

Release of the Prolabium in the Bilateral Cleft Lip

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In certain bilateral cleft lip patients with an otherwise satisfactory initial repair, the prolabial segment of the upper lip remains adherent to the premaxilla, and the labial-alveolar sulcus is absent. Lack of the sulcus poses a problem in orthodontic and prosthodontic treatment. The adherence and the sulcus deficiency may contribute to immobility of the upper lip and a 'tied down' appearance.

The paucity of local tissue, the presence of scar from prior lip repair, and the potential growth of the youthful patients involved are limiting factors to be considered in devising reparative methods. Experiences with several surgical techniques for the release of the prolabium and the reconstruction of the upper lip sulcus are presented here and evaluated on the basis of clinical observation.

Material and Results

Forty cases of bilateral cleft lip treated at Columbia-Presbyterian Medical Center from 1954 to 1964 were reviewed. In 12 patients from this group, 14 operations for the release of the prolabium and the formation of an upper labial-alveolar sulcus were performed. Details regarding procedures and results are present in Table 1.

Partial osteotomy of the premaxilla with use of local mucus membrane flaps was successfully carried out in three cases. The degree of premaxillary protrusion involved in one of these patients was noteworthy (Figure 1).

Split thickness skin graft to lip and premaxilla produced a good result in three of four cases in which this method was used (Figure 2). Significant hypertrophy of the donor site of one of these successful cases was noted, however. Failure occurred in a two-year-old in whom the initial lip release was not maintained in a three-year period of follow-up.

The technique of full thickness free mucosal grafting of the labial surface, leaving the premaxillary surface bare, was carried out in six instances (Figure 3). Loss of the graft caused the single failure. The size of the mucosal graft required ranged from 2.5 by 1.0 cm in a two and

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TABLE 1. Procedure and results for 12 individual patients.

<i>Case</i>	<i>Age at operation (years)</i>	<i>Method</i>	<i>Follow-up (years)</i>	<i>Result</i>	<i>Comment</i>
A.W.	14	partial osteectomy of premaxilla; local mucosal flaps.	1	good	floating premaxilla with irretrievable dentition.
P.W.	14	partial osteectomy of premaxilla; Z plasty mucosal flaps; immediate insertion of dental prosthesis.	4	good	as above.
J.I.	5	partial osteectomy of premaxilla; local mucosal flaps.	1	good	massive premaxillary protrusion. Figure 1.
C.W.	6	split thickness skin graft to lip and premaxilla.	4	good	lip appearance markedly improved. Graft donor site hypertrophic. Figure 2.
M.J.	4	split thickness skin graft to lip and premaxilla.	4	good	long term follow-up
E.M.	2	split thickness skin graft to lip and premaxilla.	3	failure	release not maintained.
	5	buccal mucosal transposition flaps.	1	failure	release not adequate lip bulky.
T.C.	12	mucosal graft to lip alone.	1	good	3.5 by 2.5 cm lip defect.
J.S.	12	mucosal graft to lip alone.	2	good	4.0 by 2.5 cm lip defect. Figure 3.
R.B.	2½	mucosal graft to lip alone.	4	good	2.5 by 1.0 cm lip defect.
D.E.	8	mucosal graft to lip alone.	4	good	3.0 by 1.0 cm lip defect.
M.G.	8	mucosal graft to lip alone.	3	good	
B.S.	4½	mucosal graft to lip alone.	1	failure	loss of graft.
	6	split thickness skin graft to lip and premaxilla.	1	good	

one-half year old to 4.0 by 2.5 cm in a 12-year-old. There was no difficulty in primary closure of the buccal mucosa donor sites and no late contractures were noted.

In one case, long laterally based buccal mucosal flaps were transposed to cover both lip and premaxilla. The result was unsatisfactory in terms of the release achieved and the bulkiness of the lip which was created.

