

Rotation-Advancement Principle in Cleft Lip Closure

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Correction of prealveolar, alveolar, and postalveolar clefts poses a five-fold project: natural appearance, functional dentition, unimpaired hearing, normal speech, and well-adjusted personality. This multifaceted task takes a team of specialists: pediatrician, prosthodontist, orthodontist, pedodontist, otolaryngologist, speech therapist, plastic surgeon, and psychiatrist. It is natural and commendable that each specialist show enthusiasm for his own specific responsibility yet it never should be forgotten that the cumulative effect of all working together promises the closest approach to a normal end point. It is well, however, to put first things first; for no matter how excellently the patients hears, bites, or sings, if he ends up looking like a hare, we have failed. Granted the growth of the maxilla and position of the teeth are a vital part of the final appearance of the patient, but then so is the construction of the lip and nose.

A most vital decision toward this goal is the optimum time for lip surgery. The primary surgical repositioning of the lip and nose at present is being carried out at about three months by this author. This tentative date has been set to allow the soft tissues to increase in quantity and to avoid any inhibiting effects from surgery on the growth of the maxillary components. Closure of the lip with moderate tension, high across the arch as in the technique suggested here, seems to give excellent molding. Yet if there is malpositioning of the maxillary components with overriding of the noneleft side over the cleft side, then lip closure will force them into overlapped collapse. In such cases it would seem that postponement of surgery is indicated until prosthodontic manipulation can align both maxillary components. Once this has been achieved, lip closure with its muscle molding effect will continue to improve the situation.

In order to transform a cleft lip with nasal deformity into normal, it is essential first to define the normal. Then a careful detailed study of what is present in each individual case is essential before it is possible to utilize to the best advantage what we *have* to make what we *want*.

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Presented at the 1963 Convention of the American Cleft Palate Association, Washington, D. C.

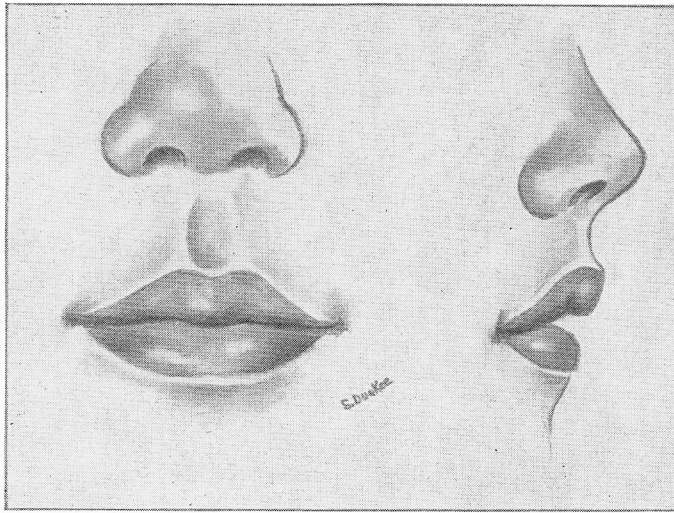


FIGURE 1. An example of the normal with its landmarks.

The Normal (Figure 1)

The normal nose has a straight columella of adequate length backed by a straight septum. Symmetrical alar arches are supported by equivalent alar cartilages and rest on equally balanced alar bases. Equal nasal floors are bounded by nostril sills. The normal upper lip with its intact orbicularis oris musculature has a philtrum with curved column prominences bounding a central dimple. The gentle curving cupid's bow with its midline vermilion tubercle is highlighted by a white skin roll along its upper mucocutaneous junction. The natural position of the lips places the loose upper lip, with eversion of its lower portion, over and slightly in front of the lower lip. There must be an adequate and symmetrical bony platform to support the soft tissues of the nose and lip.

Cleft Variations

Each cleft lip deformity varies but in broad generalities the lip-nose distortion can be divided into unilateral incomplete cleft with nasal deformity, unilateral complete cleft with nasal deformity, bilateral incomplete cleft with adequate columella, bilateral complete cleft with inadequate columella, and various degrees of the rare median cleft. Whether or not there is an alveolar defect and/or associated postalveolar palate cleft is also important. Maxillary and premaxillary prosthodontic and orthodontic manipulation, alveolar bone grafting, palate closure, and lengthening will not be discussed in this paper.

