VI. Complete Clefts
SOME EXPRESS RESERVATIONS

ALTHOUGH Clifford and Pool accepted the rotation-advancement in incomplete clefts, they were the first to express some reservations about its use in complete clefts. These judgments were, however, based on early (now obsolete) diagrams. This was their logic:

In the Millard repair we see that the vertical height is gained by the use of a modified "Z" with lateral mobilization under the nares. The greater the vertical height needed, then, the more will be the lateral mobilization needed with added tension under the nares. Tension at this point is a great disadvantage in the wide cleft where this falls right over the separated alveolar ridge. In the complete unilateral cleft, in order to gain sufficient height with the Millard repair, the incision must be carried up through the philtrum, across the base of the columella on the uncleft side. To match the length of this incision some vermilion of full thickness of the cleft side must be sacrificed. This puts maximum tension in the Millard repair at two points; the first just under the base of the nares and the second at the white line of the vermilion.

They went on to say:

An advantage of the flap procedures which are done at the lower half of the cleft is that they put the line of maximum tension below the alveolar ridge at the point where the lip normally begins to pout.

I thought this interpretation incorrect and soon said so.
My response was published in 1960 under the title “Complete Unilateral Clefts of the Lip”:

Yet as some express anxiety when facing a severe complete cleft [with the rotation-advancement]. . . . Any closure of a wide cleft is more demanding and will call for a point of tension. The point of contention is where this point of relative tension is best tolerated—along the lower portion of the lip where any tightness is reflected in the loss of natural looseness of the free border, more in LeMesurier and less in Tennison, or high in the lip just under the nasal base where tension is almost mandatory anyway to correct the gaping nostril floor and grotesque flare of the alar base? In the latter any relative tension is splinted by the maxillary processes. This also produces a natural eversion of the free border of the lip. It might be said that if one can get a closure at the high point the possible distortion will be minimized. Thus, the flap from the lateral lip element has been designed to come from the upper portion and its medial advancement across the cleft will bring the delinquent alar base along with it into line. . . . A wide cleft should not, in most cases, require any more radical rotation than an incomplete cleft. The increased demand is the distance required for the lateral flap to advance across the cleft. Yet, as the width of the nostril floor and the flare of the alar base is [usually] greater in wide clefts, it follows that the distance the lateral flap must advance medially is also increased. Thus, it is suggested the rotation-advancement principle is actually more effective in wide clefts and certainly its margin of advantage is as definite in complete clefts as in incomplete ones.

A helpful hint in timing was also mentioned:

The time factor is an ally in the wide clefts. Although the rotation-advancement method has been used very early with success, it has been found far easier in a fat and pink three month old infant. The tissues are more generous for the approximation and the maxillary components have had at least three vital months to grow without lip restraint. Because of the former and in spite of the latter, the cleft is relatively less “breath-taking.”

Ross Musgrave in 1963 joined with Clifford and Pool in selective use of the rotation-advancement method.

When this procedure is used for the severe complete cleft lip, some difficulty has at times been encountered with the lateral flap development. Extension of the incision far down the lateral side of the lip may be required, producing tension just above the mucocutaneous ridge. . . . In the wide
unilateral clefts repaired in this manner, the involved nostril may appear small and rolled in for the flap developed below the lateral nostril insertion must be brought far medially beneath the columella. Furthermore, where the cleft is severe and the upper point of the cupid's bow lies close to the columella on the cleft side, the "uncurling" and dropping down of the medial lip segment has at times presented a problem.

Along the same line, and as late as 1969, Russian Kozin stated:

It is not possible to use the Millard method in those cases where there is a large defect of the lateral part of the lip in vertical as well as horizontal direction. In such cases, it is most appropriate to use a modification plasty according to Kawrakirov in which, in relation to the degree of lack of tissue, two opposite triangular wedges with angles of 60°, or 45° and of 70° respectively are cut from the base of the skin part of the nasal septum and from the involved nostril.

Actually, the medial incision varies the angle of rotation, and the lateral flap is based above, as advocated by Wynn. It is, in fact, a Z-plasty positioned higher in the lip and is shown here as a secondary procedure. It promises no better solution to wide clefts with deficient lateral lip elements and, in principle, does not offer many of the assets of the rotation-advancement.

In 1965 Jorge Psillakis of Brazil reported excellent results with the rotation-advancement method in incomplete clefts but not as good results in complete clefts. Yet, the results he showed which revealed retraction were only from one to three months after surgery!

A CLEARING POOL

The beginning of a breakthrough came in 1966 when Robert Pool of Michigan, the tall, ambling, artistic and astute surgeon of Dutch descent, with more experience in the method and a six-year follow-up, approved its use in wide clefts. He made some interesting observations:

In the series of cases reviewed, it was discovered that the rotation-advancement repair could be used effectively in all types of lips except when the lateral lip is short in both horizontal dimension and in its vertical height. The lateral lip is the key which locks the medial element in place. A clue
to this type of lip lies in the amount of tissue available medial to the alar base, and in the measured vertical height of the existing cupid's bow. It is probable that this type of lip would be difficult with most repairs and certainly will not result in a full lip under any circumstances.

Pool made several other points:

Technically the rotation-advancement repair is simpler to execute than most triangular flap repairs. For this reason most novitiates in plastic surgery will obtain better results with fewer secondary problems. . . . It has been found that if all layers are accurately approximated and a pleasing lip is attained at the time of primary surgery, the lip height and contour will be precisely similar after a five year period. This repair, although basically uncomplicated, does not allow the surgeon to do a casual repair. . . . The eye can detect asymmetry of less than 1 mm. If a lip repair is performed in infancy and normal growth and development occur the acceptable range of error at the time of surgery is less than 0.5 mm.

**THE UNSUITABLE LABEL**

Yet the label "not suitable for wide clefts" continued to be stamped on the rotation-advancement method by some surgeons. As Mark Twain once said,

> Often the less there is to justify a traditional custom, the harder it is to get rid of it.

DeHaan commented in 1968:

> We have had somewhat more success with the triangular flap method than with Millard's superiorly placed flap which is sometimes difficult to advance adequately.

Chase also, in 1963, reported that, although he generally employs the Millard infranasal Z-plasty since it places the primary scar along the normal philtrum line,

in order to achieve precise measurements in lips, when more vertical length is needed than can be provided by the Millard technique, the author favors the triangular flap supravermillion Z-plasty described by Tennison.

In a discussion with Bob Chase during the half-time intermission of the 1971 Super Bowl game in Miami, and over the
blare of the bands, he indicated that he was using the rotation-advancement method more in wider clefts.

**PERKO**

Even as late as 1971 at the Stomatology Institute of the University of Zurich where my old friend from "Gillies days" Professor Hugo Obwegeser is doing such brilliant work on facial bone shifting in clefts, there were still reservations with the rotation-advancement method. Yugoslavian Milivoj Perko does most of the primary clefts for this unit. With orthodontist M. Hotz he stated in *Minerva Stomatologica* that, when the cleft is incomplete or when the lip muscles are well developed and the cranium is of good size, he prefers the rotation-advancement method. Yet when the cleft is wide, the muscles are underdeveloped and the cranium is small, he prefers the Tennison procedure. Perko, an expert on the facial skeleton, evidently has found some correlation, but my Italian is so sketchy that the only translation I have been able to come up with is: If the head is normal size, use the rotation-advancement; if microcephalic, use Tennison. I would have to go along with that.

For complete clefts, Perko and Hotz reported difficulty using the rotation-advancement, finding that tension along the mucocutaneous border caused loss of the pout. Perko evidently is not satisfied with Tennison either, as he modifies the method with a Trauner flap.

He responded to my challenge in 1972 and confirmed his stand:

In most of the cases where I use your standard rotation-advancement method, this method is performed without any modification. I personally use very often your method, especially in partial and narrow cleft lips and find it an ingenious one. Only in a few cases an additional Z-plasty on the vermilion border was necessary.

In very wide clefts I still use the Tennison-Randall method, combined with a Z-plasty on the base of the nostril, similar to the description of Trauner and Skoog.

It was, therefore, a special pleasure to visit with the gentle,
sincere "Voyo" Perko over a breakfast Danish during the 1973 Cleft Palate Congress in Copenhagen and encouraging to hear his quiet response to my questioning.

Yes, I now use the rotation-advancement method in almost all primary cases because of the correction of the nose.

When asked if he still had difficulty with the rotation in wide clefts, he shook his head and said, with a suggestion of a smile, No, the downward cut at the end of the incision is helpful and produces a better scar than the triangular flap, which is not always so nice.

**BREAKING THE BARRIER**

Several surgeons, including such renowned ones as Randall and Cramer, have cited and taught that a difference of 3 to 4 mm. between the vertical height of the two bow peaks on the non-cleft element is the automatic cutoff limit for using the rotation-advancement. They have always said simply that they have difficulty rotating the cupid's bow into symmetry with more than that distance to go. Of course, the back-cut should wipe out this cutoff.

To drive the point home, let us turn, not even to a complete, but instead to an incomplete cleft in little Sandra of Jamaica. Her medial lip element measured 9 mm. from columella base to bow peak on the non-cleft side and only 2 mm. on the cleft side.
9 — 2 = 7! but the bow came down into perfect symmetry with a minor back-cut and very little difficulty.

At the 1973 Foundation Cleft Lip and Palate Symposium, expertly produced by Nicholas Georgiade at Duke University Medical Center, a few recent adjuncts designed to facilitate rotation and advancement in certain cases were presented. The following day in the hall, I challenged a young innovative surgeon who I knew also suffered the 3 mm. hang-up. He admitted with a twinkle that he still preferred the inferior triangular flap with more than 3 mm. bow discrepancy, and when I asked,

Even with the back-cut?

he responded with a switch:

Oh, I have no trouble with getting enough rotation. It’s the deficiency on the cleft side.

I wondered why the rigid 3 mm. limit was being used for the cleft side and countered,

Did the adjuncts just presented in measuring and extending the cleft side and the muscle flaps from the medial side help to alleviate this hang-up?

He mumbled defensively and almost as an aside,

Oh, by a little cheating, you mean?

Then I went for him.

Let’s try to get this into perspective. You are imposing inflexibility by presupposing that a published description dogmatically sets an iron rule and any modification is unfair infraction of that rule. No! That’s fuzzy thinking. Any method should be accepted merely as a proposed principle which for each case can and should be varied, not by cheating but by creating!

CATCHING A WILY ONE

There were just too many good men along with the others joining what I affectionately refer to as the loyal opposition. A
statement by Musgrave in 1963 and repeated in 1964 had caused me many a sleepless night. He wrote:

In Millard's hands and the hands of some other surgeons, this procedure has been satisfactorily used for all forms of unilateral cleft lip.

What was the hang-up? Eventually it was realized that the back-cut in rotation and the circumalar extension in advancement were the previously undescribed and inadequately illustrated essentials that were making the difference. These details were stressed in Rome in "Rotation-Advancement in Wide Unilateral Lip Clefts" and elaborated upon a year later in "Extensions of the Rotation-Advancement Principle for Wide Unilateral Cleft Lips." The "extensions" caused Musgrave to state in Rome that these modifications presented a new operation which deserved reconsideration in wide clefts.

Yet, over the past few years, the talented Ross Musgrave has continued to have a "thing" about different degrees of cleft being more suitable for different procedures. I think this is nonsense, and Ross and I have gone round and round on it, but until recently he has held tight to the theory. In 1971 there seemed to be a little weakening for he admitted about the rotation-advancement method:

A minimal amount of tissue is discarded. The ultimate suture line direction is superior to any of the zigzag scars. . . . It is a fluid method that can be adjusted as one proceeds. It is by far the method of choice for the majority of cleft lips.

He acknowledged the refinements and extensions proposed to facilitate rotation and advancement and labeled it the Millard II,

in which a much better nostril is created both at the apex and at the base of the columella. The Millard II, which is much trickier for the inexperienced surgeon, continues to have the disadvantage of extending the lateral incision too far down the mucocutaneous ridge toward the lateral commissure.

This is not necessarily the case if the operation is done correctly. Measurement from the height of the cupid's bow to the
end of the lateral commissure on each side should be within 1 to 2 mm. In fact, the width of the cleft offers no real problem in the rotation-advancement approach.

A RUSE ON ROSS

Only after several sleepless nights did I finally figure out how to persuade Musgrave. The plan was to do an adhesion procedure and turn a very wide cleft into an incomplete one and wait six months. Then, without telling Ross, I would get the case to him and, as it would be an incomplete cleft, he would use the rotation-advancement voluntarily according to his gradation theory. The result would make him so happy that one evening over a beer he could be told the truth and he would be hooked forever . . .

November 30, 1972, before this subterfuge could be perpetrated, Ross Musgrave wrote me a congratulatory note on the Dolphins football team's record up to that time of 12 and 0. As an afterthought, he added:

Incidentally, I think you should know that for the very wide cleft lips I am now using the Millard II almost exclusively, and in the past year have done only one triangular flap and no rectangular flap operations for the wide cleft. In my "canned lecture" carousel, I now am using the Pigott illustrations you so kindly sent me. I am combining this with the little stitch from the opposite nostril to the tip of the advancement flap which you described in Melbourne.
CANADIAN COMPARISONS

BRUCE WILLIAMS, at the Montreal Children’s Hospital, even in his residency began using the rotation-advancement method. Surgeons had previously been using LeMesurier and Tennison. In 1968 he reported a “comparison of LeMesurier and Millard techniques.” Two distances, a point from the nasal floor to the height of the cupid’s bow (a), and to the commissure on the cleft side (b), were the important measurements in the assessment. He found that in incomplete clefts the rotation-advancement graded ahead of the LeMesurier. In complete clefts both ratings were lower than in incomplete clefts, and the rotation-advancement method graded insignificantly less than the LeMesurier. Williams, however, was using the rotation-advancement as originally described without either refinements or extensions, a fact which must nullify, at least in part, the results.

Williams’ original study did cause me to focus more carefully on the commissure as a landmark, but for me the distance from the cupid’s bow peak to the commissure (2 to 3) is the important guideline. With this additional adjunct and the aid of the extensions, the rotation-advancement method consistently checks out exceptionally well.

Remembering that Williams had previously been using the early rendition of rotation-advancement, I asked him recently about his present stand. This was his answer in January 1973:

The more recent modifications, that is, further curving of the upper medial incision and advancement of the small upper triangular flap into the columella, in conjunction with undermining and freeing of the alar carti-
lages with suturing at the dome, have changed the original operation considerably. I would agree with Ross Musgrave that the operations should be listed as the Millard I and II. I usually reserve the latter operation for the wider clefts and in those where I have difficulty in rotating the alar cartilage into a good position. I use only a slightly modified Millard I procedure for incomplete clefts or for those with a narrow gap.

**ANOTHER COMPARISON**

M. A. Dion and J. Parenteau, also in 1968 and also in Montreal, stated:

The senior author has been fortunate to observe the late operative results of LeMesurier, Tennison and Millard methods of repair. Since June 1964, the Millard procedure, which has given outstanding results, has been used as the primary method at St. Justine Hospital, Montreal. . . . We prefer this method for the following reasons:

1. The distortion of the philtrum is minimal, particularly at its lower part where minor deformities are most noticeable.
2. The nostril on the cleft side can be narrowed and permanently fixed in a more normal position.
3. The columella is lengthened, thus correcting the most common deformity in the cleft lip patient. The base of the columella is lifted from the nasal spine and moved toward the cleft side. The techniques of LeMesurier and Tennison destroy the integrity of the lower third of the philtrum and often leave the nostril floor wide and distorted.
4. Because of its simplicity and versatility, this technique is adaptable to all cleft deformities.
5. Revision of cleft lip that was previously repaired in an imperfect manner is readily completed with this procedure.

In the same year, 1968, but at the opposite end of the earth at Lady Ridgeway Hospital for Children, Colombo, Ceylon, Dr. S. F. Wickramasinghe wrote:

Doctors Furnas and Stokley left behind the rotation-advancement operation for cleft lip. I do not wish to sound boastful, but I honestly believe that my results have improved since my conversion.

**AN ALLENTOWN COMPARISON**

It was rumored that Allen Trevaskis of Allentown had actually dared to use the rotation-advancement method in the "lion's
den.” I wrote him in June of 1972, and the reason he gave for his change is confusing, as is the summation of his results, but you had better hear it directly from him:

As Dr. Marcks’ associate I had at least 10 years experience in the repair of unilateral cleft lip with the triangular flap method, as conceived by Dr. Tennison and modified by Dr. Marcks.

When you published your first paper, I decided to convert to your method—not because I was dissatisfied, I simply felt that it would be a good opportunity to see if one method was better than the other.

