Chapter 12

Cleft Lip Repair

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WHY A CHAPTER ON CLEFT LIPS?

Fortunately there has been widespread dissemination of information about the repair of clefts throughout Africa, thanks to Operation Smile, Smile Train and the many cleft surgeons who have visited and taught throughout Africa. Many DVDs and instructional videos have been distributed all over the African continent and around the world.

So why should one write a chapter on clefts for this publication? All of these other wonderful educational tools tend to leave out small but important little steps. The authors have looked for a complete publication but have never found one. An attempt has been made in this chapter to cover all the details for the surgeons in remote hospitals who have not done many of these procedures.

The authors recommend that surgeons preparing to repair cleft lips read and re-read this chapter and other chapters and watch the videos from Smile Train before performing the repair. Many resources describe the pathology of the cleft lip and the reader is referred to these classic works.

INTRODUCTION

Cleft lips are seen throughout the world. Since it is a visible deformity, there is a stigma wherever one lives with a cleft lip and especially in countries where a correction or repair cannot be carried out at an early age. For years the main goal of cleft lip surgery was simply to bring the lip together. In more recent years there has been an emphasis on correction of the cleft nose deformity as cleft surgeons have come to understand that the best opportunity to repair the nose is at the time of lip closure.

The best time to repair a lip is at 3 months of age as long as the child is healthy. It has been shown that a 10 week old child with a weight of 10 pounds/4.5 Kg and hemoglobin of 10 will go through surgery well—Rule of 10s. With any cleft deformity, feeding will be difficult immediately after birth. This is especially true with cleft palate children who cannot generate the necessary suction to feed. A complete cleft lip child may have similar problems. The child should be fed in an upright position with the mother's breast tissue filling any gap in the lip or alveolar ridge. Sometimes it is necessary that these children be fed with a bottle or spoon and the mothers should be taught to express milk from their breasts—EBM.
When children are seen late with a cleft lip and cleft palate, **older than 10 months**, there is the temptation to repair the lip first and leave the cleft palate until later. The lip is always easier. This is **not in the best interests** of the young patient or their family. At this age the child needs to have the palate repaired in order to give the best chance for normal speech. If only the lip is repaired, then the parents may not be concerned at this young age about the palate as there no longer will be a stigma associated with the invisible cleft palate. Regurgitation of food will still be a problem but a personal one and often not seen by the outside world. If one has good anesthesia, if the child is relatively healthy and most important if the surgeon is skilled in cleft palate surgery, then the palate should be repaired first and the lip can be repaired at the same time or later. When performing both at the same operation, always repair the palate first so that the Dingman retractor for cleft palate surgery is not resting on the newly repaired lip. If only the palate is repaired, the stigma of the lip remains and one can be certain the parents will bring the child back for lip repair in a short time.

**CLEF LIP CLASSIFICATION**

- **Unilateral**
  - Microform
  - Incomplete
  - Complete
- **Bilateral**
  - Microform
  - Incomplete
  - Complete
  - Combinations of above
- With or without Cleft Palate
- With protruding premaxilla/prolabium—usually in bilateral CL
With Nasal Deformity except in Microform
- Moderate
- Severe
- Mild

CLEFT LIP FACTS
Unilateral CL/CP is more common on left side and in boys.
Cleft Lip/Palate is more common than CP alone.
  CL/CP left 41%
  CL/CP right 20%
  CP alone 22%
  CL/CP bilateral: 17%
Cleft palate alone is associated with syndromes and more common in girls
Incidence: 1/1000 whites, 1.7/1000 in Chinese and 0.3/1000 in blacks
Risk of Clefts in next generation—Facts to give parents with cleft lip child
  General population: 1/3000 or 0.3/1000 in published data for Africans and 1/1000 in Caucasian children
  Chance of cleft in next generation:
    One child with cleft: 4/100 or 4%
    One parent with cleft: 4/100 or 4%
    Two children with cleft: 9/100 or 9%
    One parent and one child with cleft: 17/100 or 17%

