V. Incomplete Clefts
Early Acceptance in Incomplete Clefts

OFTEN it has been said, "An incomplete cleft can be more difficult than a complete one." Yet, with less tissue missing, less nasal distortion and a better maxillary platform, this need not be the case. If efficiently designed, the end product should approach normalcy. The rotation-advancement method received almost immediate acceptance in incomplete clefts. First, it not only exceeded the accomplishments of the other methods but did so with greater economy of tissue. It was the only method that, rather than excise, utilized Simonart's band when there were mesenchymal elements present. Second, the early diagrams, and particularly the drawings of Freret, were an excellent guide to how to handle incomplete clefts and were partly responsible for the early acceptance. Several surgeons expressed their preference for the rotation-advancement in incomplete clefts.

Clifford and Pool started a precedent:

If it is necessary to combine the length of the Z-plasty with lengthening of one side of the central limb, this can be done by eccentric lengthening of one of the flaps of the Z. This modification of the Z-plasty is the basis for repair as outlined by Dr. Millard and is most useful in incomplete clefts, since the vermilion of full thickness on the two sides is usually at a different level.

Consistent with his prediction on incomplete clefts, Robert Pool has continued his use of the rotation advancement as
exemplified by the lovely case he forwarded in 1974.

Ross Musgrave from the University of Pittsburgh, in a presentation to the American Cleft Palate Association in 1962, gave his opinions:

In an attempt to save as much of the cupid's bow as possible, various procedures to introduce lateral tissue into the deficient medial portion of the lip have been designed. For example, the insertion of the major portion of this tissue into the area just below the columella has been well demonstrated by Millard. This produces a tightening of the lip in the upper portion, and some fullness of the lip at the mucocutaneous junction, especially in the incomplete clefts.

In our experience the Millard procedure is particularly recommended for those clefts which are somewhat more severe than the notching or grooving and yet somewhat less than the wide complete cleft lip. This operation produces a nicely camouflaged scar. It elevates the floor of the nostril and it rearranges the columella base particularly on the cleft side. For those infants who have a full lip with a well demarcated mucocutaneous ridge and for whom the cleft is not quite complete, one can produce with this method a most satisfying and aesthetically correct result.

Musgrave repeated these feelings in 1964 for Converse and told me on the side:

The rotation-advancement gets the most whistles from the nurses at the end of the operation.
Clayton DeHaan, for Stark in 1968, joined Clifford, Pool and Musgrave:

The majority of incomplete clefts present much more complicated problems and call for a more sophisticated approach. Millard has a repair which we consider excellent for an incomplete cleft. A triangular flap is shifted from one lip margin to the other, but, in contrast to other techniques, the tissue is shifted at and below the nostril floor so that a minimal amount of lip tissue is discarded. Advancing the flap beneath the columella gives adequate length to the lip, and the wound is closed along a line closely simulating the normal philtral ridge. At the same time, the columellar base is rotated upward and the flaring ala nasi is drawn medially, thus creating a longer columella and a natural appearing nostril floor and sill. This repair, which has yielded excellent results, is relatively simple technically and does not rely on a set of predetermined points; any adjustments required in the length of the flap can be readily made. An additional advantage is that secondary repair can be accomplished by simple reduplication with extension of the original incisions.

Even some of my most worthy antagonists such as David Davies and Peter Randall, it has been rumored, prefer the rotation-advancement method for many of their incomplete clefts.

Residents do not seem to find the procedure difficult. Here is a cleft that was rotated and advanced by my first resident, Peter Stokley, in 1968 and his result as seen four years later.

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THE EASIEST OF ALL

Probably the ideal general category for any cleft lip procedure is an incomplete cleft in the adult Negro with the more massive
musculature, voluminous vermilion, natural nasal flatness and racial columella shortness. Therefore, as most surgeons admit the rotation-advancement principle is easy in incomplete clefts, it is little wonder that I reveled in rotating and advancing, at 30 minutes apiece, the clefts pouring out of an inland valley on the island of Haiti.

Although these people were never seen again, there need be no concern. With such full-bodied labial structures and less haughty nasal aspirations, as they sat with their stitches at the end of the operation, so shall they be until the end of their time.

AN EXCEPTION

With general acceptance of the rotation-advancement procedure for incomplete clefts, there was a "foot in the door" and a temptation not "to look a gift horse in the mouth" but to claim all incomplete clefts for the R-A method. Yet, lest we run like stupid sheep into the slaughter pen, let us balk and reconsider.
In the rare minimal cleft, where the displacement of normal structures is nil, a radical rotation and a complete advancement may be unnecessary. Any effort to avoid skin scarring must be considered carefully.

THE MINI-MINI CLEFT

Takuya Onizuka of Tokyo, in Melbourne in 1971, suggested a conservative but intriguing method of handling the minimal cleft lip where a slightly wide nostril floor and a vermilion notching are the deformities noted. Here, except for a lack of philtrum column on the cleft side, the skin is intact and should be kept that way. Onizuka narrows the nostril floor with an excision and corrects the vermilion peak with a small Z-plasty. He then undermines the lip skin between these two areas and gathers it into an exaggerated roll like a philtrum column with mattress sutures.

As noted by Ohmori, the long-term results of this gathering will be of interest as there is a tendency for scars and rolls to flatten in time, particularly under continuous lateral pull of the lip muscles. Avoiding a skin scar in these small notches has always been a favorite hope of mine, but as yet I have not been able to correct all the other associated discrepancies without violating the skin. This indeed may prove to be the answer in certain very minor clefts.

It is important to end with this note: In all the clefts that I have treated since 1954, only two could be corrected without a skin incision. One was a vermilion notch with no other
deficiencies or distortions present. The other was a slight deficiency of the orbicularis oris muscle appearing as a vertical skin groove which was undermined from the floor of the nose and filled with a dermal graft.

Yet recently I treated a cleft lip which, although it required skin incisions, was correctable without rotation. The patient was a 35-year-old man who has a sister reported to have a similar microform, but there is no family history of the cleft anomaly in his family, including his own four children. His cupid’s bow, both columns of the philtrum and the intervening dimple were in normal position. The skin groove lateral to the “cleft side” philtrum column required skin excision. The lateral lip muscle bulge was dissected and rotated down, and a medial muscle flap from the area of the vertical groove was transposed up into the rotation gap in the muscle. The interruption of the mucocutaneous “white roll” ridge was interdigitated. The free border mucosal deficiency was filled out with a posterior V-Y roll-down. The flaring ala and wide nostril floor were corrected by a circumalar incision, its medial advancement, denudation of the tip of this flap and suturing it to the septum at the nasal spine. The other nasal deformities required a rhinoplasty, submucous resection of the septal cartilage with a strut graft to the tip, alar cartilage reduction on the normal side and an onlay alar cartilage graft on the “cleft side.” It is interesting to note the correction, which necessitated all other aspects of rotation-advancement with refinements, extensions and adjuncts, still did not require rotation. This is indeed a rare situation!
25. Genetic Counseling, Parent Guidance, and Preoperative Preparation

When an infant with a cleft of the lip and palate appears in the newborn nursery, a chain of reactions and actions is set in motion. After nine months of happy anticipation the parents listen in horror to the news that their baby has a facial deformity. If either parent had suffered the deformity or knew of it in the family, then the gnawing fear already present has become a painful reality. If the anomaly is unknown to them, it will strike panic in their hearts. The disappointed obstetrician will call in the pediatrician, and he, in turn, will call a plastic surgeon.

The future of this baby now becomes the responsibility of the plastic surgeon, who will be assisted, as the baby develops, by the prosthodontist, orthodontist, pedodontist, otolaryngologist, speech therapist and even the psychiatrist.