From that time to the present, Dr. Marcks and I “went our different ways” in so far as this specific bit of surgery was concerned. Our friendly competition to produce the best lip permitted an on-the-spot comparison of the two methods.

Naturally my early trials with the rotation-advancement method were punctuated with new problems, but as time passed and as I kept reading your later bulletins—I found some of the answers.

In my experience at least several points of comparison are worthy of notation:

1. The rotation-advancement does not lend itself to building a balanced nasal floor as well as the Marcks’ method.
2. The rotation-advancement technique frequently produces a more noticeable scar in the upper 1/2 of the lip.
3. The scars of the Marcks lip are quite thin (by comparison) but this advantage is outweighed by the unalterable direction of scars where scars should not be.

I can honestly say that though the end results are different, one method is not superior to the other. The essence of the matter seems to be the experience and ability of the surgeon, plus a little bit of luck.

RANDALL’S RANDOMIZED COMPARISON

It is particularly encouraging that Randall is carrying out a series of cases for comparison in which he is operating upon infants with cleft lip at random, one-third by the Tennison-Randall procedure, one-third by the rotation-advancement and one-third by what he refers to as a “combination of the two.” The third group is actually treated by the rotation-advancement plus Randall’s triangular muscle flap taken from the cleft side and inserted into a pocket in the lower border of the medial element. He admits using the rotation-advancement approach in complete clefts but only after a preliminary adhesion. He also has his own
cutoff point for use of the rotation-advancement method set at those cases in which the peak of the bow on the cleft side is more than 4 mm. short of the normal, requiring greater rotation. As he explained:

Poor results for me in the rotation-advancement method come when there has not been enough rotation and poor results in the triangular flap where there has been too much release.

As rotation has never been and should not be a problem and the value of Randall's randomized comparison seemed to hinge on the accuracy of his execution of the rotation, I was pleased when Peter accepted an invitation to stop over in Miami on his way to 1971 Christmas sailing off St. Thomas in the Caribbean. A wide cleft after a four-months adhesion was scheduled, and its execution from the radical rotation to the mucocutaneous interdigitation went well. Randall and I worked together to find a suitable place for the excess skin and mucosa of the "adhesion throw away" along the Muir-Horton-Cramer plan. A small Randall triangular muscle flap had been preserved. With the usual fullness on the non-cleft side, there seemed no real need for it in this case, and with due apologies it was finally discarded.

In discussion later Randall revealed a slight inflexibility when he still insisted that in the more radical rotations the necessity of crossing the midline offered the danger of lengthening the vertical height to a "Mickey Finn" lip. This crystallized for me where others must be hanging up and I presented the following clarification to Randall:

It is advantageous to cross the midline as marked by the mid-base of the columella but it is "against the law" to cross as far as the opposite philtrum column. Not only is the height of the bow on the cleft side short but so also to a lesser degree is the central point of the bow. Both must be lowered into normal position. The rotation may extend slightly past the center of the lip to let the center of the bow down. Then the cut-back will increase the remaining rotation without the necessity of entering the normal column on the opposite side. As long as the distance from the alar base to the height of the bow peak on the normal side is unaltered and remains normal for that lip and as soon as the other two points of the bow are maneuvered into normal balanced position the game is won!
Randall agreed.

In fact, at the 1973 Foundation Cleft Symposium at Duke University, Randall showed a fine result with the rotation-advancement method incorporating his inferior muscle flap. It was in an incomplete cleft, but it is a good beginning.

RUT JUMPING

It is asking a lot to expect a surgeon who has developed his own method and is proceeding with great momentum suddenly to check and veer or "come about." Almost as difficult is it to dislodge an established surgeon set in his ways. Thus, older surgeons are less likely to change while residents, unencumbered, are more receptive. In general, such has been the case with the rotation-advancement even in programs headed by a chief who is adamant in his loyalty to some outmoded method. In most teaching programs the chief will let the residents make their own choice from several standard methods; if not, they merely wait until they are free. . . .

There are established surgeons who enjoy an "open attitude" and with it the ability to adapt, which is responsible for their being able to improve constantly on their own performance.
COMPLETE BREAKTHROUGH

Bob Pool, who had spearheaded the resistance in 1959, by 1970 had reviewed his cases of rotation-advancement and compared them with his cases of the Tennison type of triangular flap. At Colorado Springs he presented results like this one with a varying follow-up of four or five to six years.

He concluded:

The results from the rotation-advancement were more pleasing functionally and cosmetically due to a more symmetric cupid’s bow, a smoother philtral ridge camouflage, better dynamic and adynamic muscle balance, and less tendency for the occurrence of a redundant flattened lateral lip with a thick vermilion border. Staggered line closures in the lower third of the lip have produced flattening of the cupid’s bow even when the primary measurements were precise and accurate. This unfortunately was not predictable.
and could not be quantified. With the rotation-advancement repair this series suggested that the operative posture was an excellent guide to the five year appearance of the lip. Finally, the tip of the advanced lateral flap must not be utilized as structural support from lateral to medial lip. Instead this must form the fullness where the philtrum meets with the columella, and for that reason solid deep muscle support is the cardinal point in obtaining the camouflage of the philtrum.

Finally, in June 1971 Pool wrote:

There is a large misconception in reference to the complete cleft lip. Everyone makes a great point of the width of the cleft and I may have been guilty of this error in the past myself. This is not the critical point, as you well know; rather it is the vertical height that gives greater problem than the width of the cleft. The rotation-advancement repair, in my opinion, is without a doubt the dominant method used by practicing plastic surgeons. Thus I believe that we should stop all this intellectual bloodshed about the other methods and go to the panel discussion of refinements in the rotation and advancement as well as the errors made by the inexperienced in this particular repair.

Another advocate of the rotation-advancement principle in all clefts is steadfast David O. Maisels of Liverpool, who was trained by Osborne, a student of Kilner, and in 1965 spent a year with me in Miami as an R. W. Johnson Fellow. He had the opportunity to see both sides of the lip picture and wrote, in his 1966 Kay-Kilner Prize winning paper, a comparison:

At the end of the scale we have the Kilner/Rose/Thompson type operation which often results in a lip which is too tight, especially after secondary repairs necessitating the sacrifice of tissue to obtain adequate length. This tightness, particularly in the lower third of the lip, produces an excessive moulding effect on the alveolar segments and contributes to collapse. The nasal deformity being uncorrected at the primary operation, subsequent development of the nose is faulty and secondary correction is frequently extremely difficult. . . . At the other end of the scale are the modern operations, the best of which is undoubtedly that devised by Millard, which not only preserves the natural landmarks of the lip and restores them to their normal position, but also corrects the nasal deformity to a very marked degree. This allows the subsequent growth and development of the nose to proceed normally and should render superfluous all but the most minimal of secondary corrections of the nose. By placing the tension high in the lip it has been noted that the Millard operation has a more favorable effect upon the arch alignment (Joss 1964).
He repeated one aspect:

Since it is believed that adoption of the Millard technique for unilateral clefts will eliminate the need for secondary procedures of any magnitude no further discussion on their timing is called for.

Furthermore, Maisels has deigned to extend the rotation-advancement principle beyond lip clefts. As he wrote:

A similar technique is applicable to a number of other situations, principally those in which there is a triangular shaped defect with one base bordering upon a free margin.

Thus he and Nabgy Saad in 1969 applied the principle to the repair of alar margin notches, and Saad and Maisels in 1972 reapplied it to defects of the lip and eyelids.

A TEACHER'S APPROVAL

Bill Holdsworth, trained by Gillies and McIndoe, was one of my cleft lip and palate instructors in England in 1948–1949. He is Australian, born with a yearning for the sea, and whenever absent from Rooksdoun House usually could be found as a ship's doctor on a voyage to the New World or "down under." He has large steady hands and as a hobby he constructed toy ships in narrow-necked bottles—two- and three-masted schooners no less, and rigged in full sail. As it is seldom that a teacher acknowledges the work of a pupil, I quote with special pride Holdsworth's 1970 edition of Cleft Lip and Palate:

There is advantage in a plan which can be varied during its execution. To cut exactly on a drawn line is not easy. The skin yields to pressure from the knife, and stretches if pressed or pulled. However accurate the design, angles open less, or more, than expected, and edges to be sutured together are found to be unequal. In such contingencies the only hope of a symmetrical lip is to be able to redesign the opposing flap. The Millard operation is the only one in which this can be done easily. With it the surgeon is not tied to his design, and the plan is never his master.

Holdsworth cited other reasons for choosing this method:
1. Little tissue is discarded. Only the cleft edge is thrown away, and there is no removal of skin from the upper part of the lip to bring about eversion. The natural bow is preserved and can be placed easily in the centre of the lip.

2. Full eversion results from preservation of the border, often in its entirety, and from tightness in the upper lip, where the defect beneath the columella is closed by advancement of the lateral part of the lip.

3. The line of muscle closure is not over the cleft, but more medially, in front of the premaxilla, which provides a better seal than sewn mucosa.

4. Skin can be spared for increasing the deficient side of the columella adjoining the cleft. This makes equalization of the nostrils possible.

5. The outstanding advantage is in the location of scars. These are longer than with other methods, but those beneath the nostril become unnoticeable, and the long vertical scar imitates the absent pillar of the philtrum. There is no other operation which leaves the lateral plane of the lip unmarked, and in the absence of a line running down from the nostril a major stigma of cleft is taken away.

Holdsworth also confirmed a point I have made numerous times, namely, that there is spontaneous correction of contracture if the procedure has been executed correctly.

With single clefts, parents are warned about contraction in the scar, since with healing the operated side of the lip may be pulled out of shape. The Millard operation, with its long scar-line, curved and unbroken, is more prone to this disturbance than most. Providing healing is uneventful, and mucosa has been well wrapped around the back of the lip to seal the muscle union, tightening of the scar will not cause permanent deformity, and resolution can be awaited with confidence. Softening of the lip continues for years, and straightening may take as long. This applies only of course if the operative procedure was performed correctly and the medial element let down fully.

He presented a case that five months postoperatively still showed some contracture but after four years showed perfect symmetry.

**SOME EXPRESS NO RESERVATIONS**

During the March 1970 Cleft Lip and Palate Symposium in Miami I baited Professor Stefan Demjen, previously of Bratislava.
slava, Czechoslovakia, then of Iowa City, but now again at Comenius University in Bratislava, as chief:

Ever since Clifford, Pool and Musgrave started the idea that the rotation-advancement method is unsuitable for complete clefts, many have been hesitant, even afraid to try it.

Demjen, an adroit technician with vast experience, gave an answer that was pertinent:

Yes, it has almost become a superstition. I don't know why as I have never found any difficulty with it in complete clefts. It is not how long you make it, it is how you make it long—but the rotation 'back-cut' is important.

In Colorado Springs in 1970, as Pool was giving an erudite evaluation of the rotation-advancement method in all types of clefts which he substantiated with excellent lip results, Georgiade in the back of the lecture hall whispered:

I don't know why there is so much discussion. I've never seen a cleft yet in which I couldn’t do a rotation-advancement.

This flat-footed statement by such a light-footed tennis player stimulated my extraction of a summer of 1971 invitation to Duke University. It was a visit long overdue for me as I had been anxious for years to see with my own eyes the North Carolina unit which Ken Pickerell pioneered into one of the strongest and most productive plastic surgical teaching centers in the world. I had an opportunity to observe Nick Georgiade do a two-layer Campbell alveolar cleft closure and a rotation-advancement procedure on an incomplete cleft lip. His surgical ability during the entire procedure was impressive. I was invited to do a wide complete cleft which caused me a little more than the usual difficulty but which seemed to turn out pretty well. Then I stood over senior resident L. McCraw while he rotated and advanced a complete cleft with both skill and poise. To my great pleasure but much as expected, Nick had backed what he claimed and “in spades.”
A YOUNG TURK

A worthy proponent of rotation-advancement in the Middle East has been Guler Gursu of Turkey. She works in Ankara, once the land of the Hittites but now a typical college town. It was somewhat disillusioning to discover that since 1923 the fez, veil and harem have been banished legally from this exotic country. In the same spirit of progress, some of Turkey’s more enterprising doctors travel to foreign hospitals to study.

“GiGi,” as she has become known in the States, became a resident under Barsky, Simon and Kahn at Mt. Sinai Hospital in New York, where unilateral clefts were getting the LeMesurier and Tennison treatment. Then, at a cleft palate meeting in Washington, D.C., in her usual forthright style, she asked me a leading question on lip in the hotel coffee shop and received several sketches on a paper napkin. Upon return to Mt. Sinai, she solicited the cooperation of senior resident Saul Hoffman, and together they did their first rotation-advancement operation in “silencio.” Later in 1961 Gursu accompanied our plastic team to Jamaica on a “cleft” trip and spent several weeks in our unit at the University of Miami. Then she returned to Turkey and by 1965 had become associate professor and chief of plastic surgery at the modern university in Ankara, Hacettepe Medical School. This is an abstract of her fight for plastic surgery:

There was no chair for me. I do not mean academic, I mean even a chair literally to sit on, no instruments, no residents, no program and no patients!

This girl, with flashing dark eyes behind glasses and true Turkish tenacity, scimitared her way inch by inch until in 1967 she had developed a respectable plastic surgery service. Then, at the Rome International Congress, she noted the extensions in rotation-advancement, as she wrote in 1973:

I had been able to close every wide cleft before the circumalar incision extension but after 1967 that little trick made it much easier for me and gave better results for the patients.
Over the past seven years she has rotated and advanced 175 times, and, as she says,

Rotation-advancement is easy to perform, does not require complicated measurements and it is very simple to teach. It usually takes me no more than one or two cases with each resident helping him mark the anatomical points and plan the basic rotation of flap A with its “back-cut,” advancement of flap B with its extended alar incision and use of flap c. Then they have to learn to fiddle around in their own way with the final millimeters.

Her first resident, Onur Erol of Istanbul, who found this method easy to learn and teach, is at present working on an in-depth study of 563 clefts seen at Hacettepe University from 1957 to 1971.

**FINLAND**

From the Finnish Red Cross Hospital for Plastic Surgery in Helsinki, where 99 percent of clefts of this country are treated, V. Ritsila, S. Alhopuro, R. Ranta and A. Rintala reported in 1973:

The surgical procedure has included our routine method of modified Veau’s anterior palatoplasty with mucoperiosteal flaps to the nasal lining and repair of the lip with Millard’s rotation-advancement technique.
ADAPTABILITY

Gerald O'Connor pointed out the unpretentious, clairvoyant George Scrimshaw, chief plastic surgeon of the Kaiser group of hospitals, as having "one of the best lip and nose repairs in the Bay area." I wrote Scrimshaw, of Oakland, California, for detail. He responded with sketches and expounded with specifics:

I have used the rotation-advancement technique for all clefts in the past ten years. It has been, for me, satisfactory in all cases, and I prefer it to any other present operation for lip repair. Everyone modifies each technique as he uses it, and I found early that I could work out my results better with certain changes. Some of these were presented in one of your later papers and I was pleased that my changes were in the same direction.

In unilateral clefts, I have found specific measurements to be a very dependable guide during surgery. Most of my patients are approximately 3 months of age at operation. At this time the distance from the midpoint of the columella base to the normal peak of Cupid's bow (AB) is between 9 and 11 mm., usually 10 mm. This is also the distance from the normal alar base to the Cupid's bow peak (CB). Usually the distance from the alar base to the lip vermilion directly below it (CD) is also 10 mm. Thus AB = CB = CD. In measuring the cleft side, I measure from the alar base and describe an arc 10 mm. in radius. Where it intersects the skin-vermilion border is the proposed peak of Cupid's bow for the lateral segment.

From the normal Cupid's bow peak, I measure 2 mm. toward the cleft to obtain the center of the Cupid's bow and 2 mm. again for the proposed peak on the cleft side. Incisions are made along the vermilion base as you described but my skin incision passes very little beyond the base of the columella. However I free deeply by cutting the muscle and deeper tissue subcutaneously as far as necessary to allow the prolabium to flap loosely into position without pull or tension forcing it. It is often necessary to carry the mucosal incision across the frenulum for adequate relaxation but this does not appear to disturb healing or the function of the frenulum after healing.

Once the peak of the bow on both medial and lateral elements is easily located 10 mm. from the indicated points, I contour the adjoining sides into a gentle curve concave toward the midline simulating the philtrum ridge trimming mostly skin and dermis and leaving muscle for bulk. The lateral wedge flap advanced medially must be sutured muscle to muscle.

