II. Secondary Bilateral Cleft Deformities
Unless the surgeon has been unusually unskilled, most severe secondary bilateral cleft lip deformities have resulted following complete double clefts. In the beginning, that is, the surgeon faced a premaxilla presenting varying degrees of projection and deviation flanked by lateral maxillary elements in varying degrees of relative retroposition. In front of this irregular and treacherous platform was a prolabium of varying size and shape, with little or no muscle in it, attached to a short columella of varying length. The lateral lip elements may also be of varying size both in length and in bulk.

Yet what the secondary surgeon faces, although indirectly influenced by the original deformity, has been seriously altered by what the previous surgeon did and how that affected subsequent growth.

An inseparable interrelation
Secondary bilateral deformities of the lip and nose are somewhat difficult to divide into separate chapters without repeating interrelated aspects. Choice of treatment of a nasal discrepancy often depends directly on the condition of the lip postoperatively. Thus, as it is difficult to divorce one aspect from the other, they will be dealt with together when necessary and separately when possible.

Repetition for teaching
It is planned that the reader can look up a certain subject and get a rather complete coverage. As examples must also appear in depth in the case studies, repetition is occasionally necessary and is acceptable only as it reduces the number of times the reader must interrupt his concentration to flip about in the book.
**Skin Scars**

WHEN the primary surgery of bilateral cleft lip heals poorly or is planned or executed inartistically, there is double trouble, for indeed, inadvertently or on purpose, the same mistake has been made twice!

At the very best there will be two scars, and when they run straight up into the floor of the nose and contract to cause a notching depression, they create what Broadbent rather vividly refers to as the "dirty nose" look.

When triangular, square and quadrilateral side flaps have been transposed below the prolabium or Z-plasties interdigitated into its sides and the columella is plucked out of its center, the main scars become irreversible, unphiltrum-like brands reminiscent of strange alphabetical symbols and Indian signs.

If the sutures were placed too far from the skin edges, tied too tight, bathed in nasal discharge and left too long, there will be stitch marks too. They will appear not just as one ladder running up the lip but as at least two with possible cross ladders forming a truly bewildering maze of scars!

**Beware Double Excisions**

Secondary scar revisions in bilateral clefts can be handled much as described in unilateral cases. The double-breasted vest and other procedures are available. Here, again, it is well to visualize the normal position and direction of bilateral philtrum columns and
try to maneuver the scars along these general lines, avoiding any abrupt interruptions that extend directly into the floor of the nose or even across the mucocutaneous junction ridge. There is one vital principle to remember: Tension was probably responsible for the need for this revision, and the best chance for secondary success is to cut your tension odds in half and revise only one side at a time. An exception to the rule is made when the muscles from each side are to be joined together behind the prolabium, taking up the skin tension on both sides and promising better bilateral healing.

**ATTEMPTS TO WIPE THE SLATE CLEAN**

When, in addition to stitch marks, transverse relaxing incisions have been placed widely across natural lines, the lip is turned into a tragedy of whiskered scars as seen in this spine-chilling example from Veau’s 1938 *Bec-de-Lièvre*.

In 1952 and 1954 Schmid, of Stuttgart, presented a unilateral cleft case with such severe scarring and whisker stitch marks that he was forced into drastic action. He inserted an Abbe flap for relaxation and then excised all skin and scar of the entire upper lip and covered the area with a full-thickness skin graft taken from the submental area, adding:

This procedure has also been satisfactory in men.

Skin excision of the entire area and total resurfacing with a full-thickness skin graft was also suggested by Broadbent of Salt Lake City in 1957 as a desperate last-ditch effort to salvage a tragedy that was avoidable in the first place.

Musgrave, for Goldwyn’s *The Unfavorable Result in Plastic Surgery*, does not give this approach for cat whisker scars much praise and offers a combined alternative:

Replacement of the entire area by a skin graft is not very rewarding and gives an artificial appearance. When feasible, a centrally placed lip flap in conjunction with dermabrasion and scar revision may offer some hope.

Here is a personal case which was referred with extremely wide stitch marks, a short columella and alae too flared. A small
lip-switch flap had been merely stuck in the lower half of the lip, rather than being used to advantage to remove a good portion of the scarring. A forked flap reduced much of the lip scarring as it lengthened the columella, but in its wake followed the typical teenage scar hypertrophy.

Later, a high transverse elliptical lip excision shortened the lip and lifted the lip-switch flap into better philtrum position. Then bilateral vertical scar excisions flanking the central flap further improved the lip. Advancement and fixation to the septum of the denuded tips of alar base flaps reduced the nasal width. Time has brought improvement, but there is still too much scarring.

SCARS IN "HAIR" LIP

One problem of upper lip scars in the male is their effect on the hair-bearing area, for scars are hairless and stand out like brands even on a cleanly shaved lip. Extensive scarring actually prevents the production of a mustache or at least renders it ineffectual. The ability to grow a mustache offers a means of camouflage. Then, too, some men just look better with a mustache. My father did. They need not have had a cleft or be scarred; to a lip that is slightly short or recessed a mustache can bring both body and distinction. There was a time when the black mustache automatically designated the villain, invoking in the audience an immediate conditioned reflex for hissing. Mafia gangsters are
often referred to as the “mustaches.” Yet today, whether it is because villains have been glamorized into ridiculous half-heroes or because the mustache is the most masculine part of the male hair pattern, the mustache has become popular in every level of society. The fashion is fanned further by such stars as Larry Csonka on the gridiron, John Newcombe on the tennis court, and Burt Reynolds on the screen and centerfold. In fact, Schick had to pay Joe Namath $10,000 to shave off his Fu Manchu mustache on television!

In the bilateral cleft one evidence of a successful treatment is the construction of a lip that can produce a respectable mustache. This is not a cop-out nor is it as easy as it may seem, for in the bilateral cleft there is a double dose of scars, and the original isolated prolabium is seldom able to sprout a luxuriant growth of hair in the first place. When the prolabium is hairless, the trick again is to have it philtrum width so that any baldness lies less noticeably between lateral bushes.

Even the Abbe flap, so often called upon in secondary correction of bilateral clefts, does not solve the mustache problem completely. When the lower lip flap is transposed into the upper lip, its normal hair growth, of course, proceeds after transplantation but in upside-down direction as shown. Some patients become infuriated with this disorganization of hair, but with training by brushing and clipping, order can be brought to the chaos and an enviable soup strainer or handlebar can be cultivated. Here are two more examples of a mustache augmented by an Abbe flap.
Several of my bilateral cleft lip patients shown throughout this book, who have results good enough to enjoy clean-shaven lips, are at present sporting mustaches. They are merely capitalizing on the fashion of the day, which also provides them the ultimate in camouflage.

Here is a cleft lip patient at Rooksdon House, Hampshire, England, during my time with Gillies, in whom the lip scarring was rather severe and the maxilla retraposited. Either the patient had seen so many forehead-scalp flaps dangling about the wards that he had requested one himself or a surgeon in desperation had swung a rather cavalier, hairy scalp flap over the scarred lip to cover the problem once and for all with a truly swashbuckling mustache!

**PROPHYLACTIC BETTER THAN ANAPHYLACTIC**

If the bilateral cleft lip is handled as described in the primary section with mucosa and muscle approximated to each other in the midline behind the prolabium, taking all tension off the skin scars of union, the infant will heal these scars superbly. Then, if the prolabium has been reduced to philtrum dimensions and tissue for the columella shifted out of the lip, reentry and rescarring of the lip will never be necessary. If this course has not been followed primarily, then its use secondarily may be the best way out, leaving the teenager to heal it the best he can.

**SECONDARY SCAR REVISIONS ARE OFTEN SECONDARY**

When there are other, more severe labial deformities in addition to the scars, then as an added dividend the scars are simultaneously revised and often even repositioned during the process of sculpturing the contour or correcting the lip length, width or tightness. Examples of this action are scattered throughout this entire secondary section.
33. Correction of Secondary Muscle Discrepancies

In bilateral clefts, besides the actual clefting, there are two discrepancies in the orbicularis oris muscle of the upper lip. Depending on the completeness of the clefts, the prolabium has little or no muscle. The lateral lip elements have muscle, but the fibers run parallel to the cleft edges up toward the alar bases. When the lateral lip elements are merely attached to the sides of the prolabium in the standard bilateral cleft closure, of course, the muscleless prolabium eventually is pulled wide and flat against the projecting premaxilla by the strong lateral muscle elements bulging with hypertrophy. It is best to count your losses, consider this stage a radical adhesion and at about five to six years take it all apart and start again doing what has been described and should have been done during the primary procedure.

In 1963 Bill Holdsworth of Queen Mary’s Hospital, Roehampton, England, cognizant of the importance of muscle continuity, designed a secondary procedure in bilateral clefts. In his 1970 fourth edition of *Cleft Lip and Palate* he explained:

To interfere as little as possible with growth, operation is delayed until the age of eight.

He then reemphasized the values of his procedure:

1. To permit function, it is necessary, as in the palate, to join muscles. Otherwise the lip can never be an instrument of expression, and will remain a passive curtain, with unsightly lateral bulges caused by misplaced muscle. Veau (1938) pointed out that the absence of muscle from the
prolabium was the principal cause of mediocre results in double clefts.

2. Vertical scars need revision.
3. The prolabium is too wide to imitate philtrum.
4. A mucosa sulcus is wanted in front of the premaxilla.
5. The lateral elements of the lip require vertical shortening in muscle and skin.
6. A median notch on the edge is to be removed.
7. The nostril floors are too wide.

Holdsworth considered that all of these matters were dealt with by his 1963 operation based on the Veau III. He excised the scars bilaterally, elevated the prolabium as a trapdoor flap, joined the lateral muscles together across the midline, advanced the alar bases and replaced the prolabium.

The only possible criticisms are that this maneuver should have been completed during the primary operation, and even as a secondary procedure it has made no allowance for adequate lengthening of the short columella.

Thus, it is proposed that the best and most efficient approach is to join the lateral muscles to each other across the cleft during the primary surgery as has already been described in the banking procedure. If this has not been done, then it should, as a secondary procedure, be carried out the same way. The lip elements should be cut free from the alar bases, brought down and advanced to each other behind the prolabium.

Here is a case treated in New York using the earlier plan in which primary bilateral rotation-advancement had been followed by a secondary forked flap. The columella seemed almost long enough, but the lack of muscle continuity across the prolabium,
lip shortness, the visible preservation of a portion of the prolabium vermilion and a slight whistling deformity spoiled the result.

As the columella was almost adequate, the lip scars were excised and the prolabium was elevated. The lateral muscles were mobilized and sutured to each other in the midline, and a Mersilene dimpling stitch replaced the prolabium in better philtrum posture. Maintaining the inferior mucocutaneous ridge, the prolabium vermilion was turned down so that vermilion of the lateral lip elements could overlap it out of sight and create a full tubercle.

The borderline shortness of the columella and the width of the alae will probably be corrected by the advancement of the alar bases and nostril floors into the columella at about 15 to 16 years, when nasal shortening and a septal cartilage strut can be used for final tip shaping and support.
If the columella is also short, a forked flap can be banked while the muscles are approximated, and three weeks to three months later the forked flap can be advanced into the columella.

This complete bilateral cleft with a severely protruding premaxilla was treated with the early Georgiade-type rubber band retraction. The lip clefts were closed by simple straight-line approximation with no effort to join the muscles or bank a fork. The result was about what would be expected and nearly what would be achieved by a bilateral adhesion procedure. The stage was set for taking the entire lip apart, paring a forked flap, joining the mucosa and muscle of the lateral elements behind the prolabium, advancing the alar bases and suturing their denuded ends together in the midline to the septum, placing a dimple stitch in the prolabium and banking the forks in whisker position.

Several months later the forked flap was taken out of the lip and advanced along the septum into the columella and the lip elevated to the nostril sill.
Here is another example of secondary correction of the nose and lip which included cutting the forked flap, approximating the lateral muscles together behind the prolabium, and banking the fork in "praying hands" position. Three months later, the forked flap was advanced into the columella.

The six-year-old Central American girl on the next page had been born with a bilateral cleft lip and palate, treated in infancy in San Salvador by surgical approximation of the lateral lip elements to the prolabium. The result was typical for this method, presenting a flat nasal tip, short columella, wide prolabium with lack of muscle continuity, lateral muscle bulges and deficient central vermillion with a whistling deformity.
A forked flap incorporating the bilateral scars and portions of the wide prolabium was cut up to the base of the columella. The central portion of the prolabium was freed from the premaxilla, leaving most of its mucosa to cover the anterior raw surface of the premaxilla. The lateral lip elements were approximated to each other, first mucosa and then muscles for complete continuity. The prolabium was replaced as a philtrum with a dimpling stitch. The forked flap was banked in subalar whisker position.

Two and a half months later, the banked fork was reelevated and advanced into the columella with the aid of a membranous septal incision, which was extended bilaterally in the vestibules at the tip for adequate release. Small side flaps cut from the forked flap were interdigitated into the vestibular releases. The forks were sutured together in front, rolled into a tube with catgut sutures and stitched to the septum with the tips splayed at the columella base. The alar bases were cut as flaps with subcutaneous scar extensions, which were advanced medially and sutured to each other at the nasal spine. The join of the alar bases to the splayed tips of the forked flap created the nostril sills.
SECONDARY MUSCLE APPROXIMATION AND FORKED FLAP

This boy, with a complete bilateral cleft lip and palate, had the old standard closure in infancy in New York. At 10 years he revealed all of the typical secondary deformities including short columella, flaring alae, absence of muscle in wide prolabium, lateral muscle bulges, absence of upper labial sulcus and deficiency of prolabium vermilion with whistling deformity. The premaxilla was slightly projecting but the maxilla and palate were reasonable.

In the first stage of the secondary correction a forked flap was elevated, lateral mucosa and muscles united across the midline, dimple stitch placed in philtrum, lateral vermilion flaps advanced to overlap miserable prolabium vermilion and forked flap banked in whisker position.

Several months later forked flap was advanced into the columella and lip lifted up to the nasal sill.
Ian Jackson of Glasgow, Scotland, is one of the modern champions of joining muscles across the midline in bilateral clefts. In Copenhagen in 1973 he pointed out its value as a secondary procedure:

These methods can be applied to secondary cases where there is shortening of the lip and muscular dysfunction due to lack of reconstruction. Correction of whistling deformities in bilateral cases has been effected without difficulty since this is due to lack of muscle in the prolabium.

Several months later he added:

If one looks at the orbicularis reconstruction in secondary cases, this is where I think the answer lies. . . . It has been interesting that showing these lips prior to operation to other surgeons they have suggested in many cases that Abbe flaps will be necessary to bring in new material. It seems that when one brings the orbicularis into its true position in the midline the need for an Abbe flap diminishes because the whistling deformity is cured in an effortless fashion and the whole lip is lengthened by swinging down the muscle bundles into the midline. In fact, there have been a few lips which have ended up marginally too long after this procedure.

