Secondary Mucous Membrane Advancement in Bilateral Cleft Lip: A Combined Surgical-Dental Approach

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A bilateral cleft lip deformity is frequently associated with a deficient labial vestibule. This is the result of the intimate attachment of the prolabium to the premaxilla. It is impossible to release and resurface this vestibule in a one-stage primary bilateral cleft lip repair. The only effective means of overcoming this in a primary repair is with the utilization of local mucosal flaps in a two-stage repair as described by Bauer, Trusler, and Tondra (*1*). It is those instances in which the vestibule reconstruction has not been accomplished to which we direct our attention.

The lack of a labial vestibule is not only cosmetically undesirable, but can be functionally inhibitory as well. It can also prohibit the orthodontist from inserting appliances needed for major orthodontic treatment. It can prevent the proper protection and lubrication of the maxillary incisor teeth, by the upper lip, and thus promote the premature decay and loss of these vital teeth. To enlarge the labial vestibule presents a substantial rehabilitative challenge. For, while it is quite possible to surgically dissect the prolabial area and to create an adequate vestibule, the stability that results is diminished by the healing processes endogenous to the procedure. That is, while a labial vestibule can be surgically achieved, the secondary contracture following surgery will often deny vestibular stability.

As an answer to this problem, skin grafting procedures in the vestibule have been advocated (*2*). These procedures are not without limitations. Among the limitations are: the graft may contract, the graft may slough, the donor sites may hypertrophy and be unsightly, the graft growth is limited by its fibrous or scarred bed, and hair growth at the graft site is possible.

With these factors in mind an alternative was effected, using a com-

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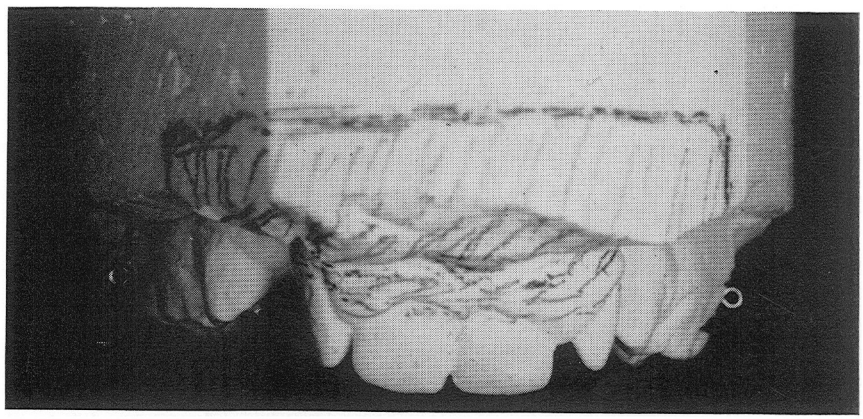

FIGURE 1. Model with proposed resected area outlined.

bined dental and surgical approach.[1] This approach involves the use of a prefabricated acrylic splint. The adherent prolabial tissue is released from the premaxilla and a mucous membrane advancement of the upper lip is carried out to provide mucosal coverage for the labial defect. The denuded premaxilla is then permitted to epithelialize secondarily beneath the acrylic splint. Harkins (*3*) briefly mentions a removable clasp-type prosthetic appliance. This was advocated to maintain the space after release in preparation for a final prosthesis.

Methods and Materials

The patient is first seen in the dental clinic and stainless steel bands are fitted to the maxillary right and left first permanent molars or second deciduous molars if the first molars have not yet erupted. .045 round buccal tubes are tack-welded to these bands and the bands are refitted on the maxillary first molars. The buccal tubes are then paralleled to each other by manipulation, using six-inch segments of .045 round wire. The tubes are then welded securely and a maxillary impression with the band in place is taken. This impression is poured in snow white #1 dental plaster. After consultation with the plastic surgeon the area for mucous membrane advancement and prolabial release is demarcated. This area is outlined on the dental model (Figure 1), and the case is then knife trimmed to the desired surgical specifications (Figure 2).

A .045 round stainless steel wire is then bent to conform to the trimmed dental model. A right angle bend in the wire is usually necessary at the posterior border of the premaxilla to insure proper placement of the splint at the surgical site. On some of the earlier splints small hooks were soldered on the right and left buccal segments just anterior to the buccal

[1] Personal communications with Frank Hapak, D.D.S.; John Mink, D.D.S.; and H. M. Trusler, T. B. Bauer, and J. M. Tondra.

