Converse: Chapter 44

The Bilateral Cleft Lip With Bilateral Cleft Of The Primary Palate

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A lip that is completely cleft on both sides is usually associated with a complete cleft of the palate, but it may involve only the primary palate, the secondary palate being uncleft. In such cases the premaxilla is unrestrained by attachment to either segment of the maxilla and is projected forward by the growth of the cartilaginous septum (Scott, 1956, 1959a, b). The prolabium appears to be attached to the tip of the nose by an almost nonexistent columella. The alae are flared and stretched out to the maxilla on each side.

The premaxilla may vary in size and development. It may contain the four incisor teeth; often only one or two teeth are present, and occasionally a supernumerary or a normal tooth may be encased in a saclike structure protruding from one side of the premaxilla. The prevomerine bone, which is the stem of the premaxilla, is distinguished from the vomer by a suture line located 5 to 8 mm posterior to the base of the premaxilla. The site of the suture line is indicated by a bulge or enlargement of the inferior border of the vomer.

The maxillary processes, lacking attachment to the premaxilla and not influenced by the growing septal cartilage, may appear small and retruded. There may be adequate space to accommodate the premaxilla, or the maxillary segments may have collapsed medially, leaving no room for the premaxilla in the alveolar arch. The premaxilla may be united to the maxilla on one side and cleft on the other or united to the maxilla on both sides, although this usually occurs when the clefts of the lip are incomplete. In fact, any degree or combination of incomplete cleft of the lip or palate or both may occur.

Incidence

The incidence of bilateral clefts has been variously reported:

<table>
<thead>
<tr>
<th>Author</th>
<th>Number of clefts</th>
<th>Percentage of bilateral clefts</th>
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<tbody>
<tr>
<td>Ladd (1926)</td>
<td>622</td>
<td>16</td>
</tr>
<tr>
<td>Davis (1928)</td>
<td>425</td>
<td>12.94</td>
</tr>
<tr>
<td>Veau (1931)</td>
<td>500</td>
<td>9.6</td>
</tr>
<tr>
<td>Gabka (1960)</td>
<td>3142</td>
<td>15</td>
</tr>
<tr>
<td>Total:</td>
<td>4689</td>
<td>14.33</td>
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Diagnosis

Before a plan of treatment is undertaken, an accurate assessment of the degree of deformity should be made. The evaluation should determine (1) whether the cleft is complete or incomplete; (2) the size and position of the premaxilla and prolabium; (3) the length of the columella; and (4) in complete clefts, whether the interalveolar space is sufficient to accommodate the premaxilla.
Treatment

Principles and Objectives

In any plan of treatment, the following principles should be observed (Cronin, 1957).

1. The prolabium should be used to form the full vertical length of the middle of the lip.

2. The vermilion ridge of the inferior border of the prolabium should be carefully preserved.

3. The thin prolabial vermilion should be built up with vermilion muscle flaps from the lateral lip segments, but no lateral skin should be brought beneath the prolabium.

4. Repositioning of the severely protruding premaxilla, whether accomplished surgically or nonsurgically, not only permits easier and better repair of the lip by relieving undue tension but also makes one-stage repair possible unless contraindicated by the method itself.

5. Collapse of the maxillary processes behind the protruding premaxilla ideally requires prevention or expansion by an orthodontist trained in maxillary orthopedics. If such an orthodontist is not available, the collapse will have to be ignored until conventional orthodontic therapy is possible when the patient is approximately 4 years of age.

6. Bone grafting is indicated to stabilize the premaxilla when it is not united on both sides, but it is not necessary if one side is fused with the maxilla. Bone grafting, if indicated, should be delayed until there is good alignment of the premaxilla and maxillary segments (Cronin, Brauer and Penoff, 1969; Cronin and Penoff, 1971).

7. All plans of treatment are predicted on the following: complete correction of the lip and nasal deformity; control of the relationship of the premaxilla and maxillary segments; and closure or provision for closure of the anterior palate.

Use of the Prolabium

Superficially, the prolabium appears to be entirely adequate for its function of forming the full vertical height of the middle of the lip. The reason for this appearance is that, at its periphery, the prolabium is unattached except at only one point. Consequently, there is no stretching force, and the natural elasticity of the skin causes it to contract. Furthermore, it has little or no muscle (Rees, Swinyard and Converse, 1962; Fára, 1968), so that it is thinner than the lateral lip segments (see Chapter 41).

Most of the earlier authors, such as Koenig, Maas, Rose, and Thompson (Holdsworth, 1951), and some more recent ones (Smith, 1950; Barsky, 1950) have been deceived by this appearance and have recommended flaps of skin, muscle, and mucosa from the lateral lip segments to increase the vertical length of the lip. Such a procedure almost always results in a lip that is too long vertically and too tight horizontally, because skin has been taken at the
expense of the horizontal width, where it can ill be afforded, and used to increase the vertical height where it is not needed. Furthermore, the prolabial skin becomes entrapped. Like a peninsula, it is almost completely surrounded by scar, so that it bulges, domelike, in the center of the lip as the scar contracts. Even worse results ensue when the entire prolabium is used to form the columella, with the lateral lip segments closed in the midline (Adams and Adams, 1953). Embryologically, the prolabium belongs in the lip, as pointed out by Stark and Ehrmann (1958). Marcks, Tevaskis, and Payne (1957a) concur and have demonstrated hair follicles, sebaceous glands, and submucosa of lip tissue. They have also noted hair growth on the prolabial skin in adult males. Current opinion strongly supports the use of the prolabium to form the full vertical height of the lip (Axhausen, 1932; Brown, 1932; Davis, 1940; Vaughn, 1946; Schultz, 1946; Huffman and Lierle, 1949; Trusler and coworkers, 1955; Cronin, 1957; Bauer, Trusler and Tondra, 1959; Berkeley, 1961; Skoog, 1965; Manchester, 1970; Millard, 1971a, b).

Timing of Repair

Repair of the lip is generally deferred until an infant weighs approximately 12 to 14 pounds in order to have more tissue with which to work. If the premaxilla protrudes excessively and nonsurgical methods are to be used for its correction, it is important to begin immediately, so that advantage may be taken of the soft, pliable condition of the bones and the rapid growth that occurs during the first six months. If surgical setback is decided on, it may be done at any time in the first few weeks of life. After surgical setback, at least six to eight weeks are allowed for the healing of the vomer before the lip is repaired.