MUSCLES ARE JOINED IN MICHIGAN

Robert Oneal with Donald Greer and Gary Nobel of the University of Michigan reported “Secondary Correction of Bilateral Cleft Lip Deformities with Millard’s Midline Muscular Closure” in Plastic and Reconstructive Surgery, July 1974. They cited nine cases adopting this two-stage procedure in secondary deformities. The sequence of events as they described it is of interest:

We had been doing our primary closures with bilateral lip adhesions. With Dr. Millard’s encouragement, we applied his two-stage technique for lip closure in one of these patients. We were encouraged by our results with this patient. Because the lip-adhesion repairs resembled many of the patients coming to us for secondary repairs, we decided to try this technique in a series of patients for secondary repair of bilateral cleft lip deformities.

They noted certain aspects about these deformities:

In some cases during movement of the lip, the deformity is magnified. . . . With an attempt at puckering, the lack of midline orbicularis oris union becomes quite striking. In these cases the lateral vermilion is redundant and
the unconnected orbicularis segments bulge laterally beneath the skin; this causes the central muscle and vermilion deficiency to become even more apparent. In addition, many of these patients have a short columella and a tethered nasal tip; these also require correction.

Robert Oneal kindly forwarded me a series of diagrams and photographs, some of which he published in Plastic and Reconstructive Surgery. A few of these have been selected to show the secondary deformity, banking the fork, muscle union behind the prolabium and finally columella lengthening.
Their attitude toward banking the forked flap is sound:

If the columella needs lengthening, the extra bulk available from the "banked" flaps and the good results obtained by the Cronin columella raise justified the two-stage procedure.

In summary they noted:

Our review of nine cases in which this technique was employed demonstrates significant improvement in all the basic aspects of the deformities. We have been particularly impressed with the resultant cupid's bow and midline tubercle. The most dramatic change, however, has been in the dynamic function of the orbicularis—particularly during active puckering of the lip . . .

Once the muscle is united in the midline, the transverse vectors cancel each other out, the vertical vector is doubled and it now acts centrally to elongate the center of the lip. This is potentially helpful when the prolabium is congenitally short. These factors suggest to us that the lack of muscle continuity should be corrected as early as possible.

It was particularly encouraging when sound and knowledgeable Bill Grabb, author of the comprehensive Cleft Lip and Palate, voluntarily expressed his "joy" with the functional and relaxing effect of this joining of the lateral muscles behind the prolabium. The reduced prolabium, shorn of the forked flap, snuggles like an intervening piece of a puzzle back between the skin edges of the lateral elements in a better than perfect fit so that the scars of union have absolutely no element of tension tugging against their healing.

In 1976, James Lehman of Akron endorsed this type of secondary muscle approximation during forked flap banking followed by advancement of the forks into the columella as a second procedure.
Tord Skoog of Uppsala is another surgeon who by 1973 in Copenhagen was advocating joining the lateral muscles across the midline as a secondary procedure. He wrote me in January 1976:

In bilateral clefts I am more and more impressed by the results of the secondary lip reconstruction which is described in my book on pages 134–140.

In his 1974 *Plastic Surgery* Skoog shows several cases of bilateral cleft lip with a whistling deformity that had been closed originally by his method. He then presents beautiful color pictures of lifting the prolabium (making fresh skin scars) and joining the lateral muscles across the midline in an effective secondary procedure. This is similar to what many of us have been advocating for years *primarily*—and, of course, secondarily also when necessary.

**AUTOGENOUS SKELETAL MUSCLE FREE GRAFTS**

In 1874 Zielonko, a Russian pathologist in Strasbourg, first transplanted free autograft of skeletal thigh muscle in the lymph sac of the frog and observed rapid necrosis without regeneration. Others experienced similar failures. Lyndon Peer’s 1955 suggestion that the entire length of the myofibril be used in the grafting rather than only a segment of the cell, and Hogan, Dawson and Romanuel’s 1965 demonstration of reduced metabolism following denervation of muscle suggested two adjuncts to increase the chance of free muscle graft survival. This was the basis of Noel Thompson’s Foundation of the American Society of Plastic and Reconstructive Surgeons 1971 prize-winning essay. Then in 1974, in his Kazanjian Lecture, he presented autogenous free skeletal muscle grafts applied to various areas including the bilateral cleft lip.

Research-oriented Thompson, apparently without great experience in primary cleft lip surgery, infatuated with his free muscle grafting and anxious to try it everywhere, made a vague “half case”:

Attempts made to restore muscular continuity across the prolabial region by mobilizing the lateral lip musculature (Glover and Newcomb, 1961; Duffy, Noel Thompson
1971) have the disadvantage of producing a tight lip of excessive vertical height or progressive fibrous replacement in this tissue putting excessive tension upon the transposed muscle (Fara and Smahel, 1967).

He continued:

A simple and reliable method of successfully restoring the continuity of the orbicularis oris muscle fibers in the bilateral cleft lip is by exposing the area completely. This is accomplished by turning down skin of the already repaired upper lip by bilateral nasolabial incisions joined by a transverse incision below the nostril floors and root of the columella. The lateral muscle masses of the upper lip are exposed; the fibrous tissue of the prolabial region is removed, and a muscle graft (one belly of suitable size from the extensor digitorum brevis muscle [denervated 14 days prior to transplantation]) is applied to bridge the prolabium and sutured directly to the lateral muscle elements. Complete sphincteric contraction of the lips results.

He then presented an adult secondary bilateral cleft. Obviously the patient had never had the lateral muscle elements joined behind the prolabium and could not whistle. His postoperative photo revealed improvement but a rather odd-looking lip while whistling and had this label:

Electromyography. Preoperatively there was, on volition, normal electrical activity in the lateral lip elements, but no activity in the prolabium. At 3 months after muscle grafting to the upper lip, there was well marked volitional activity in the prolabium following reinnervation of the graft.

This is interesting, but his next suggestion is disturbing:

If applied at about the age of one year, it seems possible that the improved muscular activity might affect skeletal development in the premaxillary region beneficially.

Many of us will postpone free grafting of skeletal muscle until its microscopic vessel anastomosis is practical. It will probably never be needed in bilateral clefts anyway as there is already enough innervated muscle present, if handled correctly, to obtain good function and whistling without one's having to lend a hand or even part of it to the lip.
MANY operated lips with a bilateral cleft hang like a curtain without animation, philtrum dimple or cupid’s bow. This condition is easily understood as there is no muscle in the prolabium and there is no residual of the normal cupid’s bow or dimple in the bilateral cleft deformity. If the vertical length of the lip is within normal limits, the problems of the cupid’s bow and philtrum dimple become priorities. In fact, if there is ever to be a bow and dimple—and a lip without them is unnatural—they must be handmade. If correctly designed, a cupid’s bow and dimple can be created during the primary surgery. If they were not, then secondary bow and dimple formation is necessary. There are several ways of achieving this goal.

Dimple Making

Even when the bilateral scars have been placed strategically in the philtrum column positions, the lip still looks unnatural without a philtrum hollow flanked by eminences.

Gouging a philtrum

Gerald O’Connor and Mar McGregor of St. Francis Memorial Hospital, San Francisco, noted in 1958:

Obvious anatomical differences that immediately single out the operated cleft lip from the normal are:

1) The absence, or lack of development of the normal philtrum (median groove) either pre- or postoperatively.
2) The absence, lack of development or alignment of the normal prominence that is in the upper lip skin just above the junction at the vermilion border. This has been called the "white line" or "white roll" (Gillies).

They called it the cutaneous upsweep of the upper lip and noted that Marcks and Trevaskis claimed its presence in all cases and emphasized its importance as a landmark in alignment of the cleft lip elements.

O'Connor and McGregor elaborated on the function of the philtrum:

The philtrum, besides being possibly the junction point of the two medial nasal processes, has elevated sidewalls to permit nasal secretions to run down either side of the upper lip, and the cutaneous upsweep acts like a gutter for perspiration or nasal secretions to drain away from the mouth opening. . . .

The philtrum and cutaneous upsweep are also so constructed, in our opinion, to permit the many and varied motions of the lips in all directions, giving a little extra material when play is needed in the upper lip. . . . The excess material lies in sort of a reverse folded position to act as a ready reserve for all complicated lip motions and yet spring back to the norm when at rest.

As they pointed out:

This philtrum absence is accentuated in the double cleft lip by the prominence of the prolabium and the presence of the flattened surgical junction scars on either side of the prolabium.

To imitate the philtrum groove and cutaneous upsweep, they elevated the skin of the prolabium. A mid-vertical subcutaneous flap based inferiorly was cut and split down the middle. Each prong, when threaded laterally into a tunnel along the arch of the bow just under the mucocutaneous junction line, left a central hollow and emphasized the bilateral upsweep. The prolabial skin was sutured deep into the hollow in an attempt to maintain the groove.

Recently Mar McGregor, nicknamed "Fearless" by his residents because of his willingness to take on any problem, was asked how he felt about his philtrum operation today. He reminisced that they had done four of these procedures and had been encouraged by the results over a period of about a year, after which, for one
reason or another, the patients were lost to follow-up. Thus their ingenious and original preliminary report, now 15 years without photographic records, suggests that O'Connor and McGregor combined the economy of the Scots in its conception with a bit of the blarney of the Irish thereafter. In spite of the ingenious design for shifting philtrum tissue, nature tends to smooth out man-made depressions in the upper lip, which always have been and continue to be as elusive as leprechauns.

*Alps and valleys*

At the Rome International Congress in 1967, Austrian Otto Neuner of Berne University Dental Institute, Switzerland, presented some impressively artistic secondary corrections of bilateral clefts. One of the methods he described was remarkably similar to that of O'Connor and McGregor. He transposed two inferiorly based subcutaneous flaps from the mid-vertical to the lateral-horizontal position to create a philtrum hollow and the elevations of a cupid's bow curve. The case he presented had photographic evidence of a dimple. To this he added bilateral V-Y vermilion advancements to accentuate the red lip eversion and the central tubercle of the bow.

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*The roll-over*

There is also a possible application in the bilateral cleft lip of Onizuka's 1971 unilateral philtrum roll-over flap.
An even better double roll-over also follows Onizuka’s philtrum adaptation of the great general principle of taking tissue from where it is not wanted and moving it to where it is needed.

*A chondrocutaneous philtrum*

Innovative Edward Schmid of Stuttgart, Germany, stated in 1963:

So far, none of the attempts to reconstruct an absent philtrum have given a satisfactory result. . . . Lexer, in particular, practiced philtral imitation. . . . In patients with bilateral cleft formation, in whom no after-development of the philtrum can occur . . . our solution is to take suitable cutaneocartilaginous fragments from the ear and transplant these as composite grafts into the upper lip. . . . Permanent trough-shaped grooves are obtained, which are bordered by lateral elevations corresponding to the sides of the philtrum. . . . Owing to the support given by the cartilage it is possible to stretch lips which are slightly shortened in the center.

Schmid used composite auricular grafts with the central portion of the cartilage thinned or perforated to aid in philtrum hollow construction. When the entire skin of the philtrum was scarred, the entire philtrum was replaced by the composite graft.
A commoner and more intriguing application of this principle involved use of a philtrum-shaped auricular cartilage perforated in the center and carrying with it only the amount of skin necessary to create the tip of the philtral bow. As described by Schmid:

In the zone of the philtrum the vermilion is separated from the lip and a tunnel is made in the latter. The cartilage fragment without skin can now be introduced into the subcutaneous space, while the skin attached to the cartilage is sutured between the lip and the vermilion, which was retracted downwards.

Pieces of cartilage in the lip have never been particularly enticing to me, but Schmid faced the problem head on:

I have been asked whether such implantations of cartilage did not impair the patient's sensitivity, e.g. during kissing. I have asked my patients this and their answers have reassured me.

Other stiff upper lips

Neuner of Berne confirmed, in Rome in 1967, the value of Schmid's auricular cartilage graft in the formation of a philtrum hollow. He advocated use of the cartilage with a preformed hollow from the scaphoid fossa of the ear inserted through a mid-vertical mucosal incision.

CUPID'S BOW IN BILATERAL CLEFTS

In the original bilateral cleft, there is no vestige of a cupid's bow, and only by shaping the prolabium and even its inferior border
and possibly bringing in lateral vermilion flaps, or vermilion flaps ridged with a mucocutaneous "white roll" ridge, can a semblance of a bow be created. If this procedure has not been done primarily, there are ways and means of secondary bow construction.

Transforming Blair-Brown into Hagedorn-LeMesurier

When triangular flaps from the lateral lip segments have been slid toward each other below the inferior edge of the prolabium to touch tip to tip as in the Blair-Brown method, often a single mucocutaneous arc is created with the suggestion of a central vermilion whistling deformity. The advantage of the Hagedorn-LeMesurier method was that it created an artificial cupid's bow. Thus, by turning the triangular flaps with additional excisions into quadrilateral flaps, wider at their medial ends, the semblance of a cupid's bow is achieved even with a midline tubercle.

The unnatural position of the skin scars, of course, is more noticeable three weeks after surgery but will forever detract in some degree from the ultimate result.
Gillies' cupid's bow operation

Another secondary method of creating an artificial cupid's bow was ingeniously designed by Sir Harold Gillies in 1932. This was, incidentally, the one of his artistic procedures that propelled me to cross the Atlantic for study with him. I went to learn of philtrums and of cupid's bows but in the process was also taught of trouts' tricks, "Of shoes—and ships—and sealing-wax—Of cabbages—and kings."

It was said that Gillies was one of the top six fly-fishermen in England. One day he and I were strolling along his stretch of the river Test in the mayfly season. My mind was on the lip section of our book. I realized that when the mucocutaneous line curves without any peaks but the lip is loose with no reason to insert an Abbe flap, the Gillies cupid's bow procedure can be useful. I tried to draw him out on this subject, but he simply countered by picking a hook out of a tobacco tin and with green floss silk tied a fly of brown cock's hackle and flue for wings and tail, identical to the pale watery olive mayflies hovering over the quiet river that afternoon. Only after a catch was Sir Harold willing to return to the cupid's bow, and then and there we composed a few lines for our 1957 *Principles and Art:*

First estimate by measurement from the alar base the desired lift, mark the elliptical skin areas and excise them. Then undermine the lip mucosa from its muscle except at the central point, which is to remain fixed. Nick the tight muscle bands at the centre of each "bow," or perhaps even excise a small triangle, which will increase the side-to-side length of the lip. As the fresh vermilion edge is advanced up into its new position, the central point tilts forward.
Freeing the vermilion.

Block excisions of skin.

Nicking the muscles.

Suturing the cupid's bow.
This was an operation Barrett Brown attacked with vigor, saying,

Only God can make a cupid’s bow!

and then elaborating,

It is thought that the resultant scars of these operations, in some instances, may be more deforming than the absence of the “bow.”

Meticulous Musgrave echoed this same feeling decades later:

Note the artificial appearance of this “manufactured” cupid’s bow.

