. If this back-cut is made at a shallow depth near the

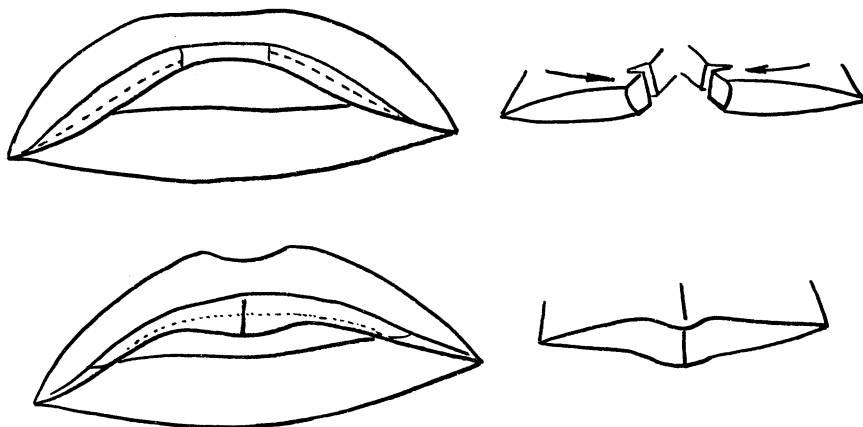


FIGURE 1. Sketches of pedicles and tubercle. *Left:* (Above) Outlines of pendulum pedicles of tissue of mucosa and muscle on the upper lip. (Below) Pedicles have been brought together medially. *Right:* (Above) Pendulum pedicles have been dissected and back-cut for medial lengthening. (Below) Pedicles have been brought together to form central tubercle.

FIGURE 2. Sketch shows incisions in the upper lip to include mucosa, muscle, and vascular tissue.