The Premaxilla

According to Scott (1956, 1959a, b) and Baume (1961), the growth of the cartilage of the nasal septum acts as the force for downward and forward growth of the maxilla. Latham (1970) has shown that this force is transmitted by the septomaxillary ligament coursing from the caudal border of the nasal septum posteroinferiorly to blend with the premaxillary peristome and the intermaxillary suture (see Chapter 40). Growth of the septum thus results in a pull on the maxilla. Latham (1968) pointed out that, contrary to earlier views, the septal cartilage is not important as a growth force to the maxilla after birth. He demonstrated that postnatal maxillary growth is due to the deposition of new bone on the orbital and posterior free surfaces of the maxilla (the maxillary tuberosities). The force of this growing bone against the adjacent soft tissues (orbital fat, eyeball, temporal muscle) results in a downward and forward movement of the maxilla at the maxillary sutures, the latter acting as sliding planes. Latham and Scott (1970) postulated that, because this mechanism would supplement the action of the cartilaginous nasal septum, a basic biological principle of "multiple assurance" applies to facial growth. That is, there is usually more than one process involved in the growth mechanism, so that if one does not operate, there are other processes available.

Latham (1967, 1973) has demonstrated overgrowth at the vomeropremaxillary suture in bilateral cleft lip and palate, as evidenced by a change in the structure of the sutural margins in its inferior part to chondroid tissue. This chondroid tissue is not the force causing the growth but rather a fill-in, as the cartilaginous septum grows forward, pulling the premaxilla with it by the attachment of the septopremaxillary ligament. Normally the
premaxilla grows forward more slowly than the nasal septum in the development of the normal columella.

A diagrammatic representation of the septum-premaxillary relationship in the normal infant and the infant with bilateral cleft is shown. Note that a large part of the premaxillary protrusion is due to the abnormally anterior position of the alveolar process over a period of seven to eight months of intrauterine life. Also note the oblique direction of the premaxilla-vomer suture.

Control of the Protruding Premaxilla. When the position of the premaxilla is fairly normal or the protrusion is only moderate, the lip can be repaired over it with little tension, although nonsurgical methods may be employed to further reduce any mild protrusion. Extensive protrusion is a serious complicating factor, however, in relation to the planned repair of both the lip and palate. Attempts to repair the lip over a conspicuously protruding premaxilla may, because of excessive tension, result either in actual dehiscence of the wound or in spreading of the scar. The inordinately protruding premaxilla is in an abnormal relationship to the tip of the nose; instead of being located at the base, it has grown out to the tip; thus the shortness of an already too short columella is accentuated.

Listed in order of preference are the methods currently used in dealing with the prominent premaxilla:

1. (a) Traction by external elastic with head cap.
   (b) Intraoral pin and elastic.
2. Lip adhesion
3. Surgical setback of the premaxilla.
4. Closure of the clefts, one side at a time.

Georgiade and Latham (1975) have developed a coaxial pin-screw device for expansion of the maxillary segments and simultaneous traction on the protruding premaxilla which may prove to be the most efficient method yet devised.

Elastic Traction. Clodius (1964) attributed early use of a head cap and traction to Franco (1561), Levret (1772), and Desault (1791). It has been used sporadically since then, but its use in recent years has become common as the complications of surgical setback have become known.

As shown, an elastic band attached to a head cap by hooks and eyes is worn continuously, except when feeding the infant, to restrain forward growth and to pull the premaxilla back to some extent while permitting the maxillary segments to grow. Lateral pressure from the elastic may cause collapse of the maxillary segments; therefore, if the segments are not in a satisfactory position, an acrylic plate (see Chapter 49) is adequate. A screw plate would be advisable to correct a collapse which was already present. Dental assistance is required for bilateral clefts. Results can be expected over a period of weeks or of up to two to three months. If retropositioning of the premaxilla has not been achieved, lip adhesion or surgical setback may be indicated. A disadvantage of the elastic traction procedure is the essential prerequisite of intelligent cooperation from the mother. Moreover,
frequent checks are required to assure a sufficient but not excessive amount of pressure, which would cause buckling of the septum with lingual tilting of the premaxilla.

**Intraoral Elastic Traction** (Georgiade, 1970, 1971). Under local anesthesia with the mouth open, a Kirschner wire (0.054 inch) is inserted with a hand drill through one cheek at the junction of the maxilla and the pterygoid plate. Under direct vision through the open mouth, the wire is drilled across to the opposite pterygoid area until it is palpable in the cheek. The end is cut off so that both ends will be covered by the cheeks. The wire is easily removed at a later date by grasping it with a heavy needle holder intraorally and forcing the wire out through the opposite cheek.

Georgiade has employed two methods of applying force to the premaxilla. The first (Georgiade, 1970) is by insertion of a pin in the premaxilla behind the dentition with a hook bent on each end. In the other (Georgiade, 1971), a 1.25 cm strip of Dacron approximately 7.5 cm in length, cut from arterial implant material, is slit down the middle for half its length to create a Y-shaped sling. After its margin is trimmed to facilitate its smooth passage through the soft tissue, one limb of the Y is threaded across the anterosuperior surface of the premaxilla subcutaneously, under the prolabium as close to the bone as possible, and superior to the point of the most forward position of the segment. The second limb of the Dacron mesh Y is placed over the lower anterior (labial mucosal) aspect of the premaxilla, and the two previously separated ends are sutured together with 4-0 white nylon. This results in a continuous single Dacron band 2.5 cm long and 1.25 cm wide on either side of the premaxilla to pull on a double sling over the bony segment. Rubber bands are attached and adjusted to the desired tension.

Georgiade expects to accomplish premaxillary retraction within four or five days, at which time both sides of the lip are repaired, while the traction is maintained for two more weeks. He points out that with the wire through the premaxilla, retropositioning requires a week or ten days.

In general, the author would be inclined to use less tension over a longer period of time to minimize any chance of buckling the septum or the danger of the premaxillary wire cutting through the tissues.

Acrylic plates, simple or screw type, may be used for control or expansion of the maxillary segments. Georgiade uses a spring plate fixed to the palate by means of a staple inserted into each lateral maxillary segment.

**Lip Adhesion.** A repaired lip is a very efficient means of controlling a protruding premaxilla. An attempt at definitive repair over an excessively protruding premaxilla, however, can result in a spreading hypertrophic scar or actual dehiscence of the repair. A lip adhesion may be indicated when external elastic traction has failed or may be of value as a primary procedure, especially if the external elastic traction cannot be properly supervised. In these circumstances, lip adhesions avoid the possibility of a poor definitive repair because of excessive tension.