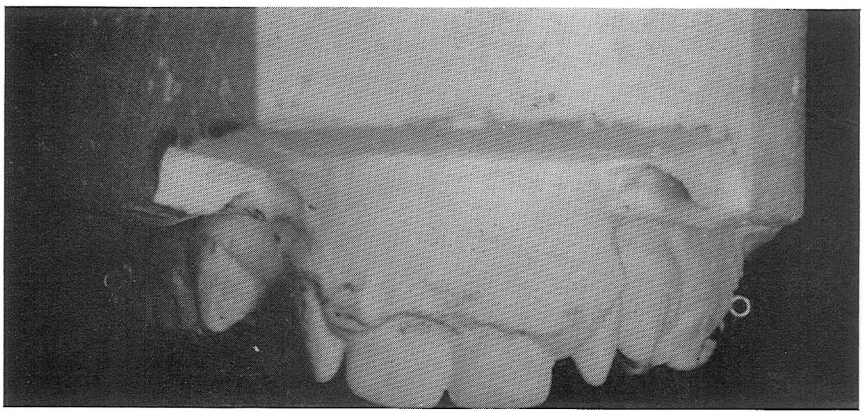

FIGURE 2. Model trimmed.

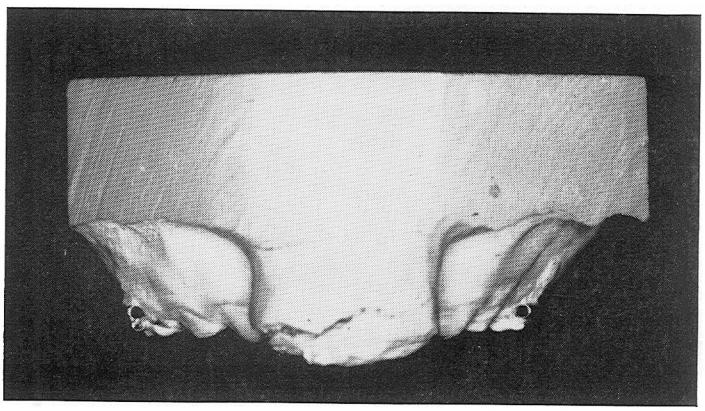

FIGURE 3. Model trimmed to desired level.

tube. These hooks can be used to ligate the splint in place if retention becomes a problem. Retention has not been a problem.

The acrylic portion of the splint is fabricated on the arch wire using quick-cure acrylic. Seventy-two hours later, the final product is highly polished and trimmed to coincide with the pattern previously outlined by the surgeon (Figures 3, 4, and 5). The overall thickness of the splint is about 2 millimeters. The patient is then recalled and the bands are cemented in place. The splint is now ready to be sent to the surgeon for insertion at the time of operation.

Surgical Procedure

The technique is as follows. We release the mucous membrane completely from the premaxilla and utilize all of it along with the advancement of lateral buccal mucosa into the prolabial buccal area for complete coverage of the lip. The premaxilla is denuded and covered by an

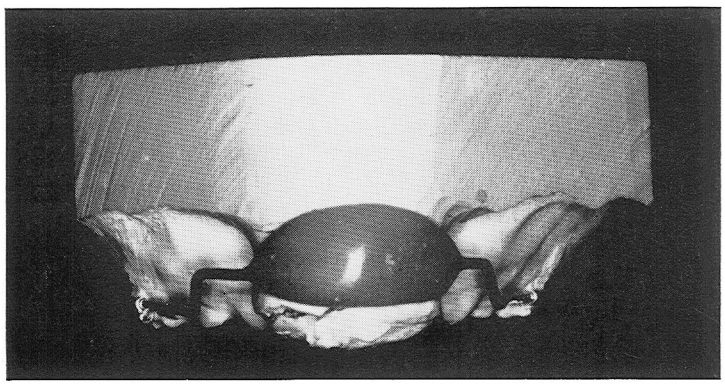

FIGURE 4. Acrylic splint mounted on trimmed model, preoperative.