Gerhard Pfeifer of Hamburg expressed German resistance to the operation:

I do not think we ought to use excisions at the vermilion border, after Gillies, since even the finest suture cannot improve the natural border of labial red and white.

It is quite true that when this method is executed inartistically the unnaturalness created cancels out any assets accrued. Yet there are several possible modifications to refine the design.
Preserve the mucocutaneous ridge

The original procedure can create a semblance of a bow with improvement in certain cases. As the normal white roll of the mucocutaneous junction was destroyed in Gillies' plan, the results consequently present in the lip area a false-face effect. Thus, to counteract Brown's, Musgrave's and Pfeifer's criticism, it is suggested that the white roll of the mucocutaneous junction be spared, as has been shown in secondary unilateral cleft corrections, and the excisional lift be carried out just above it, preserving the skin ridge of the mucocutaneous junction to reflect a highlight along the white roll.

INCORPORATING THE "W"?

Albert Facundo Borges, the czar of scars, formerly of Havana University and now of Falls Church, Virginia, wrote an excellent W-to-Z atlas entitled Elective Incisions and Scar Revisions. He advocated that transverse excisions of the lip be made as W-plastic-type scars and further insisted that this principle is applicable to the skin excisions in the cupid's bow operation. Even when the excisions are carried out above the salvaged mucocutaneous "white roll" ridge, Borges claims the W-plastic maneuver will give a superior end result. In 1977 he wrote:

Your modification of Gillies' procedure in which the mucocutaneous ridge is preserved is an ingenious one and will get a great improvement. The correction of displaced anatomical landmarks supersedes in cosmetic improvement any deleterious effect created by the presence of a scar. The unfavorable, or not, result of a transverse scar on the lip should be judged, not only with the patient's lips in repose, but specially with the patient smiling or talking. Although I have not performed the following W-plastic technique to correct asymmetry of the two arcs of cupid's bow secondary to cleft lip repair, I have performed it for post-traumatic drooping as seen in Figure 8-10 of my book on scars. The schematic representation of the technique is enclosed. Note how the widest triangles correspond to that segment (medial third) where one desires the greatest excision of tissue, thus the greatest upward pull. The lowermost angles of the W-excision reaches to, but does not transect the mucocutaneous ridge. The excision should not be any higher, since this would require a greater width of the W-plastic tissue excision. Too
wide an excision could create dog ears at the ends of the excision which would require vertical fusiform excision of tissue for its correction. The end result would be an elastic concertina-like transverse scar on the lip that would not hinder the normal laugh of the patient, nor would it make the patient stop laughing. This scar would be composed of “almost” vertical TL very small scars. This scar WILL BE superior in theory and in practice than any transverse long scar running against the RSTL.

This may be true but here the scar skirts the mucocutaneous ridge and I personally prefer to keep the scar parallel to the curve of the ridge line rather than try to “W” it just above the ridge along the entire width of the lip.
TO MAKE A BOW AND Dimple

A further improvement in this operation is suggested. The bilateral triangular or elliptical skin excisions should not be removed in the usual manner, and the notches should not be cut out of the free edge of the orbicularis oris muscle. Instead, the skin triangles should be de-epithelialized and then incised as dermomuscular flaps based at the center of the bow. If subcutaneous tunnels very close to the skin are dissected along the ideal philtrum column lines toward the base of the columella, the dermomuscular flaps can be tugged into these tunnels with pull-out sutures. This operation will now create a cupid’s bow with a mucocutaneous ridge, a central tubercle and philtrum columns with a central dimple.

Such an operation, as always, is available for shortening a long lip, but these refinements make it possible simultaneously to fashion a more natural cupid’s bow and to contour philtrum character. By the relative rise of the overlay principle, the philtrum columns and hollow can be achieved without the necessity of dividing by gouging the midline muscle union across the lip!

Again, if the primary cleft operation was executed correctly, there will be no need for such shenanigans. This is but a secondary procedure of last resort refined to make the most of a flat situation.
De-epithelializing the skin but preserving the mucocutaneous junction ridge.

Medially based subcutaneous-muscle pedicle being dissected and elevated as flaps.

Philtrum column tunnel dissected.

Flaps being pulled into tunnels to create cupid's bow, philtrum columns, and dimple.

*This modification has real possibilities!*

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THE WHISTLING DEFORMITY

The most common defect of the free border in bilateral clefts is the whistling deformity. This unattractive central deficiency, often seen as a postoperative sequela, spoils the effect of an otherwise satisfactory closure, for one tends to see the hole and not the doughnut! Of course, its occurrence is easily avoidable if the primary lip surgery is planned correctly and the prolabium vermilion is not called upon to constitute the center of the lip alone. A myriad of methods have been used to correct this secondary deformity.

A MYRIAD OF METHODS

A fancy vertical V-Y

In 1957 George Crikelair and M. J. Hickey of Columbia-Presbyterian Medical Center noted that in bilateral clefts when the lateral segments have simply been approximated to the prolabium the central segment is often lacking in vermilion fullness, presenting a dark hole in which the upper central incisors are visible. They suggested a V-Y advancement with lateral extensions from the posterior buccolabial line of the prolabium to fill out the "whistle deformity."
Double horizontal V-Y's

Tall and gentlemanly Dave Robinson, with Lynn Ketchum and Frank Masters from the plastic stronghold in the center of the corn belt of Kansas, admitted that after conservative simple side-to-side closure of a bilateral cleft lip when the prolabial vermilion is left as the center of the red border:

For the first few years, the prolabial vermilion is too high—but it does assume a more normal position in 5 to 10 years. In spite of the claims that it will usually assume the same level and the same degree of fullness, this progression does not always happen. Thus the "whistling deformity" occurs.

For this deformity they reviewed the central advancement of posterior upper lip mucosa by a Z, a V-Y or a double rotation. They even mentioned a free composite graft from the lower lip. Then they plowed them all under and came up with a horizontal double V-Y in the free vermilion border of the lip which shifts the lateral mucosal redundancy into a central four-flap tubercle.

More recently, at the University of Kansas, the surgeons have been treating whistling deformities with flaps described by Kapetansky.

The pit and the pendulum

In 1971 enthusiastic Donald Kapetansky of Detroit noted:

When the prolabium has not been augmented with lateral vermilion flaps in the primary repair, an abundance of tissue is usually apparent in both sides of the upper lip. The problem is one of secondary transfer of this tissue. The usual flaps do not permit the necessary mobility, but island flaps are mobile and avoid the need to twist the tissues or stage the repair.

He designed two vertical pendulums composed of vermilion,
muscle and coronary vessels. The anterior plane of dissection divided the lip coronally with about one-third of the orbicularis oris muscle mass in front of it; the posterior plane was behind the labial vessels. A transverse incision uniting these two provided a space into which the pendulums could swing together, filling the whistling deformity.

His result was impressive, but the magnitude of the muscle splitting of the "pit and the pendulum" method has the slightest suggestion of a plan by Poe.

Three years later, with a total of 24 cases, Kapetansky had made a few interesting modifications which he presented in the April 1974 *Cleft Palate Journal*. He now cuts his pendulums full-thickness muscle in their medial portion and split-thickness laterally. With back-cuts into his pendulum pedicles he achieves medial lengthening to form a central tubercle and notes that if the back-cut is placed low and short, the tubercle will be small, while if it is high and deep, the tubercle becomes larger.

To create a pit between his pendulums, Kapetansky sutures the central prolabium dermis to the muscle pedicles. His immediate results are dramatic but seem slightly better than the later results, as in most dimpling procedures.

It is also worthy of note that Kapetansky has such faith in this secondary procedure that he is happy with simple side-to-side
closure in his primary bilateral clefts at one week, accepting lack of muscle continuity, short columella, flared alae and whistling deformity. Then at five years he plans to swing the pendulums and, later, to lengthen the columella.

Juri, Juri and de Antueno of Buenos Aires in 1975 suggested a modification of the Kapetansky technique that used another approach to increasing central lip fullness. They advocated that the Kapetansky flaps be "fitted together downwards in the shape of an 'L' to make up the center of the tubercle."

Double transpositions

Marvin S. Arons, of Yale University, also designed a correction of the whistling deformity. As it is intriguing to review the background of those who later contribute, here are his 1974 reminiscences:

As a general surgical resident at Duke, I first saw the cleft lips repaired in a textbook technical fashion. My first experience was with Truman Blocker of the University of Texas while he was still active in the operating room. It was what I called the "twenty minute free hand repair of a cleft lip." I believe that he represented to me the art—as well as the science—of plastic surgery. I learned from him the importance of rolling in the ala, utilizing the skin below to restore the floor of the nose as a lateral based flap brought medial. We all called this the "Blocker flap." I'm sure Dr. Blocker did not realize that the Collis procedure was reported in 1868.

In 1971, for the central vermilion deficiency in bilateral clefts, Arons designed a secondary Z. He hinged small bilateral inverted V flaps of mucosa and scar down on either side of the whistling deformity. The central segment was elevated and flapped forward into a roll. The lateral V flaps were then interdigitated horizontally behind the central flap.
V-Y-Z

In 1969 Shugo Soeda, of Tokyo University Hospital, added a Z-plasty to the V-Y posterior mucosal advancement. As he explained:

V-Y-Z plasty is combined V-Y plasty and Z-plasty for advancement of the wide V-shaped flap and preventing postoperative retreat of that flap. This technique is applied for secondary revision of the thin prolabial vermilion, produced as the postoperative deformity after primary repair or Abbe flap repair of the bilateral cleft.

This rather complicated action does have a double advantage of lowering the short central segment while lifting the long lateral edges, but it must be rare that the middle segment is short enough to require this many flaps.

A drop down

Humorous Hugh Johnson of Rockford, Illinois, simplified his treatment of the whistling deformity by turning the posterior lip mucosa down like the back flap in a pair of red long johns and holding it rather adroitly with a stay suture over cotton. This maneuver presupposes that there is posterior mucosa in the first place, that the inevitable overgrowth of injured mucosa is inevitable and that the rather large posterior raw area will heal without contracture. Too many ifs for most cases, but for the one he presented with a minor "whistle" there was permanent improvement.

Turning a chink in V-Y for a tubercle

In my experience, advancing the free border in the central whistling deformity with a posterior mucosal V-Y can be augmented by a combination of details. Mark and cut the V slightly
wider than the free border vermilion discrepancy. Dissect the V flap down to its base along the inferior border of the lip. Then cut one or two small vertical subcutaneous or muscle flaps from the excesses on each side and transpose them beneath the flap to form a filler under the roll. The muscles are approximated across the upper defect, but the downward advancement of the V can be minimal, producing only enough stem in the Y for one or at most two closely placed sutures.

Redundancies

A very common secondary deformity of the vermilion free border is an excess bulge here or there. With an eye for a symmetrical cupid's bow curve of the free border, the surgeon must trim the redundancy by marking and sculpturing with scissors. Sidney Wynn facilitates accuracy and hemostasis in his removal of redundant vermilion of the free border with a series of Allis clamps pinching a welt of the excess. Then he cuts with scissors along the compressed teeth marks of the Allis clamps. According to Albert Borges, this transverse reduction and contouring of free border
vermilion redundancy can best be accomplished with a W-plastic type excision. The extensible zigzag scar is very good cosmetically, producing elasticity in and out of a smile.

_A relative whistling deformity_

When the central portion of the vermilion is adequate but there is a relative excess of the lateral vermilion segments, there may be an apparent whistling deformity. It can be corrected simply by reduction of the sides without disturbance of the center. In this case transverse free border excisions of the overhanging vermilion, more on her right than her left, produced a central tubercle and the natural vermilion curves of the cupid’s bow.

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*From tip of tongue*

Another source of pink mucosa for constructing the deficient vermilion of a cleft lip is the tip of the tongue, as described by José Guerrero-Santos of Guadalajara in 1964:

We obtained a lingual flap in one single unit and after a vermilion shave of the upper lip, we sutured the flap in place and resected the pedicle 2 weeks later.

By 1969 he had modified his tongue-tip flap. When the vermilion was scarred, he replaced it with a tongue flap.
When the vermilion was unscarred but deficient in bulk, presenting the whistling deformity, he denuded the tip of the tongue-tip flap and buried it in the lip. After three weeks, the flap was divided, keeping as much tongue mucosa as was necessary to correct the deficiency.

From opposite lip

Vermilion flaps from the lower lip are available and have been used for defects of the upper lip. They are all possible solutions to the whistling deformity. Lexer used a relatively wide flap from the inside of the free border of the lower lip which he turned out and attached directly to the center of the upper lip. This flap he divided after an inset of two weeks.

In 1973, Hans Tschopp of Basel, Switzerland presented an embellishment of the Lexer lower lip mucosal flap which sported lateral extensions.
His design was similar in principle to the mucosal portion of my 1964 fleur-de-lis lip flap presented at the end of this chapter and the reverse of a flap used in the following case.

Here is an eleven-year-old girl who had had a LeMesurier lip closure in Missouri with a reasonable result except for soft tissue flatness of the upper lip when compared to relative protrusion of the lower lip. The thinness of the free border vermilion of the upper lip suggested the use of a reverse Lexer type lower lip mucosal flap.

At age 14 years under local anesthesia a transverse posterior incision above the free border of the upper lip released the vermillion. Then a wide mucosa and orbicularis oris muscle flap based inferiorly was cut on the lower lip and let into the upper lip defect. Andrew Klein inquired if my fleur-de-lis flap could be used here. Realizing that such a modification of a flat flap would achieve final inset of the lateral wings and produce larger portals for breathing and feeding, I did just that, with excellent take of the entire flap.

Ten days later the pedicle was divided, the spurting coronary vessel cauterized, the donor area in the lower lip closed, and the flap inset completely in the upper lip.
Gillies, in the two world wars, used flaps from the vermilion of the lower lip for defects in the upper lip. He even tubed the pedicle of one of these mucosal flaps, but in most instances he transposed them 180 degrees without delay.

Much ado about almost nothing
This may seem like a whole circus parade of methods for a problem worthy of only a "peep show," but actually each one has merit and in a certain case could be the best. The important point in the entire show is that the whistling deformity should no longer occur in the first place, and if the primary surgery is well designed it damn well won't!

A MORE CONTINUOUS VERMILION FREE BORDER DEFICIENCY
The wide medial advancement of the upper labial tissues after extensive freeing from the maxilla and "back-cutting" the mucosa at the extremities of the incision was advocated also in bilateral clefts in 1973 by O'Connor, McGregor, Murphy and Tolleth. This radical action does give more body and eversion to the free border vermilion of the upper lip and does so without visible scars.

Since 1965 the artistic Otto Neuner, oral surgeon of the Berne University Dental Institute, has reported fascination in secondary cleft deformities. In 1969 and 1971 he published three designs for evertting the deficient upper lip vermilion in bilateral clefts.