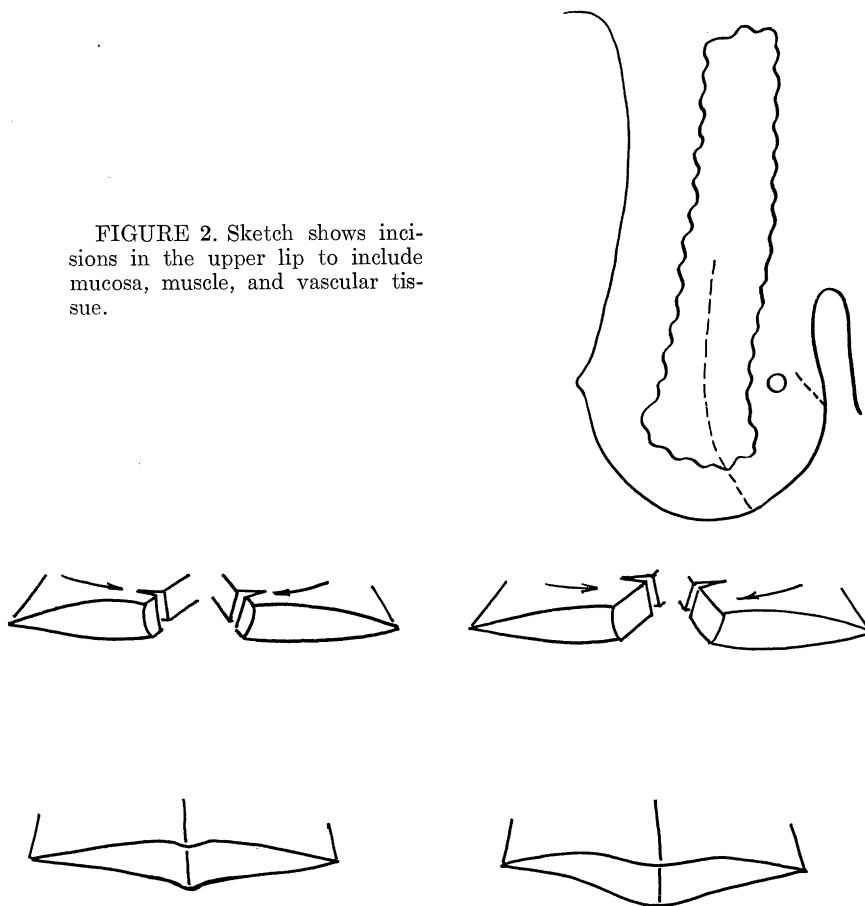


FIGURE 3. Sketches. *Left*: Low back-cut to form small central tubercle. *Right*: High back-cut to form larger central tubercle.

vermillion border, only a small tubercle will be made in the center of the lip. However, if the back-cut is made rather superiorly and large, a pleasingly wide and gentle curve will result in the tubercle portion of the upper lip vermillion border. The muscle fibers curve upwards in the clefts, and transverse approximation is accomplished by the myoplasty (Figure 4). The muscle is carefully repaired with multiple fine, nonabsorbable sutures, and no dehiscence has been noted on subsequent muscle biopsy.

Philtrum and lip dimple can be constructed simultaneously with the myoplasty (Figure 5). The prolabium mucosa is dissected as a thin pedicle (Figure 6), and can be used to line the premaxilla as high as necessary, eliminating the need for a skin graft at a separate procedure. Moreover, remodeling of the subcutaneous tissue of the prolabium by a vertical midline incision beneath the dermis (Figure 7) allows the subcu-

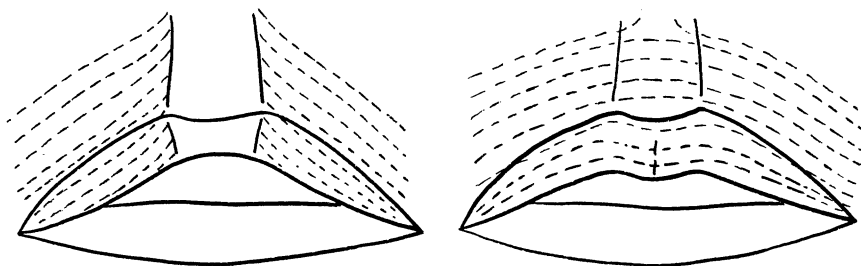


FIGURE 4. Sketches. *Left*: Muscle fibers curve upward in the cleft. *Right*: Transverse approximation of the muscle fibers by means of back-cutting myoplasty.

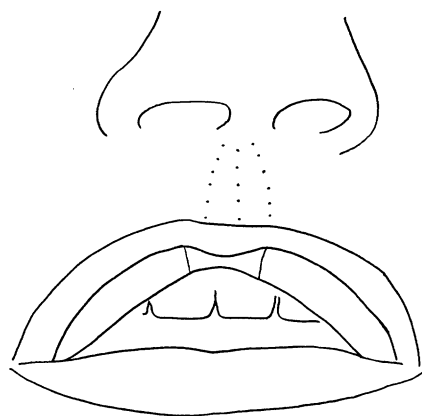


FIGURE 5. Sketch shows outline of philtrum and dimple construction with myoplasty.

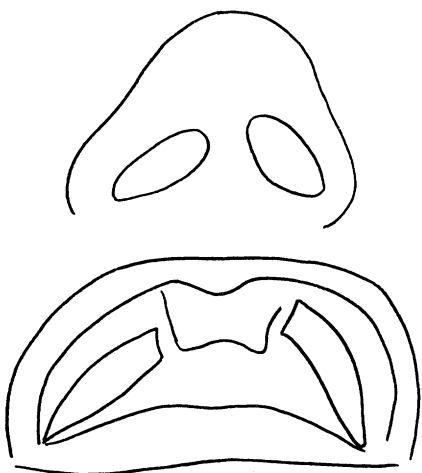


FIGURE 6. Sketch shows lip incisions with thin prolabium mucosal pedicle centrally to line the premaxilla.