Genetic Counseling

It is well to put the parents somewhat at ease by assuring them that in no way, by negligence or other obvious action, have they as parents been responsible for their baby's anomaly. It should be explained that the ratio of cleft to normal births runs about 1:750 in the United States and that, although there is a definite hereditary factor, it is only a part of the entire problem, for parents with one or more children with clefts can have a normal infant and, to a lesser extent, normal parents with no family history of anomalies can produce a child with a cleft. The arrival in a family of one infant with a cleft does not indicate that subsequent babies will be deformed. Although a repetition can occur, in general the chances are against it.
Heredity plays a significant role in the occurrence of cleft lip and palate. CL, with or without CP, appears to be transmitted by separate genetics from that involving isolated CP. Although some data exist suggesting sex-modified inheritance in clefts, they remain inconclusive. The data available support a polygenic inheritance for both CL, with or without CP, and isolated CP. An exception is the rare Van Der Woude or “lip pit” syndrome, in which CL and/or CP occurs with a lower lip fistula and which is transmitted by an autosomal dominant gene.

Woolf, Woolf and Broadbent (1963) in Utah, and Bixler, Fogh-Andersen and Conneally (1971) in Denmark published data from select populations from which it is possible to derive empirical risk factors for concerned parents. The child of a parent having a cleft lip, with or without associated cleft palate, has a 3 to 4 percent risk of being similarly affected. A child with unaffected parents but with an affected sibling has a 4 to 5 percent chance of being affected. The child with both an affected parent and an affected sibling has a 13 percent chance of being affected. The risk for children with normal parents but with an affected grandparent, aunt, uncle or first cousin is under 1 percent.

The analogous data for isolated cleft palate are as follows: Children of an affected parent have a 6 to 9 percent risk, children with normal parents but with an affected sibling have a 2 percent risk, children with both an affected parent and an affected sibling have a 13 to 14 percent risk and children with normal parents but with an affected grandparent, aunt, uncle or first cousin have under a 0.5 percent risk.

An exception to the above data is the “lip pit” syndrome. Seventy percent of those affected will also have CL(P) or CP and will pass on the gene to 50 percent of their children. Of the 50 percent, 60 to 80 percent will have CL(P) or CP.

The Fraser parental genetic guide

The studies of Canadian geneticist Clarke Fraser has made it possible to advise parents of their percentages.

If they are unaffected and have an affected child, the chances
of the next child being affected is 4% in CL ± CP but 2 to 7% in CP depending on the existence of affected relatives. If they as unaffected parents have two affected children, then the chance of the next being affected increases to 9% in CL ± CP and drops to 1% in CP. If one parent is affected and they have no affected children, the chance of the next being affected is 4% in CL ± CP and 6% in CP. If one parent is affected and they have an affected child, the chances of the next baby being affected are 17% in CL ± CP and 15% in CP and if both parents are affected the chance is about 60%. The presence of affected distant relatives apparently does not increase the chance; other major malformations not part of a genetic syndrome reduce the recurrence of the cleft anomaly. The severity of the degree of the cleft increases the recurrence risk by double. For instance, a unilateral cleft lip recurrence risk is 2.5% while a bilateral cleft lip and palate rises to 5.7%.

ETIOLOGY

Extensive study has been under way for years in search of the etiology of this deformity. Both heredity and environmental factors have been covered in the parents' questionnaire.

1. Careful study of the family history for other congenital anomalies.
2. Data on the condition of the parents at the time of conception of the deformed child.
3. Details of the first trimester of pregnancy including the mother’s diet and activities, exposure to radiation, occurrence of bacterial or viral infections, use of drugs and experience of emotional stress.

Environmental factors produce clefts in experimental animals, but their influence in man is unproved.

REASSURANCE OF PARENTS

The nurses taking care of the mother and the infant with the cleft will have a natural compassion, but it should be channeled beyond sympathy toward a constructive preparation for what
lies ahead. Poignant memories of other children with clefts who ended up with scarred and twisted lips, crooked hooked noses and cleft palate speech rendered unintelligible by the nasal escape of air can be minimized. The nurse can emphasize to the parents the great progress that has been achieved in the surgical, dental and overall care of these babies.

**CARE OF THE BABY**

The baby himself can be treated with the same gentle kindness that other more normal babies receive. Only the feeding requires specialized training. A cleft in the lip reduces the baby's ability to suck and will render breast feeding improbable and bottle feeding difficult. A cleft of the palate also interrupts suction and allows escape of fluids through the nose. Therefore, the baby is supported in the nurse's arm with his head held upright in her left hand. Formula is fed by bulb compression through a 50 cc. Asepto syringe with a 1½ inch rubber catheter extension. The catheter is slipped over the baby's tongue, and the formula is fed as the baby is able to take it. As soon as the baby has adjusted to this routine, the mother is instructed in the technique. Once mother and baby are prepared by the nurse, they are allowed to go home. This general routine was taught to me as an intern by MacCollum at Boston Children's Hospital.

In certain particularly malnourished cases in which successful intake seems to be more difficult, a nasogastric tube can be introduced and fixed to the face with tape to facilitate forced and controlled nourishment through gavage.

**ANTICIPATION OF SURGERY**

Most parents are anxious to have plastic surgery immediately. Yet, when it is explained to them that the best result for their baby can be achieved if the lip and nose surgery is postponed until the tissues are larger and stronger, they are content to wait, take the baby home and fatten him up. If the cleft is incomplete, a definitive closure is scheduled at age three to six months, while a complete cleft is set for an adhesion at three weeks and a definitive closure at six to eight months. It is felt that there
is a better psychological adjustment with fuller understanding of the problem if the parents have a chance to become familiar with the deformity. To shield them completely reduces the maturity of their approach.

**SPECIAL CARE BEFORE LIP SURGERY**

If the cleft is incomplete, the baby should be at least three months of age, healthy and gaining weight and should have an estimated hemoglobin of at least 10 gm. The requirements can be outlined in a general "rule of over 10":

- Weight—over 10 pounds
- Hemoglobin—over 10 grams
- White count—not over 10,000
- Age—over 10 weeks

He should have been trained to sleep on his back in preparation for the postoperative period, when this position is mandatory to protect the healing lip from brushing the bed.

No special preoperative or postoperative formula is required. What was considered satisfactory by the pediatrician before closure will suffice after surgery.

Before we turn our attention to the actual technical aspects of incomplete cleft lip surgery, let us have one last look at another vital principle in craftsmanship.
26. Never Underestimate the Importance of Detail

Sir Arthur Conan Doyle received his medical degree from Edinburgh University in 1881 but, finding his early practice slow, turned to writing and in his spare time created a detective genius in Sherlock Holmes. In a foggy gaslit 1890 London, Holmes, rumbling over cobblestones in a hansom while collecting clues or at 221B Baker Street in dressing gown with calabash pipe and magnifying glass fitting these clues into the puzzle, outwitted the cleverest criminals of the late-Victorian–early-Edwardian era. Through the same fog and over the same cobblestones, William Rose and Edmund Owen trudged to and from the London hospitals, but, lacking in Holmesian observation and intuitive inference, they were still concerning themselves with straight-line or distorted broken-line lip closures. Across the Channel in Germany, Hagedorn had surpassed their best efforts. Yet Sherlock Holmes, had his attention been directed to the cleft lip problem for but a moment, might have hastened the advances needed for the surgical solution of the puzzle. He explained the secret of success quite simply:

[My dear Watson] They say that genius is an infinite capacity for taking pains.

A plastic surgeon correcting the embryological catastrophe of a cleft lip uses methods which parallel those employed by a detective solving a crime. The missing bit is the criminal, and what tissue is available, including the landmarks, provides the clues. Then by collecting and piecing together what is there with “infinite pains” and using every available millimeter, the surgeon finds the solution to the mystery.
It always seems to amaze observers that it takes me as long as it does to deal with the detail involved in rotating and advancing the lip and nasal elements. A millimeter here or there is vital, and even when first measurements suggest accuracy, the trained eye may find a flaw. It is then that the inherent patient persistence of a perfectionist invariably will compel suture removal, realignment and resuture. To the hurried surgeon, whether on account of too heavy an operative schedule or his insistence on speed rather than precision, this concern over trivia may seem ridiculous. He must wonder, with so many clefts in the world being improved in appearance and function, what real difference one more millimeter can make?

In his 1961 presidential address, Herb Conway repeated the classic story about the child who was asked:

With all the hundreds of millions of people in the world, what difference does it make at all to the world if one man be killed?

The child replied:

I suppose it would not make any difference at all to the world but it would make all the difference in the world to that one man!