One approach was similar in principle but less radical in execution than that described later by O'Connor. He referred to it as a "vestibulum-flip-shifting-plasty to protrude the vermillion," and, as with the O'Connor method, it was equally applicable in unilateral and bilateral clefts.
Another Neuner method took two mid-vertical mucosal flaps and transposed them bilaterally after release by horizontal posterior incisions. This approach, of course, supposed that there is enough mucosa in the scarred vertical axis of the posterior upper lip to supply rather grand horizontal needs.

It has also been diagrammed this way:

The third method looked to the lower lip for its mucosa. When the upper lip does not have sufficient mucosa to spare, Neuner advocated transposing a horizontal bipedicleed mucosal strap flap from the lower lip. This strip of mucosa is let into a posterior releasing incision placed in continuity around the commissures with the upper incisions of the strap. The action not only everts the deficient free vermilion border of the upper lip but reduces redundancy of the lower lip.
The procedure has also been diagrammed this way:

Abbe stay home

Neuner feels that one of the advantages of these mucosal maneuvers is the fact that they can be done without the use of an Abbe flap. This is a commendable point. It is, however, important not to overemphasize the attitude of "use anything to avoid a lip-switch flap" because the Abbe has far more to offer than mere mucosa.

For instance, sometimes the upper lip vermilion is thin while the lower lip is voluminous, and, at the same time, there is transverse tightness or a vertical skin scar which, when excised, will produce side-to-side tightness. In this case the lip fleur-de-lis Abbe flap can be a winner.

Fleur-de-lis

The lip-switch flap can be specifically designed to fill out the free border vermilion of a tight lip which has a thin red edge. The conception of the fleur-de-lis lip flap was developed only after three consultations with a bizarre case over a period of one year beginning in 1962. Yet the dividend derived from this prolonged and tenacious campaign to fit the pattern of procedure to the specific idiosyncracy of the defect was dramatically rewarding. It was published in Plastic and Reconstructive Surgery, July 1964.

A 29-year-old female at first sight presented an upper lip with slight shortness in vertical length producing a notch which exposed teeth and appeared to be a postoperative unilateral cleft lip deformity. The impulse to use a routine Abbe flap was almost as conditioned for me as salivation at the sound of a bell for Pavlov's dog. But the history revealed that a hemangioma of the upper lip had been treated in infancy with radon seeds. The sclerosing process had shriveled the skin into an atrophic scar with areas of depigmentation and hyperpigmentation involving
the left philtrum column and skin 1 cm. laterally. On closer examination, the full effect of the interstitial radiation became more apparent. The central two-thirds of the upper lip revealed a generalized lack of development with a thinness particularly of the vermilion, which contrasted unfavorably with the pouting voluminous vermilion of the lower lip.

My thoughts persistently ran a one-track rut straight for the routine Abbe flap. Yet to transpose a portion of the thick lower lip into the thin upper would have been as uncraftsmenlike as repairing a hole in a bed sheet with a patch of puffy eiderdown. As I was obviously not on the right track, rather than proceed at full speed or even jump the track, it seemed wiser to slow down until coming on to a suitable sidetrack. After a year of off-and-on meditation, the solution became clear: two sidetracks! The severe excess of lower lip vermilion demanded reduction. If the usual composite lip-switch flap were taken with lateral vermilion extensions, the lower lip would be reduced effectively in three dimensions, and these mucosal wings could be used to bolster the free border of the entire upper lip.

A vertical excision of the upper lip scar preserved the philtrum dimple and two-thirds of the cupid's bow. The lower lip fleur-de-lis was cut to pattern retaining the usual small coronary vessel pedicle posteriorly. The mucosal extensions had to be taken anterior to the main coronary vessel. Horizontal relaxing inci-
sions in the mucosa of the upper lip just posterior and superior to the free border let its thin vermilion flap down. The three-armed flap was cartwheeled 180 degrees and inserted into the upper lip defect with the lateral extensions fitting behind into relaxing slits to maintain the improved plumpness of the upper lip. The pedicle was divided at two weeks and the new lip relationship was so exciting that a reduction rhinoplasty became mandatory.

Considering the possibility of a Cinderella story for this patient, I asked her if she was married. She replied that she was and smilingly asked, "Why?" "Oh, I just thought how easy it would be for you now," I told her. Several years later after a follow-up visit she said rather hesitantly, "Doctor, do you remember you once asked if I were married? Well, it was not successful, but now I have remarried and we are very happy!"

Of course, this lip fleur-de-lis flap variation can be of value in certain postoperative cleft lip deformities, especially bilateral, when the lower lip vermilion is voluptuous and the entire upper lip shows only a thin red line.
36. Creating the Upper Labial Sulcus

ARTHUR von Deilen of Camden, New Jersey, in 1956 set criteria for bilateral cleft lip construction including a free upper lip. This involves creation and maintenance of an upper labial sulcus.

ADHESION

When the upper labial sulcus is bridged by an adhesive band, this can be simply divided—or better, split—and closed with a Z of mucosal flaps as described by many, including Raymond Gola in 1970.

TOTAL ABSENCE OF SULCUS

Techniques that introduce the lateral mucosa behind the prolabium satisfy the development of a sulcus. Methods that accept the prolabium's attachment to the premaxilla, of course, never achieve a sulcus. For such cases several surgeons have proposed methods of secondary sulcus construction.
An important contribution to face and jaw reconstruction during World War I was that of Johannes Frederick S. Esser, a Dutchman working in Austria. He conceived the free skin graft inlay for creating a labial sulcus. Concerned about the complications of infection, he made an incision in the skin under the jaw and dissected a blind pocket between the lip and cheek and the mandible without opening into the oral cavity. A stent, covered by a skin graft with its raw side out, was inserted into the pocket, which was closed by suturing the skin over it. Once the graft was well healed, Esser incised along the line of the future sulcus inside the mouth and removed the mold, revealing a well-lined labial sulcus.

There are stories that cloak Esser’s name in mystery and contradiction. Joseph Safian recalls observing him in Berlin trying to operate without anesthesia on the cleft lip of a convulsing infant, with the baby in his lap. When questioned about this incident, Esser is reported to have stated abruptly:

Babies have no feelings.

At the peak of Hitler’s power in the early 40’s, Esser, who was now working in Berlin, came to the United States and, traveling about in a mobile home, visited various plastic surgeons. Maliniac recalled that, during Esser’s visit,

One could not meet him without liking him.

Yet Lamont remembers that the elderly John Staige Davis had been quite upset by his visit with Esser. Certainly during his call on Safian, Esser revealed his Nazi sympathy by condoning the loss of thousands of lives in the effort to unite western Europe. Just one day after Esser’s visit with Safian, an agent of the Federal Bureau of Investigation came looking for him, but he managed to keep one jump ahead of the F.B.I. until his return to Germany.
POSTWAR ERA

At the end of the 1914-1918 war, most of those who had served as plastic surgeons in the British army returned to their previous specialty. Gillies recalled:

To venture into this rather new field of civilian plastic surgery was certainly a gamble, and as Sir Milsom Rees had kept the E.N.T. post open for me, it was a temptation to return. . . . It meant reassociation with royalty and certain financial success, but the plastic bug had bitten.

By 1922 Gillies had consulting rooms in London at Great Portland Place, Kilner had joined him and private practice was gradually increasing:

One particular group of patients that were numerous about this time were the old secondary hare-lips who were coming in for buccal inlays.

He simplified Esser’s original 1917 skin-burying procedure, and this more direct method has served effectively in bilateral clefts that require the construction of a sulcus. The technique is quite easy. A split-skin graft is wrapped around a gutta-percha mold with its raw surface out. Then an intraoral pocket is dissected between the lip and the premaxilla, the epithelial egg is nested into the pocket and the mucosa sutured over it for several weeks. Then the sulcus “lays the gutta-percha egg,” leaving behind a skin-lined cavity.

These grafts are notorious for their 99 percent take. Of course, the fate of the take depends on the raw surface’s being outward. I have heard the rotund Professor Kilner relate his favorite inlay graft story. He awakened one night suddenly wondering whether
the inlay he placed the day before had been inserted the wrong side out. He tossed and turned becoming more and more suspicious that the graft was inside out. Finally he got up and went to see for certain and was relieved to find the graft correctly positioned.

This procedure is effective. Eventually some contracture is noticed, but in general the skin graft inlay creates a functional sulcus.

**EXTENDING SULCUS TO FREE THE NOSE**

H. D. Gillies extended his upper sulcus inlay principle to its ultimate in the contracted luetic nose. He used the same principle to free the contracted nose in the secondary bilateral cleft lip.

Later, in 1952, A. von Deilen of Camden, New Jersey, described the restoration of a 15-year-old girl with the typical secondary deformities of a bilateral cleft including contracted maxilla following a Brophy-type palate closure. He carried out a prolabium shift into the columella and replaced it with an Abbe flap. He then noted:

This girl's face still had a dished appearance, due to the retroposition of the base of the nose. . . . I decided the best way . . . was with an appliance which had a high and thick labial flange. This flange would fit into a manufactured epithelialized pocket anterior to the maxilla and push out the nose and upper lip and close all holes. So I decided to deepen the labial sulcus, free the base of her nose, bring the nose forward and cover all raw areas with a split skin graft. This was done.

The result he showed was a noticeable improvement.

**FREE MUCOSAL GRAFT**

In 1966, Cosman and Crikelair reported late release of the prolabium from the premaxilla and creation of an upper labial-alveolar sulcus in 12 cases out of a series of 40 bilateral clefts. As they reported:

Dissection of the prolabium from the premaxilla with a full thickness free mucosal graft to the labial surface leaving the premaxilla area bare was found to be an effective method free of major objections.
FLAPPING THE SULCUS

Alfred Falcone of Syracuse, New York, a romanticist with a love of his work, was trained by pioneer Leon Sutton, whom he considers a second father. He recalls such succinct "Suttonisms" as:

Why is a left sided cleft lip easier to repair than the right? Simply because there are more left clefts and the experience level should be greater.

or,

One can compare repair of the cleft lip, especially at the point where some of the excess vermilion is discarded, to the government fiscal policies—it seems that when you don’t have enough, you end up throwing some away.

Obviously, Falcone resented misuse of mucosa. In 1966 he designed its effective use in the construction of the upper sulcus. The mucosa of the anterior premaxilla was cut free with its base above in continuity with the upper lip mucosa. The lip was dissected from the premaxilla as a pocket up near the nasal spine, and the mucosal flap was turned under to line the lip side of the sulcus. The raw periosteum of the premaxilla was left to re-epithelialize, and it readily does so.

The productive Norfolk team of C. E. Horton, J. E. Adamson, R. A. Mladick and R. J. Taddeo in 1970 suggested preservation of the vermilion parings as flaps of mucosa to line the sulcus or cover the premaxillary raw surface in the primary surgery. This sound and economical gesture at least partially maintains a
sulcus. They also stated that, quite apart from the need for a free upper sulcus, if the prolabium remains attached to the premaxilla it can interfere with growth.

Then, in Georgiade's 1974 transactions of the Cleft Lip and Palate Symposium held at Duke University, after a slight rearrangement of the members of the team and one substitution, Richard Mladick (of Yugoslavian extraction but Duke trained), with Horton, Adamson and J. H. Carraway, presented several alternate secondary methods of flapping and mucosa-grafting (MG) the upper sulcus. Each has a possible place in sulcus surgery.
FOR BOTH FREE BORDER AND SULCUS

Gung ho Joseph O’Malley of Orlando left his practice to serve in the field with the marines in Vietnam. Once, over the mountainous terrain of Ethiopia, he tracked and shot a rare, padded knee goat, the walia ibex, now in the Smithsonian Institution. Just a few months before his tragic end, O’Malley wrote a note in the June 1973 *Southeastern Plastic and Reconstructive Surgeons’ Newsletter:*

Throughout my travels around the world . . . and particularly in Central America, I have found many cases of repaired bilateral cleft lips which present a totally obliterated upper lip sulcus and inadequate vermilion of the prolabium and I have found the vermilion lip roll, a variation of the Abbe flap, to be most useful.

In cases with a whistling deformity and no sulcus or posterior mucosa for the usual roll-down, O’Malley advocated Peterson’s altered Abbe. A standard V Abbe flap the width of the prolabium was cut and shorn of its skin, leaving muscle, mucosa and vermilion border. He freed the prolabium from the premaxilla and slid this skinned Abbe behind to line the lip and fill out the free border. The pedicle was divided in 10 to 14 days.

Yet again, it is important to remember that if the primary surgery is designed correctly, an upper labial sulcus will be one of the dividends and only minor revision, if any, should ever be required.
EXCLUSIVE to secondary results in bilateral cleft cases, besides the usual discrepancies in the scar, muscle, contour, landmarks, free border and sulcus, there is the especially characteristic bilateral cleft lip nose. As this nose has ordinarily been left for secondary correction, it presents a more constant picture and one not greatly unlike the original deformity. A typical bilateral cleft lip nose that has had no treatment besides closure of the clefts in the lip presents a columella of varying degree of shortness from slight to almost total absence of any central column. The tethering of this short, single, central bridge presents a depressed nasal tip, often with nothing between lip and tip and boasting little to no profile at all. It is accompanied by bilateral dislocation of the alar cartilages off the crest of the septum, attenuation of these stretched cartilages with an obtuse medial-lateral crural angle and a spatula flatness of the nasal tip with an unnatural width between
the alar arches. Therefore, with the *flare* and even *eversion* of the alar bases, the *shortness of the vestibular lining* and the *width, flatness, scarring and fistulae of the nostril floors*, reconstruction of these residual discrepancies promises no plastic picnic.

The combination of the frontonasal shortness in the original congenital deformity and the subsequent attempt at projectory growth produces a snubbed nose restrained at the tip but exploding at the sides with kinking and flaring like that of a snorting steed on a carousel.

Frankly, the distal half of this type of nose is a depressed mess, as deserving of special allocations as any other disaster area. The only positive light in the darkness of the double deformity is that the anomaly has occurred twice, and so usually has a quality of symmetry.

**Alar cartilages:**

**ONCE SHORT, STILL SHORT**

In all methods that incorporate the entire probalium the full vertical length of the lip, if the columella was short originally, it continues to be short postoperatively. In methods in which the probalium is not pulled into the full vertical length of the lip but is bolstered below by lateral flaps, there may be slightly less drag on the columella but it will still end up too short. The LeMesurier results fall into this group.

In 1971 Farkas and Lindsay studied bilateral cleft patients after the LeMesurier closure and reported:
In all bilateral cleft lip and palate patients the columella length on both sides was significantly shorter than in normals. However, the difference in length was only about one and a half millimeters. In patients with complete and incomplete bilateral cleft lip and palates . . . the columella difference in length from one side to the other did not differ significantly.