TIMING OF REPAIR

- Cleft lip—3 months is ideal or when at least:
  - 5 kg. (10 pounds)
  - 10 grams Hemoglobin
  - 10 weeks of age
- Cleft palate—9 to 12 months
  - Before child begins to speak
  - Earlier the repair → less velopharyngeal incompetence → less need for pharyngeal flap
  - Possible disturbance of mid-face growth, but this can be corrected later with LeFort I maxillary advancement later. Often this (mid-face hypoplasia) is not a noticeable problem

ANATOMICAL DEFINITIONS

Cleft and non-cleft sides
Cupid’s bow
Philtrum columns
Vermillion border is same as white roll
White roll
Mucocutaneous line (red line)--between wet and dry lip mucosa
Columella
Alar base
Nostril sill
Commissure

SURGICAL DEFINITIONS
  Advancement flap
  Rotation flap
  C-flap

CLASSIFICATION
  Kernahan Y Classification

Incisive foramen at junction of limbs
Primary Palate: palate anterior to incisive foramen
Secondary Palate: hard and soft palate distal to incisive foramen

TYPES OF UNILATERAL REPAIR
  Straight line
  Lower lip Z-plasties
    Randall-Tennison
    Triangular
    Fisher
Upper Lip Z-plasties
Millard Rotation Advancement—this is the easiest to use and will be the only one described in this chapter

Advantages of the Millard Rotation Advancement Repair
♦ Measurements are not definite and one can “cut as you go”—cut a little more to bring edges together
♦ Mid-course corrections are possible
♦ Restores normal philtrum column
♦ No scars across philtrum
♦ Z-plasty at base of columella and this is not easily noticed after lip has healed

Disadvantages of Millard Repair
♦ Requires wide undermining in wide clefts
♦ Tendency for short lip on cleft side and
♦ Notching of vermilion in wide clefts and when Cupid’s bow is not level after rotation

Problems with all techniques
♦ Do not address the alveolar ridge defect—can be minimized by the use of an appliance if one is available and also early bone grafting at time of lip repair. Bone grafting is only possible if alveolar ridges are approximated.
♦ Do not address nasal deformity adequately—can also be minimized by appliances if available
♦ All require secondary stages except incomplete clefts
♦ Philtral column on cleft side not adequately reconstructed
♦ Size and placement of nostril difficult

Preoperative Preparation
♦ Hemoglobin and malaria smear
♦ Weight
♦ NPO 6 hours prior to surgery
♦ One dose of a cephalosporin antibiotic after IV started

Anesthesia
♦ Ideally general endotracheal anesthesia is used with the ET tube, preferably a Rae tube, brought over the midline of the lower lip. Midline location is best for the tube so as to give symmetry throughout the repair.
♦ It must be well taped in place in the midline so that it does not shift during surgery
♦ The head is elevated with sand bags/IV bags on either side by the ear to stabilize the head
A throat pack is then placed by the surgeon or anesthetist with care not to dislodge tube.

This operation can be done in older children/adults under local with ketamine (or straight local) by blocking local nerves—infraorbital on each side as well as a field block for the vasoconstrictive effects of the epinephrine. There still must be control of the airway.

**Basic Operation**

- Ideally photographs are taken before the patient is given an anesthetic.

**Markings:** Place marks at key points

- Midline Cupid’s bow #1
- Height or peak of Cupid’s bow on non-cleft side #2
- Measure distance from #1 to #2 and then mark peak of Cupid’s bow on cleft side #3. Distance from 1 to 3 will be the same as 1 to 2, usually 4 mm.
- Alar base on each side, #5 on non-cleft side and #6 on cleft side.

Measure distance from alar base #5 on non-cleft side to #2. This distance, about 10 mm. in a young child, should be measured on cleft.
side from alar base to where it intersects with vermillion border, #4. This should be where the vermillion is the fullest.