And it is the same with every cleft, for as standards rise so also does the importance of detail. Generalizations may point the way, but without explicit and minure detail there can be no finesse.

Michelangelo put it another way, and if he still had the patience, after lying on his back on a scaffold for more than four years painting 343 masterpieces from the Book of Genesis on the ceiling of the Sistine Chapel, to say,

Trivials make perfection but perfection is not trivial,

it might be well for us all to pause and reconsider . . .

Enough of history, principles and discussion. It is now time to turn to the actual detail of corrective surgery on incomplete unilateral clefts. As Holmes would say,

Come, Watson, come! The game is afoot.
27. Incomplete Unilateral Cleft Lip Rotation-Advancement Detail

SCALPELS

A sculptured stone tablet found at the site of the temple of Asclepius near the Acropolis at Athens dates back to about 300 B.C. The shape of the blades depicted by the ancients is not unlike the Bard-Parker and Beaver today. Hippocrates alluded to these "bellied" scalpels, and Galen called them bellied surgical knives from the Greek word meaning "like the breast of a woman." These scalpels were of steel, for, as Galen remarked, the best quality of steel yielded a knife which neither blunted nor bent or chipped.

Today I use the small #67 Beaver blade because of its maneuverability to score the skin to dermis along the marked curved incisions. A #15 Bard-Parker is used to incise along the upper labial sulcus and to free the lip elements from the maxilla. A #11 Bard-Parker blade is used to stab along the initial superficial incision through the full thickness of lip when the rotation and advancement flaps are actually cut.

I.O.U.'S

The basic rotation-advancement principle still stands while refinements and extensions have facilitated its execution. The final design with all the possible present variations synthesized into a master plan reflects many recent influences which are acknowled-
MEASURING

The unilateral cleft has a normal side which presents a challenging comparison and sets the standard, but it also provides an ideal pattern to be simulated. Use it as a guide, measure it and be directed by it in the plan of surgery.

Dot-mark the center of the cupid’s bow on the mucocutaneous junction ridge 1 and then the peak on the non-cleft side 2. The distance between these two points, 1 and 2, is usually about 4 mm. and will set the site of the bow peak on the cleft side of the medial element 3. This siting can be done with calipers or a practiced eye.

The vertical distance from the alar base on the normal side 4 to the height of the non-cleft peak of the bow 2 gives the distance that must be matched ultimately on the cleft side from its alar base 10 to its bow peak 8. This is usually around 10 mm.

Measure the distance from the peak of the bow on the non-cleft side 2 to the commissure on the non-cleft side 6, which is usually about 20 mm. Mark the same distance on the cleft side from the commissure 7 to a point along the mucocutaneous junction ridge of the lateral lip element to be the matching peak on the cleft side 8. This measurement is done with slight spreading of the cleft element as it is bunched because of contracture with lack of muscle continuity across the cleft. Point 3 should eventually approximate point 8 to create the cleft bow peak.

MARKING THE ROTATION

Now that all peaks of the future cupid’s bow have been indicated, the next step is to mark the rotation incision. Start at point 3, the potential bow peak on the cleft side, and skirt the...
edge up to the base of the columella. At this point the incision mark curves medially across between base and lip but definitely hugging the columella and extending past the midline of its base almost as far as the philtrum column on the normal side but no farther. The final extent of the rotation curve is point 5. Always keep in sight and mind, as the rotation incision is
positioned and shaped, that it must balance in symmetry as near as possible the line of the opposite normal philtrum column.

**MARKING THE ADVANCEMENT**

There are four important points to be determined in the creation of advancement flap B. These will vary according to the amount of usable Simonart's bridge band. This, in turn, depends on the condition and conformity of its skin and the amount of subcutaneous tissue and muscle in it.

The first point has already been marked tentatively at 8, a distance from the commissure to the potential peak of the bow on the cleft side as compared to the normal. At least this gives the surgeon an idea of how much legitimate running room he has down the lateral lip element. Digression past the designated point 8 is rarely necessary and should be limited to 2 mm. at most. The position of point 8 is verified further by checking that the distance from 10 to 8 is equal to the distance from 4 to 2.

The next dot mark is placed at the most medial point possible in usable Simonart's band 9, which will serve as the leading point of the advancement flap. One way to determine the position of point 9 after evaluation of the usable tissue in Simonart's band is to use a heavy wire. With the normal distance from the commissure to the potential peak of the bow on the lateral element set at 8, the distance from 8 to 9 will provide the edge of the advancement flap. This edge must match the rotation edge plus the back-cut, or \( 3 + x = 8 \) to 9. A piece of wire held at 3, bent to 5 and kinked to x, when straightened out and placed along the lateral edge beginning at 8, will indicate point 9 reasonably accurately.

The third dot mark has been set at the midpoint of the alar base 10. The fourth point will be set at the end of the upper lateral alar base incision after it has curved sufficiently around the alar base 11. The amount of circumalar release depends on the degree of rotation necessary to place the flaring cleft side
alar base into balanced symmetry with the normal side. When the lateral cleft lip element is severely deficient, the circumalar incision can be raised to include a small amount of the actual alar base in the lip flap B, thus increasing the size of the flap to adequate proportion. This addition is required more often in complete clefts. Another rare occurrence in incomplete clefts is to have the cleft side slightly longer vertically, requiring a slender transverse wedge excision from its upper edge to allow the desired lift with the advancement.

The actual final position of each of the four points, 8, 9, 10 and 11, is determined by a "cut as you go" policy. Rough estimates are easy, but the final placement of each of these points is interdependent on the other two, and the last millimeter of revision may have to wait until some of the key sutures have been set.

The "unneeded" attenuated center portion of incomplete clefts between the rotation flap A and the advancement flap B is flap c and some extra tissue. This segment of tissue will be isolated by the rotation and advancement incisions and will be left attached to the columella as in the original flap c design. Care must be taken, however, not to interrupt, during the medial and
lateral undermining, the mucosal attachments of this central segment to the alveolus. Any skin, subcutaneous tissue, muscle and mucosa that is not used in the tip of advancement flap B or the body of flap c can be used to line any raw areas in the lateral nasal vestibule and alveolar sulcus and at the same time should offer extra contour when the cleft alveolus is deficient. In actual practice the "extra tissue" will be mostly mucosa.

**NO STRICT ORDER OF ACTION**

Once the rotation and advancement flaps have been measured and marked, they are *scored*. After this the order of incision making is not important. Usually the rotation is cut first, but in incomplete clefts with sufficiency of tissue the creation of lateral flap B is not quite so dependent on the positioning of flap A. Thus, in the case being used for demonstration the advancement flap was stabbed out even before the rotation incision was completed. Freeing of flaps A and B from the maxilla can be achieved either before or after the flaps are actually cut. Again it depends on the case.

**CUTTING THE ADVANCEMENT FLAP**

Advancement flap B has been incised into dermis with a #67 Beaver blade from point 8 to 9 to 10. Now the flap is completely severed through and through along these lines with a #11 blade leaning on the bias to include as much muscle and mucosa in flap B as possible. The extension of the labial-alar incision from 10 on farther around the alar base to 11 depends on the amount of medial rotation desirable for each specific alar base and creates flap D. Along the same principle, the amount of Simonart's band retained in the tip of the advancement flap B is determined by how much is needed against how much is usable.
LATERAL UNDERMINING

An incision with the #15 B.-P. blade high in the upper labial sulcus of the lateral lip element frees the soft tissue attachments to the maxilla.

In incomplete clefts, the amount of lateral undermining varies, but freeing up to the infraorbital foramen may be required. This decision is determined by manipulating the lip element to see when it moves freely into its destined position across the cleft without resentment. Any final restrictions can be felt along the sulcus with the finger and released with the scalpel.

CUTTING THE ROTATION

It is well to remember that the difference in the distance from the mid-base of the columella to the two peaks of the bow on the non-cleft element indicates exactly the amount of cupid's bow displacement and, consequently, must determine the amount of rotation and back-cut necessary to place it into a balanced position.
Cupid's bow peak is now in norm symmetrical position.

The difference in the heights of the bow peaks.