If the nostril floor is in excess, a triangle is removed but if a complete
cleft is being repaired, the floor is made of tissue taken from the lower medial area of the nostril rotated upward to meet the tissue from the lower lateral nostril area. To free the lateral nostril base adequately, an incision is made directly into the nostril below the alar base creating a flap which when elevated would advance medially bringing the alar cartilage with it. I have tried Skoog's method of suturing the alar to the upper lateral cartilage, but these structures are very thin and my needles and scissors do not appear fine enough to do this without tearing. I have tried the small "white line" flap but have not had much success with it. I occasionally left excess vermilion at the line of closure hoping to use it later for central tubercle bulk anticipating some thinning with growth. I have almost stopped doing this because of the limited number of cases in which it was valuable.

He added a P.S.

Most of my local colleagues tell me that after a rotation-advancement closure, the lip shortens but later lengthens again. . . . I have not found this in my cases . . . the length remains the same as set at operation. I suspect they do not adequately free the prolabium and pull it down so it retracts upward again later. Those I have seen do not "come down" again. In my own cases there has been no problem.
Nestled in the ancient, cobblestoned village of Antigua in the interior of Guatemala and almost in the shadow of a volcano is the unique and immaculate Centro Infantil Estomotologia of Oscar E. Asensio del Valle, an oral and maxillofacial surgeon of the University of San Carlos. Here in 1970 the proud and practical Asensio, who does about 150 cleft operations a year, presented fine examples of his modification of the Mirault-Blair method, demonstrated a case under local anesthesia with skillful precision and then allowed me to rotate and advance a couple of difficult complete clefts.

Two years later he sent me a reprint of an article published in a 1971 Venezuelan odontological journal diagraming his modification of the rotation-advancement method.

I was pleased to see his back-cut on the rotation, interested in his reversion to the old use of flap C with little or no aid to the columella and happy with his advancement of the alar base across the cleft to achieve a round nostril. His only true modification, however, is an exaggeration of my "concavity making" of the lateral cleft edge. Asensio actually excises a very large "Thompson-type" angle-shaped full-thickness piece of good tissue (9-10-11) to facilitate (temporarily) lateral edge lengthening without lateral paring. Incidentally, he is throwing away quite a bit of usable tissue on the non-cleft side also. The double sacrifice of unexpendable tissue in clefts already deficient must magnify the discrepancy. In spite of this discard of principle, Asensio sent me some interesting early postoperative results.
Cutting the advancement flap into a long, narrow rectangle produces an unnatural scar line in a more visible position.

In my opinion, the closer Asensio holds to the refined standard rotation-advancement method, the better his results.

The longest result he sent was six months postoperative and encouraging.

The plastic surgery division of Stanford University has appointed Asensio to its teaching staff and rotates residents through his hospital, where there is an abundance of clefts. Donald Laub for Asensio at the Waldorf-Astoria Hotel in New York, June 1973, presented to the American Association of Plastic Surgeons this modification of lengthening the lateral side to save mucosal paring in wide clefts. He projected slides of these same cases. Musgrave, spotting the narrow advancement flap actually crossing the normal philtrum column, rose and approached the microphone:
I have been one of Millard's severest critics so it is only fair that I question Asensio. It is predictable that his lips will increase in vertical length as the LeMesurier method did. In fact, from the photographs, the A-P, not the under view, I can see the lips are already long.

This was like having Larry Little, Dolphin A.F.C. offensive lineman of the year, leading the interference. It gave me a chance to score around end against Asensio's temporarily expedient excessive wedge resection of lip from the deficient side. In fact, Randall asked Asensio, "Where did the muscle go?"

My comments were confined to principles:

Although this modification by title is designed for wide clefts, actually what is important is not how wide the cleft but how short the vertical length of the lateral edge. It is true Asensio can lengthen the lateral edge as Rose and Thompson did but again it is at the expense of mid lip side-to-side shortening and this is too great a sacrifice. Anyway, keeping the bow peak to commissure distance equal offers no real problem and there are better ways of achieving lateral cleft edge length than throwing away good lip.

In the face of this attack the poised Asensio responded in Spanish, which was translated adroitly by Mark Gorney:

I do not take away as much tissue as it seems in these drawings.

Then, of course, he comes into line with the refined rotation-advancement, which also concaves the lateral cleft edge.

Donald Laub's comment following my "voice of polite dissent" in Plastic and Reconstructive Surgery in 1974 gives strength of length to my stand:

Recently we have noticed three patients repaired by the Asensio technique as infants, followed-up for more than one year. They seem to have a long lip on the cleft side . . .

In fact, Laub and Kaplan of Stanford Medical Center have survived the Asensio "rapids," at least rotation-advancementwise, and after 182 Asensios and 100 true rotation-advancements have, as they say, made "the full circle" return to the rotation-advancement. They support my present modifications which are the natural process of evolution of this principle. These include lip
measurements using the commissures and labial muscle reconstruction, both of which I presented at the 1973 Cleft Palate Symposium at Duke University, as well as concave shape of the advancement flap and frequent need for a back-cut on the rotation, both of which I presented at the Rome Congress in 1967 and published in my 1968 "Extensions."

In September 1974 Ernest Kaplan sent these diagrams of the rotation-advancement method with explanations. His quotes will be followed by my comments.

He made the point:

I have not been using the C-flap for columella reconstruction. I believe I achieve equivalent lengthening because of the nearly straight line of the rotation, thus the C-flap is greater in vertical direction when it is transposed.

Answer: Not really. I have been through all of this years ago as it is merely returning to my original use of c flap as nostril sill which simply does not achieve as fine shaping and lengthening of the columella.

He noted:

I also have found that it is necessary to release the C-flap from the septum to allow it to ‘ride up’ into a more superior position.

Answer: Yes, this was also published in 1967 and 1968—but with far more release than shown by Kaplan. As a matter of fact, this is a partial contradiction to his claim of not using c for the columella.
He mentioned:

Also, the wider quadrilateral advancement flap adds height under the columella and this also increases the vertical height. Have you tried this?

**Answer:** This long, skinny quadrilateral flap is a holdover from Asensio and does not give the natural philtrum line. Of course, the back-cut necessitates snipping off the very tip end of the advancement flap for a perfect fit. Then by switching the tail of flap c back into the back-cut to shape the cleft side hemi-column and lengthen this part of the columella, the quadrilateral defect is kept to an artistic minimum.

There is also Kaplan's holdover of Asensio's alar base (F) flap being sutured to a raw area on the septum. This was being used in Korea in 1954 (page 232) but the new methods of handling the alar base, as shown in this book, should be much more effective.

The basic problem with Kaplan's entire rendition, as seen in his diagrams, is that the rotation incision does not ascend high enough to the columella base (his b') on the cleft side. This cuts flap c too large, placing the rotation gap and subsequent scars too low in the lip, thus forcing Kaplan's compensations.

**AURICULAR ADJUNCT**

Cesar "Valentino" Arrunteguy of Trujillo, Peru, consultant at the Barsky Unit in Saigon, presented before the Vietnamese Society of Plastic Surgery in October 1972 a paper entitled "The Addition of Tissue in the Unilateral Cleft Lip Repair Associated
with the Millard Technique." This is of special interest for two reasons. Arrunategui studied under Tord Skoog in Uppsala for nine months in 1969 but uses the rotation-advancement lip principle. Convinced of its value in all cases, he has proposed a sound adjunct for very wide clefts when he feels there is a vertical deficiency of tissue in the lateral flap when measured from the alar base to the vermilion border. After the rotation-advancement (and other methods also) he finds, as do other surgeons in the unit, that the ala ends up lower than normal with its inner part rotated downward and medially giving a wide structure to the inferior part of the ala.

He favors a wedge of whole-thickness skin graft taken from the auricular lobule, semilunar in shape and not more than 3 to 4 mm. wide. As he explained to me in 1972:

When the rotation-advancement flaps have been sutured into the right position, measurements are taken from the lower part of the base of the ala to the mucocutaneous line and compared with the normal. The difference will give the approximate amount of graft to be added between the ala and lateral flap. It is sutured in with 7-0 silk.

In my experience the lateral flap has very rarely been so inadequate that it cannot be made to carry its own. Lateral paring more than a few millimeters beyond the normal limit is taboo. Yet there is another way out of this difficulty. The upper hori-
horizontal incision can be made higher, cutting through several millimeters of alar base which is left on the upper part of the lateral flap. This increases vertical lip length with no serious consequences to the more than adequate alar base length.

The addition of an ear graft is another approach which is to be commended because the surgeon has put first things first and not forsaken a vital fundamental principle because of a local correctable deficiency.

TEACHABLE

A meticulous, fastidious and artistic surgeon with a hi-fi personality and a sense of drama is Mark Gorney of San Francisco. He wrote a glowing report upon his return from two and a half months in Vietnam with the Children’s Medical International:

It has certainly been one of the most fantastic experiences of my life. It is of some interest to you in that we were doing on the average of four to six clefts a day and when I left there was still a backlog of 52 that I had not been able to schedule. Although Wynn and Randall had preceded me, you will be happy to know that ALL lips are being closed by the rotation-advancement technique. On one day I took on four cleft lips and did each one by a different method and one month later we compared results; there was just no question in the trainees’ minds which gave the best results, and above all, why. In the past 10 months the three trainees have done over 400 cleft lips between them.

LEAVES HIS MARK

A year later Mark Gorney returned to Vietnam. His report exemplifies the reward a teacher enjoys when he has planted seed in fertile soil.

In the waning moments of my second Vietnamese journey I stood quietly behind our senior trainee while he laboriously took our west junior trainee through his first rotation-advancement. I was amused to hear him using the same aphorisms I had taught him the year before. At the end of 1½ hours the doctor doing his first lip had done an admirable job. Suddenly all the frustration and all the shoveling against the tide dissolved into a very warm feeling of satisfaction.
TEACHING THE RESIDENTS

On my plastic surgery service at the University of Miami, the residents scrub with me on a number of cleft lips before they do their first one under supervision. They are expected to understand the theory completely before undertaking the "practice." With that preparation they not only enjoy the operation but achieve superior results, as seen in this patient operated on under supervision in 1971 by senior, senior resident John Devine and reviewed one year later.

FROM ISLAND TO ISLAND

Victor Hay-Roe of Honolulu, formerly an ardent surgical resident in Pittsburgh, does a nice rotation-advancement even on the most difficult of complete clefts in which the discrepancy in the height of the two bows on the medial element was horrendous. In fact, it was well over half the vertical length of the lip, possibly two-thirds!
He did not quite agree with his former chief Musgrave's earlier feeling as to the difficulty of teaching the method. His story is a fascinating adventure in paradise. It takes place on the Polynesian island of Western Samoa where 130,000 natives live in thatched, stilted fales. The only trained surgeon is an American-educated Belgian named Walter Vermeulen, who completed four years of general surgical residency at Queen’s Medical Center in Honolulu in 1968.

Hay-Roe showed me a photograph of Vermeulen's first case and told me,

It was after Walter’s first attempt at lip repair using the description of a Mirault-Brown-McDowell as supplied in Christopher's *Textbook of Surgery* that he wrote to me asking me to come down to help him with some of his more difficult plastic cases.

Hay-Roe sailed over to Samoa, assisted Vermeulen to do one rotation-advancement and left a set of my reprints with him. After an interval of one year from his first case, he sent Hay-Roe an encouraging record of his unaided use of the rotation-advancement method. It was probably an easier case, and there are still discrepancies but even so . . .

**KUALA LUMPUR**

V. Sivaloganathan of the University of Malaya, Kuala Lumpur, in 1972 reported on 86 cleft lip cases treated over a 20-month period, covering briefly all aspects from incidence to assessment. Surgery was reported without fanfare:

Millard's rotation-advancement technique, with some modifications, was used in all the patients. . . . The overall results of management have been satisfactory to the surgeon. The parents have been pleased and relieved. Teenaged and adult patients showed immediate psychological improvement.

**EVEN UNTO KATMANDU**

Edward Lamont of Hollywood, California, and the University of California, Irvine, wrote of his 1971 visit to Shanta Bawen
Hospital in Katmandu, Nepal. Huddled in one corner of the main ward, which was filled with Nepalese with odd diseases and the usual number of lepers, was a beggar woman in her late teens with a boy of four and a six-month-old baby with a wide unilateral cleft. She had walked with her little boy from the foot of Mt. Everest for seven days and seven nights with the baby on her back.

This was only 15 years since the first Westerners had been allowed into the country. As no lip or palate clefts had been treated except by someone merely sewing the edges together, Lamont had been invited by G. Mack to start a cleft lip clinic with a demonstration of a lip procedure that could be used for all forthcoming clefts. Lamont recalls:

I was given a fleece lined scrub suit and advised it would be quite welcome when the temperature dropped to 50 below zero. General endotracheal anesthesia was given competently by a Nepalese doctor trained in England. It was my decision to employ the Millard cleft lip operation for my Nepal heritage because for someone who is not a plastic surgeon, less can go wrong. One approximates one wall to another and gains length by creating interdigitating flaps in a relatively cosmetically silent area. With just two or three opportunities to present the lip operation I was concerned that any procedure presenting triangular flaps on the lower portion of the lip might lead to confusion.

I have long been a devotee of carefully measuring the non-affected side, from the base of the nose to the tip of the vermilion (in the three to four month old baby in the States it approximates 12 to 13 mm.). Because I had no calipers, in this case I measured the distance with a cotton applicator stick. Then I marked off the triangle in the lateral lip at the alar base, and the incision below the columella, and again measured these with applicator sticks bent to form with greenstick fractures and cut off at these dimensions to serve as a pattern for this first operation and for all future procedures. The rotation-advancement operation was accomplished uneventfully.

When the baby was returned to his bed, it was found that the tiny mother had climbed up into the crib with her four-year-old son. She received and cuddled the postoperative infant, but as soon as the sutures were removed the three set forth on the long trek back to their Himalayan lair.
Only weeks later, Lamont received news that Dr. Mack and his assistants had continued to operate on a number of clefts, including that of the Secretary of State's son!

Just when it seemed that general application of the rotation-advancement principle in all types of clefts was being accepted, M. Lomas-Fuentes of Mexico City, at the Sixth International Congress in Paris, August 1975, presented this conclusion from his experience.

Dr. Millard's technic is best for repair of the complete, wide cleft and Dr. Tennison's repair is useful for closure of the incomplete one.

At first I was undecided whether to laugh, scream or just ascend 36 floors and jump off the top of the Congress Hotel Concorde-Lafayette! As a compromise Lomas-Fuentes is referred to in Chapters 24, 27 and 29.
THE E R E is still a small corps of surgeons who do not understand the back-cut and, rather than include it at the end of the rotation incision, prefer to place it separately in the inferior portion of the lip.

In 1966 Takuya Onizuka proposed in the *Japanese Journal of Plastic and Reconstructive Surgery* a tiny Tennison flap as an adjunct to the rotation-advancement method much as Skoog had done years before. In 1972, from Showa University in Tokyo, Onizuka elaborated in English his preference for the rotation-advancement principle. After 2,000 cases he concluded:

All methods have advantages and disadvantages. Millard’s method is no exception.

He then describes what he considers the disadvantage:

Especially, elevation of the cupid’s bow on the cleft side is conspicuous and the shape of the cupid’s bow on the cleft side is more peaked if compared with the smoothly curved shape of the normal cupid’s bow.

Acknowledging my 1 to 1.5 mm. “white roll” flap and expressing his fear of the Tennison-Randall larger triangular flap causing cupid’s bow droop “due to overgrowth of the triangular flap,” he suggests using the rotation-advancement method but inserting a small triangular 2.5 mm. flap at the mucocutaneous junction. In other words, Onizuka is joining Skoog’s earlier design by adding 1 mm. to the white roll flap.

Onizuka says:
If the difference of the two peaks is over 3 mm., the small triangular flap (limited to 2.0 mm.) should be used. Otherwise Millard's method must be applied.

He is against use of the standard triangular flaps of Tennison and Randall in infants because of the resultant distortion that occurs from what he refers to as "the rapidness of the growth of the lip." He admits, however:

The limit of the flap should be less than 2.5 mm. but it is not clear presently about how much of a deformity will occur after operation since it has only been a few years since application in infants.

As this flap calls for an increase of only one millimeter or less from the original white roll flap, we are now quibbling over split millimeters. Yet, in principle, I must say again, if the back-cut is used properly, it does not matter what the original difference in the height of the peaks of the bow is. The 1.5 mm. wide white roll flap is not designed to lengthen the cleft side even though it can do so slightly; its main purpose is camouflage: to construct a continuous white ridge across the scar of union at the mucocutaneous junction. It should be made, therefore, the width of each specific white roll, whether it be 1 mm. or 2 mm.

Also in 1966 Jean Paul Lintilhac with J. P. Cochain of Paris discussed the rotation-advancement method:

Theoretically, the curvilinear skin scar, not interrupted by a flap, best imitates the philtral ridge.