Fig 4

Note #1 midline of Cupid’s bow and #2 the peak of Cupid’s bow on non-cleft side. #1 to #2 gives the distance for #1 to #3, #5 and 6 are at the alar base. #4 is where vermillion of the cleft side is fullest or thickest. It is also found by measuring the distance from #2 to #5 and then measuring the same distance from #6 to the point where it intersects with the vermillion border or white roll. This distance is usually about 10 mm. in young children.

Fig 5

The non-cleft side measurements are the basis for determining points on the cleft side. So 2 to 5 should equal 4 to 6 with the lip slightly
pulled down on the cleft side. The commissure should never be used in these measurements.

The rotation flap should be drawn from #3 upward as a slight convexity following the cleft margin and then curving just below columella to non-cleft side (as seen in the drawings) and it should not cross the philtrum column on the opposite side—non-cleft side. The end point of the rotation flap is #8—the end of green arrow below in Fig 6—though this point is not definite until the surgeon is satisfied by the downward rotation of the rotation flap with a level (transverse) Cupid’s bow and lip.

Markings on the cleft side from #4 to nostril sill #7 should equal #3 to #8. These are not definite but a guideline as will be seen below. In the picture below A to B is the same as 4 to 7

Fig 6

#2 to #5 equals #6 to #4 though the picture does not show this clearly. Alar base to the fullest point of the lip on the cleft side equals #5 to #2 on the non-cleft side
Fig 7
This picture shows it clearer (cleft on right side)
Alar base to the fullest point of the lip on the cleft side, #4 (red line), equals #5 to #2 on the non-cleft side (blue line) and also equals the height of the philtrum column on the non-cleft side and also the length of the rotation flap, #3 to #8

Fig 8
Distance from A to B (4 to 7), the Advancement Flap, equals A’ to B’ (3-8), the Rotation Flap. (This is the same measurement as #4 to #7 and #3 to #8.)
This also equals length of normal philtrum column on normal side, non-cleft side

In a complete cleft lip, the incision between #4 and #7 is along the vermillion border and it is the same distance as #2 to #5 and #4 to #6 and #3 to #8 on the non-cleft side as mentioned above—see red arrow in Fig 9.
When the rotation flap (R) has been developed, the lip should be horizontal as the blue line above—level.

If not, the “back cut” must be deepened just medial to the philtrum column (red arrow) on the non-cleft side. Never should the backcut cross the philtrum column.

(Original illustration, Grabb and Smith Plastic Surgery, Fig 9-7, page 280, courtesy of Lippincott Williams Wilkins)

♦ **Incisions:**

- The Rotation Flap (R) should then be incised, dividing the vermillion perpendicularly at #3. The Rotation Flap is then pulled down very gently with a skin hook. Cupid’s bow should lie horizontally, level, with very slight tension on it. If it is not horizontal, then a “back-cut” should be made at the end of the Rotation Flap (end of red arrow in Fig. 9). This should be downward and **not crossing** the philtrum column on the non-cleft side. One continues incising until Cupid’s bow lies horizontal as the blue line in Fig. 9. **When extending the back cut, it is important to divide the muscle completely, through and through, to allow complete rotation downwards of the flap.**

The line between #4 and #7 is along the vermillion border and should equal the distance from #3 to #8 after the back-cut. These are not definite but a guideline.

The vermillion at #3 is always narrow. A triangle/wedge shaped flap is taken from the cleft side vermillion just below #4 to fill in the non-cleft side in order to give a full and equal lip on both sides. This wedge inserts at green arrow in the figure below. So the lip at #3 on the non-cleft side is not as full as the cleft side and should be augmented.
Fig 10

Showing the importance of equalizing the thickness of the lips: A wedge from the cleft side, blue arrow, should be taken to fill the deficiency on the non-cleft side at point #3—green arrow

Note Fig 3: vermillion at #3 is not as thick as at #4

Incising from #4 to #7 is along vermillion border. It is extended past #7 into the nose along the mucocutaneous line in order to free up the alar base and later close the nostril floor.