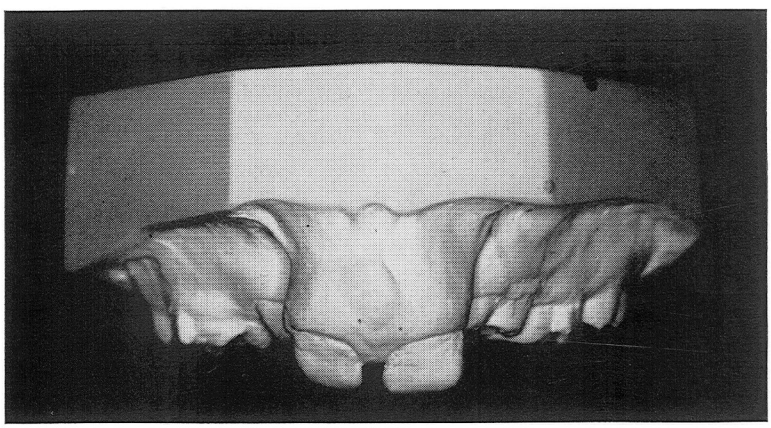

FIGURE 5. Model postoperative.

acrylic splint.[2] In our opinion, this procedure offers a superior result over all previous methods. Following our successful utilization of this procedure in ten cases, we feel it deserves to be in print and available to others.

With the acrylic appliance available in the operating room, the patient is given a general anesthetic, and an oral endotracheal tube is inserted. The mucosa of the superior buccal sulcus is infiltrated with 0.5% xylocaine with adrenalin 1:200,000 to aid in hemostasis. An incision is made adjacent to the alveolar ridge of the premaxilla and lateral maxillary processes to free the mucous membrane from the underlying alveolus. The mucosa is generously undermined from the lip muscle laterally

[2] We wish to give full credit for the initial demonstration of this procedure to Dr. John Mink, Chief of Pedodontics at the University of Kentucky Dental School, who was formerly in charge of the Dental Clinic at the Riley Hospital, Indiana University Medical Center; Dr. Frank Hapak, Indianapolis orthodontist; and Drs. Harold Trusler, Thomas Bauer, and John Tondra of the Plastic Surgery Service at the Indiana Medical Center.

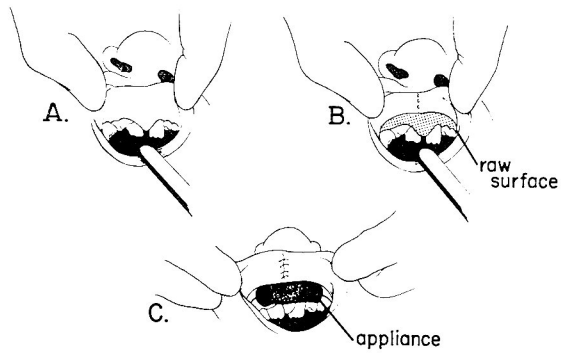

FIGURE 6. A, preoperative status; B, release and advancement of mucous membrane, raw surface of alveolar ridge; and C, acrylic splint supporting mucosa and covering denuded alveolus.

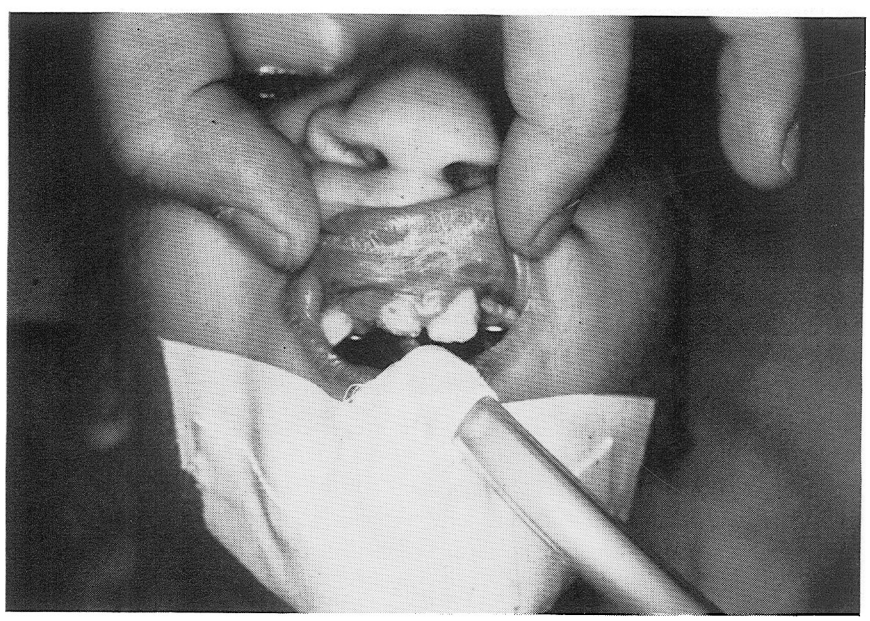

FIGURE 7. Preoperative release, patient JD.

to at least the first molar area. A vertical dart incision is made posteriorly for further relaxation of the mucous membrane, and it is advanced anteriorly. With the mucosa relaxed, a vertical closure is started in the midline, advancing the mucosa until the closure has been completed up to the level of the nasal spine. Closure is accomplished with 4–0 and 5–0 interrupted catgut sutures (Figure 6).