On this last point, our experience in particular with Moroccan infants, who are very prone to form hypertrophic and retracted scars, has shown us that often an upward retraction of the mucocutaneous line occurs. This problem must have been encountered by Millard, since in an article published recently [1964] he describes a small rectangular flap involving only the mucocutaneous junction, a modification which he had personally communicated to one of us at the end of 1962, but which when tried did not seem to entirely resolve the problem for us. This is why, since 1963, we have returned in the majority of cases to a small, triangular flap, which we previously used in association with the rotation-advancement flap.
Actually from the diagrams of their design, it seems there is very little difference from the 1964 rotation-advancement including the tiny mucocutaneous flap.

AGAIN A MATTER OF A MILLIMETER

Then came a similar hybrid which will receive more attention than it deserves because of the principle involved. Leslie Bernstein, a South African E.N.T. surgeon at the University of Iowa Medical Center, in 1969 was quoted by the J.A.M.A. “Medical News” under the misleading heading, “Repair Procedure Returns ‘Pout’ to Wide Cleft Lips.” He said:

Because the standard procedure is so good . . . I selected only candidates . . . that were certain to be failures with standard procedures.

His photograph of what he referred to as “conventional results with a similar congenital defect” revealed his lack of adequate rotation and inadequate use of the lateral advancement.

In 1970 he reemphasized what he called a modified rotation-advancement operation using the same “Tennison type but Randall sized” flap that Skoog described in 1958, Meyer presented in Hamburg in 1966 and Onizuka published in Japanese in 1966. His motive seems commendable as he adopted a quote from McDowell to be used in his own context:

. . . any new design will be adopted alike by superb, average, and clumsy surgeons. . . . this modification . . . is being offered for use in wide unilateral clefts of the lip in the hope that it will produce improved results.

(It never occurred to me to design an operation for a clumsy surgeon, but it is a thought!)

In his address to otolaryngologists interested in plastic surgery at the American Academy of Facial Plastic and Reconstructive Surgery Meeting in New Orleans in 1969, he restated, in a British accent, an old wives’ tale:

This is an excellent procedure for partial and narrow clefts . . . When applied to wide clefts there is often a tendency to contraction of the main scar, so that a short lip results . . .
Yes, if the method is not done correctly, this and other secondary deformities can occur. Then he repeats another common misunderstanding:

Also, when the cleft is wide, there is a need to extend the incision for the rotation flap beyond the midline in order to gain additional vertical height.

This surgeon keeps referring to more recent descriptions of the rotation-advancement operation but continues to use them to whatever advantage suits him and completely ignores the important message in the later work, i.e., the back-cut, which is the essence of rotation negating any need to cross the column and enter the uncleft side of the lip. A study of Bernstein’s marks on one of his complete clefts reveals lack of back-cut in rotation and lack of nasal extensions for advancement and explains why he had trouble.

Another inaccuracy reads,

Not infrequently the vermilion grows into the lower part of the scar, leaving a permanent red streak.

The vermilion does not grow into anything. The skin scar extending directly to the vermilion gives the eye the effect of an extension suggestive of a contracture. For this problem he does get his statement correct:

To overcome this Millard has designed a narrow little skin flap from the lateral segment to create the white ridge at the vermilion-cutaneous border.

The white roll flap measures 1 to 1½ mm. in width, and Bern-
stein has gone to all this trouble to justify increasing this flap 1 to 2 mm. more.

It is amusing that Gerald Hodge, Professor of Art, University of Michigan, for Grabb, Rosenstein and Bzoch drew the white roll correctly in one sketch (A) and in another (B) inadvertently made the flap 1 mm. wider at its base, a cross between my white roll flap and the Onizuka-Bernstein flap. Bernstein accused me of using “his” flap without giving him credit!

There was so little difference that I actually missed the artist’s very slight discrepancy but suggest you do not!

This questionable modification publicized by Medical News with its second inferior triangular flap is similar in principle to what Skoog proposed 12 years before. Yet, in my experience, this interruption in the philtrum column and violation of the dimple is unnecessary if the surgeon executes the rotation and the advancement correctly. That view seems substantiated by the results published by Bernstein, who, in my opinion, has tried to milk a mile out of someone else’s millimeter.

**DOUBLE ROTATION**

Motomasa Sasaki of Sapporo, Japan, when grading his rotation-advancement cases, reported an occasional peak of the bow on the cleft side to be high. To counteract this contracture or failure to rotate sufficiently, Sasaki in 1969 developed a double rotation-advancement, a large high one as in the original Millard and a little low one as in Skoog, but as a curved rotation incision rather than the Z of Tennison. During Sasaki’s visit to Miami
in 1971 he was introduced to the back-cut in the high rotation to save him the need for the low rotation incision. He seemed particularly pleased with a demonstration of the white roll interdigitation at the mucocutaneous junction line.

A PLEA

It is hoped that Onizuka, Meyer, Sasaki, Lintilhac, Perko, Bernstein, and others similarly tempted to act at this low level, as their experience increases, will perfect the back-cut and forget the "low cut" except as a camouflaged white roll.
Over the years, Bill Berkeley and I have maintained a friendly but heated battle over clefts which was constantly flaring up in the literature, during open discussion on the floor at meetings and once in the john. One letter from "Wild Bill" Berkeley challenged me to "scalpels at dawn" in a duel with each of us operating on a cleft lip and then comparing the results. In July 1970, before this confrontation could take place, Berkeley in his typical explosive honesty wrote again:

I want to extend a belated apology for my failure to appreciate fully the excellence of your lip repair. I now believe, as you do, that it will give a superior lip and I also feel that in combining my nasal reconstruction with your procedure that the two complement each other in a way in which none of the other lip and nose procedures do.

This gold star marks a special moment for R-A because of my personal affection and respect for Bill.

He later explained that his section for Grabb et al., which was to be published later in 1971, had been written before his "change of heart" and accounted for his old refrain,

The Millard Technique, a more free-hand method . . . requiring a more artistic touch, produces a superb lip . . . but I find this the most difficult of the four techniques to master.

Duel In The Sun

So, in January 1971, a special operating workshop was scheduled for Bill Berkeley in Miami. The cases were chosen to enable Bill
and me to heal old wounds and open new ones! One of the cases was a unilateral cleft in which the rotation-advancement method was demonstrated. Berkeley was pleased with the lip but expressed a slight disappointment that the columella lengthening had not been followed with more radical nasal correction including an external skin incision. He asked if I would accept a midline columella incision, and I admitted that I would. He then demonstrated the hemi-rotation of Joseph using an external nasal incision extending well over the nasal tip in a secondary cleft lip nose. The conformity correction was impressive, and only the scar posed a potential problem.

I waited one full year for the scars of our duel to have time to soften and then in January 1972 called Berkeley by phone one night and asked him to sketch and sign or initial his design for what he considers the ideal primary correction of a complete cleft lip with a marked nasal deformity. This is what he sketched and initialed. He marked rotation flap A, advancement flap B and little flap c much as I have described previously. His specific description for the nasal correction is pertinent:

With a double prong hook placed in the roof of the cleft nostril, the roof is elevated so that one can definitely define the mid line between the two medial crura making up the columella. Mark in the mid line of the columella and extend the line well up into the dome of the nose. In severe deformities of the nose, this line may continue upward in Joseph fashion curving laterally above the upper margin of the lower lateral cartilage. The position of the mark is thus between the upper and lower lateral cartilages similar to the plan for the creation of a Joseph lift of the ala.

The arrows indicate the general flow of four participating elements in the combined correction of the lip and nose. The rotation flap or flap A has been created by making the full-thickness cut through the lip salvaging as much mucous membrane as possible on the interior of the lip. The incision through the lateral element develops the advancement flap and partially frees the base of the ala. Neither flap is actually ready for rotation at this point in the dissection.

The mid line columella incision is made between the medial crura of the two ala cartilages exposing the cartilaginous septum. Careful dissection is required at this point to prevent trauma to the cartilaginous septum. The dissection should be performed as in a submucous resection, beneath perichondrium. This dissection will later communicate with the dissection
for the development of the vomer flap in Figure E. When the dissection is complete the defect side of the columella rides free and contains the medial crus of the defective cartilage as well as the c flap. Posterior to this the vomerian flap rides free so that the medial crus can rotate upwards to assume its normal position. The c flap should be thought of as that important element necessary for the formation of the foot of the columella on the defect side.

With a mouth gag in place, the palate is exposed. An incision is made at the posterior margin of the hard palate at the junction between nasal mucous membrane and the oral mucous membrane on the medial side of the cleft margin. This incision is continued forward around the base of the pre-maxilla. It then continues forward to the peak of Cupid's bow. This completes the lateral circumscription of flap c. Using a Freer elevator, the vomerian flap is fully developed by elevating the nasal mucous membrane from the septum throughout its entirety. This is also known as the Veau flap. A similar incision which is somewhat harder to develop is made at the junction point of the nasal mucous membrane and the oral mucosa on the lateral cleft element beginning at the posterior extent of the hard palate. Using a combination of the small Cronin elevator and a Freer elevator, this flap can be developed up to the base of the inferior turbinate. Anteriorly this incision continues around the maxillary component to join the incision at the base of the ala. When this dissection is completed, the base of the ala is totally freed so that it can then rotate medially to that extent which is necessary. The freeing of the two nasal mucous membrane flaps is not considered complete until they can be sutured from posterior to anterior without tension from the oral side.

When viewed from the oral side, the degree of freeing along the buccal sulcus can be seen. One frees along the buccal sulcus line to whatever degree is necessary to completely mobilize flap B so that it can interdigitate with the apex of the incision created by the development of the rotation flap on the medial lip element. The mucous membrane closure of the advancement flap is not made until the floor of the nose has been closed sufficiently forward so that the remainder of the floor of the nose can be closed through the nostril anteriorly.

The dotted line represents the closure of the floor of the nose using nasal mucous membrane (Veau flaps) and this closure is continuous into the floor of the nose and out onto the lip.

The bowstring in the cleft nostril runs along the upper margin of the lateral crus of the lower lateral cartilage from the apex of the nasal cavity down to the margin of the pyriform sinus. This is a constant finding in the cleft lip-nose deformity and we have chosen to correct it with a z-plasty as depicted in Figure G. If one attempts to develop the z-flaps in the
opposite direction, the result is a reverse Z which defeats the purpose of

The medial crus as well as the dome of the defective cartilage is freed
up subcutaneously so that one can define the angle and the normal ana­
tomical dome. In severe deformities, the Joseph incision is continued
upward so that the entire lateral segment of the lower lateral cartilage is
defined. Through this incision the upper margin of the lower lateral
cartilage can be sutured to the lower medial aspect of the upper lateral
cartilage on the opposite side as described by Horton and Reynolds. This
gives greater assurance for obtaining nostril symmetry in difficult cleft
lip-nose deformities than the simple advancement sutures between the two
medial crura of the lower lateral cartilages. In the lesser defects, the simple
advancement sutures between the medial crura are sufficient to insure nostril
symmetry without overhanging on the defect side.

The floor of the nose is closed anteriorly through the nostril thus
completing the reconstruction of the floor of the nose from the posterior
margin of the hard palate to the base of the ala. The base of the ala and
the foot of the columella must then be carefully closed using the marriage
suture of Marcks. This suture must be deeply placed in order to accentuate
the lateral nasolabial angle on the defect side.

The final closure of the lip includes the all important muscle closure
followed by the skin closure. . . . The mid line columella incision is closed
with a 6-0 atraumatic suture and leaves little or no perceptible scar.

In spite of the recent "improvement" in his plan with the
incorporation of rotation and advancement, it was imperative
to present at least one of his cases. Berkeley sent two examples
with the following labels.

1.

a. Born 2-10-72.  b. Repair of lip (Millard), nose (Berkeley) and anterior
palate (Veau); local with sedation (Straith) on 3-24-72.  c. Final photo-
graph one week postoperative on 4-1-72.
2.
a. Born 2-8-71. Lip and nose design marked.  
b. Repair of lip (Millard), nose (Berkeley), floor of nose (Veau); local with sedation (Straith) on 4-26-71.

c. 4-30-71, four days after surgery.  
d. 7-15-71, 2½ months after surgery.

As Berkeley’s changeover to rotation-advancement has been relatively recent, he does not have long enough follow-up to show his promising results to their best advantage. In his typical honesty, he concluded:

Nothing seems to come up to my standard when I examine them closely but I hope that the basic plan as we now are performing it is on the right track.

As for local anesthesia in the intubation era, I do not know whether to question Berkeley or pin a medal on him. Personally, if I tried to work under these conditions I long ago would have been talking to myself and answering.
IT was not long after Berkeley’s provocative visit to Miami that I was scheduled to demonstrate over live TV a cleft lip closure at the Fifth International Congress of Plastic Surgery in Australia. When the preoperative photo of the severe cleft that O’Brien had saved especially for me arrived, I began looking at travel folders for a February holiday in Alaska. Yet the temptation to go for a primary nasal correction without external scars at the time of the lip rotation and advancement was too great. I postponed a trip up the Yukon and headed down under.

The time was the hour and a half at the opening of the International Congress on the morning of the first day, February 22, 1971. The place was St. Vincent’s Hospital, Melbourne, Australia, before the color television cameras with 14 viewing sets at the Masonic Centre for the international membership. The patient, 11 weeks old and having wide unilateral cleft with severe nasal distortion, was “kindly” presented me by Bernie O’Brien, who also masterfully engineered this first color TV medical presentation in Australia.

The panel of opponents which had been collected included Skoog, Johanson, Manchester, Randall and Davies, and these were partially buffered by a gentle moderator, Bill Lindsay. In my opening remarks, I explained that if I were back in Miami on such a wide and difficult cleft patient I would use a small adhesion at one to two weeks of age, let this mold the maxilla and then at five to six months do a vomerine flap closure of the hard palate as Manchester advocates, an alveolar cleft closure with possibly a Skoog periosteal flap and then a rotation-
advancement closure of the lip. With the nasal structures less delicate at six months, the more radical correction would be facilitated. As this was not Miami, there was no time for adhesive action.

With one of Benny Rank’s top registrars, Felix Behan, as assistant, I proceeded to do the rotation-advancement, emphasizing the back-cut. Then we launched into a radical nasal correction. The incision which freed the lateral lip from the maxilla was extended in the usual fashion in the vestibule along the intercartilaginous line of the nasal lining to free the abnormal attachments of the alar base. In this case this incision was carried around under the tip and joined the membranous septal incision previously started from below for the advancement of flap c into the columella. The alar cartilage was freed by undermining from the skin, and the skin was also freed from the septum at the tip. A white 4-0 nylon suture picked up the slumped alar cartilage at the junction of medial and lateral crus and stitched it up onto the septum and to the opposite alar cartilage. The first tie-up was not quite right, and Hector Marino was heard to whisper among the spectators,

He will take this one out.

The second attempt at suture placement finally did sit the nose up nicely.

The remainder of the operation went smoothly, as previously described in publications, but with special attention to possible queries from the panel. I had the benefit of John Hueston remarkable pre-Congress publication of the Transactions and knew what my friend David Davies was thinking and probably planning to say. Davies had already acknowledged in the 1971 Transactions,

Finally, the Millard repair. Almost certainly the most commonly used today, it is presumptuous of me to criticize it but no method is as yet perfect and one must be prepared to discuss its flaws. The line diagrams are simple, the logic flawless, the concept brilliant; but many of us struggle to execute it . . .

What he was saying was that it looks good on paper but the free-hand fiddling may be difficult. In the Transactions he had pointed
to an attenuated medial element which occurs in some cases but need not be a problem. Davies emphasized another flaw:

A factor that I find disturbing is the approximation of two convex curves which appears to leave the majority of the bulk in the centre of the lip and not on the lower rim.

This can be troublesome, and so, during the Congress operation I made a particular effort to demonstrate fashioning the lateral lip element concave to fit the convexity of the medial component. It seemed to go well.

Then, on the fifth and last day of the Congress, after suture removal the baby was brought back on TV for a final show. The nose, lip and baby behaved so well before the cameras that a "hand of applause" was requested and received for this future actor. Recently, O'Brien sent me the 21-month follow-up photographs of the Congress cleft lip baby with a report that the palate had been closed and all was well.
After my cleft lip operation in Melbourne, Musgrave informed me that he had been most interested in this demonstration, but it was not until I read his and Garrett's section in Goldwyn's 1972 book that I understood his reference.

The most dramatic improvements in the correction of severe nostril defects in the wide complete cleft lip have been recently observed in Millard's personal application of the rotation-advancement principle, wherein attention is paid to both the medial and the lateral alar crus. The medial crus is elevated in the upward swing of the composite columellar pedicle, and the lateral alar cartilage is advanced medially and upward to simulate the dome effect of the opposite alar cartilage.