(Original illustration, Grabb and Smith Plastic Surgery, Fig 9-7, page 280, courtesy of Lippincott Williams Wilkins)

• An incision is made from #7 to #6 below the alar base in most clefts. In wide clefts one may have to extend the incision around the alar base in order for the Advancement Flap to advance over to meet the Rotation Flap—see black arrow in Figure 10. Cleft lip repairs in western texts now encourage the surgeon not to incise around the alar base, but where there is no pre-surgical orthodontic care the complete cleft lip is often still very wide and requires the extension of this incision around the alar base in Millard repairs.

• Whether or not this incision is carried around the alar base as shown in incomplete clefts, it is still very important that the abnormal orbicularis muscle that extends up to the alar base (at #6) on the cleft side is divided.

• An incision is also made in the buccal sulcus beneath the Advancement flap, so that the entire flap and lateral cheek musculature may be elevated off the periosteum and up to the inferior orbital nerve.

• The alar base is then elevated with a skin hook and the alar base dissected free from the underlying maxilla as is seen in the figure below. The dissection is carried above the periosteum up to the infraorbital nerve.
Fig 11
Blue arrow shows the where the abnormal orbicularis muscle must be divided as it extends up to the alar base. Shaded area also shows the area that requires undermining down to the periosteum. Green arrow points to area of infraorbital nerve.

Fig 12

- The mucosal pairings along the cleft side of the defect (along the advancement flap) are incised in such a way that a vermillion flap is created based along the alveolar ridge. This is the “L” flap (L for lateral), red arrow in Figure 13 below. As one incises from #4 to #7 along the vermillion border, the incision can extend past #7 up into the nose along the mucocutaneous line in complete clefts. This allows elevation of the medial aspect of the alar base so that the floor of the nose maybe closed. The “L” flap may later be turned up and over (mucosal side down) into the floor of the nose. See Figure 13 for outline of L and M flaps (M for medial).
This picture is purely to show the mucosal pairings. This is an incomplete cleft lip and the lateral pairing, red arrow and outlined in blue is usually discarded. The medial pairing, orange arrow and outlined in green may be preserved and used to fill in the mucosal deficiency after the frenulum is divided. It is outlined in green. In this case the tissue between these pairings and below the nostril sill is Simonart’s band, black arrow, and is excised.

- The C flap (C for columella) is the tissue remaining on the cleft side of the rotation flap and under the columella—see “C” in Figure 13 above. A double hook is placed in the nose on each side of the columella to elevate the nose and the C flap is rotated into the columella to lengthen it on the cleft side. The remaining C flap can be used to fill the defect left by the downward rotation of the Rotation Flap. **So the C flap may have two functions: first to lengthen the columella and second to fill the defect left by the**
**rotation flap.** The mucosal pairings along the cleft border of the C-flap, orange arrow shown above are incised in such a way that the base of the flap is the alveolar mucosa—this will be the “M” flap. This flap is used to fill in the buccal mucosa deficiency at the frenulum. In addition, the incision along the vermilion of the C flap, green line in Figure 13, is extended in complete clefts up into the nose along the mucocutaneous line. This allows for reconstruction of the nasal floor with approximation to the alar base.

- The alar base is then elevated with a skin hook and the alar base dissected free from the underlying maxilla as is seen in the figure 11 and figure 15 below. The dissection is carried above the periosteum up to the infraorbital nerve. In this way the advancement flap is advanced into the defect left (see red arrow) by rotating the rotation flap down so that the Cupid’s bow is level or transverse.

- The orbicularis muscle is then dissected free from the overlying skin and underlying mucosa on each side—Figure 14. There is minimal dissection of 2-3 mm on the non-cleft side so that the philtral dimple is not disturbed. The dissection on the cleft side depends on the width of the defect. If an incomplete cleft, then the dissection needed is minimal. If the defect is wide and in an older child with a complete cleft lip then 5-10 mm. of muscle must be dissected free.