Rotation incision dividing lip element (A) from the columnella.

Deeper release.

Freeing medial element from the maxilla.

Back-cut for final bit of release.

Cupid's bow peak is now in normal symmetrical position.
The rotation incision will lower the non-cleft element, flap A with cupid’s bow, one philtrum column and dimple into normal position and release a portion as flap c to rise up for columella and nostril sill duty. The marked curve of the rotation incision has been cut through skin to dermis with a #67 Beaver blade and now is severed completely with the stabbing action of a #11 B.-P. blade through full thickness of lip to release flap A from its superior nasal attachments. Again the blade is tilted on the bias to retain as much muscle and subcutaneous tissue as possible in flap A. The descent of A is then tested to see whether points 2 and 3 are on a direct horizontal line, which would position the cupid’s bow in perfect symmetry.

**MEDIAL UNDERMINING**

The next maneuver is the freeing of the medial lip element from the maxilla by an incision at the height of its upper labial sulcus. The amount of undermining is usually less than on the lateral side and need be no more than will let this element rotate easily. This undermining can have been completed earlier to facilitate the rotation or postponed until after the rotation incision.

**BACK-CUT**

Even after the rotation incision and the undermining, the position of A usually will be found a little short of perfection. With flap A tugged slightly toward normal position, the tip of a #11 is used to stick-cut at point 5 the back-cut, which speeds up the rotation. One to 2 mm. of back-cut in the skin obliquely down with slightly more release of the muscle will complete the necessary rotation for normal positioning of flap A. A back-cut of as much as 3 mm. is needed only in odd cases. As the back-cut lowers the scar in the lip, it should be used sparingly and only when needed.
USING THE SCRAPS

The "extra tissue" now has been isolated to a section which was once posterior and edge mucosa of Simonart's band along with whatever muscle and skin were not carved off for more important duties in flaps B and c. It is based on its mucosal attachments to the alveolus and can be used to line the sulcus and cover raw alveolus preferably on the cleft side. In incomplete clefts this flap is usually kept in one piece with its medial m and lateral l extensions as shown and is eventually sutured to cover the raw alveolus and to preserve a deeper labial sulcus.

FLAP c AND EXTRA TISSUE

The rotation and advancement incisions isolated flap c and the remaining portion of this central segment. A generous estimate of the needs for flap c in columella lengthening as well as columella base and nostril sill construction should allow the cutting of flap c free from its lateral attachments. Flap c will be composed mostly of skin for anterior and cleft side columella. The extra mucosal scraps have been trimmed free from flap c.

Flap c is attached now to the cleft side of the columella and is continuous with the nostril floor. It is further released by dissection from the maxilla with scalpel and dental scaler.

FREEING THE MEDIAL CRURA

Through this exposure scissor dissection between the crura will facilitate upward shifting of the cleft side of the columella as flap c is fed into the columella as a one-sided forked flap. This increases the columella length on the short side by 2 to 4 mm. and creates a fullness at the columella base to balance the normal side. If the columella is very short, further facilitation of advancement of flap c by a posterior membranous septal incision may be necessary. This is less often needed in incomplete clefts.
Salvaging the "in between" tissue.

Medial (m) and lateral (l) cleft edge mucosa preserved on a single alveolar base.

Subperiosteal dissection around the pyriform opening to free flap c, nasal floor and alar base for medial rotation.

T-shaped mucosal scrap sutured over raw alveolus to preserve the sulcus.
ALAR BASE FLAP

The freeing of the alar base flap D separately from the advancement flap B is the maneuver that will allow positioning of the alar base correctly without tendency to lateral drifting. As the alar base D is freed from the maxilla in the incomplete cleft, the dissection is carried around the pyriform opening with a dental scaler type of sharp elevator. Then as flap c is continuous with the nasal floor, which in turn is continuous with flap D, this entire contingent is whirled in a revolving motion around the nostril (clockwise in left clefts and anticlockwise in right clefts). Thus is flap c fed into the columella as the nasal floor moves into the columella base area and the alar base shifts medially into a position balanced with the normal side. The subcutaneous bulk retained in the most medial portion of the alar base flap B is now picked up with a white Prolene 4-0 suture (Ethicon #8603) or Mersilene 4-0 (Ethicon #765). This suture is passed under flap c to catch the septum at the nasal spine. When tied, the suture advances alar base flap B into symmetry with the normal side and prevents later lateral drift.

If in the original deformity the nasal floor was nearly normal, then it should be kept intact to counteract any narrowing that medial advancement of the lateral lip flap and alar base may cause.

ALTERNATIVES

If the nasal floor is still too wide, a wedge excision may be required, or the amount estimated for excision can be merely denuded of epithelium, divided from flap c but left attached to the alar base and advanced medially by sutures to the septum under the edge of flap c.

FINAL EDGE ADJUSTMENTS

In order that the scar of union imitate the opposite normal philtrum column, the convexity of the rotation edge is maintained. The convexity of the advancement edge is corrected with
Dissecting the slumped medial crus from its inferior attachments.

Tying the prolene suture from subcutaneous tissue of the alar base to the nasal spine reduces the ala flare.

Advancement of flap c into the columella.

If nasal floor is still too wide then a wedge excision is necessary

or

Nasal floor is denuded and divided so

through-and-through suture from septum can pull denuded alar base flap D under flap c.
a broken line marked on the skin and trimmed to a gentle concavity to fit the matching edge. Then the dermis and mucosa are freed from the lip muscle on each side 1 to 2 mm. to prepare for accurate approximation. The key stitch, placing the point of the advancement flap B into the rotation gap, facilitates the tailoring of the edges. This is the time for cutting the little "white roll" flap.

**MUSCLE EDGE FLAPS**

With flaps A, B, c, D and the white roll all cut, the rearrangement of tissues with final revisions begins. Use of muscle flaps for interdigitation across the cleft into the opposite side depends on the muscle bulk, or lack thereof, of the two main elements, flaps A and B. If the medial element A is deficient in its free border edge and the lateral element B has sufficient muscle bulk (this is rare), then a muscle flap from the lateral element can be inserted into the inferior edge of the medial element. The more usual condition is a muscle bulk in the medial element serving as a "springboard" to prevent good A-to-B approximation. This can be taken as a muscle flap based below and inserted into the subcutaneous tissue of the lateral side free
border to increase its bulk and fill out the deficiency of its visible vermilion. These muscle flaps are threaded into tunnels with pull-through sutures for accurate positioning and retention.

Should the tip of the advancement flap be thin, the muscle flap cut from the edge excess of the lateral flap can be turned under to bolster the deficiency. Another possibility is the transposition of a superiorly based flap, obtained from the medial edge, under the thin advancing tip of the lateral flap or rather into a pocket actually dissected into the advancement flap at its deficient or grooved area. Often the bulk of flaps A and B is sufficient, and these fancy muscle adjuncts are not required. Just remember they can be available if needed.
MORE RADICAL LATERAL MUSCLE POSITIONING

It is becoming apparent that the most physiological approach to the muscle of the lateral element is radical dissection to position its oblique fibers in a more horizontal direction. When there is an abnormal bulge of this muscle with thinning above causing almost a groove between the hump of muscle and the nostril sill, wide undermining of the muscle from both skin and mucosa and a back-cut release of the muscle will allow its fibers to come down for end-on apposition with the rotated fibers of the non-cleft side. This will leave a muscle gap above, which then will require any muscle flap available from the opposite edge to fill the defect. The details of these refinements will be shown in the description for closure of complete clefts.

WHITE ROLL FLAP

At point 8 the mucocutaneous junction ridge or white roll is well differentiated and can be cut free ready for interdigitation across the cleft. The notch for its insertion in the mucocutaneous junction ridge on the non-cleft side can be created by an incision when the rotation is a millimeter short or usually by a millimeter block excision for perfect fitting. This excision or incision to receive the white roll flap should not be made early because during the suturing of the rest of the lip the split will spread into oblivion. Rather it is postponed until the very end when the white roll flap is lying over its destination. Only then should the recipient bed be split and filled.