Discussion

In a certain number of bilateral cleft lip patients, the initial condition and/or its repair leads to adherence of the prolabial lip segment to the

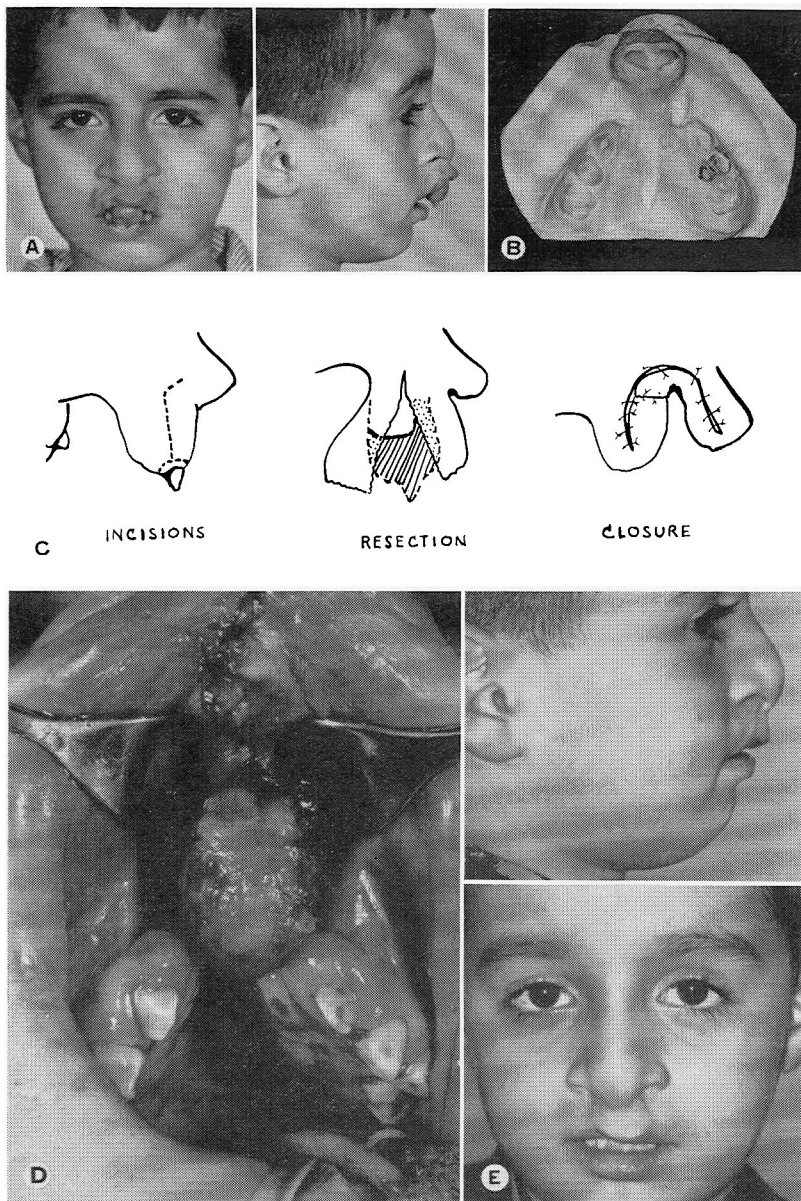


FIGURE 1. A. Five-year-old boy with massive protrusion of premaxilla despite satisfactory lip repair in early infancy. With teeth in occlusion, premaxilla overhangs the lower lip. Upper lip adherent to premaxilla with anterior surface of premaxilla cracked and crusted due to exposure.

B. Dental model for patient shown in Figure 1A showing alveolar arch in satisfactory alignment, with massive vomerine strut maintaining space where premaxilla should have been. Anterior surface of premaxilla 2.5 cm anterior to anterior edge of maxillary arch and premaxillary dentition on a level 1.5 cm below the plane of the maxillary dentition.

C. For same patient, partial osteectomy avoiding trauma to premaxillary-vomerine suture line and employing local mucosal flaps to reconstruct sulcus.

D. Intraoral view of same patient at end of operative procedure.

E. Appearance of same patient seven months after operation.

premaxilla and to deficiency of the upper labial-alveolar sulcus. These problems were significant enough to deserve operative revision in 12 of the 40 bilateral cleft lip patients in our series.

A primary consideration for surgery in this group was the need for release of the upper lip for effective placement of orthodontic or prosthetic devices. A secondary factor was the attempt to achieve a more natural appearing, less 'tied down' upper lip. While physiometric analysis has not substantiated the significance of upper lip immobility in bilateral cleft lip patients, it did appear in this group that immobility was present and that that immobility was related to the anatomic deformity (9, 13). The release of the lip was accompanied by improvement of mobility and, occasionally, by a striking improvement in appearance (Figure 2).