taneous pedicles created to be drawn laterally with nonabsorbable 6-0 suture material. The alar bases can be exposed and narrowed with sutures, along with a Cronin (2) type of columella lengthening. The subcutaneous pedicles will simulate the philtrum columns and the pyramidal tissue

elevation (Figure 8) normally found at the base of the columella. The central prolabium dermis is sutured down to the advanced muscle pedicles to produce the lip dimple (Figure 9). No skin incisions are needed for any of these reconstructions, permitting the skin repair at infancy to remain intact. The initial skin repair usually gives the least noticeable scar, and the establishment of the undulations of the philtrum aid in the camouflage of the lip scars. Figure 10 is a photographic record of the operative technique performed on a fifteen year old girl and Figure 11 shows the record of a seventeen year old girl.

FIGURE 7. Sketch shows vertical subcutaneous incision in prolabium, and subdermal dissection to transfer tissue bilaterally for philtrum columns and pyramidal elevation under the columella; the alar bases can be narrowed with nonabsorbable sutures while the nasal tip is being elevated.

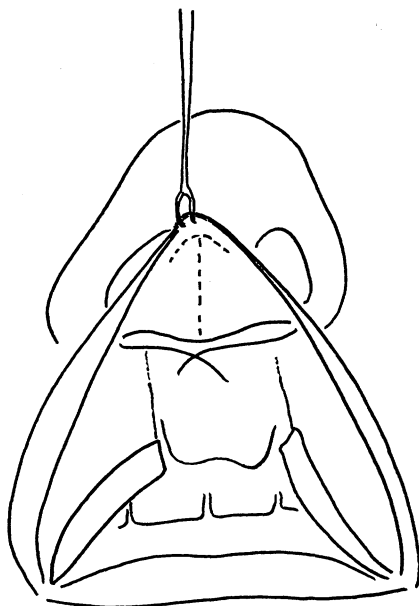


FIGURE 8. Sketch shows that nonabsorbable suture material forms the subcutaneous tissues into philtrum columns.



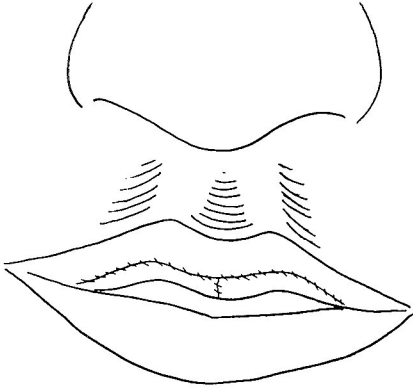


FIGURE 9. Sketch shows central prolabium dermis sutured to muscle pedicles advanced for formation of lip dimple.