Unilateral Deformity and Its Correction

In a unilateral cleft of the lip with nasal deformity there are varying degrees of absence of tissue as well as actual distortion. The vital primary

action is to visualize what is normal and to shift the tissue into a normal position. These clefts, among other deficiencies, have an inherent vertical shortness along each side involving both the nose and the lip. This, according to Stark (7) may be due to the lack of adequate mesodermal ingrowth which would force a filling out of the lip with normal downward displacement. Instead, however, the potential lower part of the lip actually maintains its high attachment to the nose on either side of the cleft. Thus the noncleft side shows a twisted distortion with lack of vertical length from the

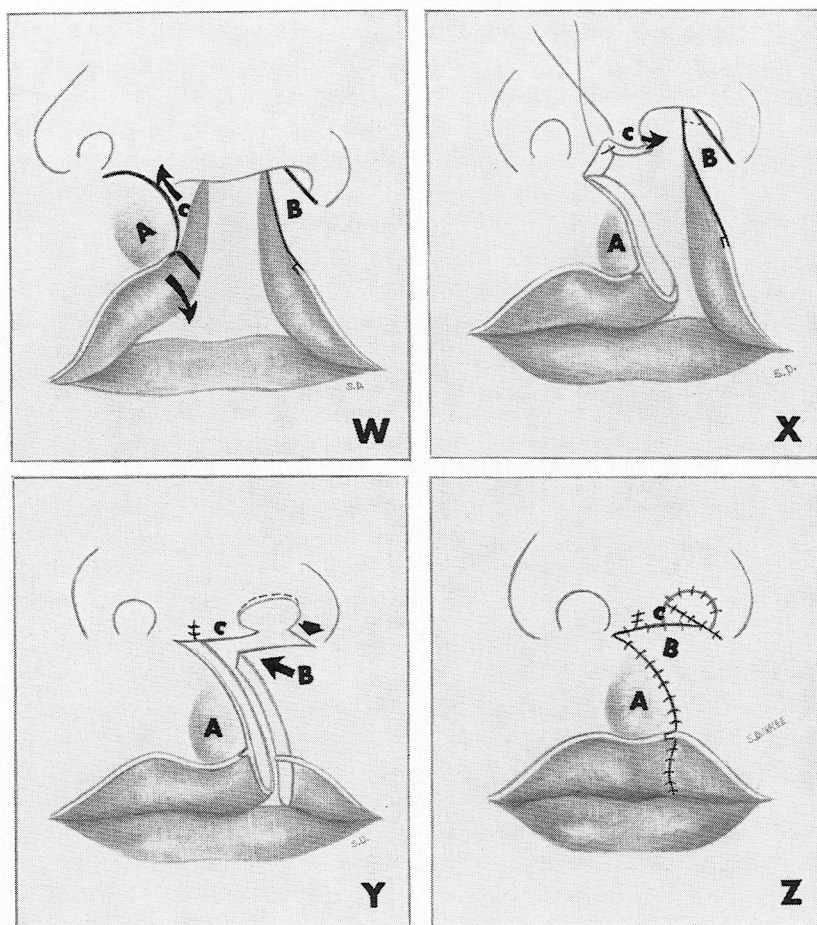


FIGURE 2. W. Downward rotation of A for correct placement of cupid's bow, philtrum and dimple. Upward advancement of C to lengthen the unilateral shortness of the columella. X. Suture of C into columella before its lateral advancement to make the nostril sill. Y. Medial advancement of lateral flap B into the rotation gap to maintain the new position of A and to correct the alar flare and width of nostril floor. C does not advance to the extent of the lateral incision, but is aided by a V-Y closure. Z. Note cupid's bow, philtrum, dimple, alar base, and columella are in correct alignment. Scars are camouflaged in natural positions. Whether the cleft is complete or incomplete, severe or minor, the final end point is more or less the same.

height of the arch of the ala to the height of the potential arch of the cupid's bow at the mucocutaneous junction. The columella and anterior septum have been pulled by intact muscle toward the noncleft side increasing the distortion. Equally distorted on the cleft side may be the short columella and the flattened alar arch with its cartilage displaced and its flaring base attached to intact lip musculature. A compensation in all this distortion is the presence of two-thirds of a cupid's bow, one column prominence of the philtrum, and a dimple. This component is in a distracting position up near the columella for it has never been forced down into normal position by mesoderm ingrowth. It would seem that the logical action is to free this cupid's bow-philtrum-dimple component in its entirety from the columella base and drop it into a normal position. This is the *rotation* action of the rotation-advancement method (Figure 2) (2, 4, 5).