![Fig 15](image)

**It is important to understand that the buccal sulcus is incised under both the Rotation and Advancement flaps to allow rotation and advancement.** The buccal sulcus is later closed at the beginning of the repair.
Nasal

In recent years early correction of the nasal deformity has been found better than delaying it until later in life. In Africa, early correction is best since the patient may not return for later nasal repair. The alar base must be completely freed from the underlying periosteum of the maxilla and piriform rim—see figures 11 and 12. The lower lateral cartilage is carefully freed from the overlying skin up to the dome, from lateral to medial. The dissection begins at the cut edge of the alar base as shown by the blue arrow in Figure 15. Dissection in the midline is carried out between and over the medial crux (cartilages) and then over the dome cartilages. This dissection is begun at the junction of the rotation flap with C-Flap, at the red arrow in Figure 15. This dissection is then carried up over the dome cartilages to meet the previous dissection over the lower lateral cartilages. Some will even free up the dome cartilages on the non-cleft side. Suspension sutures may later be used to hold the domes and lower lateral cartilages in position—see Figure 18.

![Figure 15](image)

**Fig 16**
The lower lateral cartilage #6 is freed up from the overlying skin up to the dome. The medial cartilages, medial crura, #3, are freed up to the dome. The two dissections meet at the dome, #2. Sutures can be placed through the dome to elevate the dome and correct any asymmetry. This is usually performed at the end of the case when the lip has been repaired.

**Reconstruction/Suturing:**
- Suturing with absorbable material (chromic gut or polyglycolic acid) begins with closure of buccal sulcus mucosa since it’s difficult to do later. This general principle of reconstruction is to close deep to superficial, or “inside to outside”.
- The columella on the cleft side is then lengthened by advancement of the C flap superiorly. Non-absorbable sutures are used to approximate the C flap to the opposite side columella and ends of suture left long so they can be easily removed. The C flap can then be used to fill the defect left by the back cut. Several sutures are needed. See arrow Figure 17.
- A long lasting absorbable or non-absorbable suture is next used as a “cinch” suture. This may not be necessary in incomplete clefts. The suture is placed under the alar base on the cleft side, then in the midline
beneath the columella and then under the alar base on the non-cleft side. If properly placed this suture brings the alar bases in proper alignment to the columella and at the same level. This suture is just tied down loosely so as to bring the alar bases in alignment. **This is a KEY SUTURE.** It should not be tied down tightly as this make the nostril too small.

♦ The orbicularis muscle is closed with 3-4 sutures, beginning above the back cut on the non-cleft side and above the tip of the advancement flap on the cleft side. Either a non-absorbable or absorbable suture can be used.

♦ A second muscle suture is placed inferiorly between the muscles at level of the vermilion border or white roll. Several sutures are placed between these two sutures to repair the muscle.

♦ A deep dermal suture is placed from the tip of the advancement flap (#7) to a point at the end of the back cut (#8). **This is also a KEY SUTURE.** **This is the loose suture illustrated in Figure 17 below that has not been tied down.**

![Fig 17](image)

This shows the **key suture** from the advancement flap to the depths of the backcut

(Original illustration, Grabb and Smith Plastic Surgery, Fig 9-6, page 278, courtesy of Lippincott Williams Wilkins)

♦ Skin sutures are placed at this point and then at the vermilion border or white roll.

♦ Skin sutures of 5-0 or 6-0 nylon are then placed between these two sutures to close the lip and the vermilion.

♦ In complete clefts the nasal floor may be closed with absorbable sutures and the lip mucosa is closed up to the buccal sulcus with small absorbable sutures.

♦ If the patient is to be discharged soon after surgery and if Fast Absorbing Plain Catgut is available, then this suture may be used for all the skin sutures and then skin glue, Dermabond (if available).
♦ The dome and stent sutures for correcting the nasal cartilages are not absolutely needed. One may contact the author for more information. See figure 18 below.