A variety of methods related to extension of the atrophic mandibular and maxillary alveolar ridges have been reported. Not all of these are applicable to the situation present in the bilateral cleft lip patient. Simple incision and maintenance of release by prosthesis is not usually feasible because of the depth of the sulcus to be created, its irregular shape, and the general difficulty of prosthetic management in the child (5, 6). The category of methods involving the lingual-alveolar sulcus is also not applicable to this problem (3, 20).

Methods utilizing bone resection on the anterior surface of the alveolar ridge have been reported (12). For the cleft lip patient, this implies partial premaxillary resection. Damage to the premaxilla and, specifically, to the premaxillary-vomerine suture line is generally accepted to be fraught with the hazard of growth deficiency of the maxilla (2, 8). Premaxillary osteotomy is therefore suitable only for the patient whose maxillary growth has been completed or for the rare case of massive premaxillary protrusion (Figure 1).

The deficiency of local mucosa in the premaxillary labial-alveolar sulcus in these cases tends to make flap methods difficult or unsuitable. Whether based on the alveolus or on the lip, such flaps do not achieve the degree of release desired in the bilateral cleft lip patient (4, 10). Except where premaxillary resection has left redundant mucosa, the successful release of the lip and creation of a sulcus depends on making new covering tissue available.

The raw areas created by the release of the lip from the premaxilla can be grafted with skin or with mucosa (1, 7, 11-12, 14-18). Skin is available in large quantity. We have observed no late complications of its use within the mouth and the graft take is usually good (18). However, it is true that late hair growth is possible, or, as in one observed instance, the growth of the skin graft may not keep pace with the growth of the area in which it is placed. Further, as was also true in one of our cases, troublesome hypertrophy of the skin graft donor site is possible.