With the entire premaxillary area now denuded down to the periosteum, the acrylic appliance is inserted. The tendency for contracture is markedly reduced and the entire exposed area is secondarily epithelial-

ized rapidly. The appliance can be readily removed for cleaning and irrigation. It must be worn for three months to maintain the sulcus. Earlier removal will result in contracture. It is well tolerated by all patients (Figures 7–11).

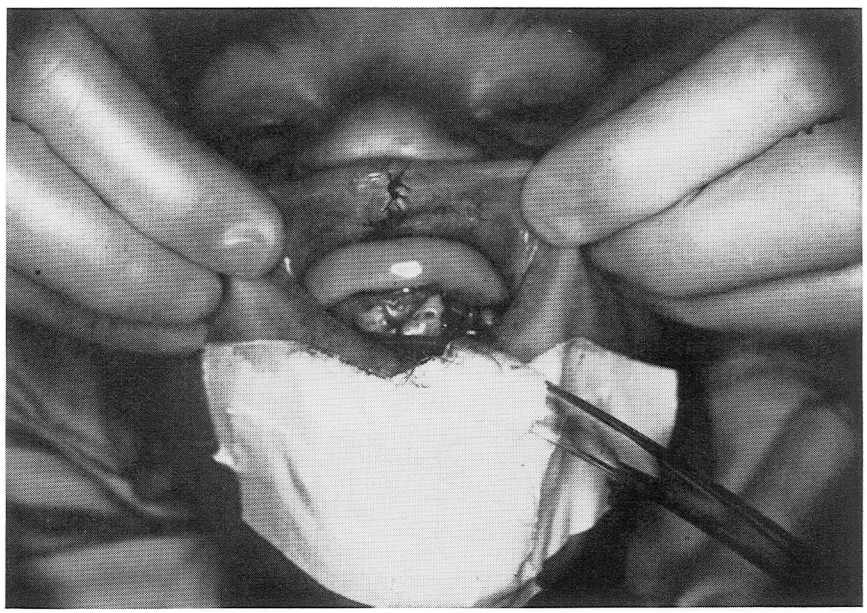

FIGURE 8. Splint in place, patient JD.

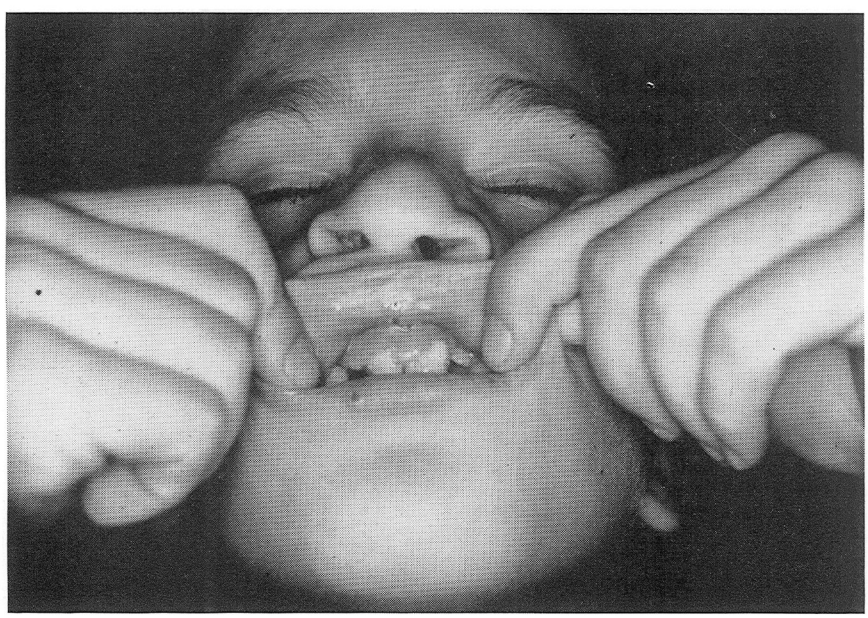

FIGURE 9. Postoperative status, patient JD.