On the cleft side there is a slumping of the alar arch, a flaring of the alar base with width of the nostril floor, and varying degrees in size of the other one-third of the lip. In order to close the cleft of the lip and nostril floor and reduce the alar flare it seems logical that the upper lateral portion of the lip with its attached alar base should be advanced medially. All of it must be used to its best advantage and this includes a portion of Simonart's band in incomplete clefts (Figure 3). If freed from its attachment to the maxilla and brought across the cleft, the lateral lip element will serve to maintain the rotation of the noncleft side by filling the rotation gap. This action, with its relative tension high in the lip and across the nasal base, straightens the columella and anterior septum by equalizing the lip muscle balance and exerts effective maxillary molding over the appropriate position (Figure 2). It also avoids tightness of the free border of the lip and forces its eversion.

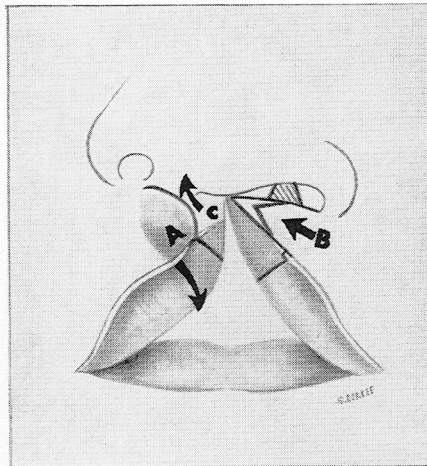


FIGURE 3. Rotation of A and columella advancement of C in incomplete clefts. Varying use of Simonart's band for advancing tip of lateral flap B and wedge excision from wide nostril floor facilitate the procedure in incomplete clefts.

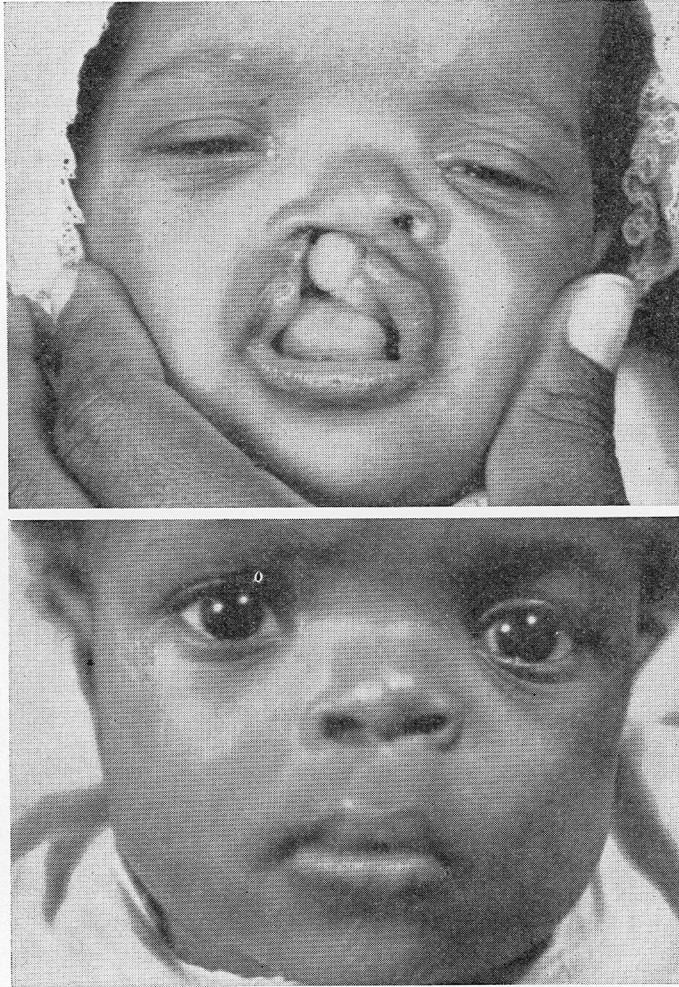


FIGURE 4. A severe complete unilateral cleft before and after rotation-advancement.

This, then, is the fundamental principle involved. It is extremely economical for it calls for minimal discard of tissue and ends up with its scars camouflaged in the philtrum column, along the nostril sill and alar base and finally back into the floor of the nasal vestibule (Figure 4).

Details such as unilateral columella lengthening, nostril sill formation, muscle to muscle approximation, mucocutaneous flap interdigitation, alar web and tip revision, alveolar bone grafting, are adjuncts of varying degrees of importance depending on the case (6).