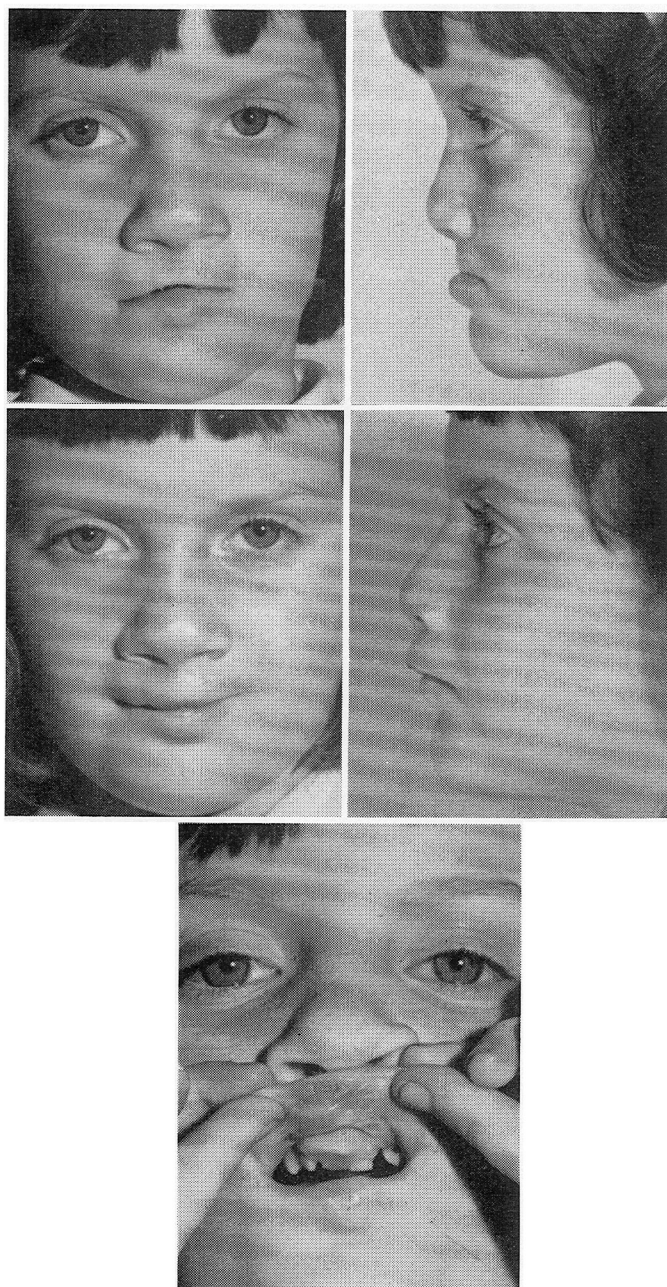


FIGURE 2. The 'tied down' appearance of upper lip is strikingly improved by split thickness skin graft to lip and premaxilla. Top, pre-operative full face and profile; middle, post-operative full face and profile; bottom, skin graft sulcus.

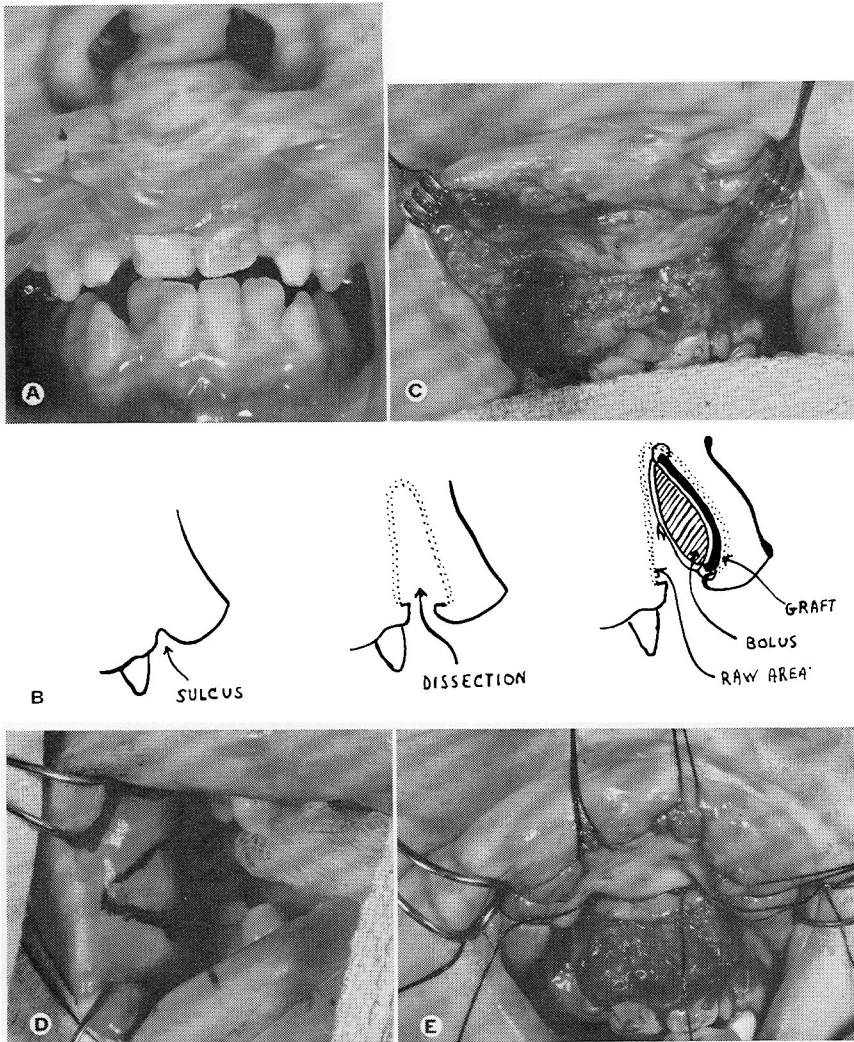


FIGURE 3. A. Pre-operative view demonstrating adherence of prolabial lip segment to premaxilla.

B. Operative design involving dissection of lip from premaxilla and coverage of labial surface alone by a full thickness mucosal graft held in place by a bolus dressing.