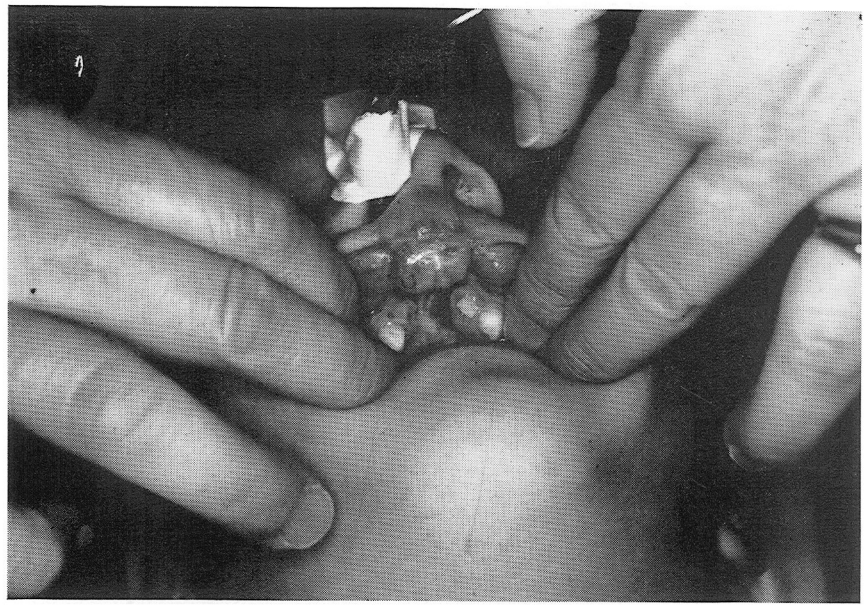

FIGURE 10. Preoperative fixation of prolabium, patient MM.

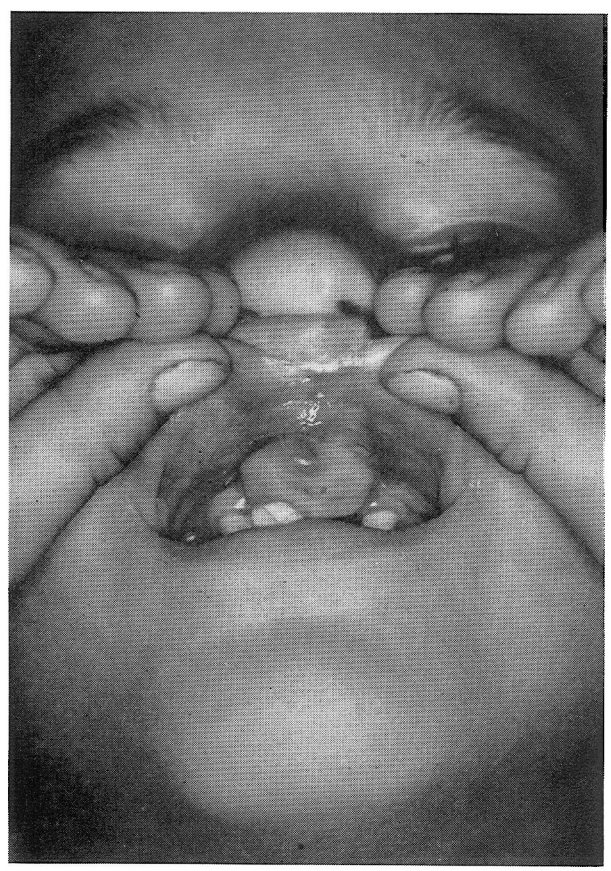

FIGURE 11. Postoperative release, patient MM.

Discussion

The rationale for the mucous membrane advancement to surface the buccal aspect of the lip and the secondary epithelialization of the premaxilla is based on the premise that there is a marked lack of available mucous membrane to resurface both the lip and the premaxilla. By carrying out relaxing incisions of the superior buccal sulcus on both sides and advancement of the mucous membrane to the midline, sufficient mucosa can be mobilized to adequately resurface the buccal aspect of the lip. The dissection and release of the lip from the premaxilla is ordinarily carried up to the level of the nasal spine superiorly, and if this gained space is not retained by some appliance, contracture with obliteration of the vestibule is certain to occur. The utilization of a split thickness skin graft to this raw surface has been advocated; however, secondary contracture may still occur. Retaining the gained space in the sulcus with the acrylic retained and permitting the open area of the premaxilla to epithelialize is quite effective in minimizing the secondary deformities and retaining the gain of the lip release. It is necessary to keep this splint in place for a period of three months because of the secondary contracture that will occur if this retention is not maintained.

Summary

A method of enlarging the labial vestibule in secondary bilateral cleft lip revisions has been described. This method involves surgical mucous membrane advancement in the upper lip area, followed by the use of a prefabricated acrylic splint. The splint is utilized to minimize contracture in the vestibular area and to permit epithelialization of the premaxilla.

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