Hamilton, Graham, and Randall (1971) recommended the use of two equal rectangular flaps from the cleft margins, the medial one being based anteriorly and the lateral one
posteriorly, using only tissue that would be discarded in the definitive repair. Closure is accomplished in three layers: skin, subcutaneous tissue, and mucosa. They advised freeing up the lateral segment as needed to avoid undue tension, and they also recommend use of a heavy (3-0 silk or nylon) retention suture if there is much tension. This suture is inserted from the mucosal surface on one side, coming out on the skin surface. The needle is then reinserted through the same hole in the skin and is directed subcutaneously across the repair and out through the skin about 1 cm lateral to the cleft. It is again reinserted through the same hole in the skin, coming out on the mucosal surface before being tied. Spina (1966) performs a fairly elaborate preliminary adhesion while delaying definitive repair for about five years.

**Surgical Setback of the Premaxilla.** This procedure is indicated only for premaxillary protrusion that seriously compromises repair of the lip. It is particularly recommended in the child undergoing lip repair after the age of 6 to 9 months, when the vomer is less responsive to pressure. Surgical setback is of value when the infant cannot be under frequent observation, but lip adhesion might also be considered in this situation. It also may be indicated when all previous methods, including closure of one side of the lip at a time have failed to correct a severe protrusion.

Setback of the premaxilla (Cronin, 1957) may be done in the young infant under either local anesthesia or general anesthesia (preferably endotracheal or otherwise by either hook). This technique does not appear to interfere with growth centers in the area that can cause underdevelopment of the septum and a "hidden" columella in adulthood. Strips of cotton sparingly moistened with equal parts of 10 per cent cocaine and 1:1000 epinephrine are packed into the nose and laid over the inferior border of the vomer. This method gives adequate local anesthesia but is also advisable with general anesthesia because of its hemostatic effect. The instruments required for a surgical setback of the premaxilla are shown.

The surgeon sits at the head of the table with the infant's neck hyperextended and a Lane side mouth gag in place. The suture line of the vomer-prevomerine bone is identified by the bulge or enlargement at this point. The resection of bone should be made from the vomer posterior to the suture line. An incision is made through the mucosa over this area and extended anteriorly over the prevomerine bone.

The thin mucosa is elevated from each side of the septum with great care to avoid tearing. The amount of protrusion is measured, and 4 to 5 mm less than this amount of vomer is removed as a rectangle. A sharp osteotome or a thin, fine-toothed saw is used to make the anterior cut first; if the posterior cut is made first, the other osteotomy is difficult to accomplish, since the vomer is loose. A right-angled knife is used to make a horizontal cut through the septal cartilage from the area of resection toward the tip of the nose. This makes it possible to slide the premaxilla posteriorly without any tilting.

Instead of incising the septal cartilage horizontally, an alternative method (Burston and Kernahan, 1961) is to free the cartilage from the groove in the bone with a septal elevator and then slide the premaxilla backward. This method may possibly be less likely to case any disturbance in the growth of the septal cartilage.
Sectioning through the vomer is preferred because one has a "handle" with which to control the premaxilla. Sectioning through the prevomerine bone deprives one of this handle and makes control and fixation of the premaxilla difficult.

The prolabium is lifted with a hook, and a Kirschner wire (0.035 inch) is drilled through the premaxilla and vomer until the point comes out on the cut surface. The drill and excess wire are removed, the two fragments of the vomer are carefully aligned, and the Kirschner wire is driven into the posterior portion with a mallet. When driven in this way, the wire is tighter than if drilled in and will hold the premaxilla firmly in position. The wire should be placed close to the inferior border of the vomer because the thickness of the bone is greatest there. The resected piece of vomer is then cut into small chips and packed around the junction to promote bony union. The mucosa is sutured with 6-0 silk. Packing is used to prevent erosion of the suture line by the tongue. The protruding end of the Kirschner wire is removed close to the skin surface so that it will lie buried. The packing and sutures are removed after five to seven days.

Kahn and Winsten (1960) have suggested the use of an additional diverging pin, either into the vomer or into the lateral palate. Wilde (1960) has suggested the use of two pins crossed through the premaxilla and additionally into the lateral palate on each side. Although the crossed pins would hold the premaxilla solidly, there is the possibility of distraction of the cut ends of the vomer, unless the wires are inserted with great care. The preferable method, therefore, is to have at least one wire inserted longitudinally, as described above.

About six to eight weeks later, the Kirschner wire is removed and the lip is repaired over the premaxilla, which is now solid. Usually, after a few days' pressure from the repaired lip, the premaxilla rests either close to or against the maxilla.

Closure of the Clefts, One Side at a Time. Setback of the premaxilla can be achieved by the pressure of the repaired lip without preliminary orthopedics or surgery. When this method of combating the protruding premaxilla is used, the second side usually must be closed under extreme tension, with consequent danger of breakdown of the wound or spreading of the scar. Unless the points for incision of the second side are lightly marked with India ink at the time of the first repair, accurate marking may be difficult owing to distortion of the prolabium by the first operation.

Pinned Coaxial Screw Appliance. Georgiade and Latham (1975) have developed a device to retract the protruding premaxilla and expand the maxillary segments simultaneously. It is coaxial in that there are two screws, one within the other. One screw positions the premaxilla 1 mm posteriorly with one complete revolution of the screw, while the other screw will expand the arch 1 mm. The arms of the device are embedded in acrylic plates, which in turn are fixed to the palatal shelves with staples. The yoke for premaxillary adjustment straddles the bone immediately behind the premaxilla and is fixed with a pin through the bone. Georgiade states that the premaxillary adjustment is accomplished in about ten days, after which time the lip can be repaired. The chief objection at this time is the tendency of the pin to cut through the bone.
Techniques of Lip Repair

Method 1: Straight Line Closure (Veau III Operation)

Several techniques of lip repair are available. The simplest is essentially a straight line closure, and it produces a most satisfactory result. There is some resulting contracture of the scars. However, as they are symmetrical, the contracture is usually not noticeable and merely accentuates the Cupid’s bow. Instruments used for the lip repair are shown.

Berkeley (1961) has called attention to the importance of not placing point a’ too high, as this results in an unduly short columella. He prefers to lift the dome of the ala with a hook to accentuate the presence of the medial crus and then to place point a’ well below the tip of the medial crus. Although Berkeley feels that this placement of point a’ will result in a columella of normal length, many surgeons believe that in most complete clefts some lengthening will subsequently be necessary.