C. Operative view showing raw surfaces produced by dissection.

D. Site of mucosal graft on lateral buccal surface.

E. Mucosal graft in place with suture ready to be tied over bolus. Note remaining exposed surface of premaxilla.

The use of a full thickness mucosal graft obviates most of these problems. The amount of mucosa available for donation is not unlimited (15). By allowing the premaxillary surface to epithelize spontaneously, the size of the defect requiring mucosal coverage has been routinely

reduced to a size easily managed by a single, small mucosal graft. The question of contracture consequent upon the secondary epithelization of the premaxilla can be raised. Both experimental and clinical observations suggest that some shrinkage of sulcus depth occurs under all conditions (18, 19). However, lip release appears to be maintained by this method as effectively as when both lip and premaxillary surfaces are covered by a skin graft.

Conclusion

Fourteen surgical procedures for the late release of the prolabium and creation of an upper labial-alveolar sulcus were carried out in 12 cases in a series of 40 bilateral cleft lip patients. The techniques employed were reviewed and their results compared. Dissection of the prolabium from the premaxilla with full thickness free mucosal graft to the labial surface leaving the premaxillary area bare was found to be an effective method free of major objections.

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References

1. ASHLEY, F. L., SCHWARTZ, A. N., and DRYDEN, M. F., A modified technique for creating a lower lingual sulcus. *Plastic reconstr. Surg.*, 22, 204-213, 1958.
2. BARSKY, A. J., KAHN, S., and SIMON, B. E., Early and late management of the protruding premaxilla. *Plastic reconstr. Surg.*, 29, 58-70, 1962.
3. CALDWELL, J. B., Lingual ridge extension. *J. oral Surg.*, 13, 287-292, 1955.
4. CLARK, H. B., JR., Deepening of labial sulcus by mucosal flap advancement: report of case. *J. oral Surg.*, 11, 165-168, 1953.
5. COLLETT, H. A., Immediate maxillary ridge extension. *Dent. Digest*, 60, 104-106, 1954.
6. COOLEY, D. O., A method for deepening the mandibular and maxillary sulci to correct deficient denture ridges. *J. oral Surg.*, 10, 279-289, 1952.
7. ESSER, J. F., Studies of plastic surgery of the face. *Annals Surg.*, 65, 297-315, 1917.
8. GLOVER, D. M., and NEWCOMB, M. R., Bilateral cleft lip repair and the floating premaxilla. *Plastic reconstr. Surg.*, 28, 365-377, 1965.
9. HARING, F. N., and McCORMACK, R. M., A physiometric analysis of lip function in cleft and noncleft subjects. *Cleft Palate J.*, 1, 320-328, 1964.
10. KAZANJIAN, V. H., The surgical treatment of abnormalities of the edentulous alveolar processes and the palate. *Amer. J. orthod. oral Surg.*, 26, 263-277, 1940.
11. KRUGER, G. O., Ridge extension: review of indications and technics. *J. oral Surg.*, 16, 191-201, 1958.
12. OBWEGESER, H., Surgical preparation of the maxilla for prosthesis. *J. oral Surg.*, 22, 127-134, 1964.
13. OFFERMAN, R. E., CLEALL, J. F., and SUBTELNY, J. D., Symmetry of lip activity in repaired unilateral clefts of the lip. *Cleft Palate J.*, 1, 347-356, 1964.
14. PICKERILL, H. P., Intraoral skin grafting: the establishment of the buccal sulcus. *Brit. J. dent. Science*, 62, 135-141, 1919.
15. PROPPER, R. H., Simplified ridge extension using free mucosal grafts. *J. oral Surg.*, 22, 469-474, 1964.
16. PROWLER, J. R., A skin-grafted ridge extension: new approach to atrophic ridge management. *J. oral Surg.*, 23, 123-129, 1965.
17. REHRMANN, A., Creation of an alveolar ridge after bone transplantation to the mandible. *Plastic reconstr. Surg.*, 24, 183-189, 1959.

18. SLANETZ, C. A., JR., and RANKOW, R. M., The intra-oral use of split-thickness skin grafts in head and neck surgery. *Amer. J. Surg.*, 104, 721-726, 1962.
19. SPENGLER, D. E., HAYWARD, J. R., and ARBOR, A., Study of sulcus extension wound healing in dogs. *J. oral Surg.*, 22, 413-421, 1964.
20. TRAUNER, R., Alveoplasty with ridge extension on the lingual side of the lower jaw to solve the problem of a lower dental prosthesis. *Oral Surg., oral Med., oral Path.*, 5, 340-346, 1952.