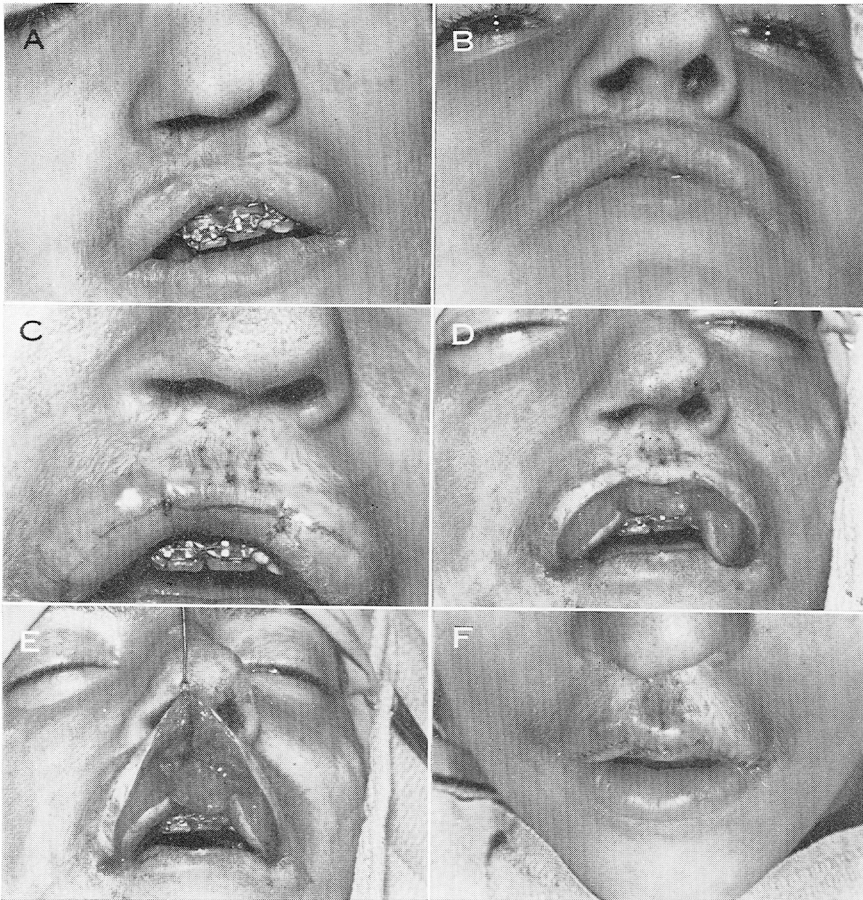


FIGURE 10. Photographs of a 15 year old girl. A. Whistling defect. B. Thin prolabium and full lateral segments of upper lip. C. Proposed philtrum, dimple and pendulum pedicles. D. Pendulum pedicles and thin prolabium mucosa pedicle to line premaxilla. E. Vertical incision beneath dimple to form philtrum columns with lateral suture of subcutaneous tissue. F. Completed lip repair.