Point b’ is placed as far down and laterally as possible. The short-angled part of the line a’c’b’ results in a greater length of vermilion border. The distance between the two c’s is less than that between the two b’s, which makes the lip a little tighter just above the vermilion border and tends to make the vermilion border protrude in a more normal manner. In some instances, the prolabium may be so small that the line a’b’ must be straight. If line a’b’ is slightly shorter than ab, the prolabium should be stretched with a skin hook during the suturing. Greater differences in length can be corrected by excision of a small wedge from the full thickness of the lip just below each ala. If the prolabium is extremely small, Method 4A or 7 should be used. When incorporated into the lip, the prolabium will enlarge rapidly (see Method 4B).

Point a is just medial to the tip of the base of the ala, and point b is at the peak of the Cupid’s bow. It should be placed where there is still vermilion ridge and normal thickness of the lip. Point c is placed on the line ab rather than medial to it, thus accentuating the tightness at this level, which in turn results in protrusion of the vermilion border. The points are usually marked with the sharpened end of a wooden applicator stick. When it is certain that the points are in correct position, a 25-gauge hypodermic needle is dipped in methylene blue ink and the point of the needle inserted through the skin. If only one side is to be repaired, the marks abc and a’c’b’ on the other side are lightly marked by dipping the needle in India ink, thus avoiding later confusion in locating these marks because of distortion of the prolabium resulting from the first repair. The India ink marks should be 0.5 mm out of place so that they can be trimmed away at the next operation.

After marking is completed, 1 per cent Xylocaine with epinephrine 1:100,000 is injected very sparingly into the buccal sulcus, the base of the ala and columella, the prolabium, and the lip. A 25- to 27-gauge needle is used, and the total solution injected should not exceed 1 to 1.5 mL in order not to distort the lip tissues. Ten minutes should elapse for maximal epinephrine effect.

Anterior Palate Repair. Prior to making the lip incisions, the experienced surgeon may choose to repair the anterior palate, particularly if the premaxilla and maxilla are in a
fairly acceptable relationship and the clefts are not too wide to prevent suturing the vomer flaps to the edge of the cleft. One or both sides may be repaired. The less experienced surgeon should devote all of his attention to achieving an excellent lip repair. However, he should schedule the anterior palate repair before the premaxilla and maxillary segments are jammed together by the action of the repaired lip. If the latter occurs, complete repair of the anterior palate is quite difficult due to the limited access to the area.

If the cleft is complete, it is usually necessary to free up the base of the ala and the cheek from the maxilla. This is done through an incision in the labiobuccal sulcus, the tissues being freed with scissors superficial to the periosteum just enough so that the lip can be closed without tension. At this time the attachment of the alar cartilages to the margin of the pyriform aperture may be severed, including, if necessary, incision of the nasal mucosa. This facilitates a freer rotation of the alar base.

To control bleeding, the lip is fixed firmly against a wooden tongue depressor as the line $acb$ is incised completely through the lip using a #15 knife blade. This cut is made vertical to the skin surface, care being taken to retain sufficient bulk in flap X to build up the prolabial vermilion with a tubercle in the center. The skin between $acb$ and the vermilion border is excised, leaving a flap consisting of muscle, vermilion, and mucosa for use in building up the deficient prolabial vermilion.

With finger pressure used again for fixation and hemostasis, line $a'c'b'$ is incised; the skin is trimmed away; and the remaining vermilion border and mucosal flaps are turned back to be sutured to the mucosa of the respective lateral lip segment as needed.

The vermilion border is incised from $b'$ one side to $b'$ on the other side. This incision should be about 1 to 1.5 mm below the vermilion ridge. Flap Z is thus formed and is turned down, opening a space into which the X flaps are fitted. Lateral vermilion flaps are preferred, as a uniform color results. The prolabial vermilion border is turned down where it will not show, because it is often not of the same color as the lateral lip vermilion; moreover, there is a tendency for the epithelium to desquamate.

The floor of the nose is formed by continuing $a'c'b'$ inside the nose, and, if the anterior palate is to be repaired, it continues around on the back side of the premaxilla and along the midline of the vomer. Likewise, the incision $acb$ would become continuous with the incision along the edge of the cleft of the anterior palate.

In making these extensions, as much of the skin on each side of the cleft in the region of the nasal floor is preserved as possible for subsequent use in lengthening the columella.

A double 4-0 plain catgut or a single 4-0 armed Dexon suture is inserted into the muscle at the base of the right ala. The needle is passed subcutaneously through the base of the columella and out into the cleft on the left, then across the cleft, taking a good solid bite in the muscle at the base of the ala, then back through the columella into the cleft on the right. If only one side is being repaired, it may be necessary to pass the suture entirely through the columella and then back over a small bolster, since the subcutaneous tissues are scanty. The ends of the suture are tightened to determine if the alae and columella
approximate as desired. If they do not, the suture is removed and reinserted. Before the muscle suture is tied, the skin flaps forming the floor of the nose are sutured with 5-0 plain catgut. Rather than trim the excess skin in the floor, it is "banked" by approximating the raw undersurface together, thus forming an elevated ridge in the floor of the nose. Subsequently, this skin will be advanced to lengthen the columella.

The first 6-0 silk suture is placed at the base of the ala and columella.

The vermilion ridge is approximated by placing a 6-0 suture about 1 mm from the vermilion ridge; if placed directly upon the ridge or border, the suture may cause just enough scar to make the vermilion border appear irregular. If the prolabium is short, it is stretched with a skin hook, or if the lateral lip is excessively long, a full thickness wedge of the lip is removed from below the ala, so that the vermilion border of the lateral lip and the prolabial portions can be accurately aligned. Two or three 4-0 plain catgut or 5-0 Dexon sutures may be used in the muscle on the lateral side and in whatever tissue is available on the prolabial side. The skin is then approximated with 6-0 sutures.

The thin prolabial vermilion border is built up with the vermilion-muscle X flaps. This maneuver increases the vertical length of the deficient mucosal surface of the prolabium, in effect deepening the labial sulcus. If the lateral vermilion-muscle flaps have been cut to an adequate thickness, a normal appearing tubercle will result. In any event, the prolabium should be built up enough to avoid a whistle deformity.

**Postoperative Care.** When the operation is finished, the suture lines are covered lightly with an antibiotic ointment, and a small gauze dressing is taped in place for 24 hours. The author has not used a Logan bow for many years. It is certainly not needed when the protruding premaxilla has been repositioned. The next day, exudation from the suture line usually having ceased, the dressing is no longer needed and should be removed, especially since it may become soiled when the infant is fed.