♦ **Remove throat pack and carefully suction throat.**

![Fig 18](showing elevation of domes to create symmetry)
![Fig 19](never as perfect as one would like especially in wide clefts)

Sutures used in the repair: Depends on what is available
- Mucosa—Chromic or Vicryl 4-0 to 6-0
- Muscle/Deep dermal—Chromic, Vicryl, PDS 4-0 or 5-0 or 3-0, see below.

(If available, a 3-0 Vicryl (polyglycolic acid) should be used for the muscle and especially in bilateral clefts. The nutritional status may be poor and a larger suture in the muscle may reduce the dehiscence risk.
- Subdermal/deep dermal—5-0 Chromic or Vicryl if necessary
- Skin—Nylon/Fast absorbing Plain catgut

**Important aspects of Nasal repair**

♦ Ideally, preoperatively, the patient wears an appliance such as a Latham appliance that approximates the alveolar ridges and also has an extension to mold the nose—This is not widely available in Africa
♦ Must have adequate undermining of cleft side alar base
♦ Release lower lateral cartilages from overlying skin with fine scissors
♦ Cinch suture to align alar bases and size of nostril—nonabsorbable suture (See below)
♦ Some use traction and bolster sutures to place nostril dome and lateral cartilages in proper position—only good if left in 7-10 days with return visit unless one uses absorbable sutures. These are the dome sutures mentioned above. (Please contact the author for more information)

♦ **Potential Problems**

♦ Rotation flap not level (transverse) and may lead to notching: Rx—adequate back-cut
♦ Inadequate vermillion beneath Cupid’s Bow on cleft side: Rx-- triangular vermillion flap from lateral lip on cleft side to augment vermillion
♦ Large area left by back-cut that is difficult to fill by advancement flap: Rx—may use part of C-flap
♦ Incision around alar base on cleft side leads to scarring: Rx—one should limit the incision around alar base but in wide clefts these incisions will be necessary. (Remember in the West, appliances are used beginning at one month of age to approximate the alveolus and lip defect. This narrows the defect and a wide excision around alar base is not necessary when lip surgery is done at 3 months.
♦ Throat pack NOT removed

Postoperative Care:

♦ BE SURE THROAT PACK IS REMOVED
♦ Keep head elevated
♦ NPO first 6 hours
♦ Clear liquids next 6 hours by spoon or cup or syringe
♦ Expressed breast milk (EBM) after 12 hours by spoon, cup or syringe.
♦ The author allows breastfeeding immediately after the operation and patients do well without any dehiscence.
♦ Some feed by spoon or cup (medicine cup), etc. for a minimum of 7 days and sometimes up to 2 weeks postop on difficult and wide clefts.
♦ If non-absorbable sutures have been used, these are removed at 5 days and skin glue applied.
♦ The patient should be followed so that a cleft palate, if present, can be repaired by 9-12 months

Incomplete Cleft Lips

The incomplete cleft lip is repaired in the same way. The nasal deformity is often not as severe, but still requires the same dissection to obtain a good result in most cases. The nasal sill is intact and it is elevated in continuity with the lateral alar base and over to the columella. It is carefully elevated off the periosteum up to the piriform rim without damaging the nasal mucosa. The skin, below the nostril sill, between the C flap and Advancement flap is not needed and can be excised. This is Simonart’s band--blue arrow below and black arrow in Figure 1. The width of the nostril sill on the cleft side will be slightly more than the non-cleft side. One can allow the extra tissue in the sill to fold up into the nasal floor or excise 1-2 mm. The author feels it best to do the former—do not excise tissue from the sill—as this extra tissue will settle in time with a good cosmetic result. If tissue is removed, invariably after suturing there will be narrowing of the nostril.
Bilateral Cleft Lips

Bilateral cleft lips may be complete, incomplete or microform or combinations of these. It is not difficult to miss a small microform cleft prior to surgery. The most important findings in a bilateral cleft lip are a protruding premaxilla and prolabium and a very short columella. The premaxilla contains all the incisors. In addition, feeding can be a very difficult problem as many of these infants will also have a cleft palate.