The tissues are now ready for the final suturing . . .
28. Suturing

Of necessity the key stitch has already been placed in order to facilitate accurate cleft edge matching and trimming. Flap c has lengthened the columella while the alar base has been advanced and the nasal floor constructed, and all of these actions have been fixed with sutures. So as not to confuse the surgery with the stitching, the description in detail of the suturing has been postponed until now.

Part of the craftsmanship in cleft lip surgery is the skill of the suturing. For me this is best accomplished with a slender-nosed Stille-made Gillies needle holder and fine-toothed forceps.

The Actual Stitching

Early in the surgery, flap c is advanced into the columella and fixed with skin sutures of 6-0 silk (Ethicon #780) in front and when indicated 5-0 chromic catgut (Ethicon #792) behind in the membranous septum.

After the incisions have been made and flaps created, the vermilion parings are cut free on a single base and sutured with 4-0 chromic catgut (Ethicon #752) to line the sulcus by covering the raw area of the alveolus. At the same time, and with the same suture, the lip elements are advanced medially by suturing their upper lining edge to the maxillary mucosa along the labial sulcus on each side.

Key Stitch

Now comes the key stitch. A 4-0 white Prolene (Ethicon #8603) or a 4-0 Mersilene (Ethicon #765) suture first picks
up the subcutaneous tissue of the leading point of the advancement flap and then takes a good bite in the depths of the rotation gap at the bottom of the back-cut. As this stitch is tied, the main actions of rotation and advancement shift the tissues into their final interlocked positions. Interrupted 4-0, 5-0 and even 6-0 chromic catgut (Ethicon #790), or preferably 4-0 Mersilene, sutures are used to bring the muscles together with one last suture in the orbicularis marginalis to force the free border of the vermilion “smack” together right to the very edge. A 6-0 silk suture is placed in the skin just above the white roll interdigitation and another in the vermilion just below it. Then a triangle of white roll is excised from the medial edge skin and a 7-0 silk (Ethicon #768) suture pins the point of the white roll flap into this notch. If the muscle sutures have succeeded in bringing the skin edges into “kissing” position, a 6-0 silk continuous suture will complete a gentle apposition.
Usually an incomplete cleft will have a wider than normal nasal floor, which is corrected by a wedge excision of the excess followed by direct closure with 4-0 catgut sutures. In wider clefts which have merely a skin thread of a band joining the cleft, more active advancement and fixation of the alar base may be indicated. In such cases the tip of the alar base flap D, which has been created by division in the nasal floor region rather than discarded by wedge excision, is denuded of epithelium and advanced medially across the nasal floor and sutured with 4-0 Prolene to the septum. Mersilene 4-0 is also good for this suture. Flap c overlaps the denuded area and is sutured to the skin of the alar base to complete the nostril sill with 6-0 silk.

Closure of the externally visible vermilion edges around the free border is carried out with 6-0 chromic catgut. Then the posterior mucosal edges are approximated with 4-0 chromic catgut.
Closure by direct suturing.

Alar skin web marked for excision.

Closure by direct suturing.

catgut. A mucosal interdigititation is incorporated into the posterior closure to break the straight-line scar.

If the free border of the cleft edge is attenuated, then the medial vertical mucosal flap is cut longer and the lateral releasing incision is placed nearer the edge in order to achieve free border balance.

The final action is usually a crescent excision of skin along the webbed margin of the cleft nostril. This is simply sutured. There are other methods of dealing with the alar margin overhang, but they will be illustrated in the complete cleft section.

All sutures are now set.

A DISSERTATION ON THE STITCH MARK

Like a beast tracked by the print of its claws, the surgeon is known by the mark of his sutures. If by these permanent tracks we are to be known, it behooves us to scrutinize this potentially vicious cycle of suture. Each link in the chain of stitch mark making was charted in a circle for Medical Times in 1965.

1. First is the needle, fine, sharp and atraumatic, which enters the skin near the edge passing perpendicular or preferably turning slightly lateral to encompass a good bite of dermis. This ensures edge eversion.

2. Next are the sutures, which must be fine in caliber and for exact action must be interrupted or for gentle apposition can be continuous. They are placed close together to profit by the Lilliputian distribution of stress. Sutures placed far back from
the wound edges leave their ladder of cross marks which will require for removal too great a sacrifice of tissue.

3. During the *tie* the first loop of the knot is laid and locked, bringing the edges together by gentle persuasion. There need be no tension in the tie as the wound should be well approximated already with subcutaneous sutures. The tie merely nudges the skin edges together without the slightest evidence of blanching.

4. Postoperative *edema* is certain to swell the tissue trapped in the relentless suture loop.

5. Resulting *ischemia* may lead to necrosis.

6. Any local *necrosis* is easy prey to skin surface bacteria.

7. *Infection* will eagerly nibble a larger hole around the stitch.

8. *Time* of removal is of prime importance. The longer the foreign body suture is retained, the greater the chance of scar marks and even actual epithelialization to form permanent pits. Lip and nose sutures should be removed in two to four days. Earlier removal is possible if the wound is supported by microporous tape. Where closure demands tension, requiring longer suture retention and in a position where stitch marks are objectionable, a subcuticular suture can be used and left for one to two weeks without danger of cross tracks.

As can be seen, the sutures are out of the little patient that I have used for this entire demonstration and now even on the fourteenth postoperative day no stitch marks are visible.
29. Examples of Incomplete Clefts of Varying Degrees

KEY TO CODE ON CASES

B.D. birth date
F.H. family history
F.T. first trimester
O.C.A. other congenital anomalies
Op operation
Ad adhesion
Adv advancement
Rot rotation
R-A rotation-advancement
H.P. hard palate
S.P. soft palate
B.G. bone graft
b-c back-cut
wr white roll flap
c flap c
col columella

A cleft is indicated by stippling, a submucous cleft or submucous distortion by horizontal lines.
VERMILION NOTCH (CASE 1)

1. 8 months
B.D. October 16, 1961
F.H. Unknown
F.T. Unknown
O.C.A. Internal strabismus


MINIMAL CLEFT WITH CONGENITAL SCAR (CASE 2)

1. 6 months
B.D. May 15, 1968
F.H. No clefts
F.T. Uneventful
O.C.A. None

R.A. At 6 months

Comment. Congenital scar with vertical shortness of lip and width of nasal floor required scar excision and moderate rotation and advancement to give natural balance.
MINIMAL CLEFT WITH CONGENITAL SCAR (CASE 3)

B.D. March 21, 1964
F.H. No clefts
F.T. Uneventful
O.C.A. None

R-A. At 7½ months
3. Adv with wr. 4. Cleft vermilion edge interdigitation into non-cleft at free border.

Comment. Congenital scar with shortening and vermilion notch required scar excision, moderate rotation and advancement, nasal floor wedge excision, muscle suture and vermilion interdigitation to achieve balance.
MINOR CLEFT WITH CONGENITAL GROOVE (CASE 4)

B.D. September 4, 1964
F.H. No clefts
F.T. Uneventful
O.C.A. None

R.A. At 6 months

Comment. Important to preserve philtrum dimple and cleft side column as much as possible.
MINOR CLEFT WITH CONGENITAL GROOVE (CASE 5)

3. 8½ years

Comment. Aim to preserve column on cleft side as well as normal side and still rotate dimple and bow into balanced position.

MINOR CLEFT WITH CONGENITAL GROOVE (CASE 6)

2. 5 months

R.A. At 5 months

Healing. Slight contracture.

Comment. Scar balances opposite column maintaining central dimple.
MINOR CLEFT (CASE 7)

B.D. November 2, 1970
F.H. No clefts
F.T. Uneventful
O.C.A. None

R-A. At 3½ months

Comment. More rotation necessary than obvious at first glance.

1. 3½ months
2. 3½ months
3. 9 days postoperatively
4. 10 months
5. 10 months
B.D.  July 29, 1963
F.H.  No clefts
F.T.  Uneventful
O.C.A.  None

R-A.  At 7 months
     3. Adv with wr.
Revisions. At 1 year. 1. Excess vermilion trim. 2. Small scar revision.