For 10 to 14 days postoperatively the infant is fed through a bulb syringe with a short piece of rubber tubing on the tip. Some skin sutures may be removed on the third postoperative day. Usually all of the skin sutures are removed by the fourth day. If there is concern about tension on the lip, the sutures in the floor of the nose and on the vermilion may be left in place a few days longer. After removal of the skin sutures, a strip of wide mesh gauze is applied to one side of the lip with collodion USP (not the flexible type). When dry, the gauze is pulled across the lip snugly and held until the collodion has dried on this side also. In addition to relieving tension on the suture line, the stiff collodion gauze acts as a splint, keeping the lip at rest. Alternatively, the scar may be supported by painting the skin with compound tincture of benzoin and applying 35-mm Steri-Strips for about ten days. Bottle and nipple feeding is resumed after seven to ten days.

**Lengthening the Columella.** The shortened columella, practically always associated with complete bilateral clefts, may be lengthened at any time after the lip is healed and the scars have softened, preferably during the first year before the child is able to get about and possibly fall on his freshly operated nose. The author has described a method of advancing skin from the floor of the nose and base of the ala into the columella (Cronin, 1958). Converse (1957) (see Chapter 47) used skin from the floor of the nose. Millard (1958, 1971a),
Marcks, Trevaskis, and Payne (1975b), and Peskova and Fára (1960) advocated methods which used a forked flap from the prolabium. Brauer and Foerster (1966) employed the V-Y principle in the region of the wide tip.

As described by the author, bipedicle flaps are formed, based medially on the columella and laterally on the alae. Where the flaps diverge, a small triangle of skin is left attached to the lip. The flaps contain sufficient bulk to form the columella and are somewhat thicker laterally, so that the base of the lengthened columella will be pyramidal and therefore more normal in appearance. The medial incision which separates the columella from the septum is continued laterally and posteriorly across the floor of the nose in order to make the flaps progressively wider laterally. As the flaps are advanced into the columella, the increased width aids in pushing the base of the columella downward. In this way, a retracted appearance, such as might result with narrow flaps, can be avoided. If the alae are of excessive length, the amount of excess is determined, and a wedge is outlined at the base of the ala. The wedge will involve only one-half of the thickness of the ala. The remaining or inner half is advanced medially to make more skin available to the columella. The incision at the base of the ala is made in the same plane as the surface of the skin of the cheek, so that, after removal of the half thickness wedge, the upper cut surface will fit down against the lower cut surface.

When the flaps have been freely mobilized, the tip of the nose is lifted forward by a hook. If any tightness remains, the flaps are further undermined laterally. The flaps are then sutured together in the midline for a distance sufficient to give the desired increase in length. The adjacent tissues of the cheek are freed from the maxilla, and a buried, nonabsorbable suture is inserted from side to side in order to draw the tissues medially to conform to the narrowed base of the nose. The columellar-septal incision is sutured with the columella in a more forward position. As the lateral portions of the incisions are closed, the cut edge of skin on the lip side will be visibly in excess because of the medial displacement of the alae. This excess makes possible the revision of old scars of the original cleft lip repair, since a wedge of the desired size can be removed on one side or on both. In this way, there is no additional scarring of the lip. If the scars require no revision, the excess length can be used in the closure. The operation can be repeated if necessary.

Variations in the technique may be practicable. In some instances, the medial incision to detach the columella from the septum may not be required. In others, if the alae are of normal length and if adequate tissue is available from the floor of the nose, the half thickness wedge resection of the alar base may be eliminated.

To avoid subsequent settling of the lengthened columella, it is sometimes advisable to extend the length of the medial crura of the alar cartilages if they are poorly developed. Ear cartilage is ideal for this purpose. An elliptical piece of cartilage is taken from the posterior surface of the concha of the ear. This is cut into two pieces, which are sutured together with white silk or twisted nylon thread, convex surface to convex surface, but the ends are left in a spreading position posteriorly astride the spinous process. The anterior ends are sutured to the medial crura. Rarely, the alar cartilages will be so thin that the tip of the nose is almost devoid of support. In such cases, a longer piece of conchal cartilage is taken, which will reach from the tip of the nose to the maxilla.
In some patients, the lip scars from the original repair may be so inconspicuous that it is undesirable to remove wedges from the lip. Often it is possible to use up the excess length on the lip side of the incision. A variation is possible by the use of a Z-plasty, with the ala as one arm and a flap from the floor of the nose as the other. The ala is shifted medially; the base of the nose is narrowed, and flaring is corrected. The transposed flap from the nasal floor covers the defect that is left laterally and relieves any tendency for lateral spread of the alae. These small triangular flaps have to be sutured in place with great accuracy to avoid conspicuous scars.

**Bone Grafting.** In complete bilateral clefts, the premaxilla is usually unstable. It may be stabilized quite successfully with bone grafts after adequate alignment of the arch by maxillary orthopedics or orthodontia (see Chapter 48). Thus, the earliest that bone grafting might be performed would be at 4 to 5 years of age.

**Method 2: Adaptation of the Tennison Unilateral Cleft Lip Incision to Bilateral Cleft Lip Repair**

This repair results in zigzag scars; however, they are usually not as inconspicuous as in unilateral clefts, especially if the flaps are large. The central part of the vermilion margin protrudes in a more normal manner than is ordinarily achieved with the straight line closure, because of the increased horizontal length of vermilion tissue obtained from the prolabium and the relative tightness of the lip a few millimeters above the vermilion border. Usually a two-stage procedure is necessary because of the horizontal cuts in the prolabium. Revision, if necessary, may be more difficult because of the zigzag design of the incisions and resulting scars. Variations of this type of incision have been described by Brauer (1957), Marcks, Trevaskis, and Payne (1957a), Bauer, Trusler, and Tondra (1959), and Berkeley (1961).