Let us say that at this specific time in the evolution of cleft lip surgery the rotation-advancement principle would seem to be generally accepted. There are those who follow the original design. There are those who have adjusted to the refinements and extensions. There are those who use the principle but "do their thing" with some little modification which is of benefit in certain cases. This is my general approach, always trying to improve in the detail as with the refinements or nasal correction at the Congress. There are other surgeons with the same motive, also trying to improve the final results.

LOOK OUT FOR THE BACK-CUT

One afternoon of the Melbourne International Congress was spent at Emu Bottom, the oldest homestead farm in the area. Here dogs demonstrated their skill at herding sheep, champion woodcutters competed with their axes chopping through logs of equal girth, wool was shorn and unleavened bread was served. Then, out on an open sloping field, boomerangs were offered. Lessons given in the position of the hand and the angle into the wind to throw soon challenged the plastic surgeons. The Australian surgeons were conspicuously absent, being fully cognizant of the hazards of a novice with this sharp, flat, curved stick, for if accurately thrown it will in truth "cut back" to the thrower without concern for those within the arc. Cleft lip and palate surgeons were notably present—optimistic, energetic, per-
fectionist, competitive and determined to master every detail of the technique. Among the throwers were Bengt Johanson, Ivo Pitanguy, Ed Schmid, Rudy Meyer, Theo Wilkie and myself, each ducking the other’s boomerang when not trying to get out of the way of his own. Tord Skoog watched wisely from high on a hill. The winner—the surgeon getting the boomerang to return the closest to him the greatest number of times—was Wilkie of Vancouver, and this outcome was pleasing, for he has long been using the rotation-advancement method effectively, as he described in 1969.
A Preliminary Adhesion

In extremely wide complete unilateral clefts, no matter what the technique used for closure, any adjunct is welcome. An adhesion-type procedure allows the surgeon a chance to stall for time and tissue growth, reduces the actual deformity by molding the maxillary segments into closer approximation and, consequently, facilitates the subsequent construction of a more perfect final lip result. In the absence of a normal intact orbicularis oris muscle spanning the maxillary arch, there is no molding action. It was noted by Veau and mentioned by Plessier in 1930 that even the most minor Simonart's band acting as a restrainer in utero greatly reduces the extent of maxillary and nasal distortion, Pruzansky has reconfirmed these findings.

Although delayed in its application, any closure of the lip across the cleft affects the width of the gap and position of the segments of the maxilla. In my 1964 "Refinements," in reference to a wide cleft of exceptional severity, I suggested:

In such cases postponement should be considered particularly for those not veterans of the rotation-advancement approach. Rather than compromise the final result by forcing the rotation-advancement technique or settling for less with another method, a simple straight first stage approximation of the superior one-third of the lip cleft is a possibility. This could be carried out high enough to avoid destruction of any natural landmarks. Partial union of the lip will help to mould the distorted maxillae and, if deemed necessary, better alignment can be achieved with orthodontia and maintained with a bone graft. The rotation-advancement method then is available for final lip closure.

At Princess Margaret Hospital, Nassau, in 1963, a severe cleft from Turk Island was closed with an adhesion procedure. After
the medial lip element had been freed from the maxilla, it was underlapped with a rectangular vermilion flap from the lateral lip element. All landmarks were preserved by the superior position of the adhesion.

As early as 1954 Johanson advocated a type of lip adhesion procedure as part of his routine for obtaining closure in the anterior palate area in preparation for his primary bone grafting. By 1961 Bengt Johanson with Ohlsson of Sweden realized that the adhesion had other values. He noted,

This avoids troublesome scars and loss of tissue prior to a later more thorough lip closure, but secures the desired muscular influence on the upper jaw.

In 1965 Randall, in his enthusiasm for the adhesion procedure, did much to popularize it. His reasons are clear-cut:

When the cleft is complete and wide there is likely to be more concern over tension, the position of the lip segments after the bony segments have been moulded and the eventual position of the alar base. In addition there is considerable worry whether or not an "S" shaped alar cartilage is ever going to approximate the contour of the normal side.

Randall advocated short broad triangular flaps interdigitated and approximated with sutures of the mucosa, muscularis and skin.

He explained that this was a broader attachment than that of Millard and an improvement over the simple margin incisions or limited excision of the cleft margin as suggested by Spina (to add substance to the prolabium in bilateral clefts). Randall's report indicated that he used an adhesion on all complete clefts...
regardless of width, and the procedure was carried out at ages 2 to 10 months (average 3.6 months) with the final definitive repair following after a 2- to 7-month (average 5.2 months) interval. In his opinion the price of an additional operation and an extra trip to the hospital was more than offset by two factors:

1. The adhesion renders the newborn infant much more acceptable looking if the surgeon prefers to delay a definitive closure until the child is older.

2. There is no true sacrifice of tissue with the scar of adhesion because the tissue used ordinarily would be discarded in the [Randall] final lip operation.

The first point, for what it is worth, is valid, but the second point holds only for Randall's procedure and is too costly in the rotation-advancement method. It is felt, first, that the adhesion is required only for complete clefts and, second, that only mucosal flaps in the upper third of the lip need be approximated, for once the adhesion is firm, the muscles lateral to it will act just as effectively as a molding band.

In 1970 Takahashi reported his use of the lip adhesion procedure. He diagramed what he considered to be (1) the Millard and (2) the Randall type of adhesions.
Actually this has never been my design. The medial flap turns the wrong way and, of course, there should not be any skin involved and wasted in this temporary maneuver. A cardinal point is the placement of the adhesion high up in the lip.

More recently, Randall with Hamilton and Graham reported on 68 lip-adhesion procedures with an incidence of dehiscence of 8 percent in unilateral clefts. They varied their adhesion to matching rectangular flaps reinforced with a retention suture.

This modification also encroaches on tissue valuable in the rotation-advancement procedure and, thus, is a bit too extravagant.

It is thought that an adhesion that does not encroach on valuable tissue, if done early, can be instrumental in shifting the maxillary components into better position. At the same time, it reduces the horror of the deformity so that the parents are pacified, allowing the surgeon to postpone the final surgical repair until the more ideal age of six to eight months. At this time, primary nasal correction may be accomplished.

C - W

In 1966 Walker, Collito, Mancusi-Ungaro and Meijer proposed the C-W technique ("close and wait" or "Collito and Walker") as an atraumatic preliminary and definitive two-stage lip closure. They made a big point that there must be no undermining of soft tissue in the buccal sulcus, no muscle detachments or sectioning of bone even in the presence of a large and/or protrusive
premaxillary segment. They believe that the lateral bands, supporting the anterior portion of the lesser segment, should be preserved and to destroy it surgically would encourage arch deterioration. They almost hissed at Randall's undermining his lateral lip segment in 30 percent of his adhesions. They describe their method and its physiology:

In the first stage, the high and low points of the expected cupid's bow are marked on the lateral and prolabial tissue and used as landmarks which are not to be interfered with surgically. . . . Bilateral vermilion flaps are turned down and sutured together.

This maneuver positions the adhesion low in the lip, placing the constriction in the inferior border, which is less than ideal. It is, however, quite necessary because, without the aid of undermining, the tension will not allow union of the upper portions of the lip elements.

Following first stage closure, the alveolar and palatal clefts are reduced spontaneously. The premaxillary area is gently molded back to the midline, and the lateral segment is oriented toward a nearly ideal arch form. The definitive or second stage closure is executed after the soft tissue and bone reorientation]. . . . A time interval of 6-12 weeks seems average. Again no undermining is allowed for the second stage. . . .

Thus, the unimpaired tissues are expected to gain their full growth potential by eliminating the suspected inhibiting factors, i.e. cicatrix, produced by undermining and the change of muscle environment created by unwarranted soft tissue detachments.

The C-W principle was first described to me by John Walker over a cup of tea in a flower garden behind the Iron Curtain during an International Plastic Surgery Congress in Bratislava in 1965. I had thought about it from time to time. As in all plastic surgery, the more atraumatic the procedure the better, but wounds do heal and with normal healing there is minimal restraint of growth. Yet, one factor in the C-W principle makes good sense. Keeping the original attachments of the lip elements to the maxillary segments allows them to act as effective strings with which to control the maxillary "puppets."
Discarding the concern about scarring following undermining but focusing on the control of segments by maintaining original attachments made it possible to formulate an adhesion plan that seems to take the best of both methods. The rotation and advancement incisions are marked to protect the landmarks. The medial lip element is freed from the maxilla so that it can advance over the outwardly rotated segment and be united in an adhesion to the lateral lip element, which is not undermined and is allowed to maintain its original attachment. Release by undermining of the medial side reduces tension and facilitates success of the adhesion uniting in the more strategic upper portions of the lip elements. Once the lip adhesion is firm, the constricting band of lip muscles will mold the forward-projecting maxilla back into the arch while the tug of intact lateral lip attachment to the retroplaced lateral maxillary segment should help to pull it forward into better alignment. After six months, adequate freeing of the lip tissues seems justified, not only because the attachments are in abnormal position on the maxillary segments, but because their release reduces the tension of the final lip closure. This allows repositioning with an improved prognosis for the lip scar and without great jeopardy to maxillary growth.
Making the Adhesion

Dark lines mark the adhesion plan.

Freesing the medial element from the premaxilla.

Mucosa of lateral cleft edge turned back.

Lateral mucosal flap slid under the medial element.

The lateral and medial muscle bundles are further approximated with a mattress suture of 4-0 chromic catgut.

Mucosa is sutured to skin.

The adhesion will push the premaxilla backward and may help to pull the lateral maxillary segment forward.
A SALUBRIOUS ADJUNCT

An adhesion is not necessary in every case, but in wide complete clefts it can be an aid. Here is an example in which it worked wonders. A very wide cleft had this type of adhesion created at three weeks of age. Two and a half months later, the final lip procedure, including alveolar and anterior palate closure, was done easily as a surgical demonstration before a cleft lip and palate symposium at Jackson Memorial Hospital, University of Miami School of Medicine, in March 1970.

ACTUAL FACTS

Subsequent experience with the adhesion procedure, which I still advocate as diagramed, has presented two minor problems:

1. An early adhesion within the first month of age will usually move the maxillary components quickly into apposition in the alveolar area with abutment which renders anterior alveolar closure difficult at the time of nasal floor reconstruction during the definitive lip closure. At the present time, a small prosthesis is being used to prevent this abutment and maintain a half-centimeter gap of access to facilitate alveolar closure at the time of rotation and advancement of the lip.

2. Even without undermining of the lateral lip element from
the maxilla, the pull of the adhesion does not, in many cases, show a rapid and dramatic forward growth of the diminutive maxilla on the cleft side.

There are certain exceptionally wide clefts that may require undermining of the lateral lip element also in order to achieve an adhesion. Yet, as shown in this case, the progress in both lip and nose is worth the effort and trauma.

? INCLUDING SEPTUM IN ADHESION

Recently, the residents and I worked on a patient with severe lateral lip element discrepancy who also had a strangely persistent nasal distortion. It resisted much improvement after the adhesion, and even after rotation-advancement with a lateral cleft edge mucosal flap let into the vestibule-releasing alar base incision and a primary alar lift, the nasal correction was disappointing.
Of course, with tissues placed in better position, there must be gradual improvement with growth in time, but the discrepancy struck such a discord that, again, a search for a better way was begun.

The key to this residual nasal deformity seemed to be the severe deviation of the septum. The thought occurred that, considering Latham's concern over the bent septum, Reidy's lack of concern over early septal surgery and Berkeley's valiant primary correction, maybe in certain cases the septum should be straightened during the adhesion procedure. Exposure, after freeing of the medial lip element from the maxilla, would be easy. The septum could be freed with the nasal spine from the maxilla and vomer a short distance. Careful, limited mucoperichondrial dissection and scoring of the cartilage on the concave, non-cleft side could be accomplished. Then, during the suturing of the high lip adhesion, possibly a stitch from the lateral lip element could catch the anterior septum to bring it around into a midline position, rendering the alar lift during the rotation-advancement operation either more effective or less necessary.

**A Trial Variation**

Recently I have tried a variation which achieves more primary nasal correction during the adhesion procedure. The cleft edge vermilion of the lateral lip element, flap 1, has been inserted across the tight area in the lateral vestibule allowing release of the alar base. The lateral lip element was also freed from the maxilla enabling the entire lip-nose component to come forward in a more nearly normal position. This necessitated a reversal of the vermilion flap which was turned from the cleft edge of the medial element to underlap the edge of the lateral element to form the adhesion. It will be interesting to study the advantages, if any, of this modification.
SECONDARY USE OF THE ADHESION

Man's ingenious adaptation to circumstance is boundless. After World War II in London, I remember queues everywhere were an accepted way of life, particularly out in front of cinema theaters. They, in turn, attracted troubadours, jugglers, acrobats, magicians and even an occasional pickpocket to entertain those waiting to be entertained and to pick up a little extra change. In the same parasitic relationship, once the obvious values of the adhesion procedure had been exploited, ingenious secondary uses began to be developed.

In 1971 Culf, Cramer and Chong of Temple University, disenchanted with the consistent depression and retraction of the alar base and certain that this discrepancy could be corrected in many cases without bone-grafting the deficient maxilla, stole, like pickpockets, the adhesive bridge itself. They denuded its distal skin and mucosal epithelium but salvaged the bulk of subcutaneous tissue, muscle and scar, usually leaving it attached medially (and in the rotation-advancement it is merely an extension of flap c). Then, through a 1 cm. lateral endonasal incision below the alar base, a pocket was dissected. Into this space the denuded adhesive flap was plugged with the aid of a pull-out skin suture, the skin and mucosa of the medial portion of this filler flap being retained to aid in lining the nasal floor.

Always interested in how and why a surgeon has come upon a method, I asked Lester Cramer, the plastic surgery chief at Temple University, about this adjunct. When he candidly referred me to Culf, to whom he awarded the credit, I was reminded of a story about Cramer. On his first day at Trinity College he was called in by the president along with several other contestants and given nine questions involving history, geography, math and science. The tenth question asked,

Which of these questions was the easiest for you?

Whereupon Cramer wrote,

Question # 10 which I do not have to answer.

He won a full scholarship and confirmed the president's diagnosis with a Phi Beta Kappa and later an A.O.A. key.
I then turned to Norris K. Culf, and he responded in 1972 that three years earlier he had begun using the adhesion in a complete unilateral cleft and,

it was obvious that there was a significant displacement of the alar base which was not corrected by the previous lip adhesion. Therefore, with the abundance of tissue available, which would otherwise be discarded, we used this to create some support by tucking it under the alar base leaving it attached medially. . . . We have done the procedure with both the triangular type lip repair and your repair and it seems to be equally effective in both situations.

EARLY SOFT PALATE CLOSURE

At the time of the lip adhesion procedure, whenever possible without further surgery, the soft palate edges are split and sutured in three layers as far anterior as possible. Even one centimeter of approximation can be of value. Early soft palate closure has the same beneficial effect behind that the lip adhesion is achieving up front. Not only does this promote early coordination of soft palate and pharyngeal musculature, but it probably improves the function of the eustachian tubes and certainly promotes molding of the maxillary tuberosities.

PROGRAM FOR FIRST ANESTHESIA

As soon as the cleft infant is feeding well, has a hemoglobin level of at least 10 gm. and is free of infection, which should be within the first three weeks, three quick procedures are carried out:

1. Otological examination and insertion of tubes, if indicated.
2. Soft palate closure.
3. Insertion of a prepared light prosthesis to prevent complete alveolar collapse and then the creation of a superior lip adhesion.

This triple mission accomplished, the patient, parents and surgeon get a six months' rest . . .
37. How to Rotate and Advance in a Complete Cleft

It has been said often that a natural-looking result following closure of a congenital cleft lip is a work of art. In fact, it is a three-dimensional work of sculptured art. Principles, measurements, marks and incisions of a technique can be standardized and a blueprint of the technique memorized. Yet the last few millimeters which make all the difference must depend upon the sculptor and his clay.

Before marking and cutting, compare the normal side and the abnormal cleft side with your eyes, switching back and forth again and again in a horizontal nystagmus. Then, by transposing the ideal normal over this entire component in your mind’s eye, it will become apparent what is present, its position, and what is needed. Now comes the surgical scramble to make up the difference without compromising the normal.
SKIN MARKING AND SCORING

First dot-mark the key landmarks on the non-cleft element as described in Part V, Incomplete Clefts, 1 to 2 to 3 of the cupid's bow, all of which are usually 2 to 4 mm. apart. An important measurement on the normal side is the distance from point 2 at the height of the bow on the non-cleft side to the alar base 4, which measures from 9 to 12 mm. This is the distance that will have to be matched on the cleft side and is roughly the length that must be achieved eventually along the rotation edge as well as along the advancement edge. Mark the rotation incision, which rises vertically up to the cleft side of the columella base and then curves across the midline hugging the columella base but stopping just short of the philtrum column of the normal side 5. The back-cut marking is postponed temporarily. The rotation incision mark is scored with a #67 Beaver blade.