Adaptation in Bilateral Cleft

In bilateral clefts of the lip this rotation-advancement principle is applicable, but of course must be modified. Its most obvious use is in the

bilateral incomplete cleft with a short prolabium but a normal columella. The rotation-advancement technique is carried out one side at a time advancing the upper lateral component medially between prolabium and columella base. The lateral vermilion turndown flap overlaps the turndown of prolabium vermilion to form one side of the cupid's bow. One month later the opposite side is rotated and advanced in similar fashion (Figure 5) (1, 3). In the bilateral complete cleft with a protruding premaxilla and shortness of the columella, not only is there no cupid's bow and philtrum dimple to preserve, but there is not enough columella. To add to the difficulty, the entire distorted premaxillary midsection has grown uninhibited far out in front of its lateral maxillary flankers. This is a complex and fascinating problem which can be benefitted by rotation-advancement technique only in a broad application of the principle. Median clefts pose a midline problem which is beyond the scope of this technique.

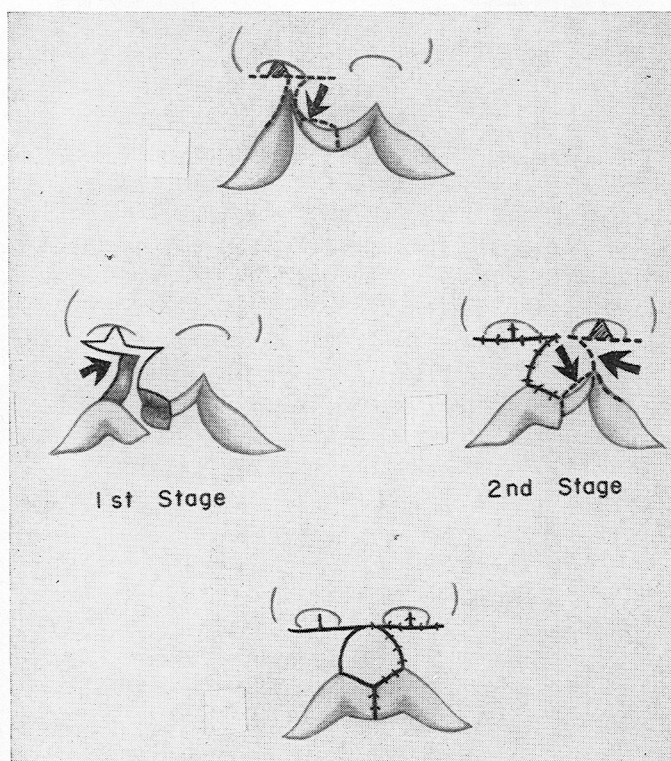


FIGURE 5. In bilateral incomplete clefts when the prolabium is short and the columella is normal the rotation-advancement principle can be used to advantage. Half the prolabium is rotated down and the lateral element is advanced into this gap. A wedge of varying size is excised from the nasal floor. A vermilion flap from the lip element is used to overlap the prolabium vermilion to form one half of a cupid's bow. One month later the same procedure is carried out on the opposite side.

Summary

The rotation-advancement technique of cleft lip closure was designed to preserve the natural landmarks of the cupid's bow-philtrum-dimple component and to rotate them into normal position. Maintenance of this rotation is achieved by medial advancement of the lateral lip element which also reduces the alar flare and width of the nostril floor. The strategic positioning of the scars manages to place the main oblique scar along the natural line of a philtrum column while the interdigitations are hidden in the shadow of the nostril sill and nasal floor. The minimal discard of tissue and the ease of secondary correction are additional dividends.

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References

1. MILLARD, D. R., JR., Adaptation of the rotation-advancement principle in bilateral cleft lip. In A. B. Wallace (Ed.), *Trans. Internat. Soc. Plastic Surgeons*, Second Congress, London, 1959. Edinburgh and London: E. & S. Livingston Ltd., 50-57, 1960.
2. MILLARD, D. R., JR., A primary camouflage of the unilateral harelook. Presented at First International Congress of Plastic Surgeons, Stockholm, 1955. *Internat. Congress Transactions*, 1957.
3. MILLARD, D. R., JR., A primary compromise for bilateral cleft lip. *Surg., Gyn., Obst.*, 3, 557-563, 1960.
4. MILLARD, D. R., JR., A radical rotation in single harelip. *Amer. J. Surg.*, 95, 318-322, 1958.
5. MILLARD, D. R., JR., Complete unilateral clefts of the lip. *Plastic reconstr. Surg.*, 25, 595-605, 1960.
6. MILLARD, D. R., JR., Refinements in rotation-advancement cleft lip technique. *Plastic reconstr. Surg.*, 33, 26-38, 1964.
7. STARK, R. B., The pathogenesis of harelip and cleft palate. *Plastic reconstr. Surg.*, 13, 20-39, 1954.