The incisions are marked as illustrated. At one side of the base of the columella, a’ is placed care being taken not to locate it too high (see remarks regarding Berkeley), and b’ is placed at the end of the vermilion ridge, some 4 to 6 mm from a’. The point c’ is placed about 3 mm from b’, so that b’c’ forms a slightly acute angle with the lower vermilion border. It is preferable to make b’c’ short, since it makes flap a’b’c’ less conspicuous in the repaired lip and also makes the horizontal length of the lip greater, as points c’ are thus farther apart. Just inside the tip of the base of the ala, point a is placed with point d as high on the lip as the normal thickness extends and where there is still a vermilion ridge. Further up on the vermilion border, point c is placed at a distance equal to b’c’. Point b is located so that lines a’b’ = ab, b’c’ = bc, and c’d’ = cd. Both sides of the lip are marked at this time. Points on the side to be repaired at a later date are marked with India ink, 0.5 mm out of place, so that they can be excised at the time of repair. This practice simplifies the second stage, since lines of incision can be drawn between the existing marks. Distortion of the prolabium by the first repair makes accurate marking most difficult if it has not been previously done.

Only one side of the lip is repaired at a time, because the c’d’ incisions might dangerously impair the circulation to the lower part of the prolabium. The lateral vermilion muscle flap is turned down as flap X, being hinged at d, and any skin is trimmed away. The incision a’b’ is made through the prolabial skin and subcutaneous tissue, with the vermilion flap turned laterally to be used as needed to suture to the mucosa of the lateral lip segment.
The incision \( b'c' \) is extended to the underlying premaxilla, across the vermilion border. The vermilion muscle flaps \( X \) may be used. The floor of the nose is repaired as described in the first method. The figure illustrates the application of this method to an incomplete cleft lip. The columella can be lengthened, if necessary, after a few months or years.

**Method 3**

Bauer, Trusler, and Tondra (1959, 1971) strongly opposed any surgery on the protruding premaxilla and preferred to control the protrusion by repairing one side at a time. Skin incisions similar to those of Method 2 are used, with partial freeing up of the prolabium and lining of the latter with lateral mucosal flaps. The technique is illustrated in the figures.

**Technique of the First Stage of the Lip Repair.** The diagram in the figure shows the location of the lines of incision. Two points are marked in the floor of the nose on either side of the cleft. Point \( a' \) is located on the vermilion border of the prolabium at the level of the base of the columella. Point \( a \) is located inside the vermilion border and slightly above the alar level. Point \( b \) is chosen on the lateral side where the vermilion border makes a definite change from a horizontal to a more vertical direction as it passes toward the nose. It is also at this point that the diameter of the vermilion portion of the lip begins to decrease in thickness.

Point \( c \) is located inside the vermilion line at the junction of the lower third and the upper two-thirds of the lip. A line is drawn at right angles to line \( bc \). Along this line point \( d \) is located, so that \( cd \) is slightly less than \( bc \). The length of \( cd \) is a negotiable distance and can be adjusted for smooth closure when required. The distance \( ad \) is then transposed to the prolabium for location of point \( d' \). This is placed just inside the vermilion border. The distance \( c'd' \), which is equal to \( cd \), is then drawn at a right angle to the line \( a'd' \). The point \( b' \) is located on the vermilion border adjacent to \( d' \).

The diagram shows the development of flap \( A \) after incisions have been made. Flap \( A \) is a mucous membrane flap containing some of the muscle fibers from the lip. The figure shows partial release of the prolabium from the premaxilla. The next figure shows the completed first-stage repair. The lateral crus of the alar cartilage is rotated medially toward the tip by a series of carefully placed through-and-through mattress sutures tied over a bolster. This increases the length of the columella slightly and rounds out the nostril into a more normal contour.

**Technique of the Second Stage of the Lip Repair.** The incisions are designed in the same fashion. The mucous membrane incision is extended around the prolabium and into the superior buccal sulcus on the opposite side. The prolabium is thus completely released from the premaxilla. In designing the skin incision, care should be taken that lines \( c'd' \) do not meet. If this happens, a continuous scar will be established that will exert a purse string effect on the tissues of the upper portion of the prolabium, producing an unsightly bulge. The mucous membrane flap \( A' \) is brought beneath and behind the lower part of the prolabium and sutured into place. It is attached to the prolabium at a slightly higher level in order to form a sulcus. The vermilion incisions are closed.
Method 4A: Millard Method of Repair of Incomplete Bilateral Clefts

Millard (1960) has adapted his rotation-advancement method of unilateral cleft lip repair for use with bilateral cleft lips. In patients with symmetrical, incomplete clefts, the columella is usually of adequate length, although the prolabium is characteristically very small.

This is the method of choice in this situation because it moves the short prolabium down from the normal nose component into the natural philtrum position of the lip better than any other method. One side of the prolabium is freed from the columella by a rotation incision extending almost halfway across the base of the columella. The gap thus produced is filled by the advancement of a large, triangular flap from the lateral lip segment. A wedge of skin is removed from the nasal floor as needed. A Cupid's bow is formed, and the deficient prolabium is built up by advancing a flap from the lateral portion of the lip (containing the vermillion ridge and muscle) to overlap the prolabial vermillion border, which has been reflected inferiorly from the adjacent half of the prolabium.

Two months later, or when all induration has subsided, the other side is repaired in the same manner. The upper end of the rotation incision should be ended 2 to 3 mm short of the scar on the first side to try to avoid excessive lengthening of the lip in a vertical direction.

When there is a complete cleft on one side and an incomplete one on the other, the same technique is employed. The complete side is repaired first, since the union on the incomplete side will maintain the blood supply of the prolabium. The c flap described in the Millard (1960) unilateral lip repair can be used to lengthen the columella on the complete side.

Method 4B: Millard Two-Stage Repair of Complete Bilateral Cleft Lips

Observing that the best scars are obtained with a primary repair in infancy and that entering the lip later to raise forked flaps, as was his previous custom, produced objectionable scarring, Millard (1971a, b) developed a two-stage method in which the forked flaps are raised initially and stored for future use. A prime requisite of this technique is a fairly large prolabium. If the prolabium is very small, the Veau III or rotation-advancement method should be used, with a resulting enlargement of the prolabium. Millard also advocated mucosa-muscle-to-mucosa-muscle suture behind a philtral strip of prolabium, but the prolabium does not enlarge under these circumstances. Consequently, as a second stage, a V-Y advancement of the banked flaps in the floor of the nose is employed to lengthen the columella (Cronin, 1958).

Although muscle-to-muscle suture may possibly give improved lip function, the author (Cronin) is not at all convinced that the tightness thus produced may not cause retrusion of the face. Duffy (1971) has also advocated muscle-to-muscle suture. Past experience, such as that of Adams and Adams (1953), demonstrated the constrictive effect of suturing the lateral lip segments together after advancement of the prolabium to lengthen the columella. Long-term observations will determine whether the present-day muscle suture will be any less harmful than in the past.
Although Millard (1971a, b) in his original communication proposed that the second stage be done one to three months later, he subsequently (1973) advised that in complete clefts the second stage of the columella lengthening be delayed until the preschool period. However, he would be willing to proceed within a year for incomplete clefts if lengthening of the columella were necessary. He found that doing the second stage immediately tended to result in a long vertical dimension of the lip. The second stage consists of lengthening the columella. Repair by this method is illustrated.