The distance from the commissure 6 to the height of the cupid’s bow on the non-cleft side 2 is measured and is usually about 20 mm. The same distance is marked on the cleft side from the commissure 7 to a point along the mucocutaneous junction line of the lateral lip element 8. Point 8 indicates the limit of lateral paring. The highest and most medial point 9 of usable lateral lip element is marked as the probable tip of the advancement flap.
Dotting the bow.
Marking the rotation.

Marking normal commissure-to-bow-peak distance on cleft side at 8.

Ensuring normal vertical height.

Matching length of rotation incision with edge of advancement flap by bending and straightening a wire.
If the lateral element is diminutive, it may be necessary to extend point 9 up into the nasal vestibule to get the extra cleft edge length required to match the rotation edge. This extension will enable one to hold the line at point 8 in the lateral paring. An estimate of these distances is best checked by the curved-wire technique. When all available tissue has been incorporated into the tip of the advancement flap and the flap is still short, conservative paring of the cleft edge laterally even beyond point 8 may be necessary for a millimeter or two at most.

The next point 10 is set at the midpoint of the alar base join with the lip. In incomplete clefts this may be the lateral extent of the upper curved horizontal incision. Yet in complete clefts that incision must be continued to the lateral extent of the alar base join with the lip 11 and, depending partly on the amount of alar base flare, may have to be extended farther in a circumalar direction around to point 12.

If the length of the lip from the alar base at 10 to the mucocutaneous ridge at 8 is much shorter than the distance from the normal 4 to 2, then the incision from 9 to 10 to 11 and even to 12 may have to be raised to include a millimeter or more of alar base in the lateral lip flap B. Including a bit of alar base in the upper part of the lateral advancement flap will conveniently shift this prominence, as this flap advances, into
a nostril sill position in incomplete clefts or columella base in complete clefts. The stretched ala can well withstand such minor shortening.

A line is marked to join these points 8, 9, 10, 11 and possibly 12, and the line is then scored to define the advancement flap B. Now the rotation and advancement flaps have been marked finally.

SAVE THE PARINGS

The next step is concerned with the salvaging of the cleft edge mucosa. As the cleft edges must be pared in order to approximate them, a flap of vermilion based above on the mucosa of the alveolus in the upper labial sulcus is stabbed off each side of the cleft with a #11 Bard-Parker blade and left dangling for later use.
Of course, various possibilities offer themselves. The medial mucosal paring flap based above on the alveolus can be used as the second oral layer in the closure of the alveolus and anterior hard palate.

The soft palate can be closed early during the lip adhesion procedure or, if the adhesion is not used, it can be closed during the same anesthesia just prior to the final R-A lip procedure.

Nasal closure of anterior cleft is reinforced with flap m as a second layer on the oral side.
Or this medial vermilion paring flap can serve as the second layer but on the nasal side.

Then flap m can serve as second-layer closure on the nasal side.

Mucosa of cleft edges used to close anterior cleft on the oral side.

Freeing the medial lip element off the maxilla.

With care to avoid the base of this flap, the medial lip element is freed by sharp dissection from the maxilla.
A similar paring of the vermilion edge of the lateral lip element can produce a flap based above on the mucosa of the maxilla. This flap is extremely valuable as a filler for the defect produced during the incising of the lateral vestibular lining when freeing the alar base from the maxilla.

The strategic position of this flap (1) and the ease of its transposition into the vestibular defect have caused it to become standard in this maneuver. When one considers that this tissue has been discarded for centuries, its present salvage is an important step making alar release possible without secondary contracture.

A preliminary adhesion procedure is being used in almost all complete unilateral clefts at about 3 weeks of age. It is now standard at the time of this adhesion to insert flap 1 of the cleft edge vermilion from the lateral lip element into the lateral vestibular defect after release of the alar base from the maxilla. This freshens one lip edge for the adhesion and lets the nose and alar base come forward early without threat of back contracture.
Lateral edge mucosa preserved.

Lateral lip and alar base undermined.

as a flap based above

on the mucosa of the alveolus.

Release of alar base and lateral lip undermining is extended up into the nasal vestibule.
**PRESENT APPROACH IN COMPLETE CLEFTS**

In most complete clefts today, an adhesion is created in the early weeks as shown here, preferably using flap 1.

All landmarks must be preserved.

Lateral mucosal flap slid under medial element, or preferably flap 1 shifted into nasal lining.

Media! lip element freed from the maxilla but lateral element left attached when possible. Mucosal flap dissected from lateral element and used to advantage. Adhesion sutured in three layers.

Then, at six to eight months of age, the rotation-advancement operation is carried out. First the rotation and then the advancement incisions are marked. Thus the "in-between" mucosa and scar tissue of the adhesion are left to be marked as (m) and (l) flaps, but are not as important if 1 flap already used in adhesion.

Adhesion preserves landmarks.

Marking the bow and measuring the height.

Wire-measuring rotation incision.

Rotation marked and advancement edge measured.

Vertical height on cleft side is short.

so portion of alar base is included in the lip flap.
Then the adhesion is divided down its center between the two flaps to open the lip for full exposure of the cleft. The two "adhesion-edge paring" flaps (m and l) are dissected free and left dangling temporarily.

Mark m and l flaps before dividing adhesion.

Flaps m and l are cut.

They are left dangling ready for use later.
Score the rotation incision first. Then pick up the medial lip element A with your left thumb and index finger and lift it free so that a #11 Parker blade can be stabbed completely through the full thickness of the lip along the scored rotation line. It is usually easier to start at point 3. The scalpel should be slanted on the bias to retain as much muscle and mucosa in the lip as possible. This maneuver will join the previous cleft edge paring already accomplished.
The amount of required rotation depends directly upon the difference in vertical height of the cupid's bow peaks on the normal side at point 2 and the cleft side at point 3 of the medial lip element. As soon as the rotation incision has been cut to point 5, the position of A should be tested to see if the drop has been adequate to line up the peaks of the bow on an equal horizontal plane. Further stabbing with the point of the scalpel in the subcutaneous tissue and muscle attachments will increase the release. Then, with care to avoid the base of the mucosal edge flap (m), undermine the medial lip element free from the maxilla a moderate amount to facilitate the rotation.

BACK-CUT

After the simple rotation to point 5 and the undermining, there is usually a slight discrepancy in the downward positioning of flap A with its cupid's bow and philtrum dimple. Here the back-cut makes its triumphant entry. The back-cut checks the transverse direction of the incision as it is directed obliquely downward, being pricked with the #11 point a millimeter or two to point x. This approach can make up for a discrepancy in bow peak height of 5, 7 or 8 or more millimeters, so do not panic when the difference is more than the fictitious 3 or 4 mm cited by some to harass beginners.
The immediate and valuable by-product of the rotation plus back-cut drop of flap A is the freeing of little flap c, which is allowed to rise out of the lip as a one-sided "forked flap." When the slumped alar arch is lifted with a hook to match the normal, a defect opens on the short side of the columella, and flap c naturally moves toward this area. Flap c, which has been pared of its edge mucosa, is further released by an incision posteriorly in the membranous septum on the cleft side all the way up under the nasal tip, allowing flap c to ride even higher. Then, scissor-point dissection between the medial crura of the alar cartilages frees the inferiorly placed cleft side crus to facilitate its advancement ahead of flap c along the short side of the columella. The action of flap c is partly advancement and partly rotation as its trimmed tip actually rises but also swings around into the upper gap of the back-cut. These combined maneuvers enable the construction of a well-balanced, symmetrical columella in its lower two-thirds.
If primary alar lift planned, this incision joins intercartilaginous incision from lateral side.

Scissor dissection between medial crura allows upward shift of the slumped side.

Posterior release of flap c by membranous septal incision.
FREEING THE LATERAL ELEMENT

Avoiding the base of the lateral mucosal flap (l), the surgeon dissects the lateral lip element from the maxilla through a releasing incision at the top of the labial sulcus. The soft tissues of the lip and cheek are undermined usually up to the infraorbital foramen and laterally until the lip will advance easily without evidence of tethering. The incision then enters the nasal vestibule, cutting the alar base free from the maxilla, starting laterally at the bony attachments of the pyriform opening and proceeding in an arch up and around along the intercartilaginous line. In many instances this will suffice, but in certain cases the distortion of the nasal tip is so severe that primary correction seems warranted. Then the intercartilaginous incision is extended to join the membranous septal flap c—freeing incision under the nasal tip. This presents the exposure necessary for alar lift.

If the medial mucosal paring flap (m) is not needed for the second layer of the anterior maxillary cleft closure, it can be draped over the raw maxilla to speed healing and maintain a deeper superior labial sulcus.
Exposure.

Lateral lip dissection from maxilla.

Extension of lateral dissection into nasal vestibule along intercartilaginous line.

Joining medial and lateral incisions in preparation for primary alar cartilage lift.

After total vestibular incision.
PRIMARY ALAR CARTILAGE CORRECTION

First the mucosa is freed from the undersurface of the alar cartilage for half a centimeter. Then the alar cartilage is freed from its overlying skin with right-angled scissors. Further undermining of nasal skin is continued up over the upper lateral cartilage to the septum and across to the opposite alar cartilage. Then a 4-0 Prolene suture (Ethicon #8603) or a 4-0 Mersilene (Ethicon #765) takes a bite in the upper edge of the septum approximately 1 cm. from the tip and picks up the freed edge of the alar cartilage just lateral to the angle of the crura. As the suture is tied, the alar cartilage is lifted out of its doldrums over the upper lateral cartilage to ride in reasonable symmetry with its normal mate. A second suture from the medial portion of the slumped alar cartilage to the normal opposite alar cartilage sometimes helps in the fixation. Minimal if any mucosa requires trimming prior to suturing with 4-0 catgut.
Suture placed in upper edge of septum

Freeing mucosa from the alar cartilage.

Tying the sutures lifts the alar cartilage into new symmetry with its mate.

Another suture approximates the angles of the two alar cartilages.

Freeing the alar cartilage from the overlying skin.

Tying the sutures lifts the alar cartilage into new symmetry with its mate.
SEPTUM

If the septum is severely dislocated into the normal nostril at the spine, it can be carefully freed submucosally, scored on its concave side, slipped over the spine and fixed into a straight position in the midline. Excision of the spine may be indicated. Septal dissection during the primary cleft surgery must be conservative but rarely is indicated at this stage of life.

ADVANCEMENT

Pick up the lateral lip element with your left thumb and index finger and again mark the advancement incision. Then, with the #11 B.-P. blade, stab from points 8 to 9 to 10 to 11, cutting on the bias to retain in this lip element all the subcutaneous tissue, muscle and mucosa available. If the alar flare is severe, it may be necessary to extend the incision 9 to 10 to 11 and even to 12 on around the alar base. If the lateral element is diminutive, the tip of the flap at point 9 will have to be extended into the vestibule.
Marking the upper transverse advancement incision.

Incising the circumalar incision so that flaps B and D can advance separately.

Stabbing the alar base free from the lateral lip.
MUSCLE ALIGNMENT

The latest refinement is the method of aligning the orbicularis oris muscle. As has already been pointed out, the rotation and back-cut places the orbicularis oris fibers of the medial lip element into true horizontal position. A cleft edge "muscle" flap based above on the medial element not only freshens the muscle edge to healthy end-on fibers and presents a more tailored edge for approximation but creates a "muscle" flap which can serve as a transposition across the cleft into any lateral muscle gap.

The lateral element during its advancement undergoes some degree of rotation-transposition, which improves the original direction of the orbicularis oris fibers. They are not, however, brought down completely by this action into horizontal position. Then too, when there is a bulge in the muscle of this lateral element with attenuation above, more radical dissection seems indicated.

Leaving the upper one-half centimeter of lateral lip element intact to be carried by the key stitch into the rotation gap, dissect the lateral lip skin off the orbicularis oris muscle. Then free the muscle from the posterior mucosa so that it can be divided above with scissors and brought down into more nearly perfect horizontal fiber alignment. Of course, a muscle gap will be left above to be filled by the medial edge muscle flap m–m.
Freeing skin from muscle of lateral element.

and cut with base above.

Medial muscle edge flap m-m marked

Muscle being undermined but leaving upper edge intact.

Cutting the muscle in back-cut above to allow its fibers to come down into alignment.

Freeding the posterior mucosa from the muscle.
SUTURING OF FLAP m

If the maxillary components are within a centimeter of each other and are not abutting, the adhesion with the limiting prosthesis has been successful. A vomerine and premaxillary mucoperiosteal flap is dissected free with its base superior, turned over and sutured with 4-0 chromic catgut (Ethicon #752) to a mucoperiosteal flap from the lateral cleft edge. Closure of the nasal floor and nasal closure of the alveolar and anterior hard palate cleft are thus achieved. The mucosal flap (m) pared from the medial cleft edge carrying most of the adhesion scar is used as a second, oral layer to this closure, as already illustrated. If the hard palate edge flaps are turned the other way, flap m can be used to supply the second layer on the nasal side.

If the alveolar and anterior hard palate cleft is not going to be closed at this time or the medial flap m is too short, it can be used to cover the raw area of the anterior alveolus to preserve the upper labial sulcus. This is often sutured earlier, before the alar lift, in order to get the mucosal flap out of the way.

SUTURING OF FLAPS c AND l

As flap c advances into the columella and rotates into the back-cut, it is fixed in front with two or three sutures of 6-0 silk (Ethicon #780) in the skin of the mid-columella. Then the posterior edge of flap c is advanced along the membranous septum with 5-0 chromic catgut (Ethicon #792). This maneuver enables flap c to contribute to the construction of the cleft side columella and its base to achieve symmetry.

The lateral mucosal paring flap (l) is sutured with 4-0 catgut into the lateral nasal vestibular defect, extending as far as possible up along the line of the intercartilaginous release. This will maintain the forward position of the alar base.
Suturing the membranous septum as flap c advances upward as a one-sided "forked flap" for columella lengthening.

Flaps c and 1 are in position.

Lateral mucosal paring flap 1 being sutured into the lateral nasal vestibular defect to maintain the release of the alar base.

Suturing the rotation of flap c into upper back-cut.
**KEY STITCH**

Rotation of flap A down, advancement of little flap c up and release of alar base have set the stage for advancement of flap B into the rotation gap. A good bite of the deep tissue of the tip of the advancement flap B is taken with a 4-0 white Prolene or 4-0 Mersilene, and then a similar good bite is taken in the depth of the rotation gap at the bottom of the back-cut. Remember that this stitch determines the amount of rotation and if placed too low can pull up on this element to the detriment of the final resting place of the cupid's bow. It is a trial and error stitch and should be placed and replaced until absolutely correct, for upon it “hang all the Law and the Prophets.”

The key stitch first picks up the subcutaneous tissue of the tip of the advancement flap and then takes a bite in the depth the back-cut above flap m-m.

Tying this stitch brings flap B into the rotation gap.

The medial muscle edge flap m-m is transposed into the high muscle defect of the lateral element (arrow).

The muscle edge flap is guided into the defect with a pull-through suture coming out the upper edge near the alar base.
INSERTING THE MUSCLE EDGE FLAPS

Next the medial muscle flap m-m is guided by a 4-0 chromic catgut pull-through suture from the upper raw edge of flap B across the cleft into the muscle gap in this lateral lip flap.

OTHER CLEFT EDGE MUSCLE FLAPS

If a muscle bulge of the cleft edges is present—usually a result of the method of mucosal paring—then these must be reduced to ease the fitting. This trimming can be salvaged as muscle flaps for use in various ways. Probably it is most important where, as already described, the muscle flap is taken from the medial cleft edge based superiorly and used to cross the cleft to make up for deficiency in muscle, a groove or an actual gap in the upper area of the lateral lip element.

The muscle flap has been taken from the lateral cleft edge l-m and tucked under itself to bolster the thin tip of its own advancement flap. This can be quite effective.
It can be taken from the opposite medial side m-m based inferiorly and inserted “tongue in tunnel” to add body to an attenuated lateral vermilion border.

**PREPARATION OF THE CLEFT EDGES**

For the scar of union to simulate the curve of the philtrum on the normal side, it should have a convexity laterally. Thus, the natural convexity of the rotation edge is ideal and only an exaggeration need be trimmed. The usual convexity of the lateral edge is not desirable as two convexities do not fit. A curved excision of skin from the lateral edge is therefore called for, to produce a gentle concavity. This will increase the length of the edge slightly and reduce the need for extra paring. Thus, the skin excesses are marked and then the lateral edge is trimmed to a concavity with scalpel and scissors, the 2 mm. by 1 to 1.5 mm. “white roll” flap of mucocutaneous junction ridge being
Trimming the lateral edge.