**THINK COLUMELLA!**

Whenever a surgeon faces a specific secondary correction in a bilateral cleft, his attention should be directed first to the columella. Too many bilateral clefts have been operated on again and again along a one-track lip correction throwing away valuable tissue and ending up with a good lip but with the columella still short—and, by now, no tissue left to lengthen it. This is preposterous procrastination or simple stupidity. *Design the columella lengthening when planning the lip correction.*

**SECONDARY COLUMELLA LENGTHENING**

When the columella is short, this aspect of the secondary nasal deformity deserves first priority of action. Once accomplished, it will set off a chain of happy reactions such as elevation of the tip and opening of the airways.

Columella lengthening requires the transport of new tissue into the area. It can be obtained from various sites in a number of ways, but its most common donor is the adjacent and deformed upper lip. How it is to be taken depends directly upon the condition of the lip. Because columella lengthening should have a high priority both in the primary and certainly in the secondary surgery, and although it is often excluded from the early planning, it will be discussed first.
38. Lengthening the Columella with Central Lip Tissue

PROLABIUM IN THE LIP

If the prolabium was incorporated into the full vertical length of the lip, the lip probably will have adequate width and length. In fact, in time the muscular lateral lip elements will stretch the muscleless prolabium wide and flat. Victor Veau complained about this aspect:

The principal cause of the mediocre results obtained in bilateral cleft lip repair is the absence of muscle in the prolabial segment of the lip. One can hope for contour and shape approaching the normal only if the lip contains muscle. I have long emphasized this fact: the muscular sterility of the prolabial segment.

At least there is extra lip tissue available for lengthening the short columella.

SHifting THE Total ProlaBIum

When the upper lip is ample, it can supply a flap for lengthening the columella. This flap can be the entire prolabium, as was used by Baron Dupuytren along with excision of the premaxilla and direct side-to-side closure of the lip. The principle was later adapted to secondary corrections. Peskova and Fara gave J. S. Davis and Ferris Smith credit for attributing this approach to Gensoul. This is possibly a language misinterpretation because both Davis and Smith describe Gensoul’s method correctly as a V out of the center of the prolabium and not the entire prolabium. In fact, Davis also illustrated a vertical columella excision to thin the center column simultaneously with the Gensoul lengthening.
Gillies taught me to shift the entire prolabium in certain cases, and I have used it in many types of combined secondary bilateral nasal and labial corrections. Usually it requires an Abbe flap replacement in its wake, and in the right circumstances the result can be quite dramatic, as demonstrated in the case of this young schoolteacher published in *Plastic and Reconstructive Surgery*, April 1963.
WHEN AND HOW TO SHIFT
THE TOTAL PROLABIUM

When the columella is short and the upper lip tight in relation
to the lower lip, a reduction of the lower lip is necessary. The
total prolabium is taken out of the upper lip as a unit. After a
membranous septal incision extended by lateral vestibular releas­
ing incisions, the columella-prolabium component hangs from
the tip of the nose like a Ping-Pong paddle. To turn this into a
columella takes a bit of clever tailoring.

Extension flaps at the top of the prolabium can be used to fill
the lateral vestibular incisions. Then the remaining prolabium is
thinned and rolled on itself with sutures. The join of the end of
the true columella to the beginning of the prolabium tends to
resist a smooth transition. If it does not form a graceful column
in the first stage, it can be revised with a vertical diamond
excision secondarily. The bottom end of the prolabium can be
split to splay as a columella base to join the alar bases across the
nasal floors as nostril sills. Again septal cartilage struts to shore
up the tip and column can be used primarily or secondarily.
Several examples of this double action will be shown later.

Others use this general principle of advancement of the entire
prolabium into the columella and filling the upper lip defect with
an Abbe flap. The most recent (1973) advocate of this approach
was René Malek of Paris, who, when taking columella from
below, elucidated the type of bilateral secondary cases in which
he preferred this regimen:

One or more of the following elements exists: the medial part of the lip is
too short in height; the prolabium is scarred and the muco-cutaneous ridge
is disturbed; there is a transverse shortening of the lip (causing, according to
Victor Veau, a holy-water basin appearance in the profile view). . . . In all
these cases, it is necessary to utilize an Abbe flap. The prolabium gives added
height to the columella.

GENSOUL

A more popular columella lengthening approach for over a
century was the use of a flap taken out of the mid-vertical portion
of the prolabium in continuity with the base of the columella and shifted upward by V-Y advancement. This has become known as the Gensoul principle.

Joseph Gensoul of Hôtel-Dieu, Paris, was a dexterous, explosive, audacious surgeon with an imperturbable sangfroid. In 1833 he was the first to conceive a secondary lip V-Y to lengthen the columella, and many fine surgeons since have used and modified this principle. There was one major drawback—it added a third scar to the already doubly scarred lip.

**GILLIES USED IT**

Gillies and Kilner described treatment of the bilateral cleft lip nose in the 1932 *Lancet*:

One of the most common faults is found in cases of double hare-lip, for the so-called prolabium is often placed so far down the lip that the lobule of the nose is dragged down with it. The vertical dimensions of the prolabium vary considerably. . . . If the skin of the prolabium were truly a part of the lip then its incorporation in the lip should lead to no secondary deformities. . . . One might describe it (prolabium) as that portion of the skin joining the columella to the upper lip . . . it might be better termed the supralabium. . . . From a lip plastic point of view, it is imperative in all cases of down-drawn nose tip to take the prolabial skin out of the lip and suture it so high upon the free border of the septum as will allow the tip of the nose to come forwards and upward into normal position. To ensure this, it may be necessary to divide the membranous septum with scissors, which are carried even over the anterior border of the septum. . . . There remains a V-shaped gap in the lip. The skin of the lip, the floor of the vestibule, and the base of the ala are carefully undermined . . . to loosen the false attachments . . . a buried catgut suture is inserted to gather the deep tissue.
together to support the columella from below and behind. This stitch draws in the alar bases and so improves the nose still further by narrowing the nostrils. . . .

In some cases there is insufficient septal development to give prominence to the new tip, and a supporting graft of cartilage . . . is required later.

**LEXER USED IT**

Erich Lexer, who succeeded Sauerbruch as chief of surgery in Munich in 1928, also used the Gensoul flap. It might seem unlikely that the grandiose Lexer, who reveled in arterial aneurysms, arthoplasties, joint replacements and jejunodermatosophagoplasties, would even notice a short columella. He not only took note of it; he designed a procedure to correct it and at the same time narrow the flaring alae.

Of great physical strength, Lexer was somewhat overpowering, as testified by Hans May, who was one of his students:

Lexer never had more than two assistants helping him, and they had to keep their fingers out of the wound at all times. "I like to be alone in the wound" was an often quoted request of his. The handling of ordinary instruments was called for by sign language, and conversation at the operating table kept at a minimum.

On a weekend he invited one of his assistants to join him in his two-oar boat rowing on Lake Constance for hours, stripped to the waist in the blazing sun, and when the assistant suffered burns and exhaustion, he was treated by immersion in a tub of iced water and a bottle of champagne to replace fluid balance.

Yet Lexer had an artistic eye and never used a ruler. He had studied art before medicine and could use the painter's brush or the sculptor's chisel as masterfully as the surgeon's knife. This facility probably explains his enjoyment of plastic surgery and willingness to lengthen a columella.

**SO DID MCINDOE**

Sir Archibald McIndoe of 149 Harley Street, London, and Queen Victoria Hospital, East Grinstead, trained in general surgery at the Mayo Clinic, where it was reputed he could perform a
cholecystectomy as adroitly as anyone at the Clinic during the last of his seven years in Rochester. A distant relative of Gillies and also from New Zealand, he came under the tutelage of Sir Harold Gillies, was knighted for his great work on the burned airmen during the Battle of Britain, became an officer of the Royal College of Surgeons and was undoubtedly one of the top technicians and showmen of plastic surgery in the world. In 1959 McIndoe consorted with one of his favorite students, Tom Rees of New York, to describe a grand and synchronous secondary correction of cleft lip and nose deformities. Using a modification of the Gensoul principle, they elevated the prolabium or a portion of it like a trapdoor based on the nasal tip and with this open door exposure removed the hump with a chisel and sawed bilateral osteotomies. The prolabium piece was then advanced completely out of the lip into the columella and the lip closed with a Z-plasty—but, alas, without a philtrum.

Suave Tom Rees, who has attracted an elite clientele of New York similar to the one that pilgrimaged to McIndoe’s Harley Street consulting rooms in London, recently reminisced on his early days with Sir Archibald:

I particularly remember driving to the Queen Victoria Hospital on Monday mornings with Archie in his Rolls Royce, in which he would be in a completely merry mood, full of good cheer and generally feeling fit and ready to tackle a new week. Immediately upon arrival at the hospital, however, he would literally tear the place apart, which he admitted to me several years later he did on purpose, just to “get the troops in line for the coming week.”

Certainly Archie had great charisma. He was aware of this and was able to
exert his magnetism in much the same way as a famous politician or even a movie star. As you know he had enormous ham-like hands with which he could do the most intricate and delicate surgery. . . . I helped Archie do several rather radical operative approaches to the secondary deformities of cleft lip nose in which he did a complete take down of all elements of the lip, nose and reconstruction with a submucous resection, nasal plastic and restoration of the lip with or without an Abbe flap.

TRIFOIL

Vilray Blair of Washington University, St. Louis, who in his prime was called upon to do many secondary cleft corrections, modified the Gensoul principle with lateral extensions to fill a releasing incision in the membranous septum by what he referred to as the trifoil flap. This procedure tended to shorten the vertical length of the lip.

Blair also used the V-Y principle in the nasal tip. He called it the "batwing" procedure and often combined it with his trifoil flap as a consecutive secondary effort to increase the nasal tip refinement, an advancement on top of an advancement. He used these two maneuvers many times during the 20's, 30's and 40's. His description in 1930 is typically lucid:

In the batwing the material comes from the nose and columella by cutting through the cartilages of the columella and nasal tip and suturing the mesial portion forward. This brings the tip of the nose forward, gives a more oblique slant to the nostril, and narrows the columella.

Here are two case examples published by Blair and Letterman in *Plastic and Reconstructive Surgery*, January 1950.
In 1941 Brown and McDowell reduced Blair’s trifoil to a smaller, sleeker fleur-de-lis with lateral extensions near the floor of the nose. Here again the donor area added a third vertical scar in the upper lip, but the procedure did produce columella length with tip elevation.

In 1947 Brown, McDowell and Byars acknowledged that their fleur-de-lis columella lengthening at three and a half years of age often required cartilage support at six years:

Further elevation of the nose may be obtained, when desirable, by an L-shaped [preserved] cartilage transplant.

In 1966 Frank McDowell reviewed their late results and noted in the bilateral complete clefts:

A further problem in the double cleft is the short columella. About half of the patients will grow a columella of minimal normal length and will require no surgery for this condition. The other half will continue to have columellas so short that the tip of the nose is snubbed down. It seems well established now that these should have surgical elongation of the columella between the ages of 4 and 8 years. The method we used was published in 1941.
Study of these cases revealed that when the columella was not lengthened it was often just short enough to drag the tip and hook the nose. When the columella was lengthened by the central fleur-de-lis, it did not always lift the tip adequately and it invariably created a third midline lip scar.

Yet as late as 1974 Broadbent and Woolf were advocating:

Minor degrees of depression can be improved with a V-Y procedure on the columella and tip.

Their tiny V-Y maneuvers acted as "petit Ombredannes" and "petit Gensouls," depending on the direction of the V. They stated:

Minor and moderate degrees of depression associated with bilateral cleft lip nasal deformity can be improved by splitting the columella, extending its halves and covering the defects with free grafts or local flaps.

The cases they presented used a V-Y type of flap and seemed to produce too much scarring for the limited amount of tip release.

**Lateral Vestibular V-Y's**

In 1954 John Potter of Stockton-on-Tees in northern England added an important corrective dimension to the Gensoul operation. First he outlined the problem:

In bilateral cleft lip cases, the nasal tip is usually depressed with a short columella, which at times seems almost non-existent. This is due to the shape of the underlying alar cartilages, which have extremely short medial (columellar) crura. The condition is similar to the flat unilateral cases, only the condition is bilateral. The arch of the alar cartilages is flattened and the lateral portions of the cartilages are frequently rotated inferiorly and so their outer surfaces are seen projecting into the nose causing a degree of nasal obstruction. The alar margins tend to be everted laterally; the appearance of the nostrils is low and wide instead of high and narrow.
Obtaining exposure by the Gensoul operation, Potter explained in detail the medial V-Y advancement of his alar cartilage flaps:

The amount of philtrum skin required is estimated in each case to give a correct length of columella. The philtrum skin required is raised and the incision on each side is continued along a line 3 mm. posterior to the columellar margin to the nasal tip and then follows the lower border of the alar cartilage [then turns back] along the upper border of the alar cartilage. . . . The cartilage with its overlying mucosa is then freed from the skin and is fully mobilized. The nasal tip skin is widely undermined. The columellar flap is retracted upwards and the alar cartilages are sutured into their correct positions to each other. . . . There is a raw area laterally. . . . This area is undermined and closed by sutures. . . . The columella skin flap is then sutured into its new position. . . . The defect in the philtrum is closed by approximation, aided by an incision in the alar sulcus and carrying it around the lateral alar attachment for a short distance.

Again the principle is sound and probably has a better chance of success in the bilateral deformity. Many surgeons continue to incorporate it, one way or another, in their nasal corrections.

A CONDEMNATION FROM BEHIND THE IRON CURTAIN

In 1960 H. Peskova and M. Fara of Charles University, Prague, commented on the wedge-shaped flap from the middle of the prolabium to lengthen the columella:

This operation is used by Brown, Ragnell, Benaim, Kirchstein, Dockhorn and others. Lengthening of the columella is only small, however, and in severe deformity is not sufficient for a satisfactory result. The vertical scar of the lip is disfiguring and in children can undergo hypertrophy.

Most surgeons have come to agree with this stand, but for many years a third vertical scar was being added routinely to the center of bilateral cleft lips, with only inadequate columella lengthening.
39. Columella Lengthening by Vertical Scar Flaps Including the Forked Flap

**VERTICAL LIP TRANSPOSITION**

In 1881 Demons advocated the raising of two rectangular flaps of skin and subcutaneous tissue lateral to the philtrum with their bases above and their free ends reaching the vermillion border. They were turned up and awkwardly transposed 180 degrees so that their raw surfaces were apposed and their ends attached to the tip of the nose. The lip donor areas were closed directly.

In 1955, at the Stockholm Congress, Richard Trauner of Graz presented his vertical lip flap, transposed horizontally across the columella base for columella lengthening in the primary unilateral cleft. At a congress in Hamburg the previous week he had also demonstrated this flap as a secondary procedure in bilateral clefts. In 1967 in Rome, he and his son showed their adaptation of the method primarily in bilateral clefts, which they referred to as a double Z-plasty. In 1972, while visiting in Miami, the senior Trauner mentioned that he got better columella lengthening with secondary procedures and that he had used his flap more than once on the same patient to advantage.