**Method 5: Manchester Method**


**Method 6: Skoog Method**

Skoog (1965) stages the bilateral repairs, the first operation being performed at 3 months of age. He uses about one third of the prolabium for columellar construction. As shown, a triangular flap based superiorly at the side of the columella is raised and rotated 90 degrees into a cut across the base of the columella, thereby lengthening the columella by the width of the flap. This flap is similar to one side of the so-called forked flap of Millard, but it is used in the same manner as Marcks, Trevaskis and Payne (1957b) method for secondary elongation of the columella. Two triangular flaps from the lateral lip element are used to elongate the prolabium, to break up a straight scar, and to give some degree of protrusion of the lip.

**Method 7: Wynn Method (1960)**

In the Wynn procedure, a long, narrow, triangular flap, based superiorly on the lateral lip segment, is inserted into an incision between the columella and the prolabium. The columella is lengthened at the same time that the vertical dimension of the prolabium is increased. This method may have particular merit when the prolabium is unusually small; on the other hand, it might tend to make the lip too long in the presence of a large prolabium. The lateral flap sacrifices a minimum of horizontal length in the lower part of the lip where it is needed, unlike many of the older operations (exemplified by Method 5), which sacrifice horizontal length in the lower part of the lip to gain vertical length. This operation has the disadvantage of not providing for a buildup of the thin prolabial vermilion, but the modification of Cronin corrects this deficiency.

The markings in the figure corresponds to the markings placed on the lip. Wynn states:

Measurement A is made by the compass caliper between point 1, which is made just inside the vermilion mucous membrane at a level with the base of the nasal ala, and point 2, which is placed in the vermilion border where the lip tissue changes to a more horizontal direction with adequate musculature. Measurement B is made by the compass caliper between point 3, which is marked at the upper end of the prolabium just inside the mucocutaneous junction at the level of the base of the columella, and point 4, which is marked at the mucocutaneous junction at the lower end of the prolabium lateral to the midline at about where the Cupid's crest should be. The line from 3 to 4 hugs the vermilion to make a convex
curve. The actual length of the line 3 to 4, because of the convexity, will be longer than the straight line measurement taken. This will allow additional lateral flap base usage for lengthening at the columella base. Subtracting the measurement B from A will give the figure that indicates the shortness or deficiency of the central lip tissue. This is called figure C. For example, if A is equivalent to 8 mm and B is equivalent to 5 mm, this would indicate that there is a 3 mm deficiency in medial or prolabial tissue. In other words, the lateral flap base width will make up the shortness of the medial segment of the lip, as compared to the lateral segment. Then the compass caliper is taken and measured laterally from point 1 to establish point 5, which should be the width of the base of the flap. A line is then drawn from point 5 down to point 2. This gives line D which completes the lateral flap X outline. Point 6 is made at the junction of the columella with the prolabium just lateral to the midline opposite to the side being operated on. The point 2' and point 4' are merely extensions diagonally downward to the mucous membrane.

Subsequently, lengthening of the columella, if necessary, would have to be done according to the technique of Cronin or Converse, since the transverse incision across the base of the prolabium would preclude use of the forked flap.

**Method 8: Spina's Method**

Spina (1963, 1966) has described what he calls a two-stage repair. His objective is to do a simple preliminary repair, one side at a time, thereby avoiding excessive pressure on the premaxilla which might cause retrusion. Then at age 5 to 6 years when the maxilla is well developed, he performs the second stage, a definitive revision of the lip, which is actually the third operation. When the maxillary arch is intact or the prolabium is large, he may do a primary definitive repair. In essence, he initially performs a complete lip adhesion as the first stage and a straight line revision later. The chief objection is the prolonged (5 to 6 years) period during which the child appears with an incompletely repaired lip.

**Method 9: Barsky Technique (1950) (Veau II Operation, 1931)**

This method of repair is typical of the majority of the older procedures and is included mainly for complete coverage. It should rarely be used, as all too often it results in an unnatural-appearing lip: too long vertically, tight from side to side, and frequently presenting a bulging, unsightly island of prolabial skin in the middle of the lip. Usually, there is no Cupid's bow effect.

Simon (1970), stated that he is no longer using this operation and has to revise many patients so treated by removal of full-thickness transverse wedges in an attempt to shorten the lip vertically. Often a modified Abbé procedure, as described by Peterson (1966), is also employed to lengthen the vermilion transversely.

Kahn and Winsten (1960) thus described the technique:

Light tension is made upon the prolabium, holding it down to see how long it will be when sutured to the lateral tissue under slight tension. A measurement is taken from the base of the columella to the border of the vermilion and an amount (known as cd) is added to make the lip the desired length. (We agree with LeMesurier (1955) that the normal lip at the
age of 3 months, or when the child is 10 to 12 pounds, is 3/8" to 1/2".) Take points $a$ on the lateral side of the cleft close to the point of the ala, that is, the point where the ala joins the lip. Locate point $a$ low enough so the ala will rotate up well; if it is not low enough, the nostril will not be sufficiently circular; it cannot be made lower later in the operation, for this would encroach on length $ab$. Proper rotation of the ala may result in kinking or buckling of the nostril rim. The buckling rounds itself out within a few months after operation. Points $a'$ are located at the base of the columella at the mucocutaneous junction. Points $b'$ are located equidistant from the midline at the mucocutaneous junction at the points where it curves and changes its vertical direction to a horizontal one. The point $c'$ is on the midline at the intersection of the midline with the line $b'b'$ or slightly below it at the vermilion border. The point $b$ is located on the lateral side of the cleft so that the distance $ab$ equals distance $a'b'$. The direction of $ab$ depends upon the length of lip desired; its distance from the mucocutaneous junction should be such that $cb$ is greater than $cd$, since the flap of lateral tissue ($bdc$) which will be rotated inferior to the prolabium is to be rectangular, rather than square; this is explained below. Point $c$ is taken along $ab$ so that $bc$ equals $b'c'$. The distance $cd$ equals the distance from $c$ to the future vermilion border of the philtrum. This length was determined as the first planning step above, and it is achieved by inclining line $ab$ so that $c$ is as far from the vermilion as required to make $cd$ the planned length.