Comment. Scar excision with slight rotation and advancement plus the white roll flap achieved balance.
MINOR CLEFT (CASE 9)

B.D. May 3, 1960
F.H. Only one male sibling with congenital lip scar and cleft
F.T. Uneventful
O.C.A. None

R-A. At 4 months

Revisions. 14 months postoperative slight upper scar excision, vermilion trim on cleft free border.


Comment. Lateral lip element thicker and longer vertically than non-cleft element. By elevation of advancement into rotation gap this discrepancy was benefited.
MINOR CLEFT (CASE 10)

B.D.  February 3, 1962
F.H.  No clefts
F.T.  One day of nausea, cramps, diarrhea
O.C.A. None

R.A.  At 2 months

Revisions. 3 years later. Revision of vermilion vertical and horizontal free border trimming.

Comment. This was almost a bilateral cleft but effectively corrected with a unilateral rotation-advancement and a white roll flap.
HALFWAY CLEFT (CASE 11)

B.D. May 29, 1957
F.H. No clefts
F.T. Uneventful
O.C.A. None

R-A. At 3 months
Op. Early standard R-A without refinements and with interdigitation of vermilion at free border.
H.R., S.P. V-Y pushback at 11 months.

Revision at 11 months. Cleft side vermilion trimmed.

Comment. A well-balanced result even though white roll flap not being used yet. Here muscle tissue from the cleft edge would be used to fill out the depression in the upper portion of the lateral lip element primarily now.
HALFWAY CLEFT (CASE 12)

B.D. October 5, 1959
FH. Mother has cleft nose deformity without cleft lip. Half-brother on maternal side has cleft lip with nasal deformity and alveolar defect.
FT. Uneventful
O.C.A. None

R-A. At 3 months

Revision. At 1½ years. Mucocutaneous white roll created by tiny skin graft from arm.


Comment. White roll continuity achieved by 1 mm. skin graft from the arm as primary white roll flap was not being used in 1959. Patient does not know he had a cleft.
HALFWAY CLEFT (CASE 13)

May 22, 1962

No clefts
Uneventful

4½ months
R-A.
At 4½ months

Comment. The muscle deficiency in the upper portion of the lateral lip element is not evident in early postoperative photo. Muscle flap from medial element would be inserted into this deficiency during the primary procedure if done today.

2/3 WAY CLEFT (CASE 14)

B.D. April 30, 1968
F.H. No clefts
F.T. Medication to prevent miscarriage
O.C.A. None

2. 4½ months
R-A. At 4½ months
3. Adv with wr.

Comment. Upper portion of lateral lip element thin and deficient in muscle. Muscle flap from edge of medial element would have filled out the contour.
HALFWAY CLEFT (CASE 15)

B.D. November 20, 1964
F.H. No clefts
F.T. Uneventful
O.C.A. None

R.A. At 3 months

Revisions. 1 year later. 1. Elliptical excision from free border of cleft. 2. V-Y advancement of alar base.

Comment. Mucocutaneous ridge on the lateral lip element flattened out too soon in the original deformity so that getting a strong ridge in continuity across the cleft was difficult.
Twin studies in Denmark and other countries have yet been described. Partner having CL(P) and the other CP has bilateral CL(P), and also a pair with an isolated cleft palate and a single harelip. He noted:

Identical Concordance in Monozygotic Twins

In 1973 in Copenhagen, Fogh-Andersen reported 100 pairs of twins in over 5,000 clefts including 17 pairs of monozygotic twins. Among these were two pairs of identical concordant monozygotic twins. One pair had unilateral, left, complete CL(P); the other pair had unilateral, left, incomplete CL. There was also a pair with symmetrical or mirror type, right and left, complete CL.

In 1972, for England and Wales, Blake recorded for the year 1968, 819,272 live births, 8,697 twin pregnancies (twining rate of 1:94) with 1,175 clefts. He extrapolated: expected number of monozygotic twins: 2,609 (30 percent of twins being monozygotic); expected number of clefts in twins: \[ \frac{8,697 \times 2}{697} = 25 \]. One-third of this (8) should be monozygotic twins with clefts. If 30 to 40 percent of monozygotic twins with clefts are concordant (Fogh-Andersen, 1967), there should have been three concordant monozygotic twins in England and Wales in 1968.

In the U.S.A., with a 4,000,000 yearly birth rate and 47,500 twin live births (1:86), using the cleft rate of 1:750 one can extrapolate the number of twins with clefts: \[ \frac{47,500 \times 2}{750} = 128 \]. That is, 128 twins would be born with clefts yearly. One-third of them, or 42, would be monozygotic. Around 14 of these would be concordant. How many of the 14 would be symmetrically concordant is uncertain. Yet it seems quite unusual that there are no reports concerning treatment of identical concordant clefts but as I have had a pair as patients, here they are for your study. According to Colin Condron, once Medical Director of the University of Miami Mallman Center for Child Development, there is overwhelming evidence that these boys are monozygotic twins with a single placenta in a monochorionic state and common amnion, sharing most common blood group antigens (W. Bias), not refuted by mixed lymphocyte cultures (R. Warren), and having remarkably similar dermatoglyphics and ridge counts.

Identical Concordance in Monozygotic Twins

In 1942 in Denmark, Fogh-Andersen reported a pair of monozygotic twins, one with CL(P) and the other normal. Ramsey and Wynn-Williams in 1960 reported a pair of monozygotic twins, one with left unilateral CL(P) and the other with bilateral CL(P). In 1966 Boo-Chai reported two pairs of monozygotic twins; one pair had a CL(P) and a normal mate while the other pair had a right CL(P) and the opposite twin had a left microform CL. In 1972 Blake and Wreakes reported five pairs of monozygotic twins; one pair had clefts of unequal degree while the other four pairs had one cleft and one normal each. Fogh-Andersen in 1971 published an account of a pair of monozygotic twins, one with unilateral CL(P) and the other with bilateral CL(P), and cited it as another example to support his theory that CP is genetically distinct from CL(P). He noted:

Twin studies in Denmark and other countries are the same; no single example of one twin partner having CL(P) and the other CP has yet been described.

Since then he has had further confirmation with another pair of monozygotic twins, one unilateral and one bilateral, and also a pair with an isolated cleft palate in one and a bifid uvula in the other.

In 1922 A. D. Davis noted a case of twins reported by W. L. Shearer in which there were

a boy and girl, one of whom had a cleft of the soft palate, the other a cleft of the hard palate and a single harelip.

Identical Concordance in Monozygotic Twins

In 1942 in Denmark, Fogh-Andersen reported out of a total of 867 clefts 26 twins, a twinning rate of 1:33. At the International Cleft Palate Congress in 1973 in Copenhagen, he reported 100 pairs of twins in over 5,000 clefts including 17 pairs of monozygotic twins. Among these were two pairs of identical concordant monozygotic twins. One pair had unilateral, left, complete CL(P); the other pair had unilateral, left, incomplete CL. There was also a pair with symmetrical or mirror type, right and left, complete CL.
HALFWAY CLEFTS (CASE 16, 17)

B.D. October 5, 1969
(1st twin)
F.H. No clefts
F.T. Uneventful
O.C.A. None

1. 4½ months
2. 4½ months
3. 16 months
4. 3 years

R.A. At 4½ months
5. Posterior mucosal flap from cleft element cut as ♦ to create tubercle of cupid's bow. 6. Alar rim excision.

Comment. Monozygotic twins with twin diamond posterior mucosal flaps.
HALFWAY CLEFT (CASE 18)

B.D. August 4, 1960
F.H. No clefts
F.T. Threatened miscarriage at 2 months
O.C.A. None

R.A. At 4 months


1. 4 months
2. 4 months
3. 4 years
4. 9 years
5. 12 years

Comment: My cover puzzle boy.
HALFWAY CLEFT (CASE 19)

B.D. October 7, 1963
F.H. No clefts
F.T. Uneventful
O.C.A. None

R.A. At 2½ months
H.P. At 7 months, vomer flap closure of H.P.
S.P. At 18 months, island flap pushback.

Revisions. At 6 months. 1. Trimming of vermilion free border.
2. Alar base on normal side reduced. 3. Alar rim excision.

Comment. More of a cleft than visible but correctable with rotation and advancement.