**MORE Z'S**

Another secondary flap design to lengthen the columella was described by Marcks, Trevaskis and Payne in December of 1957. They cut two single-pedicle flaps from the outer border of the
prolabium along the old scars and transposed them at 90-degree angles crisscross fashion into a releasing incision at the base of the columella in what they called a Z-plasty.

This narrowed the width of the lip, lengthened the columella and had the extra advantage of being a one-stage procedure. It was responsible, however, for a most unnatural columella scar line and at best could lengthen the columella no more than the sum of one width and one tip of the two flaps. In certain cases when the need for columella lengthening is limited, this approach may be of value as it does not add further scarring to the lip.

When the vertical flaps are taken from the lateral lip elements, based on the alar wings and transposed across the base of the columella, then in principle they are the Trauner Z. The same general corrections are achieved, but as the flaps only meet tip to tip at the base of the columella, the lengthening of this element is even less.

In 1966 M. V. Mukhin and A. P. Agroskina of Leningrad endorsed Marcks’ design for columella lengthening in bilateral clefts and diagramed their modification.

**THE FORKED FLAP**

For the same type of secondary bilateral cleft lip deformity, in which the prolabium is wide, the nasal tip is spatula flat, the columella is extremely short and the alae are flared, the *forked flap* was developed originally. It was first used at St. Joseph’s Hospital, Asheville, North Carolina, in the mid-1950’s on a 12-year-old Tennessee mountain girl who in infancy had been operated on by William Justice, an early student of William Ladd of Boston. Her severe bilateral lip clefts had been closed with the prolabium constituting the center of the lip except where lateral mucosal flaps joined beneath the prolabium as advocated by Federspiel. As I suggested in 1958:

From the moment of the first surgery, the nasal tip had gone down in defeat in its struggle with the lip for the prolabium. By now, the nose tip is spatula flat with no nasolabial angle and, in fact, boasting little to no profile at all. As with any nose that is bursting for projectory growth but is rudely bridled by a short columella, it must bulge in some direction and usually this is evidenced by flaring of the nostrils.
Furthermore:

Even the most radical of us must admit the prolabium has been stretched by the lip pull and valuable tissue gained even if the prolabium is unattractively wide. . . . A natural distance between philtrum columns is actually quite narrow. Thus, an unattractively wide prolabia must be reduced and should be made to “fork up” the needed columella tissue.

It was reasoned, however:

To take the columella flaps out of the heart of the prolabia in the usual [Gensoul-Brown] manner merely adds another insult to the upper lip and places it in the unnatural position of a midline scar.

Thus, for the common type of secondary deformity seen in bilateral clefts (prolabium wide, nasal tip spatula flat, alae flared and columella extremely short), an inverted V flap forked like the fangs of a serpent was proposed, the logic being:

Why not include the bilateral cleft scars and as much prolabia in each prong of the flap as will give sufficient body for a columella and still leave a natural looking philtrum?

The use of this flap in secondary cases without adding new scars merely improves the original bilateral scars, as seen in the design published in Plastic and Reconstructive Surgery for November 1958:
Further description of the procedure was included:

These flaps are skin, muscle, and scar and run smoothly into the true columella at its base. The original columella is then freed from the septum by a piercing incision in the membranous septum which is carried up along the nasal bridge for about an inch. At this moment, the tip of the nose comes really free and sits up smartly. From this position, the flat alar cartilages can be trimmed for a neater tip. Then comes the process of closing the fork which merely entails folding the wings together, suturing them to each other and fixing them in their new and exalted position along the septum. The midline seam in the inferior portion of the new columella will pass unnoticed.

Actually, the two flaps mold into a columella with greater facility than one larger flap, which tends to resist being forced into a hemi-column. The distal extremities of the forked flap are used but not sutured, so they splay laterally as columella bases flowing into the nasal floors as nostril sills.

Further detail included the following:

Small wedges from the flaring nostril floors and short relaxing lateral incisions under each alar base will allow the lateral lip elements to be advanced medially and joined to the reduced prolabia to make a far more pleasant and natural looking philtrum. This process will also bring about an eversion of the upper lip and in principle is similar to the advancement of the lateral lip element in the radical rotation method of unilateral cleft lip.

If the extremities of the forked flap have been made pointed and extended into the vermilion, direct advancement of the lateral lip elements will achieve good closure. If the ends of the fork are flat and stop at the mucocutaneous junction, the vermilion border will have to be advanced medially on each side along the inferior border of the prolabium to facilitate the closure. There is then the possibility that an excess of vermilion mucosa humping in the midline will be available to correct a whistling deformity or even to create a tubercle.

This approach had a better answer than the Gensoul position to the invariable question of the chance of a mustache on the columella:

Even in the adult male there is usually an area along each of the bilateral lip scars which is sparse enough of hair to serve as a respectable columella.
It is incredible how much additional columella skin is required to perk up this type of round nose and, at the same time, avoid kinks just under the tip or that unnatural flatness of the tip itself. During the original planning of the long two-pronged flap, it was considered a certainty that an excess would be discarded. Out of principle, nothing was trimmed, and by the time the flat tip had been uncoiled and the nasolabial angle first created and finally deepened to 120 degrees, there was not one millimeter of excess. It is little wonder that flaps taking only one-half or two-thirds of the vertical length of the lip or depending on the width of the flap for lengthening are in many instances found short.

It has been a source of pride that during the 1959 International Plastic Surgery Congress, held at the Royal College of Surgeons in London, the elegant and artistic John Conley of New York recalled:

There was spontaneous applause twice during the Congress. Once at a lovely ear reconstruction by Rad Tanzer and again at the result of that young girl with a forked flap.
In April 1969 this secondary forked flap case was published in *Plastic and Reconstructive Surgery*:

It emphasizes the insatiable need of the short columella, requiring a forked flap with its prongs taken from the full vertical length of the lip.

Another dividend of the forked flap, besides lengthening the columella and releasing the snubbed nasal tip, has been improvement in lip conformity and the creation of a more natural nasolabial angle. It can also be used to help narrow a wide lip.
A bilateral cleft lip and palate was closed by L. W. Schultz of Chicago with his method of joining the muscles behind the prolabium. This resulted in a well-functioning lip which, surprisingly, spread to quite a wide central segment. Of course, the columella was short, the alae were flared and the nasal tip was flat.

A forked flap, taking portions of the prolabium and the bilateral scars, achieved columella lengthening, nasal tip elevation and reduction in alar flare.
Even after adequate columella lengthening and tip release the prolabium was still wider than ideal philtrum dimensions.

Here is an eight-year-old boy with a prolabium that forms the entire central segment of the lip. Not only is it too wide, but the columella is short, the nasal tip is depressed and the alar bases are flared. This is a natural for a standard forked flap.

A forked flap including prolabium and scars was advanced along the membranous septum. The alar cartilages were sutured to each other in the tip. The forked flap, sutured and tubed on itself in the upper 1 cm., was sutured to the membranous septum but allowed to splay at the bottom as columella base joining alar base flaps to form nostril sills and reduce flare.

Free border vermilion side flaps were tucked behind a turn-down flap of prolabium vermilion to create central tubercle fullness.
Fourteen months after use of the forked flap, double-breasted vest scar revisions were made and a columella-thinning procedure was done.

9½ years

From 8 to 18 years of age there is often an angriness in the healing of scars, but in time they usually settle and smooth out.

This bilateral cleft lip and palate had closure of the lip in New York by the conservative straight-line approximation of the lateral lip elements to the sides of the prolabium. By five years of age, the prolabium had spread to a wide central component, and, of course, with the short columella, the nasal tip was snubbed. Original preservation of a cuff of prolabium vermilion in front gave a segmented effect to the visible vermilion.

5 years

Excision of most of the prolabium vermilion at least smoothed out the central red area of the lip, but columella lengthening was postponed to see what growth alone would do to the nose.
At 14 years, the nose was still showing a flat nasal tip, so a forked flap was used to lengthen the columella and narrow the philtrum. Through the forked flap exposure, a modified nasal reduction lowered the bridge, shortened the septum and reduced the alar cartilages. The patient then proceeded to heal with the typical angry teenage scarring, but as time has passed, the scars have begun to settle.

Further nasal and lip revision including a sepal cartilage strut in the tip will be carried out as soon as the patient expresses the desire for further improvement.

When I described the forked flap to Sir Harold Gillies, he was pleased with the principle and said it was the reverse of his alar wing flaps.
Neither Gillies nor I associated the forked flap with the early example of the "scrambled Z," a frightening case operated on by Gillies which we included in our book section on cleft lips, warning that such radical surgery was not advised as a routine. It had called upon a double Z of the lip which moved the alar bases in and gave less than half the vertical length of the lip as advancement flaps into the columella. Initially horrified with such random chopping of the lip, I had put the case out of mind. Yet, upon reflection, one must note that the upper portion of this puzzle of cuts might be a distant ancestor of the forked flap.

While attending an International Congress in Bratislava in 1965, I learned that the grand old man of Prague, Professor Frantisek Burian, was also using a secondary columella-lengthening procedure similar to my forked flap. The language barrier blocked our discussing the method, and it was not until 1968 that his book written in English diagramed his general procedure.

His release over the tip of the septum was not enough even though he did suture the alar cartilages together. The advancement of his flaps did not go completely into the columella, for the lower one-third remained in the lip, with penalties to both the lip and the nose.
EARLIER USE

By 1958 I had adapted the forked flap for use as a delayed primary columella lengthening (four months of age) and I presented the design at the 1959 International Congress in London. My original diagrams for this new use outlined shorter pointed flaps, which, as it turned out, were too short for adequate columella lengthening in the typical bilateral complete cleft.

In 1972 Kurt Schneider of Zurich, fresh from a visit to Charles University, Prague, came to Miami for a Maytag fellowship. Informing me of the international misunderstanding about the forked flap, he obtained for my enlightenment an article written in 1960 by H. Peskova and M. Fara of Charles University. Evidently these two had hastened into the literature on behalf of their leader, Burian, who until then had said nothing about this columella lengthening. In the Prague clinic for years, as they reported in 1960:

The columella has been lengthened by using the sides of the philtrum, including the scars, and making use of excess tissue from the nasal threshold.

They diagramed a forked flap of about the same measly proportions as my 1959 design for early use in infancy but added Brown’s horizontal short Spurs from the base of the nose.

It is noteworthy that in the same paper they mentioned Burian’s preference, in severe deformities, for external incisions through the alae and advancement of the dorsal skin of the nose for columella lengthening. It is also interesting that in his final 1968 book Burian’s description of the forked flap was quite unlike their rendition.
As I have never been to Prague and had no idea what they were doing behind the then more rigid Iron Curtain, and as there had been no publications on the subject, even in Czech, little remains to be said. The same thing has happened many times in history; more than one person comes upon an idea—and often almost simultaneously as though the specialty had progressed to the point where this was the next logical step. It is almost ironical that the identical “come lately” claim was made with the tube pedicle. As J. P. Webster noted in 1959 after extensive research:

In 1916 and 1917 three surgeons, independently, recognized the value of closing the parallel skin edges of open pedicle flaps by suturing them together to form tubes. They were Filatov of Russia, Ganzer of Germany and Gillies of England. It was rumored, subsequently, that Burian of Prague had done it before any of the others but, again, without establishing the fact by publication in the world literature.

It is unfortunate, if indeed Burian favored the fork, that he did not publish his work. Yet, setting aside priorities for a moment, let me say again, the principle is a good one and its staged primary use will eventually supersede its value as a secondary procedure.

In 1963 Alexander Limberg of Leningrad, in his book *The Planning of Local Plastic Operations on the Body Surface*, gave a mathematical dissertation on the forked flap (Millard, 1958) but adding lateral triangular extensions at the columella base as described for Gensoul by Blair and Brown and for the forked flap by Peskova and Fara:

After plastic reconstruction of the lip for congenital bilateral cleft, as a result of growth the child after 8-10 years usually shows some surplus of the tissue in the central portion of the upper lip. This surplus may be well utilized in plastic operations for lengthening the columella.

From the base of the short columella, downward, there extend two diverging incisions, outlining a symmetrical triangular flap, which is kept in the central portion of the lip. The external incisions, forming lateral flaps in the upper lip, are kept if possible in the area of the scars. It is sufficient to add one more component part to the incision in the direction of the lateral surface of the columella.
In the 1966 *Modern Trends in Plastic Surgery* Limberg, with the aid of this paper model, demonstrated mathematically the effect of shifting the forked flap with its opening and closing of angles producing lying and standing cones.

All 14 components of the incision are of equal length and each is equal to half the depth of the upper lip. Two flaps of lip skin, which include the harelip scars, are raised in continuity with the short columella. The advancement of the lateral margins of these flaps is made possible by an additional three-limbed incision along the lateral surface of the columella. The five lateral components of the incision may be regarded as two sets of asymmetrical triangular flaps with unequal angles of 60 and 90 degrees and 120 and 150 degrees, one lateral limb of each being superimposed. Extensive undermining allows the flaps to be moved into their new position.

**STARK AND OTHERS CONCUR**

It was interesting that in 1964 Stark and Washio from New York's St. Luke's Hospital endorsed the forked flap. Later, Stark in his 1968 book summed up the situation and demonstrated a very nice result:

The classical postoperative defect in bilateral clefts of the lip is the overly wide prolabium, the snub nasal apex with short columella, and wide nostril floors. The forked flap columellar advance operation of Millard is ideal to correct all the aspects simultaneously.

At Schuchardt's 1964 Hamburg Cleft Palate Congress, I again presented the forked flap showing a new set of diagrams. A suggestion was made for improving the results with this principle:

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It is important to avoid the depressed notching in the new columella just below the nasal tip, noticeable in profile. This is achieved by suturing the flaps of the fork together in front. They are then rolled together in the upper portion (1 cm.) and sutured gently in a loose tube. This portion must not be sutured to the septum but allowed to ride up freely while the lower portion of the lengthened columella is sutured to the septum.

At the same Hamburg Congress, Professor Gerhard Steinhardt of Erlangen-Nürnberg University expressed his dislike of the Gensoul approach and his endorsement of the forked flap, quoting logic from my 1958 paper and adding:

The procedure will also bring about an eversion of the upper lip and elevate the anterior part of the nose simultaneously. We have good results with this modification. ... What I want to say, in short, is an old request: we should avoid secondary scars as much as possible in cleft patients.
The gentlemanly Steinhardt spoke with cicatricial authority as he himself has a "handsome" dueling scar on his left cheek, received while a student at the University of Heidelberg in the 20's. In Germany, prior to World War I, such marks were a proof of valor.

After Steinhardt finished, Gerhard Pfeifer of Hamburg University rose to give a modification:

Bilateral scar flaps are suitable for prolonging the columella as Dr. Millard and Dr. Steinhardt have just pointed out. In some cases it may be useful to leave a triangle of skin on either side that goes into the incisions at the nasal sill. This incision has to be made to bring up the tip of the nose. . . . The triangles mentioned comprise, furthermore, all extensions of Z-shaped incisions of primary operations and transform the linear scar into less noticeable smaller ones.