**Method 10: Primary Abbé Flap**

The Abbé flap has long been recognized as a secondary treatment for the tight bilateral cleft lip but is not ordinarily considered as a primary procedure. Clarkson (1954) advocated the use of a primary Abbé flap in wide bilateral clefts at 1 month of age, in order to prevent future deformities associated with customary repairs. He initially sutured only one side to avoid respiratory obstruction and sutured the other side seven to ten days later; the pedicle was divided at three weeks. Hönig (1964) also recommended the Abbé flap in a young infant. Antia (1973) reported its use in ten patients, most of whom were a year or older. He advanced the prolabium to elongate the columella and designed an Abbé flap a little over half the width of the defect of the upper lip, being careful not to make the flap too long vertically. He reported no difficulties with feeding or respiration, the procedure being done in two stages in the usual manner.

**Complications**

**Wound Infection.** It is mandatory that the infant be healthy and well-nourished prior to surgery. A dressing with an antibiotic ointment applied for only the first 24 hours absorbs serosanguineous drainage. Keeping it on longer results in soiling from feedings. Any contamination of the suture line should be cleaned immediately with cotton applicators and hydrogen peroxide. Repeated, meddlesome cleansing of a clean lip should be avoided. A pustule along the suture line usually indicates an infected, buried suture. The latter should be lifted out as soon as possible with needle-pointed tweezers. While application of a small dressing with an antibiotic ointment for a day or two is useful, systemic antibiotics are not routinely used.

**Wound Disruption or Spreading of the Scar.** This is almost always due to excessive tension, but infection could initiate or complicate the matter. Again prevention is best - reduce
the marked disparity between the premaxilla and the maxillary segments before repairing the
lip. If the wound does break down, efforts to support it with Steri-Strips are in order, but no
definitive repair should be attempted until all induration has subsided.

**Infection at the Site of the Premaxillary Setback.** This can be very serious, as it
may result in failure of bony union, or even in sequestration of a piece of the vomer. There
can be retraction of the midface subsequently.

Surgical setback should be performed only for rare definite indications, as mentioned
previously. Care should be taken to avoid bruising the delicate mucosal flaps. When the
Kirschner wire is driven in, care should be taken to fit the bones together accurately to avoid
protruding edges. The mucosa should be closed with 6-0 silk or nylon. The thin mucosal flaps
cannot absorb catgut sutures. Finally, a pack should be used over the suture line to protect
it from the action of the tongue, which is prone to open the wound. Infection should be
treated with appropriate antibiotics. If bony nonunion occurs, it may be advisable to leave the
Kirschner wire in place indefinitely (in the absence of infection) for stability. A bone graft
of the vomer might be of value.

**Tilting or Retrusion of the Premaxilla.** Tilting or retraction can be avoided by
preventing excessive traction by whatever means. The vomer should not be resected in the
region of the prevomerine-vomeral suture.

**Whistle Deformity.** Whistle deformity can be prevented by using lateral muscle
vermilion flaps to augment the thickness of the prolabium.

**Lip Too Long Vertically.** If lateral skin-muscle flaps are not used to increase the
length of lip, the resulting lip will have the proper vertical dimension.

**Collapse of the Maxillary Segments Behind the Premaxilla.** Collapsed maxillary
segments can be prevented or expanded with an acrylic screw or spring plates.

Ten different techniques have been evaluated. Method 1 (Veau III) is probably the
simplest and most commonly used. It affords uniformly good results, except in instances of
an extremely small prolabium. For the latter, method 4A (Millard) would be preferable. The
complete description of this method should be read, as many points applicable to the other
methods are mentioned only here. These are the two methods most frequently used by the
author.

The zigzag method (method 2), which must be done in two stages, elongates and
breaks up the vertical suture line and also uses a maximum amount of prolabium vermilion
horizontally. This technique produces protrusion of the lower margin of the lip, which, in
method 1, is often somewhat flat. The zigzag scar would obviate the use of a forked flap for
columella lengthening.

In Method 3, Brauer, Trusler, and Tondra reject surgical setback of the protruding
premaxilla and depend on closure of one side of the lip at a time to control protrusion. Their
incisions are similar to those of method 2, but they free up the prolabium and line it with
lateral lip mucosa, at the same time building up the prolabial vermilion with a lateral
vermilion-muscle flap. Subsequently, they usually lengthen the columella using the Cronin method.

Method 4A, the two-stage rotation-advancement of Millard, is the treatment of choice for the incomplete cleft lip with a very small prolabium. Method 4B is preferred for complete clefts with a fairly large prolabium; Millard stores the forked flaps in the nostril floor. At preschool age, he advances the flaps to lengthen the columella; thus the lip is not violated again. He also advocates muscle-to-muscle suture, but the author is not convinced that this may not have a retrusive effect on maxillary growth.

In method 5 Manchester advocates a one-stage repair of the lip and anterior palate at 5 months after maxillary orthopedics to control the premaxilla and maxillary segments. He uses lateral mucosal flaps to line the prolabial sulcus but feels that muscle-to-muscle suture would produce a lip that is too tight. He emphasizes construction of a tubercle but makes no special provision for lengthening of the columella.

Method 6 (Skoog) requires two stages. Length is added to the columella on one side at a time when a flap from one side of the prolabium, rotated through 90 degrees and inserted horizontally at the base of the columella. The suture line is interrupted with two small, triangular flaps from the lateral lip, but there is no buildup of the prolabial vermilion, which may require subsequent augmentation with mucosal flaps.

Method 7 (Wynn's method with Cronin's modification) should be of value when the prolabium is small. If columellar lengthening were required. Cronin's method would be necessary because of the transverse scar across the upper part of the lip, which would preclude the use of a forked flap.

Method 8 (Spina) reflects the feeling that definitive closure of the lip would exert excessive force on the maxillary structures. A large lip adhesion is performed on one side at a time, to be followed by definitive revision of the lip four to five years later. This regime, of course, leaves the child with an unsightly lip for several years, and later scars are usually not as satisfactory as those incurred in infancy.

The use of full thickness lateral skin and muscle flaps, method 9, is included only to prevent experimentation by the uninformed surgeon. Such repairs generally produce a lip that is too long vertically and too tight from side to side, often with constricted prolabial skin in the center of the lip.

The author sees no need for use of the primary Abbé flap (method 10) in the infant in view of present-day techniques of repair.