1. 2½ months  
2. 2½ months  
3. 9 months  
4. 5 years
HALFWAY CLEFT (CASE 20)

B.D. November 28, 1963
F.H. No known anomalies but mother adopted
F.T. Uneventful
O.C.A. Hemangioma of chest

R-A. At 3½ months

Comment. Balanced lip and nose with continuous mucocutaneous white roll ridge.
HALFWAY CLEFT (CASE 21)

1. 5 months
2. 5 months
3. 8 months
4. 4 years
5. 4 years
6. 5 years

B.D.  November 9, 1968
F.H.  No clefts
E.T.  Uneventful
O.C.A. None

R.A.  At 5 months


Comment. By keeping the slightly wide nasal floor intact, rotation and advancement was possible without reducing the cleft nostril too much primarily. When seen at age 5, a healed laceration of her right commissure was more noticeable than any residual effects of the cleft and its surgery.
HALFWAY CLEFT (CASE 22)

1. 3 months
   - B.D. February 6, 1965
   - F.H. No clefts
   - F.T. Uneventful
   - O.C.A. None

2. 3 months
   - R.A. 1st attempt at 3 months—cardiac arrest. Completed at 4 months.

3. 1 year (healthy)
   - Hard scar at 6 weeks. At 3 months soft, well-healed.
   - Comment. A happy ending after a hazardous beginning.

HALFWAY CLEFT (CASE 23)

1. 8 months
   - B.D. October 20, 1971
   - F.H. No clefts
   - F.T. Uneventful
   - O.C.A. None

2. 8 months
   - R.A. At 8 months

3. 14 months
   - Comment. The difference in the heights of the peaks of the bow on the non-cleft element (6 mm.) is equal to one-half the vertical length of the upper lip (12 mm.). This explodes the theory that a limit of 3 to 4 mm. (Randall; Cramer) is all the lengthening that rotation can achieve without crossing into the normal side.
HALFWAY CLEFT (CASE 24)

Comment. Nasal floor denuded as tip of alar base, which was advanced medially and sutured to the septum. Denuded alar rim flap transposed into the nasal tip crease.

B.D. August 27, 1971
F.H. No clefts
F.T. Uneventful
O.C.A. None

R.A. At 4 months
3. Adv with wr. 4. Alar base denuded and sutured to septum.
5. Alar rim denuded and transposed as a flap.
S.P. Closure of soft palate and vomer to both sides of mucoperiosteum of hard palate. No lengthening.

Revision. Full-thickness horizontal excision of lip along nasal join to shorten cleft side slightly, a rare necessity.

1. 4 months
2. 4 months
3. 2 months postoperative
4. 1 year
HALFWAY CLEFT (CASE 25)

B.D. March 27, 1972
F.H. No clefts
F.T. Uneventful
O.C.A. None

R.A At 6 months

Comment. This is the incomplete cleft used for demonstration in Chapter 27.
HALFWAY CLEFT SUBMUCOUS CLEFT ON THE OTHER HALF
(CASE 26)

1. 5½ months
2. 5½ months
3. 5½ months
4. 4 months postoperative
5. 17 months

B.D. May 24, 1972
F.H. No clefts
F.T. Sporting during early weeks
O.C.A. None
R.A. At 5½ months

Comment: Medial muscle flap into pocket under groove to fill out deficient tip of lateral flap, a successful innovation.
2 / 3 WAY CLEFT (CASE 27)

B.D. July 13, 1957
F.H. No clefts
F.T. Uneventful
O.C.A. None

R.A. At 1 month

Revisions. At 5 years. 1. White roll flap transposed across scar at mucocutaneous junction. 2. Revision of free border vermilion.

Comment. This was before white roll flaps were being done primarily.
2/3 WAY CLEFT (CASE 28)

5. 5% years
R-A. At 7 weeks

Revision. At 10 months. 1. Alar rim excision. 2. Cleft vermilion excess excised. At 2 years same procedures.


6. 5½ years
Comment. The deficiency of muscle in the upper portion of the lateral advancement flap needs a muscle edge flap for extra contour.

B.D. January 25, 1958
F.H. No clefts
F.T. Uneventful
O.C.A. None

28 months
5½ years
B.D. February 21, 1958
F.H. 3rd cousin with cleft lip and palate
F.T. Uneventful
O.C.A. None

R-A. At 2½ months

Revisions. At 7 years revision of vermilion. At 14 years V-Y vermilion tubercle, trimming excess cleft vermilion free border, alar rim excision and a chin implant.


Comment. If she looks this nice at 14 years, she will be beautiful at 18.
2/3 WAY CLEFT (CASE 30)

1. 3½ months
2. 3½ months
3. 2½ months postoperative
4. 4 years
5. 13 years

B.D. October 1, 1958
F.H. No clefts
F.T. Mother had leg infection
     first month
O.C.A. None

R.A. At 3½ months
Op. 1. Standard R-A without refine-
     ments. 2. Cleft mucosa interdigital-
     tion behind free border.
     3. Alar rim excision.

Original deformity and early result

Comment. When patient was re-
called at age 13, mother informed
me that her daughter did not know
she had a cleft lip.
Comment. This case did pretty well without a white roll flap.
Comment. Lack of refinements in this early case shows lack of finesse. The vermilion flap from cleft side overlapping the non-cleft side tends to give an asymmetry requiring secondary revision. This is reason for subsequent change to straight closure at this point.
B.D. July 16, 1961
F.H. Father had left unilateral cleft lip and palate
F.T. Uneventful
O.C.A. None

R.A. At 2½ months


Comment. Mucocutaneous junction at scar not camouflaged by white roll flap primarily so never natural. Diamond excision in this area was not effective.
1. 2½ months
2. 2½ months
3. 3 months
4. 6 years
5. 11 years

B.D. July 24, 1961
F.H. No clefts
F.T. Uneventful
O.C.A. None

R.A. At 2½ months
Op. 1. Rot with b-c. 2. c for col. 3. Adv with wr with vermilion, then did non-cleft mucosa to cleft side at free border.
H.P. Vomer flap at 11 months.
S.P. Island flap pushback at 15 months.


Comment. Greater deficiency of lip and more distortion of nose than in most incomplete clefts easily corrected with the rotation-advancement action.
**2/3 WAY CLEFT (CASE 35)**

1. **3 ½ months**
   - B.D.: February 15, 1963
   - F.H.: Maternal uncle had cleft palate
   - F.T.: Uneventful
   - O.C.A.: None

   **Comment.** Suggestion of bilateral cleft necessitated mucosal free border revision as a secondary procedure.

   **Revisions.** At 1 year. Vermilion trim. Alar rim excision

2. **3 ½ months**
   - R.A.: At 3 ½ months

3. **8 months**
   - **Comment.** Use of Simonart's band as the leading point of the advancement flap.

**2/3 WAY CLEFT (CASE 36)**

1. **4 months**
   - B.D.: February 3, 1968
   - F.H.: No clefts
   - F.T.: Uneventful
   - O.C.A.: None

2. **4 months**
   - R.A.: At 4 months
   - H.P. and S.P. Pushback with island flap at 14 months.

3. **4 ½ years**

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Way Cleft (Case 37)

1. 3 months
2. 3 months

3. 3 weeks postoperative
4. 4 1/2 years

B.D. July 23, 1964
F.H. No clefts
F.T. Uneventful
O.C.A. None

R.A. At 3 months
Op. 1. Ror with b-c; 2. c for col.
3. Adv with wr.

Comment. At least the rotation scar does not seem to limit his lip action.
2/3 WAY CLEFT (CASE 38)

B.D. December 1, 1966
F.H. No clefts
F.T. Uneventful
O.C.A. None

R.A. At 2½ months

H.P. and S.P. At 1 year pushback with island flap.

Revisions. At 6 years. 1. Horizontal full-thickness lip excision to shorten cleft side. 2. Denuded alar base advanced to septum to reduce flare. 3. Alar rim excision.