During that Hamburg Congress E. Schmid of Stuttgart revealed that he had been using the forked flap for some time and showed a couple of improved columellas.

Over the years, the forked flap has gained in popularity. It has been adapted to unilateral use and modified in shape, size, position of placement and methods of banking. As Mark Gorney stated in reference to his support in bilateral cleft nasal correction:

The gull wing graft can be combined with almost any procedure you may choose. If added columellar length is needed we use a forked flap or one of the other refinements.

Tessier's 1969 suggestion of selectivity for this procedure is partly correct:

The Millard procedure, or forked flap . . . consists of using, not the central part or totality of the prolabium itself, but its edges and adjacent scars. It presupposes good continuity of the orbicularis, and a wide prolabium without transverse scars. The two flaps should reach the mucocutaneous border. Lengthening is less than that obtained with the three-leafed flap; on the other hand, the scars on the lip blend in well with the philtral ridges and the philtrum takes on a pleasing triangular allure.

In 1971 even Tom Cronin, although he usually used the skin
from the floor of the nose and part of the alae for columella lengthening, admitted:

Occasionally, I have used the forked flap, especially if bad scars of the lip needed excision and revision.

I recall with pride that as early as 1959 Reed Dingman personally expressed his appreciation of the method. This specific high level endorsement meant very much because Dingman in his typical kind fairness helped me to withstand some of the oblique political flack that was still flying at that time. Then as late as the 1973 International Cleft Palate Congress in Copenhagen, Hugo Obwegeser stood in open forum and in his typical authoritative style declared:

In my hands Millard’s forked flap absolutely is the best procedure for elongating the columella.

After full consideration I did not rise to argue the point.

V A R I O U S  U S E S

As has been discussed in primary bilateral cleft surgery, the forked flap has been used in numerous ways. It also can be modified for special problems.

Modified short fork

Many postoperative bilateral cleft lip cases with a tight upper lip and only a moderately short columella are treated merely with a lip-switch flap. The meager scarred prolabium, which had proved to be inadequate in the lip but could have served in the columella, unfortunately has been scrapped, necessitating a secondary scramble to make up for this waste. A modified shorter fork can be of value, taking the scars and tissue from the Abbe flap or lateral to it. Here are two personal examples.

This young doctor had his bilateral cleft lip treated secondarily with a W-shaped Abbe flap which was most un-philtrum-like in its spread at the top. Then, too, the columella was short and the alae were flared. Unfortunately, the prolabium had already been discarded!
Scrutiny soon showed what he had that he could spare to help his columella. A short fork was taken from the scars and the upper excess of the Abbe flap.

The operative stages of this short fork were published in *Plastic and Reconstructive Surgery* in 1963.
This maneuver shaped the philtrum and released the nasal tip. The reentrant nasolabial angle could have been improved, had the patient desired, by the Cinelli septal flap or by the lozenge-ellipse advancement described in Chapter 47.

The patient shown below with bilateral cleft lip and palate was first seen at age 27 after 34 operations, including cheek-relaxing incisions and an Abbe flap. The lip scarring was severe, the columella short; the alae were flared and the nasal tip was hooked like a hawk’s beak.

A half-length forked flap, incorporating the scars on each side of the Abbe flap, lengthened the columella and released the tip. Abrasion of the lip scars gave some improvement.
Further nasal and labial work was done, but, as so often happens, the patient moved away before records could be made.

*A three-quarter-length forked flap*

In certain cases, when the prolabium has been incorporated in the upper part of the lip and lateral lip flaps have been brought together below it, the lip may not be too long and the nasal tip may be only moderately depressed. Yet there is a subtle discrepancy due to the prolabium fullness in the superior part of the lip, with relative tightness in the lower portion and only slight snubbing of the nose. Here a three-quarter-length forked flap reducing the sides of the high prolabium can be of benefit to both the lip and the nose.

An asymmetrical bilateral cleft of the lip and palate was treated in Washington, D.C., in two stages with composite skin and vermilion flaps introduced below the prolabium. The operation resulted, by age six years, in an asymmetrical nose, depressed nasal tip and a lip with transverse scars and bulging central prolabium but reasonable vertical length.

At eight years, a left alar base flap was transposed across the nostril floor to create a sill, and a vermilion V-Y was used to create a tubercle. Three months later, a three-quarter-length forked flap was elevated out of the lip and advanced along the
membranous septum with excellent tip release but obvious columella retraction. Thus a subcutaneous flap superiorly based was carved out of the center of the bulging prolabium and turned up to lie on the membranous septum increasing columella contour in profile. The resultant depression in the center of the prolabium improved its philtrum appearance.
Return inferior flaps for later forked flap

Even when all seems lost and tissue usually allotted to the forked flap has already been stolen and stuck below the prolabium, it can be retrieved. Merely steal it back, reposition it where it came from and then later incorporate it as a forked flap (see Chapter 53, Long Upper Lip). Here is an example.

The patient had had lateral triangular composite flaps transposed below the prolabium in infancy by a surgeon trained in the Brown school. The result at four years of age revealed a long lip in vertical dimension, abnormal position of scars, short columella with snubbed nasal tip and flaring alae.

There was no improvement with time.
At eight years the skin flaps below the prolabium were elevated and transposed 90 degrees into the bilateral vertical scars back where they came from along the sides of the lateral elements. The mucocutaneous ridge and vermilion was sutured up to the inferior edge of the prolabium.

This maneuver shortened the vertical length of the lip, relieved the side-to-side tightness and replaced potential tissue into a strategic position for a later forked flap for columella lengthening.

Six months later a forked flap, incorporating replaced flaps, all scars and portions of the prolabium, was incised and elevated. The prolabium also was elevated and the lateral mucosa and muscles were sutured together in the midline. The prolabium was replaced first with a dimpling stitch and then with regular suturing. The prongs of the forked flap were banked by suturing them to the alar base flaps in a type of "praying hands" position. The patient subsequently struck his lip, with partial separation of his lip incisions. The right side was revised at the time of the next surgery.

Two months later, parallel incisions anterior and posterior to the forked flap–alar base pyramids were made, followed by partial reopening of these pyramids to form longer straps. Then, with the aid of a membranous septal incision extended laterally in the upper vestibule, the straps were advanced together medially and up into the columella. Small extension flaps cut from the upper
forked flap sides were let into the vestibular defects to maintain nasal tip release. Subcutaneous alar base extensions were advanced to each other at the nasal spine and fixed with a suture. Thus the nasal tip was elevated and the alar flare reduced.

Subsequently the lip was shortened in vertical length by an excision along the entire nasal base and also along the scarred mucocutaneous line as well as the vermilion free border.

Here is another example of the same type of recovery of a forked flap from skin flaps originally misplaced by being transposed below the prolabium. This case is presented in detail in Chapter 53.
I studied and stalled for eight months but finally turned to the scalpel with one rather comforting thought: Regardless of what

Lopsided Abbe

Keep your cool and do not overlook the forked flap just because complete cicatricial pandemonium has displaced the usual donor area. Diagnose the short columella, the misplaced probium and the potential philtrum Abbe flap in deceptive unilateral position.

A bilateral cleft lip and palate patient had been treated with, among other procedures, a unilateral Abbe flap and presented a mind-boggling nasal and labial deformity. He had a short columella, a depressed nasal tip and a horizontal Z scar line of the lip with one limb of an Abbe, along with scarring and even stitch marks in the lower lip.
was done, an improvement was almost assured.

At age 12 years, the remaining prolabium on the right was elevated, split as a forked flap and advanced into the columella with nasal tip release. Then the unilaterally positioned Abbe flap, based on the vermilion free border, was shifted into the midline philtrum position. Improvement in the conformity was partly spoiled by the usual teenage scar hypertrophy.

Only after minor revisions over several years did the scars gradually improve. Then, just when coming of rhinoplasty age, the patient moved to California, and years later, at age 18 when he returned to Florida, he presented a nasal bridge reduced nicely by Bruce Connell. Further refinements were indicated. The tips of the flaring alar bases were denuded of epithelium and advanced to each other behind the columella, and slivers of septal cartilage were inserted along the alar margins.
Forked flap forced to crisscross

This 11-year-old boy born with a complete bilateral cleft of the lip and palate and mucous pits of the lower lip had had seven operations in one of the smaller cities of Louisiana. One procedure had been a columella lengthening by division of the short columella from the lip, and insertion of an ear graft. Unfortunately, the graft had been only partially successful, leaving some shortness but a more noticeable lack of contour. There were also flaring alae, lack of muscle in the prolabium, deficiency of maxillary platform, scars of the mucosa of the protuberant lower lip and fistulae in the anterior palate.
1. Palate fistulae were closed.
2. A forked flap was taken from the prolabium to reduce it to philtrum dimensions and included the old bilateral cleft scars. Because of the previous auricular graft to the columella, the flaps were based on the nasal floor and sides of the columella.
3. The lateral lip mucosa and muscles were joined to each other behind the lifted prolabium to create a sulcus and muscle continuity.
4. The prolabium was reset into the lip with a dimpling stitch and regular suturing.
5. The forked flap was banked under the alae in whisker position temporarily.
Six weeks after the first stage, the second procedure was carried out. Because the columella severely lacked contour and was only moderately short, the ideal “continuous flow” advancement of the forked flap had to be altered. The tip of the nose carrying any normal columella was released by a transverse incision at the join of the ear graft and extended back well into the membranous septum. Most of the remaining brown-colored ear graft was discarded. The banked flaps were reelevated and wrapped around the columella defect, one on top of the other, in the spirit of Marcks and Skoog. The effect was lumpy, but in time it can be improved. The most dramatic action was correction of the alar flare by the now standard dissection of two flaps in each alar base. The dermal subcutaneous underflaps were sutured to each other at the base of the septum, and the upper skin flaps formed the nostril sills.

Time, revision of the lower lip and other secondary corrections should bring improvement eventually.

Takahashi

There is one surgeon in Japan who is probably more familiar than anyone else in the world with all my forked flap modifications. Shojiro Takahashi wrote a paper in 1972 with an impressive number of co-authors: T. Shigematsu, T. Furukawa, M. Ohi, H. Tanabe, T. Ichikawa and J. Tachikawa—one more, in fact, than
the number of modifications—(1) long fork, (2) short fork, (3) delayed fork, (4) primary fork, and (5) banked fork. He showed examples of several, including this secondary short fork and a longer fork!
Maxillofacial surgeon L. C. Merville of l'Hôpital Foch, Paris, modified the lip donor area closure following the forked flap by bilateral lip-cheek advancement flaps. This is his plan:

a) Outline of the forked flap of Millard and extension of the incisions into the nasolabial folds. This is usually only possible with a supple lip.

b) Lengthening of the columella, advancement of 2 lateral labial flaps.

c) Placement of a small intercolumellar bone or cartilage graft to maintain the projection of the tip.

Otto Neuner, Professor of Maxillofacial and Oral Surgery, Berne University, Switzerland, became interested in secondary cleft deformities. He recalls:

As a young boy I used to make fun of a hare-lip schoolmate. Years later during the study of medicine I was still ashamed of my mockery and vowed to do my share of rehabilitation. As a young surgeon I followed the lines of masters like Axhausen, LeMesurier, Trauner, Veau, but was never fully satisfied. Then in 1961 in Stuttgart while studying with Schmid I became familiar with your rotation-advancement and forked flap. Since then I have adopted, adapted and sometimes modified these procedures. My goal is always to restore completely a normal esthetic and functional integrity.

It is intriguing to study his artistry. He added to the forked flap Potter's V-Y intranasal advancement, scoring of the alar cartilage domes and suturing of the medial crura. He leaves the tips of the fork tails in the lip, as did Burian, but still achieves elongation of the nasal passage by more than 9 mm. At the second meeting of the Swiss Society of Plastic and Reconstructive Surgery in Zurich in 1966, he elaborated:
We extend the upper incision in a V-Y to approximate the lateral crura with their underlying mucosa, a distinction from Millard's original method. The medial crura then remain in the columella, as recommended by Meyer for Potter's procedure, thus simultaneously correcting the tip of the nose.

When columella lengthening need be minimal, Neuner notes:

As well as elongating the nose it is almost invariably necessary to raise the upper lip.

To do so he used a bilateral forked flap, transposing the prongs as nostril sills and incorporating them by splitting their tails and inserting an alar base into each split.

He has even used the forked flap in transpositions of 180 degrees for the relief of columella retraction. There is no law saying the forked flap should be used only for columella lengthening. The bilateral scars and wide prolabium often need revision and rather than being discarded can be used in the forked flap vehicle for whatever purpose seems indicated.

Summary of Neuner's goals has a familiar and encouraging ring:

Thus our operations are always performed with the aim of leaving only vertical scars which correspond with the edges of the philtrum. This, together with the union of the orbicularis oris muscle over a broad front, restores a full measure of mobility to the lip. We consider ourselves successful when such activities as whistling, pursing the lips and laughing can be carried out in a functionally and visually acceptable manner.

Neuner has published an impressive number of papers on secondary procedures, using the same group of cases repeatedly but with results so outstanding it is a pleasure to see them again.
In spite of its popularity, certain aspects of the forked flap have caused difficulty. It is not always easy to avoid a columella kink under the tip, a grossly wide columella and an unnatural join of its base with the lip and to achieve a smooth line from a raised nasal tip, along the length of the columella, blending gracefully into the lip. These results depend on craftsmanship, on knowing when and how to take the fork and what to do with it once you get it.

Sparing the Fork

When taking a forked flap out of a lip one must be sure the lip is able to spare it. If the upper lip is already tight in relation to the lower lip, especially in its upper portion, it probably cannot spare the fork. If the lip is loose at the top and tight only along the lower border, the lip not only can spare it but will benefit by correction of this discrepancy.

What to Take in Width

Of course the center guidelines are the old bilateral scars. Forked flaps are hardy and have survived old scars crossing their base and body. In fact, I do not recall a loss, and the forked flap has been taken out of many a maze of scar.

If the prolabium is wider than the normal aesthetic philtrum, the major portion of the fork should be taken from the prolabium and include the bilateral scars (A). If the prolabium is already philtrum dimensions, lateral lip tissue will have to be included with the scars in the forked flap (B).
LATERAL EXTENSIONS

Lateral skin extensions on the forked flap can be of value to fill the chinks back under the nasal tip where the lateral anterior vestibular releasing incisions have been made. Often these incisions are extended to allow further exposure for reduction rhinoplasty procedures to the alar cartilages and hump. The extra freeing will ease the closure, but still the lateral extensions fit across potential scar lines and protect what tip elevation has been gained. The extensions should be taken relatively high on the fork so that the donor areas are placed in the floor of the nose. This is a convenient and hidden position which will merely make room for medial advancement of the flaring alar bases.

If the total lip is too long vertically, the lateral extensions of the forked flap can be taken as transverse wedges from the lateral lip elements high up at the join with the alar bases and shorten the lip at the same time.