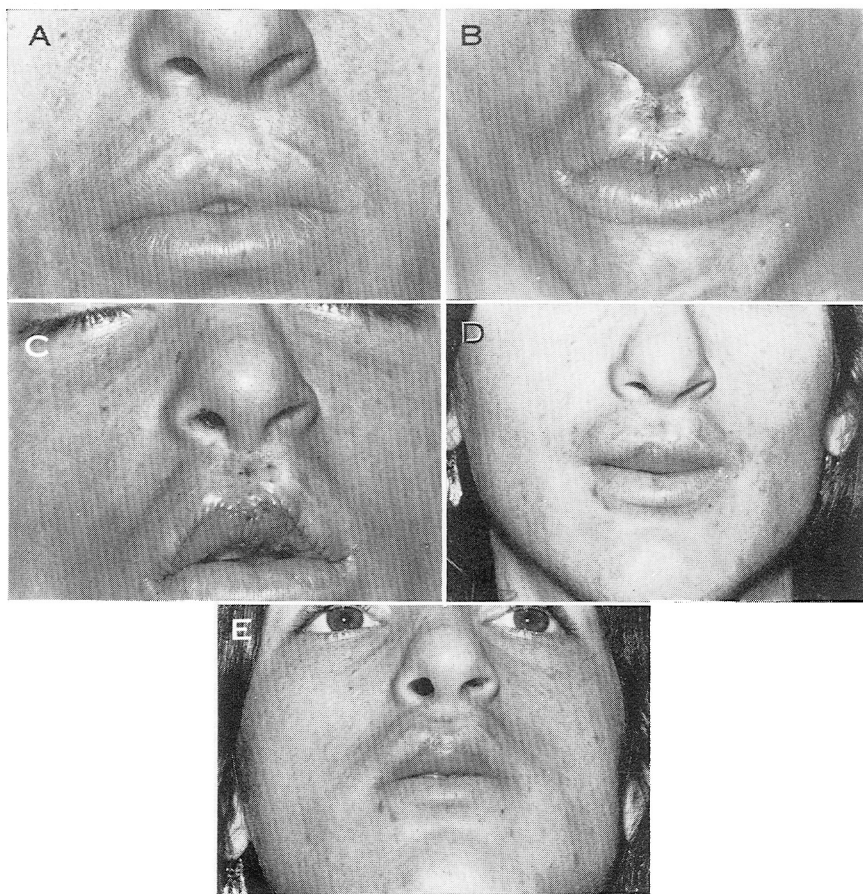


FIGURE 11. Photographs of a 17 year old girl. A. Whistling defect. B. Completed lip reconstruction. C. Inferior view of repaired lip. D. Healed lip after two months. E. Inferior view after two months.

### Comment

The patient has little discomfort in the postoperative period. Although extensive incisions are made in the vermillion border and in the mucosa, a minimum of visible scarring results in these tissues. No contractures have been formed in a series of 24 patients. The physiologic function and the cosmetic balance have been so consistent that the technique of pendulum pedicles can be advocated as the preferred procedure in the staged reconstruction of the congenital bilateral cleft lip deformity. Pedicles taken from the lower lip should no longer be necessary unless there is excessive sacrifice of tissue from the initial repair of the margins of the cleft.

For my patients, bilateral cleft lips are repaired simultaneously with vertical closures during the first week of life (Figures 12 through 15). I

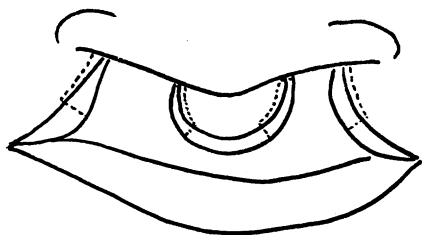


FIGURE 12. Sketch shows outline of multiple pedicles for repair of bilateral cleft lip.

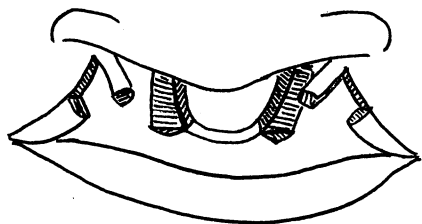


FIGURE 13. Sketch shows bilateral incisions of lip pedicles that preserve all levels of tissues.

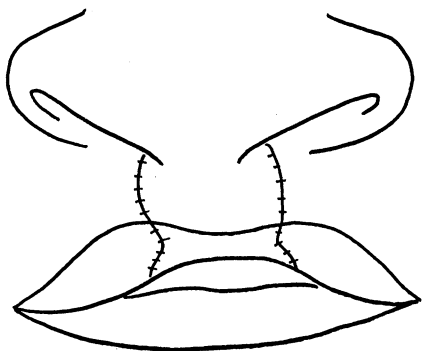


FIGURE 14. Sketch shows layered repair of bilateral cleft lip.

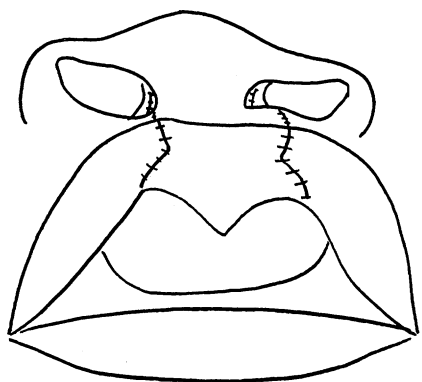


FIGURE 15. Sketch shows nasal view of lateral pedicles sutured through incisions in the membranous septum to relieve tension on the upper lip.

avoid adding tissue above or below the prolabium, as this results in excess vertical height of the lip with maturation. Lateral pedicles are banked along a membranous septum incision and sutured together to take up lip