Comment. This is a rare example of slightly too much rotation which required full-thickness horizontal elliptical excision of lip at its join along the alar base and nostril sill on the cleft side to lift the bow to near symmetry.
B.D.  January 18, 1968
F.H.  No clefts
F.T.  Uneventful
O.C.A.  None

R.A.  At 3½ months

Revision. At 4 years.  1. V-Y tubercle vermilion.  2. Denude alar base and advance to septum.  3. Normal alar base reduction.

Comment. Rotation was not carried into the normal side but lip slightly long vertically, which suggests this is natural for this patient.
Comment. Rotation did not hug columella base quite enough so the upper part of the scar of union is not quite close enough to the nostril sill. Pretty good primary nasal correction with only columella lengthening, alar base positioning and alar rim revisioning.
B.D. March 9, 1960
F.H. Cousin with cleft lip who did not live
F.T. Uneventful
O.C.A. None

R.A. At 3½ months


Comment. A severe incomplete cleft which still requires minor lip and nose revisions.
3/4 WAY CLEFT (CASE 42)

Comment. Point of lateral advancement flap had to be taken from up in the nasal vestibule.

R-A. At 3 months

Revisions. At 9 years. 1. Scar to make white roll at mucocutaneous junction. 2. Alar base transposed into nasal floor. 3. Normal alar base reduced. 4. Alar rim crescent excision.

B.D. March 21, 1960
F.H. No clefts
F.T. Uneventful
O.C.A. None

1. 3 months
2. 3 months
3. 6 months
4. 3 years
5. 12 years
6. 12 years
3/4 WAY CLEFT (CASE 43)

B.D. January 17, 1962  
F.H. No clefts  
F.T. Uneventful  
O.C.A. None  

R.A. At 3 months  
H.P. vomer flap at 10 months.  
S.P. Pushback with island flap at 13 months.  

Revisions. Slight vermilion trim at 7 months postoperative.  


Comment. Another evidence of early contracture at 3 weeks that smoothed out in several months. This is one of the first "white roll" flaps!
Comment. The repeated need for lateral groove bolstering and revision of cleft side vermilion caused change from posterior mucosal flaps to muscle edge flaps in the primary surgery.
4/5 WAY CLEFT (CASE 45)

B.D. March 3, 1959
F.H. No clefts
F.T. Uneventful
O.C.A. None
R-A. At 6 weeks.


S.P. Closed with Wardill V-Y hamular fracture and Limberg osteotomy.
B.G. At 9 1/2 years split rib bone grafts across and in cleft.


Comment. One of the early cases complicated by a groove of muscle deficiency in the lateral element. No refinements, extensions or modern adjuncts were used, and the rotation scar is a little too oblique for a normal philtrum line. No primary nasal tip correction; necessitates revision at 16 years.
30. Postoperative Care

All visible suture lines are covered generously with an antibiotic ointment. Then a Logan bow is placed across the sutured lip with inward tension on the cheeks.

William H. G. Logan, a soft-spoken, diplomatic plastic surgeon and Dean of the Loyola School of Dentistry, was also the son-in-law of Truman Brophy and in a sense directed the Brophy principle of metal control of cleft parts to the postoperative protection of the sutured lip. In 1921 he designed a curved metal piece with spiked loops on each end through which tape could be passed and secured. This device has enjoyed popularity in many cleft surgery clinics over half a century. In 1923 Brophy endorsed his son-in-law’s bow in his usual dogmatic and persuasive manner. In his book *Cleft Lip and Palate*, with the accompanying illustrations, he wrote:

This is Dr. W. H. G. Logan’s invention and it is not open to the slightest objection. Tension on the lip may be increased or diminished at will, and this is a feature that has not been possible with any other method. It not only holds the lip in a state of quiet without pressure against the vessels, but at the same time allows access to all its surfaces so that they may be kept absolutely clean and the process of repair may be watched from the time of operation until the sutures are removed. The horsehair sutures may be removed from three to five days after operation, thus avoiding suture scars, while the appliance remains.

Although today some surgeons sneer at the Logan bow, I still feel it helps to relax the operative site and counteract the deleterious effects of crying and laughing on the wound edges, thus affording better insurance toward ideal healing. At the same time,
it protects against an unexpected blow as well as leaving the wound exposed to facilitate local treatment of the suture line. The metal arch of the bow stands like an identification flag on a ship to warn the nurses of what has been done because after surgery, with ointment over the suture line, it may not be obvious that a cleft has "been and gone." It is extremely important that those attending the infant not let him lie face down!

The standard nursing care of the cleft lip wound previously entailed constant cleansing of the suture line with hydrogen peroxide to remove crusts. This is painful and irritates the stitches and the wound. I therefore cover the suture line generously with an antibiotic ointment after the surgery. The nurse can keep the sutures covered by application of the ointment three times daily after meals. The ointment protects the stitch holes from the contamination of constant nasal discharge, prevents crusting and keeps the sutures soft for easy removal on the fourth postoperative day. The antibiotic ointment is continued one day after suture removal until the stitch holes are sealed.

Other early postoperative precautions are taken. Sedation is ordered for excessive crying as this will cause undesirable tension on the healing lip. Arm restraints are applied to the elbows to prevent the infant from getting his fingers into his mouth and inadvertently separating the new wound. A slatted elbow restraint is made by sandwiching tongue blades side by side between two layers of 4-inch adhesive tape or fitting them into a cloth band with tie straps. This straitjacket is wrapped around the infant’s elbow at the end of surgery and pinned to the pajama shoulder to prevent slippage. Plaster of paris elbow casts are also effective.

**TAKING OUT THE STITCHES**

Suture removal is one of the most difficult procedures in postoperative care. Many surgeons in desperation resort to general anesthesia to keep the baby quiet long enough to remove the stitches before a head jerk pulls open the freshly healed wound. Others sedate the baby, then wake him up to strap him on the
treatment room table and with his soft little head in a hand vise and a bright light in his eyes extract the sutures painfully one by one.

I am willing to take any amount of time to place the sutures exactly but not one second to remove them, so a method was worked out by nurses Janet Kuszaj and Beverly Wirch that has proved very successful. On the fourth postoperative day, the baby is fed and is given sedation equal to the preoperative order. One hour later the baby will be found sound asleep. The side of the bed is let down quietly, and with fine smooth forceps and tiny sharp scissors the sutures are removed with great care. The baby seldom stirs during the procedure. This takes a steady hand, a good eye, great patience and a love of babies, but then so does all of pediatric nursing.

FEEDING AFTER LIP SURGERY

After the cleft in the lip has been closed and the muscles of the lip are approximated, it is important to give this wound as much immobilization as possible to encourage good healing. The Logan bow is an aid. If the baby is allowed to suck a nipple, a pull will be exerted on the new lip scar. The baby is best fed by a method that does not require the sucking movement—that is, the same routine used before surgery. The baby is held upright in the crook of the nurse’s arm with his head in her left hand. A 1 1/2-inch rubber catheter attached to the end of a 50 cc. Asepto syringe can be slipped past the baby’s healing lip and over the tongue. The liquid can be introduced by the squeeze of the bulb at whatever speed and amount the baby can tolerate easily.

The type of diet ordered by the surgeon for the postoperative cleft lip is called a cleft palate diet. This usually consists of clear fluids only for 24 hours, then half-strength formula for 24 hours, to be followed by normal formula. Like most orders that become habit, this diet is outmoded. As soon as the baby reacts fully, clear liquids are safe, and after 12 hours there is no reason why regular formula cannot be started. Return to bottle feedings one month after surgery is allowed unless there is also a cleft of the
palate. In this case the Asepto technique should be continued until some time after palate surgery.

Antibiotics are not used routinely. If the lip wound shows inflammation, they can be instituted, or if there is temperature spiking that cannot be explained by dehydration, a short course of antibiotics is in order.

The patient is allowed to go home on the fifth postoperative day with the Logan bow and elbow restraints in place. The bow and restraints will be removed after two weeks. Prior to discharge, the mother is retaught to feed her baby with the Asepto feeder.

It is important for both parents and pediatrician to realize that the lip scar that is red, firm and contracting at one month after surgery usually will be soft and pale at six months and almost invisible at one year. When a minor lip correction is necessary, it is usually done at six months or postponed until time for further palate surgery.