In Africa, patients with bilateral clefts may present late with severe protrusion of the premaxilla. These can be extremely difficult to treat. Without specialized appliances it difficult to set the premaxilla back. Unfortunately, if the patient comes in late at 2-3 years old, the palatal arches may close making the setback impossible without orthodontic expansion of the palatal arches.

If the baby is seen early with severe protrusion, pressure may be placed on the prolabium with narrow tape across the prolabium and back to the ears. The parents can be given tape and shown how to apply it each day. Slight pressure for one month will do wonders if the infant is young and future repair will be considerably easier. Anytime a child presents before 2 years of age this is attempted unless the palatal arches have closed behind the premaxilla. The older the child is, the less likely he/she will tolerate taping and the more likely the palatal arches will have collapsed. Other devices have been tried that put pressure on the prolabium and premaxilla. All require the parents understanding and daily adjustments. An older child definitely requires orthodontic care to expand the arches in order to get a good result.
Lip adhesion operations have been used to narrow the defect in preparation for formal lip repair. This is accomplished by making mirror image “book flaps” (U shaped flaps in opposite directions) on the adjoining medial and lateral lip edges just below the nostril. The skin and mucosa flaps are approximated. (One may Google “Lip Adhesion Procedure” by Randall.) This procedure will prevent further widening of the cleft and protruding of the maxilla when one does not feel it is possible to formally close the lip primarily.

An osteotomy of the vomer has occasionally been used in severe late cases of bilateral complete clefts in order to setback the premaxilla. This has been accomplished either by gentle pressure on the premaxilla or by performing a subperiosteal dissection of the vomer with an osteotomy. This has the potential complication of damaging mid-facial growth and is not used in the West. On the other hand, the author has occasionally used this method in remote locations when there is no other way to set the premaxilla back posteriorly and level with the palatal arches. This can only be used when the palatal arches have not collapsed.

The premaxilla and/or prolabium should never be excised to close the lip. On the other hand in rare cases in very remote locations and far from an orthodontist, if the child is older and the palatal arches have collapsed making it impossible to push back the premaxilla level with the arches, the premaxilla has been excised in an older child. The prolabium is not excised but pushed up to lengthen the columella and the lip is closed in a straight line. An Abbé flap (lower lip to upper lip switch flap) can be done later to give the child a near normal appearance. This is recommended only in the very unusual circumstances listed above.

(Editor’s note: Wide bilateral clefts have always been repaired. If seen early in life when the palatal arches have not closed, then pressure with tape for one or more months over the prolabium has helped. The baby and mother have been admitted, and the nurses observe the mother
applying the tape across the prolabium and back to the ears for several days. The mother is given appropriate narrow tape upon discharge. At surgery, if the premaxilla is still protruding and making closure difficult (and the palatal arches are not collapsed), then the surgeon/assistant should apply pressure with his finger/thumb over the prolabium while the flaps are being raised. The lateral lip elements are mobilized widely for closure. At this point of the operation, if closure still seems impossible, then additional pressure can be applied to the prolabium to produce a greenstick fracture of the vomer. This is rarely necessary. If closure is still not possible, reluctantly one may perform a formal osteotomy of the vomer as described above in order to gain lip closure. This may interfere with midfacial growth. This can be corrected later in major centers with a LeFort I osteotomy.)

The following is a simplified description of the bilateral cleft lip repair from an early edition of Grabb and Smith’s Plastic Surgery text. There are other methods but this is one of the easiest to learn.