Suturing the muscle fibers end-on.

Suturing the free border muscle.

Suture placed just above white roll flap.

Another suture placed in vermilion just below white roll flap.

The excess of the skin edges marked.

Preserving the white roll flap.

Trimming the medial edge.

Ready for skin suturing.
The excess of the skin edges marked.

Trimming the medial edge.

Trimming the lateral edge.

Preserving the white roll flap.

Suturing the free border muscle.

Suturing the muscle fibers end-on.

Ready for skin suturing.

Suture placed just above white roll flap.

Another suture placed in vermilion just below white roll flap.
preserved on the lateral element. The medial skin edge is tailored only slightly but maintained as a convexity. Then the dermis and mucosa on either side of the orbicularis oris muscle along both edges of the cleft are freed a millimeter or two to facilitate three-layer closure.

**THREE-LAYER CLOSURE**

First, closure of the advancement incision in the upper labial sulcus is achieved with 4-0 chromic catgut sutures in the mucosa. Then, staunch approximation of the muscle fibers end-on across the cleft is accomplished with 4-0 Mersilene. It is important to bring the muscle of the vermilion border (pars marginalis) together at the very edge with authority.

Although the white roll flap was cut during the early paring, in actual practice it often has to be discarded. After placement of the key stitch, the lateral lip segment, which was relatively contracted before the stitch, stretches out with an increase in the distance from point 7 to 8. This calls for a slight shifting of point 8 laterally to match 6 to 2 on the normal side, offering two dividends. It allows a millimeter or two more of lateral paring with additional length to this edge—usually a little short. During the paring it allows a new cutting of the white roll mucocutaneous ridge flap, which at this point is quite well developed in the lip. A 6-0 silk suture is placed in the skin just above the future position of the white roll flap interdigitation, and another is placed just below in the vermilion. Thus the white roll flap is fixed in overlap position along the mucocutaneous ridge, which is now ready for interdigitation. The actual insertion is still postponed.

The remaining 6-0 silk skin sutures can be placed in the lip and 6-0 catgut (Ethicon #790) in the free border vermilion until out of sight around under the edge. At this point 4-0 chromic catgut sutures are used to close the posterior mucosa, taking some muscle in the bites. When there is an excess of posterior mucosa, it is usually interdigitated across the straight-line closure. The details vary in every case, but invariably some type of mucosal interdigitation posteriorly out of sight is used.
PREPARING AND FIXING THE ALAR BASE

In order to correct the outward rotation and flare of the alar base and at the same time the unnatural width of the nasal floor and to prevent subsequent lateral shift of the ala, a method has been devised which is proving to be effective.

The circumalar incision 9-10-11-12 has freed the alar base as flap D from the lateral lip flap B. It is now able to rotate medially and independently of the advancement flap B. It will, in fact, out-advance the advancement. The tip of this flap is denuded of epithelium for several millimeters, so that it can be pinned with a 4-0 white Prolene or 4-0 Mersilene suture to the area of the septum near the nasal spine under the tip of flap c. By eye and suture, the alar bases should be set up in nearly perfect symmetry. Then, subcutaneous sutures approximate the alar base in its new advanced position to the upper edge of the lip advancement flap B.

Tip of alar base marked.

Alar base can be released further to 12 if necessary.

and then shaved fresh of its epithelium.

Through a stab incision on the opposite side near the edge of the septum a 4-0 Mersilene suture comes across picking up the tip of the denuded alar base.

As this permanent suture is tied, the raw tip of the alar base is pulled under the lateral tip of flap c and fixed to the septum.

This positions the alar base in symmetry with the normal side.
WHITE ROLL FLAP INSERTION

As described in the incomplete cleft operative section, insertion of the white roll flap is postponed until suturing on either side of the mucocutaneous ridge has been finished. Now the little flap, which is spearhead-shaped and measures 1 mm. thick, 1.5 mm. wide and 2+ mm. long, overlaps the noncleft side. It is lifted out of the way, and a similar-sized and -shaped skin section from the opposite adjacent mucocutaneous ridge is removed. Then the white roll flap fits neatly into this bed and is fixed with a couple of 7-0 silk sutures (Ethicon #768), breaking the line of the vertical scar crossing the mucocutaneous ridge. Interdigitation of a white skin roll to interrupt the red of vermilion mucosa "bleeding" into the red of the vertical skin scar avoids the effect of an accentuated bow peak or even a suggested contracture when none exists. This little flap also tends to round out the curve of the cleft join at the bow to the more gentle smoothness of the normal side which otherwise may be too sharply angular.
The final posture of the lip and nose after rotation-advancement plus alar lift and muscle alignment should have the alar rims reasonably symmetrical and the muscle fibers in end-to-end approximation. A Logan bow gathers it all together protectively postoperatively, and the suture lines are covered with an antibiotic ointment.

The amount of tissue discard, scraps of epithelium, attenuated edges of muscle and mucosal tip bits, has been reduced to a minimum, as demonstrated on the piece of gauze.
ALAR RIM CORRECTION

If a primary alar lift has been used, the alar rim may not seem to require surgery at this time. In such case, it is well to postpone alar rim surgery until the need is more obvious. Eventually, it will be indicated to some degree for there is always a skin web of varying amount which is not influenced appreciably by the columella and alar base positioning and is not completely removed even by the alar lift. This excess skin can be excised directly and 6-0 silk used for closure.

![Alar skin web excised and sutured directly.](image)

It can be taken as a small skin flap based medially and let into a tiny releasing incision in the side of the columella at the height of the arch to give added length to the columella.

![Portion of alar preserved as flap to be let into releasing incision in the side of the columella.](image)

The excess can be denuded of epithelium, cut as a flap and introduced beneath the undermined nasal tip skin into the area of greatest weakness where the alar crease extends as a groove.
across the tip toward the alar margin. This transposed flap usually is guided with a pull-out 6-0 silk, which is tied externally over the skin of the tip and is removed in two days. The alar margin is then sutured neatly with 6-0 silk.

Recently, another variation has been found beneficial. The new alar rim is marked on the drooping side to balance the normal side. An incision is made along this line, and the skin inferior to it is dissected thinly to expose the inferior edge of the alar cartilage. The cartilage is freed from the mucosa and is cut as a flap ac to be transposed up into the tip in the alar groove area. The skin flap awf which once covered the alar web is tucked up under the alar rim as additional vestibular lining with a 5-0 catgut mattress suture. The alar rim is then sutured to the alar web flap along the margin with 6-0 silk.
Alar web flap awf is lifted with mattress suture up under the alar arch to provide more lining.

Skin of the alar web is turned back as flap awf exposing lower alar cartilage ac.

Normal height of alar arch is marked on cleft side.

Alar cartilage ac trimmed as a flap.

Skin of the alar web is turned back as flap awf exposing lower alar cartilage ac.

Cartilage flap transposed under skin of nasal tip in the alar crease area.

Alar web flap awf is lifted with mattress suture up under the alar arch to provide more lining.

Alar rim is sutured to alar web flap awf along margin.
38. Examples of Complete Unilateral Cleft Cases

The same code is used as in incomplete clefts. Discrepancies noted resulting from the primary surgery in complete clefts will be dealt with in the secondary section.

**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** columnella

A cleft is indicated by stippling, a submucous cleft or submucous distortion by horizontal lines.
GENERAL STATISTICS

In the unselected series of 80 unilateral clefts operated on in Miami and presented in detail, 45 were incomplete (Chapter 29), 35 complete (discussed in this chapter); 39 had associated cleft palate; 77 were Caucasian, 3 Negro, 21 female, 59 male, 29 right, 51 left; 16 had a family history of clefts; 15 had incidents in the first trimester of pregnancy; 8 had other congenital anomalies.

In the incomplete clefts (45), 10 had associated CP, 44 were Caucasian, 1 was Negro; there were 12 female, 33 males, 16 right, 29 left; 8 had F.H. of clefts, 6 had incidents in F.T. and 2 had O.C.A.

In the complete clefts (35), 29 had associated CP; 33 were Caucasian, 2 Negro, 9 female, 26 male, 13 right, 22 left; 8 had F.H. of clefts, 9 had incidents in F.T. and 6 had O.C.A.

There is no significant difference between incomplete and complete cleft lips in the following parameters except that associated cleft palate was 3.8 times more frequent in complete clefts (22 percent of incomplete and 83 percent of complete lip clefts had CP).

PERCENTAGES IN TOTAL SERIES

49 percent of lip clefts associated with palate clefts
96 percent Caucasian, 4 percent Negro
74 percent male, 26 percent female
64 percent left, 36 percent right
20 percent with family history of clefts
19 percent with first trimester incident
10 percent with other congenital anomalies
ARLY CASES WITHOUT REFINEMENTS (CASE 1)

B.D. October 8, 1957
F.H. No clefts
F.T. Uneventful
O.C.A. None

R.A. At 2 months


Comment. An early rotation-advance­ment without refinements that still produced a good lip and nose.
EARLY CASES WITHOUT REFINEMENTS (CASE 2)

B.D. October 29, 1957
F.H. No clefts
F.T. Bleeding
O.C.A None

R.A. At 3 months


Comment. The advancement of the lateral flap into the rotation gap often produced attenuation of the lateral vermillion. This required a secondary V-Y roll-down and finally started me doing a primary posterior mucosal transposition to the weak side.

1. 3 months
2. 3 months
3. 1½ years
4. 2½ years
ARLY CASES WITHOUT REFINEMENTS (CASE 3)

B.D. September 26, 1958
F.H. No clefts
F.T. Auto accident in 2nd month
O.C.A. None

R.A. At 2½ months

H.P. and S.P. At 1 year vomerian flap for hard palate and 3 flap pushback.

Revisions. At 3 years. Extracted tooth in prominent premaxillary area. Mid V-Y of vermilion tubercle.

Comment. The outward rotation of the premaxilla and retroposition of the maxilla on the cleft side would have benefited by an adhesion which it did not have. The nasal deformity was stubborn. The muscle bunching in the lateral lip element resting over the prominent premaxilla has produced an unnatural bulging which is improving with time. The lack of the white roll flap is noticeable. Modern refinements and extensions would have improved the early result as would the more recent muscle surgery now being used.
EARLY CASES WITHOUT REFINEMENTS (CASE 4)

B.D. October 17, 1958
E.H. No clefts
E.T. Uneventful
O.C.A. Midline upper lip sinus

R.A. At 2½ months


Comment. A skin sinus in the midline of the upper lip is rare, having been reported six times in the literature. It has never been recorded in association with a cleft of the lip except in this case.

4. 9 months—contraction present at 2½ months postoperative but gone by 9 months old.

5. 1½ years
ARLY REFINEMENTS (CASE 5)

B.D.  January 16, 1962
F.H.  No clefts
F.T.  Uneventful
O.C.A. None

R.A.  At 3½ months
H.P.  Vomer flap at 10 months.
S.P.  Pushback with right island flap at 13 months.
B.G.  Iliac cancellous bone blocks and chips across cleft and over maxilla under alar base at 9½ years.


Comment. Original nasal deformity so severe that without primary alar cartilage correction will eventually require secondary rhinoplasty at 16 years of age.
EARLY REFINEMENTS (CASE 6)

B.D. March 27, 1962
F.H. Paternal great-aunt cleft lip and palate
F.T. Uneventful
O.C.A. Capillary hemangioma of the cheek

R.A. At 4½ months
4. wr flap used. 5. Alar rim crescent excision. Contracture at 3 weeks.
H.P. Vomer flap closure at 10½ months.
S.P. Pushback with right island flap at 13 months.

Revisions. Hard palate fistula closed twice and finally used tongue flap for closure. Lip vermilion first mobilized by lateral advancement and then filled out by V-Y roll-down.


Comment. Tip of advancement flap taken from nasal vestibule. Primary procedure produced attenuated vermilion on cleft side requiring several secondary mucosal advancements.
EARLY REFINEMENTS (CASE 7)

1. 3½ months
B.D. June 12, 1962
F.H. No clefts
FT. "Ptomaine poisoning"
O.C.A. Congenital heart deformity
R.A. At 3½ months
H.P. and S.P. Surgery postponed because of severe heart deformity, subsequently performed elsewhere.

2. 3½ months

3. 1 year

Comment. Primary rotation-advancement without refinements carried out with great concern for poor circulatory condition of patient.

EARLY REFINEMENTS (CASE 8)

1. 2 months
B.D. January 14, 1963
F.H. No clefts
FT. Tooth extraction and infection
O.C.A. None
R.A. At 2 months
H.P. and S.P. At 9 months soft palate and vomer flap closure of hard palate fistula.

2. 2 months

3. 2½ years


Comment. Not as easy a cleft as it seems and will deserve minor revisions if ever seen again.
EARLY REFINEMENTS (CASE 9)

B.D. January 20, 1963
F.H. No clefts
F.T. Uneventful
O.C.A. None

R.A. At 3½ months
5. Alar rim web excision and V excision of the lining.

Revisions. Lip: 4½ months postoperative—vermilion free border excision. Nose: 2 years postoperative—alar base transposition into the nasal floor.


Comment. Alar base drifting required secondary transposition, finally encouraged me to advance the alar base on top of the advancement flap and later denude its tip and suture it to the septum for a strong alar base tie.
EARLY REFINEMENTS (CASE 10)

1. 3 days
2. 3 months
3. 3 months postoperative

4. 1 year

B.D. July 26, 1963
E.H. No clefts
E.T. Uneventful
O.C.A. Mucous pits of lower lip

R.A. At 3 months
Oph. 1. Rot with b-c. 2. c for col. 3. Adv with wr.
B.G. At 7 months split rib grafts to onlay maxilla and chips into cleft.

5. 4 years

S.P. At 10 months soft palate closure. At 7 years pharyngeal flap to soft palate.
H.P. At 2 years vomer flap closure of hard palate.


Mucous pits. Excision at 7 months and reexcision at 2 years finally corrected this deformity.

6. 10 years


Comment. Severe deficiency of lip and maxillary tissue required several tricks including bone grafting but ended up with good result.
EARLY REFINEMENTS (CASE 11)

B.D.  February 27, 1964
F.H.  No clefts
F.T.  Uneventful
O.C.A. None

R.A.  At 2 months

H.P.  At 10 months vomer flap hard palate closure.
S.P.  At 13 months soft palate closure with island flap.
B.G.  At 8½ years iliac bone graft to maxilla under alar base.


Comment. A wide cleft with severe nasal distortion which was rotated without difficulty. Lack of mucosal flap bolstering of the cleft side is seen in early postoperative photo and eventually required V-Y roll-down and maxillary bone grafting.
ARLY REFINEMENTS (CASE 12)

1. 3 days
2. 3½ months
3. 3 weeks postoperative
4. 3 months postoperative
5. 3 years
6. 7 years

**Healing.** Lip contracture at 3 weeks gradually relaxed at 3 months and 3 years.

H.P. Left open until 5½ years.

S.P. Pushback with island flap at 13½ months.

B.G. Split rib grafts to maxilla at 5 years.

**Revisions.** At 7 years. Lip: scar and vermilion revisions. Nose: alar rim excision; alar base transposition.


Comment. Original deformity severe. The early lip contracture was marked but gradually settled until almost symmetrical, requiring only minor revisions at 7 years. Further nasal correction will be required at 16 years.

B.D. October 20, 1964
F.H. Mother's paternal cousin cleft lip and palate
E.T. Viral infection
O.C.A. None

R.A. At 3½ months


Comment. Original deformity severe. The early lip contracture was marked but gradually settled until almost symmetrical, requiring only minor revisions at 7 years. Further nasal correction will be required at 16 years.
EARLY REFINEMENTS (CASE 13)

B.D. January 7, 1965
F.H. No clefts
F.T. Uneventful
O.C.A. None

R.A. At 3 months


Comment. The original nasal distortion with the alar crease extending into a kink in the alar rim caused a persistent problem. It was not corrected primarily so will require revision at 16 years or sooner.
Comment. Original nasal distortion severe but as it was not corrected primarily with lift of the alar cartilage, rhinoplasty at 16 years will be necessary.

B.D. February 24, 1965
F.H. No clefts
F.T. Auto fright around time of conception
O.C.A. None
R.A. At 2½ months
3. Adv with wr. 4. Posterior mucosa transposed from medial to cleft side.
H.P. At 1 year vomer flap at time of pushback.
S.P. Pushback with island flap (rt).
Revisions. At 7 years. Closure of oronasal fistula; lip scar excision.