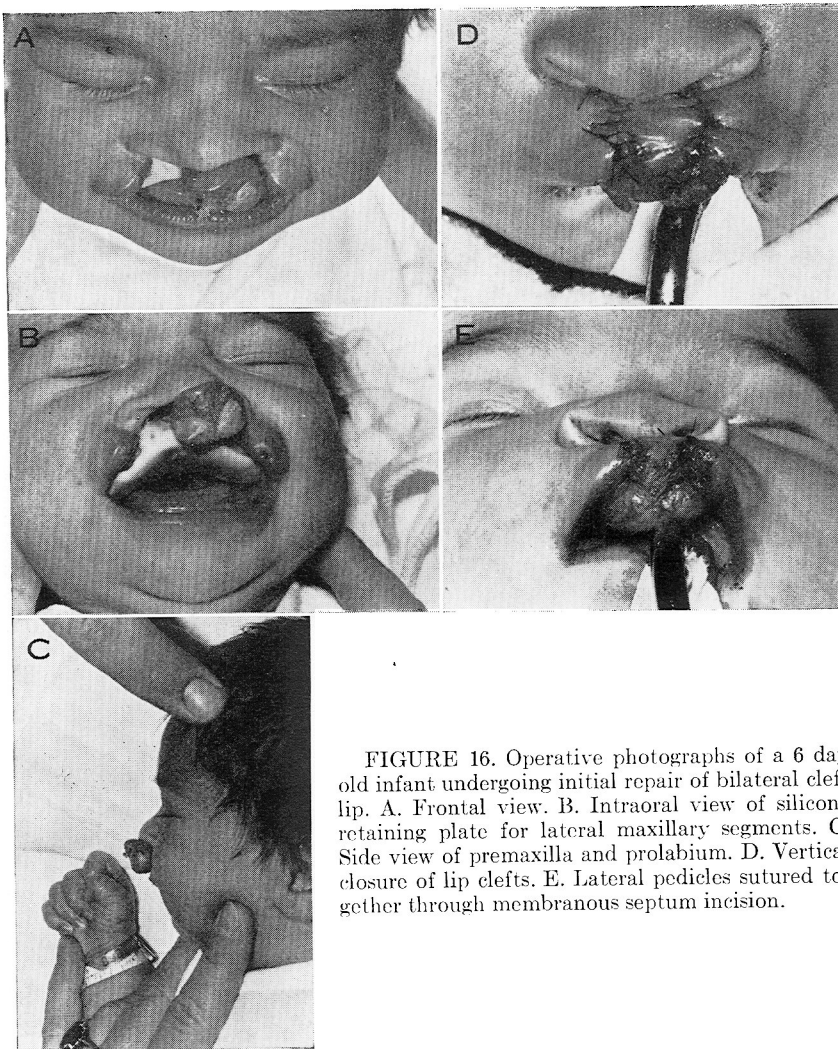


FIGURE 16. Operative photographs of a 6 day old infant undergoing initial repair of bilateral cleft lip. A. Frontal view. B. Intraoral view of silicone retaining plate for lateral maxillary segments. C. Side view of premaxilla and prolabium. D. Vertical closure of lip clefts. E. Lateral pedicles sutured together through membranous septum incision.

tension (Figures 13 and 15). Operative photographs of the procedure appear in Figure 16. The muscle transfer procedure is the next operative stage, preferably before the patient is five years of age. The series of operations is completed with a columella-lengthening procedure and nostril correction, either by Millard (5) flaps or by Cronin (2) nostril-floor pedicles.

### Summary

A method of reconstruction of the bilateral cleft lip which furnishes muscle and mucosa to the central portion of the upper lip from tissues taken from the lateral segments of the lip has been presented. It has the advantage of anatomically reestablishing the continuity of muscle fibers

across the entire expanse of the upper lip, which can aid in growth and development of the underlying bony features of the face. Philtrum columns and lip dimple are included in the staged procedure. Alar bases can be narrowed with elevation of the nasal tip. Speech function is enhanced with the production of the normal shape of the upper lip as well as continuity of lip mobility. Best results of initial bilateral lip repair occur when no pedicle tissue is added above or below the prolabium.

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