Markings:

♦ 1 is at the midline of the Cupid’s bow. 2 is the peak of Cupid’s bow and measured distance from 1 based on usual anatomy. In an infant it is 4-5 mm. The opposite cupid’s bow peak is likewise marked along the vermillion border.
♦ 3 is at the base of the columella as is the contralateral marking.
♦ 4 is where the vermillion is fullest and 6 is at the alar base along the vermillion border.
♦ The distance from 5 to 6 should equal 2 to 3 and one would like for this distance to be 10 mm. Often 2 to 3 is short and one may attempt to lengthen it by curving the incision from 2 to 3 or extending 3 up inside nose on each side. If 5 to 6 is longer than 10 mm. shortening may be carried out later when closing. The incision from 4 to 5 is taken 1-2 mm. above the vermillion border or white roll. This will also lengthen the distance to the peak of cupid’s bow, once these flaps have been rotated in.

So, the distance from 2 to 3 will always be short, but it can be lengthened 3 ways:
♦ Slightly curved incision from 2 to 3
♦ Place 3 up inside the nostril along above the columella
♦ With the extra 1-2 mm from 4 to 5

♦ The distance from 4 to 5 on each side should be approximately equal to the width of 1 to 2. 4 and 1 will come together in the midline of the repair/midline of Cupid’s bow. (Same for the opposite side)
♦ The C-flaps are seen in the drawings. These are often very small. If large they can help create the nostril floor at the sill.

Incisions
♦ Usually the prolabium incisions are made first. Incisions 1 to 2 and 2 to 3 are made down to the premaxilla and the prolabium dissected off the premaxilla as shown in diagram B. The vermillion left after the C-flaps have been raised is used to close over the raw surface of the premaxilla.
♦ The incisions along the vermillion can be continued up into the nose along the mucocutaneous line. This will provide medial skin edges to close the nasal floor.
♦ The lateral incisions for the advancement flaps are made bilateral from 4 to 6 and then around the alar base as needed. These incisions are carried down to 5 so that the vermillion from 4 to 5 can be used to recreate Cupid’s bow and midline vermillion. It is important to incise the muscle attachments to the alar base.
♦ The incision from 4-6 should be extended up into the nostril along the mucocutaneous line so that the alar bases can be elevated off the
periosteum and piriform rims and up to the infraorbital nerves on each side. This will allow advancement of the alar bases and closure of the nasal floor on each side.

♦ The orbicularis is dissected free as described for a unilateral cleft. On wide clefts 10 mm. may be freed on each side. There is no muscle beneath the prolabium, so the lateral orbicularis muscles are brought together in the midline.

♦ The freed mucosa is also brought to the midline and sutured for lip mucosa

♦ The lateral mucosal parings off of the advancement flaps, as “L” flaps in the unilateral lip and shown with blue arrows in B above, are turned over with the mucosal surface used for buccal mucosal lining in the floor of the nose if needed

Closure

♦ The mucosa of the advancement flaps is then sutured in the midline as shown in C

♦ The muscle is then approximated with 3-4 sutures. The superior suture is also sutured to the nasal spine to suspend the lip.

♦ The prolabium is then sutured to the vermilion portions of the advancement flaps to reconstruct Cupid’s bow. (1 is sutured to 4 and 2 is sutured to 5 bilaterally.) These key sutures in the midline and from 2 to 5 on either side are placed with deep dermal absorbable sutures or even small nylon sutures. Skin sutures are placed in the midline vermilion—usually a small nylon suture.

♦ The lateral flaps are then advanced to the prolabium. Often the height of the advancement flaps is greater than 2 to 3 and a wedge of tissue on each advancement flap is removed for symmetry.

♦ The C-flaps are then rotated to fill in the nasal floor and nostril sill

Fig 26     Fig 27
The distance between the philtrum columns is wide
This will be narrowed in the second stage repair when some of this tissue will be used to lengthen the columella
Postop Care

♦ Similar to that for the unilateral cleft
♦ Lengthening the columella will be needed in most cases of bilateral cleft
  lip. Note wide philtrum in Figure 26 postop picture. This may be
  narrowed and the columella lengthened at a later operation when the
  child is older. One may look this up in a plastic surgery text or contact
  the author.