Comment. Original nasal distortion severe but as it was not corrected primarily with lift of the alar cartilage, rhinoplasty at 16 years will be necessary.
EARLY REFINEMENTS (CASE 15)

B.D. March 9, 1965
F.H. Paternal 3rd cousin cleft lip
F.T. Uneventful
O.C.A. None

R.A. At 3 months
3. Adv with wr. Result good but slight deficiency of mucosa of cleft side free border.
H.P. At 9 months vomer flap for hard palate closure.
S.P. At 11 months soft palate push-back with island flap.
Fistula closed at 2 years.
B.G. At 11/2 years iliac bone graft over maxilla under alar base with chips into the cleft.


Comment. Cleft with severe distortion that was effectively corrected with the primary rotation-advance-ment procedure necessitating only minor revisions at 7 years.
EARLY REFINEMENTS (CASE 16)

1. 3 days
2. 5 months
3. 1 year—early contracture gradually relaxed
4. 2 years
5. 2 years
6. 6 years

B.D. May 4, 1966
F.H. Father’s grandmother had twins and one had a cleft lip and palate
F.T. Bleeding during trimester
O.C.A. None
R.A. At 5 months
2. Rot with b-c. 3. c for col. 4. Adv with wr.
5. Posterior transposition

of mucosa from medial side cut off inadvertently so cleft mucosa bolstered by reversed Burian from medial sulcus.
At 15 months screw-plate inserted to spread maxilla.
B.G. At 2 years. Split rib into the alveolar cleft and across maxilla under alar base.
H.P. and S.P. Pushback with island flap at 2½ years.
Anterior fistula closed 6 months later.


Comment. Original defect was horrendous, necessitating secondary mucosal roll-down to balance the vermilion free border.
EARLY REFINEMENTS (CASE 17)

B.D. October 14, 1966
F.H. No clefts
F.T. Uneventful
O.C.A. None

At 2½ months anterior palate closed with vomer sepal and lateral flaps and backed with turbinate mucosa.

R.A. At 3½ months

B.G. At 13 months split rib bone grafts to arch maxilla and into cleft. Covered with Burian mucosal flap.
S.P. At 18 months island flap push-back of palate.
Hypoplastic maxilla noted and orthodontia in action with some improvement.


Comment. Wide cleft with good early result with rotation-advance-ment without primary nasal correc-tion. Yet early anterior palate closure using turbinate and at 13 months bone graft to maxilla resulted in hypoplastic maxilla being benefited by orthodontia.
EARLY REFINEMENTS (CASE 18)

B.D. December 24, 1966
F.H. No clefts
F.T. Uneventful
O.C.A. None
R.A. At 3 months
3. Adv with wr. 4. Mucosal inter-
digitation posterior to cleft side.
H.P. and S.P. At 14 months nasal
closure of hard palate and covered
with anterior mucoperiosteal flap.
Pushback with island flap (rt).

Comment. The deficiency in the
upper portion of lateral lip element
is reflected in the various stages
from postoperative photo to late
result. Cleft edge muscle flap could
have filled out this upper grooving
for slightly better balance. The nose
will deserve revision at 16 years.
EARLY REFINEMENTS (CASE 19)

B.D. February 21, 1969
F.H. No clefts
F.T. Uneventful
O.C.A. None

R.A. At 3½ months

Early contracture subsided by 6 months.

Comment. Closure of lip over the projecting premaxilla so that the lump pummeling the lip probably explains less than ideal upper scar of union and lateral drifting of alar base. Secondary corrections will not be difficult.
EARLY REFINEMENTS (CASE 20)

B.D. December 12, 1969
F.H. Maternal cousin with cleft lip and palate
F.T. Uneventful
O.C.A. None

**Ad.** At 3 weeks
1. Medial lip undermined.
2. Turn back vermilion flap from cleft side without undermining.
3. Lateral flap tucked under and sutured to medial element.

**R-A.** At 3 months
**Op.**
1. Closure of alveolar and anterior hard palate with mucoperiostal flaps and mucosa of adhesion for 2nd layer.
2. Rot with b-c.
3. c for col. 4. Adv with wr. 5. Posterior mucosal transposition flap.
6. Alar rim excision.

**H.P.** Posterior hard palate closed with mucosa of nasal layer.

**S.P.** Pushback with island flap at 14 months.

**Revisions.** None but improving with growth.

**Comment.** A severely wide cleft in lip and maxilla with such marked nasal distortion benefited by an adhesion. Requirement of a millimeter more back-cut than usual placed scar slightly lower in the lip. Two-layered closure of the alveolus and anterior hard palate at 3 months caused initial reduction in nostril on cleft side, but with growth this is improving, as seen at 3 years.
RECENT ADJUNCTS WITHOUT PRIMARY ALAR LIFT (CASE 21)

B.D. April 5, 1971
F.H. No clefts
F.T. Uneventful
O.C.A. None

Ad. At 1 month
R.A. 5 months later
2. Rot with b-c. 3. c for col. 4. Adv
   with wr. 5. Posterior mucosal interdigation.
   6. Alveolar cleft and nasal floor closed with mucoperiosteal flaps and lined
   with labial flap from sulcus. 7. Alar rim web denuded and transposed as a flap to
   nasal tip.
H.P. and S.P. At 13 months

Comment. A severe cleft improved by an adhesion. Then without using the adhesion material the rotation-advancement was carried out resulting in early contracture which is gradually subsiding. Use of adhesion material would have improved the early result. A re-rotation and re-advancement may be necessary.
RECENT ADJUNCTS WITHOUT PRIMARY ALAR LIFT (CASE 22)

B.D. April 16, 1971
F.H. No clefts
F.T. Uneventful
O.C.A. None

Ad. At 3 weeks with slight freeing from maxilla on cleft side
R.A. At 5 months
Op. 1. Rot with bc. 2. c for col.
3. Adv with wr. 4. Posterior mucosa interdigitation to cleft side.
5. Alar rim deepithelialized and transposed into tip.
Healing with catgut reaction even at 6 weeks (arrow). Scar never completely recovered.
H.P. and S.P. At 17 months pushback and island flap and vomer flap with anterior mucoperiosteal cover.

Comment. Wide cleft benefited by an adhesion. Rotation-advancement went well, but reaction to catgut sutures at 6 weeks increased scarring in upper portion which is still noticeable at 2 years but should improve with years or be revised.
COMPLETE CLEFT (CASE 23)

1. 4½ months

2. 4½ months

3. 2 months postoperative—contracture

4. 8 months—lip laceration

5. 8 months—no primary alar lift was done

6. 2 years—lacerated again but only cheek!

Comment: All's well that ends well.

B.D. May 14, 1971
F.H. Mother had severe bilateral cleft of lip and palate
F.T. Much emotional stress
O.C.A. None

R.A. At 4½ months
7. Vermilion flap from lateral element used after denuded to increase tubercle of bow.
Complete Cleft (Case 24)

B.D. June 23, 1971
F.H. No clefts
F.T. Uneventful
O.C.A. None

Ad. At 2 months adhesion created.
S.P. At 7 months soft palate split and sutured.

Alveolus. Septal flap closure of alveolus and anterior portion of hard palate covered with mucosal scraps from adhesion.

R.A. At 7 months

H.P. At 1 year vomerine flap tucked under opposite mucoperiosteal edge.

Comment. At 7 months two-layered alveolar closure, definitive lip closure and soft palate closure.
B.D. July 13, 1971
F.H. No clefts
F.T. Uneventful
O.C.A. None

Ad. At 3 weeks
R-A. At 6 months
3. Adhesion denuded and inserted under alar base. 4. Alar base advanced toward septum. 5. Adv with wr. 6. Alar rim denuded and transposed as flap into crease.
S.P. At 16 months soft palate closed.
H.P. Left open.

Comment. Primary alar lift should have been done and will be done as a secondary procedure before school age.
**COMPLETE CLEFT (CASE 26)**

B.D. August 22, 1971
FH. No clefts
FT. Uneventful
O.C.A. None

*Ad.* At 1 month. 1. Medial lip element freed from maxilla. 2. Vermilion flap from lateral lip element sutured under medial element without undermining.

*R.A.* At 6 months


*S.P.* Soft palate split and sutured at time of lip closure.

*H.P.* Closure of hard palate at 12½ months with vomer flap.

**Comment.** This wide cleft had the benefit of most of the modern adjuncts including an early adhesion, soft palate closure at the time of rotation-advancement, use of adhesion tissue to release the vestibular lining of the alar base and line nasal floor, muscle flap insertion from non-cleft edge into cleft side. The ultimate result should be good.
COMPLETE CLEFT (CASE 27)

B.D. October 9, 1971
F.H. No clefts
F.T. Uneventful
O.C.A. None

Ad. At 3 weeks. (No undermining lateral segment.) Separated after 1 week. Adhesion recreated after 1 month with slight lateral undermining.

R.A. At 6 months

Comment. All latest mucosal edge flaps used for alveolar cleft closure and release of alar base. Reasonably symmetrical nasal tip without primary alar lift.

1. 3 weeks 2. 3 weeks 3. 4 months 4. 6 months 5. 1½ years
COMPLETE CLEFT (CASE 28)

1. 3 weeks
2. 3 weeks
3. 3 months
4. 5 months
5. 6 months
6. 1 year
7. 1 year

B.D. December 30, 1971
F.H. Father's father had CL(P); father's uncle's son's son had CL(P)
F.T. Uneventful
O.C.A. None

Ad. At 1 month. Medial element undermined, lateral element not freed.
R-A. At 5 months
Op. 1. Septal and premaxillary mucoperiosteum freed to close anterior cleft; mucosal paring flaps used for second layer. 2. Rot with b-c. 3. c for col. 4. Adv with wr. 5. Tip of alar base denuded and sutured to septum.

Comment. One of the cases with the upper lateral muscle deficiency present in the original deformity (arrow) and still present at 1 year (arrow). This recurring deformity finally caused me to use a medial edge muscle flap to fill out this lateral depression in the primary operation.
SECONDARY ALAR LIFT (CASE 29)

B.D. August 20, 1971
F.H. No clefts
F.T. Uneventful
O.C.A. None

Ad. At 2 weeks
R.A. At 5 months

S.P. Closure of soft palate at 1 year.
H.P. Vomer flap closure at 17 months.

No attempt at alar lift primarily and alar base positioning difficult.

Revision. At 17 months. Alar base advanced and alar cartilage lift in attempt to reduce the severity of the nasal distortion but leaving final work for age 16 years.

Comment. Unusually difficult nose had delayed primary correction but requires further work.
STRAP FLAP ALAR LIFT (CASE 30)

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

B.D. July 27, 1966
F.H. Paternal aunt had complete cleft of lip and palate
F.T. Uneventful
O.C.A. None

At 5 months anterior palate oral closure from septum and lateral flap from turbinate mucosa for 2nd layer. Prosthetic plate by Balber.

R.A. At 7½ months
3. Adv with wr. 4. Primary nasal correction by bipedicled chondromucosal flap of alar cartilage sutured with cotton to septum and opposite alar cartilage. 5 months later, Hagerty-Mylín screw-plate pinned in.


Comment. A wide cleft that had 3 modifications in surgery. Alveolar and anterior palate closed (1) with vomer flap and covered with turbinate flap 2 months before lip closed. Primary radical nasal correction with (2) chondromucosal strap flap lifted and sutured to septum. (3) Maxillary bone graft at 2 years. In spite of these innovations, patient seems to be developing well.
 STRAP FLAP ALAR LIFT (CASE 31)

B.D. August 10, 1966
F.H. No clefts
F.T. Uneventful
O.C.A. None

Fitted with feeding plate by Dr. Balber (McNeil-Burston).

R.A. At 3 months
3. Adv with wr. 4. Nose: primary correction. Marginal and intercartilaginous incisions formed chondromucosal strap flap which was cut free laterally and sutured to opposite alar cartilage and septum with nylon.

Screw-plate (Mylin-Hagerty) by Balber at 9 months.

Revisions. At 10 months postoperative. Oronasal fistula closed. Alar base transposition.

B.G. Split rib graft across maxilla and into cleft at 19 months.
S.P. Closed at 21 months.
H.P. Closed at 29 months.

Comment. Primary radical nasal correction with chondromucosal strap flap advancement balanced the nasal tip quite well. Early lip contraction soon smoothed out with good balance.
RECENT ADJUNCTS AND ALAR LIFT (CASE 32)

B.D. October 20, 1966
F.H. No clefts
F.T. Uneventful
O.C.A. None

R.A. At 3½ months


Comment. The difference in height of the two peaks of the bow required a radical rotation with the aid of the back-cut but it was achieved without difficulty.

RECENT ADJUNCTS AND ALAR LIFT (CASE 33)

B.D. November 18, 1970
F.H. No clefts
F.T. Uneventful
O.C.A. None

R.A. At 4 months

Comment. Lip was closed over the projecting premaxilla without difficulty. Alar cartilage was lifted up to septum with a buried nylon suture with reasonable balance to the tip.
1. 9 months
2. 9 months
3. Early postoperative
4. 6 weeks postoperative—severe hypertrophy
5. 3 months postoperative—improving
6. 8 months postoperative—even better

B.D. April 4, 1970
F.H. No clefts
E.T. Mother had rash at 2 months
O.C.A. Congenital esotropia

R.A. At 10 months
H.P. and S.P. Island flap pushback at 18 months.

Comment. Cuban patient with severe absence of tissue seen first at 9 months. So no adhesion. Excellent early result with gradual hypertrophy of scar, more than seen ever before, but by 18 months greatly improved.
Case 35

B.D. October 22, 1970
F.H. No clefts
P.T. Uneventful:
    mother—38
    father—56
O.C.A. None

Ad. At 9 days
R.A. At 2½ months
Op. 1. Large Skoog periosteal flap
    for 2nd layer closure. 2. Rot with
    b-c. 3. c for col. 4. Alar lift with
    suture. 5. Alar base advanced.
    6. Adv with wr. 7. Posterior mucosal
    flap to attenuated lateral side.
    8. Alar rim excision.
H.P. and S.P. At 13 months vomer
    flap and island flap pushback.

Revision. At 18 months. Closure of
    fistula. Nose: alar base advancement
    with denuded tip. Alar rim margin
    excision.

Comment. This case had a large peri-
    osteal flap from the maxilla and will
    be reviewed later on this basis.
Even during the writing of this volume, changes have been instituted into the primary correction of the lip and nose by the rotation-advancement principle. Here is the most recent example using many of the latest changes.

At six weeks of age a bilateral myringotomy with insertion of tubes, closure of the soft palate and creation of a high mucosal lip adhesion were accomplished.

At six months of age
1. Flap m covered the raw alveolus.
2. Rotation with back-cut.
3. Flap c advancement.
4. The membranous septal incision used to advance flap c extended across under the dome to join the intercartilaginous incision extension coming up from the lateral freeing of the alar base from the maxilla.
5. This exposure facilitated nylon suture lift of the slumped alar cartilage up on to the septum.
6. Flap l filled the lateral defect in the nasal vestibule.
7. The diminutive lateral lip element was increased in vertical dimension by including the tip of the alar base.
8. The lateral lip muscle fibers were dissected and brought down more transversely.
9. A muscle edge flap from the medial element was transposed into the muscle defect in the upper portion of the lateral element.
10. The lateral cleft skin edge was trimmed to a concavity to fit the convexity of the rotation edge.
11. A subcutaneous flap dissected from under the alar base flap was sutured to the septum at the nasal spine to correct the alar flare.
12. Flap c and ala base flap D joined to form the nostril sill.
13. A 1.5 mm. wide "white roll" mucocutaneous ridge flap was interdigitated across the scar.

SUMMARY

By the time this volume is published, it will be over 20 years since the first cleft lip was rotated and advanced. The early results of the initial "crude" procedure in Korea, 1954–1955, long lost to follow-up, in general seem to be almost as good as today's early results awaiting later evaluation. This is an overwhelming vote of confidence in the method's fundamental principles and basic design. Extensions, refinements and more recent adjuncts have
been added to facilitate the execution particularly in difficult clefts, to bypass postoperative discrepancies, mine or those complained about by others, and to ensure greater final finesse in all cases. By now you should be able to rotate sufficiently without crossing the normal philtrum column and advance with adequacy but without paring laterally beyond normal limits. Placing more and more nasal components into more nearly normal position primarily seems to be decreasing the nasal distortion. The increase in economy with absolutely no discard of tissue and the conservatism in the timing of surgery, with early lip and soft palate adhesion but postponement of radical hard palate manipulation, promise an even better long-term prognosis. Fastidious scrutiny of the healing, growth and development of each patient through the years is constantly influencing the plan for the ensuing case. *Ever looking for a better way*, I have not done one case exactly like the one before, and no case in this book has been done exactly as I—or you I hope—will do the next cleft and the next.

*Semper investigans, nunquam perficiens.*