If no extra lip tissue is available for lateral extensions, then, as the forked flap is usually wider in its upper portion, it has been possible to cut side flaps off the main forks, which can be turned 90 degrees into the lateral chinks.

DEPTH OF FLAPS

It is important to take full-thickness depth including subcutaneous tissue and muscle down to mucosa in the forks. This is necessary for columella contour, vascularity of the flaps and ease of donor area closure.
LENGTH OF FLAPS

The desired length of the forked flap depends on the shortness of the columella and the amount of depression of the nasal tip. The possible length of the forked flap depends on the vertical length of the lip. Except in an unusual near-normal columella, the forked flap should be taken from the entire vertical length of the upper lip. There are two ways to handle the cutting of the flaps and closing of the donor areas at the mucocutaneous junction line. The simplest way is to extend the flaps down into the vermillion as tapering points to facilitate straight closure of the vermillion donor area and then later cut off the excess vermillion from the tips.

Another method of cutting the fork takes the flaps wide down to the mucocutaneous junction line and transects them abruptly with a blunt end, leaving all vermillion in the lip. This approach is especially beneficial when there is a whistling deformity. During closure of the forked flap skin donor area, the excess vermillion left behind can be advanced along the lower border of the prolabium to pile up in the center to increase the body of the tubercle.

This approach is also preferred when the primary surgery preserved the original miserable vermillion of the prolabium in anterior visible position. It can be displaced posteriorly as a trapdoor flap and covered by medial advancement of the lateral lip vermillion to give a clean sweep from each side to the center.

Masters and Craft in 1974 also acknowledged the advantage of this vermillion advancement in association with the forked flap.
STANDARD OUTLINE OF FORKED FLAP INCISIONS

The medial incisions outline a natural philtrum prolabium, extend the vertical length of the lip and curve to meet in an inverted V which just crosses the nasolabial join with its point transgressing into the columella base just under the nasal tip. At the inferior end, the flap tapers into the vermilion or is cut flat at the mucocutaneous junction line.

The vertical lateral incisions run parallel to their mates except where they diverge to pick up transverse lateral extensions from the nasal floor or lateral lip elements. Upon entering the vestibules, the incisions curve back behind the columella and meet each other through and through along the membranous septum. At the top of the septum, the incisions again diverge bilaterally into the upper vestibule for extra release or exposure.

SUTURING THE FORK

First the medial skin edges of the fork are sutured with 6-0 silk down the center seam as far as is necessary for columella length. The distal ends are usually left free to splay. When lateral extensions have been cut, they are guided with 5-0 catgut into the open chinks back of the tip in the vestibule on either side of the septum. The forked flap, now sutured in front, is rolled on itself with catgut sutures to imitate the column it is becoming. The column should not be forced by sutures to the membranous septum at the tip but can be rolled gently on itself and left free; the fistula will eventually close. The main body of the forked flap, as it advances into the columella, is sutured with 4-0 chromic catgut to the membranous septum. At the base of the columella the fork prongs have been allowed to splay and thus join and are sutured to the advancing alar bases as they cross the nasal floor to form the nostril sills.

FORK SUPPORT

The actual projection of the bilateral cleft lip septum just does not have the "oomph" to maintain tip lift. Even when the spread
alar cartilages are sutured to each other, further support is often needed.

If the forked flap is being done at five years, a preserved septal cartilage strut is used for a temporary tip lifter. If the forked flap is being done at 16 years, a submucous resection will supply the cartilage struts necessary. They can be inserted behind the forked flap at the time of its advancement or later when the forked flap has healed in its new position. This additional cartilaginous strutting will give a slight lift to the tip with more definition and will improve the column contour, avoiding the slight tendency toward retraction.

BANKING THE FORK EVEN IN SECONDARY CORRECTIONS

The forked flap's worst fault in design is its five points of closure, with all its scars converging to a central point and contracting at the same time. When this procedure is used as a secondary correction in the adolescent, whose scars tend to heal angrily, the result can be less than ideal or at least take years for satisfactory healing.

This is one of the advantages of banking the forks. By staging the forked flap, one can stagger the scars in time so that at no one stage do more than three scars converge to a central point. The banking maneuver has been incorporated now into the secondary forked flap. This also makes possible side-to-side muscle union behind the prolabium.

Secondary correction in bilateral clefts of scars, muscle discrepancy, philtrum construction, cupid's bow, free border deficiency and lack of sulcus has been described in general. If all require correction, the best plan is to undo the lip entirely and reassemble it as it should have been done in the first place and as has been described in the primary procedure. If the columella is short, the scars will not be excised but included in a forked flap, which is banked. As the same amount of full-bodied forked flap has been cut and sutured end on end in a pyramid to the alar bases like "praying hands," adequate tissue has been stored. The pyramid may flatten and the forked flap disappear into the nasal
floors, but it is there nonetheless, and available three weeks, three months or three years later when the straps are recut and advanced into the columella.

CASES IN POINT

A bilateral complete cleft of the lip and palate was closed in infancy in New York. Lateral triangular flaps were inserted below the prolabium without joining the muscles or creating an upper sulcus. There resulted a wide prolabium and an irregular arrangement of the free border with the suggestion of a whistling deformity. The columella was short, the nasal tip was depressed, the alar bases were flared and there was almost no nasolabial angle in profile.

At age four years the prolabium was reduced by paring a forked flap from its sides. The lateral lip elements were advanced to each other, suturing being done first on the mucosa to form an upper sulcus and then on the muscles for functional continuity. The prolabium was brought down and sutured to form the philtrum. The lateral vermilion flaps carrying a mucocutaneous ridge were advanced over the inferior vermilion turndown flap of the prolabium. The alar base flaps were cut free from the lip elements and sutured to the prongs of the forked flap in "praying hands" position.
Three months later the forked flap was cut free from its position in the floor of the nose. A membranous septal incision was extended bilaterally in the upper vestibule for nasal tip release. Small lateral flaps were cut from the upper sides of the forked flap. Then the forked flap was sutured together and advanced along the membranous septum with its small lateral flaps fitting into the vestibular releasing incisions. A banked septal cartilage strut was inserted behind the fork to support the lifted nasal tip.

At age 16 years, two long autogenous septal struts will be used to fill the columella and give that extra permanent lift to the nasal tip.

The forked flap can also be banked secondarily in whisker
fashion and, any time after three weeks, can be advanced into the
columella.

This 6-year-old boy had his bilateral cleft lip closed in Louisi­
ana in almost an adhesion-type procedure in infancy.

A forked flap was taken from the sides of the prolabium,
incorporating the bilateral scars. Posterior prolabium mucosa was
used to cover the front of the premaxilla. The prolabium was
elevated to the nasal spine, and the lateral lip elements were
joined to each other by both mucosa and muscle. The prolabium
was replaced into philtrum position with a dimpling stitch. Alar
bases with subcutaneous flap extensions were sutured to each
other at the nasal spine. Lateral vermilion carrying mucocutane­
ous ridge was used to overlap the turndown of inferior prolabium
vermilion to create a tubercle. The forked flap was banked in the
subalar incisions in the whisker position.
Six weeks later the forked flap was reelevated. With the aid of an inverted V incision at the columella base and a membranous septal incision extending bilaterally high in the vestibule, the nasal tip was released. Small lateral flaps cut from the sides of the forked flap were inserted into the darts in the vestibule as the forked flap advanced up along the septum to lengthen the columella. The inferior tips of the forked flap were sutured to the advancing alar base flaps to complete the nostril sills. A strut of homologous septal cartilage was used to help support the forked flap nasal tip elevation.

The lip scars will settle in time, and minor nasal revisions, probably including an autogenous septal cartilage strut in the
columella to define the nasal tip, will be carried out at age 16 years.

This four-year-old boy from Bombay came to Miami after several operations in India with quite a good result. The premaxilla was in reasonably good position, but there were five fistulae in the difficult alveolar-anterior hard palate area following a V-Y palatal pushback. The patient also presented a short columella, kinked, flaring alae, fine scars but a wide prolabium without muscle continuity, attenuated free border vermilion without cupid's bow or tubercle and, in fact, a mild whistling deformity.

An attempt was made to close all five fistulae in two layers. Then attention was directed toward the lip and nose. The short columella and flaring alae demanded action, but the excellence of the scars and the reasonable conformation of the lip in general caused concern. With faith that principles would ensure ultimate improvement, a banked forked flap was carried out. The prolabium was marked in the shape of a narrower, more natural philtrum, which allowed paring of a forked flap, taking a scar in each prong. All three portions of the prolabium were elevated from the premaxilla, and the lateral lip mucosa and muscle elements were sutured to each other in the midline to form a sulcus and improve function. The philtrum portion of the prolabium was split vertically down its midline posteriorly, and a 4-0
Mersilene suture picking up dermis in this split was sutured down to the newly united muscle to suggest a dimple. The better portions of the free border vermilion on either side of the prolabium were used to overlap a turndown flap of prolabium vermilion to produce a tubercle. The prongs of the forked flap based on the sides of the columella were banked into releasing incisions between the alar bases and the lateral lip components in whisker position.

Although the philtrum prolabium would have been vascularized well enough in three weeks to allow its division from the nose and advancement of the forked flap, a trip to London and a case of chickenpox postponed surgery another month. Then the whisker forks were reelevated, and, with the aid of an inverted V incision in the anterior skin of the nasal tip at the columella base and a membranous septal incision posteriorly extended bilaterally out in the upper vestibule for 1/2 cm., the nasal tip was released.

Next, the flaring alar bases were freed by circumalar incisions, and their tips were denuded of epithelium so that they could be advanced and sutured to each other with Mersilene at the nasal spine. The skin portions of the alar bases were freed for eventual suturing to the columella base. The forks were then sutured to each other down the anterior seam with 6-0 silk and rolled into a partial tube posteriorly with 5-0 catgut. Small lateral flaps pared from the sides of the forked flap and based superiorly fitted into the chinks in the released vestibule. The main column of the forked flap was advanced along the membranous septum and fixed with chromic catgut. The inferior tips were allowed to splay so that the superior peak of the prolabium, the freed alar bases and the V at the bottom of the fork could all be brought together with one key subcuticular stitch.

Then one important trick was instituted to relift the lip that had dropped. Mattress sutures of 3-0 chromic catgut from the vestibule of the intact floor of the nose were passed down to pick up the muscle of the lateral lip segments, passed back up and tied inside the nostril floor to pull the lip up into normal position. This also improved the lateral slack of the lip after alar base advancement. Not only had the lovely lip been left intact, but all incisions of union were now lying along natural seams and
creases easily sutured without tension. The slight scallop of each alar rim was tailored by marginal wedge elliptical excision of skin closed with 6-0 silk. A slight depression in the columella was filled out by excess subcutaneous free grafts. The generous length of the columella and the extra tilt of the tip will settle in the next six months. It is better to overcorrect at this age, feeding enough skin into the nasal shortness, and then let the nose grow into it.

4 YEARS OF PREMAXILLARY PROTRUSION

Here is a bilateral cleft lip without cleft palate in which the projecting premaxilla was not remarkably affected by lip closure
in Alabama. At 4 years in Miami the premaxilla was set back by vomer resection. Mucoperiosteal flaps turned on the sides of the premaxilla and alveolae were sutured to close the clefts and a Kirschner wire used to pin the premaxilla back to the vomer in its undercorrected position.

Six months later forked flap, incorporating old bilateral scars, was banked in whisker position and the lateral lip mucosa and muscle elements sutured together behind the prolabium. Two months later the forked flap was advanced and the alar bases denuded of epithelium at their tips were sutured to each other at the base of the septum. Then mattress sutures from the vestibule pulled the lip back up to its join along the nasal base.

Time and revision at 16 years will complete this little charmer's reconstruction.

**ANOTHER DELAYED FORK**

This 2½ year old bilateral cleft lip and palate had the lip closed at one month in Tennessee. Although the result was not bad the potential with growth was limited because the columella was short, the prolabium wide without muscle continuity and there was a central whistling deformity of the vermilion.

At 3½ years a forked flap narrowed the prolabium and incorporated the bilateral lip scars. The lateral mucosa and muscle elements were joined behind the prolabium in the midline and the lateral mucocutaneous ridges with vermilion were advanced along the inferior border of the prolabium to create a central
fullness. The forked flap was banked temporarily in whisker position.

Three months later the forked flap was advanced along the columella and the tips of the alar bases denuded of epithelium and sutured to each other at the nasal spine. This elevated the nasal tip and in time with minor revisions her nasolabial relationships should be good.

**THE COST OF CONSERVATISM**

Here is one of my own primary cases which, not having had a forked flap banked or the lip muscles united, required these procedures secondarily. It is true that the smallness of the prolabium and the projection of the premaxilla make it a borderline case.

At two and a half months a C-W closure without undermining the soft tissues was carried out, but the tension caused separation on one side requiring resuture. As the muscles were not joined across the lip, the prolabium, which was small originally, stretched wide. The lack of strong restraint lessened the molding action against the arch, so at five years, after vomer resection, the premaxilla was set back partially. In spite of a short columella, depressed nasal tip, flared alae, wide prolabium and unnatural scars, the procrastination continued because of the difficulty offered by the premaxillary bulge.
Finally, at seven years, a secondary forked flap was banked in whisker position so that the lateral muscles could be joined behind the reduced prolabium. Six months later, the forked flap was shifted into the columella. One modification is of interest. V-shaped extensions on the banked fork were taken from the nasal floor, and as the forked flap advanced along the columella, these side flaps fitted into the bilateral vestibular releasing incisions to give a more secure tip elevation. This also facilitated medial advancement of the alar bases with their subcutaneous extensions being sutured with 4-0 Mersilene to the nasal spine. It is well to overcorrect the snubbed nasal tip because in adolescence when the nasal bridge develops the nose will grow into proportion.
In 1976 Peter Holm, a Maytag fellow in 1974, forwarded this case with the following story:

A 5-year old Pakistani was sent to Denmark for 6 months to have his palate repaired. He was born with a complete double cleft, the lips were approximated with a side to side suturing. His palate defect extended from the lips backward, measuring 18 mm. in width. He had a short columella. I was given six months to complete his reconstruction. The palate was closed with a 4-flap Wardill plasty. A few weeks later his lip was opened, the philtrum narrowed and the excessive tissue banked as forked flaps. Before he left, the columella was lengthened with the banked flaps. The photo from the newspaper shows him before his departure—it's hard to see that he had had a serious double cleft. Everything wasn't perfect: he had two small fistulas in the front of the palate, the dimple wasn't good enough and the nosetip wasn't raised enough but there was improvement.
41. Other Odd Ways of Lengthening the Columella

A SUBCUTANEOUS FLAP AND GRAFT

When the upper lip cannot spare skin but would benefit by the production of a philtral groove, a subcutaneous tissue flap continuous with the columella base can be dissected out of its mid-vertical length. Elevation of the nasal tip draws the subcutaneous flap out of the lip the way a robin pulls an earthworm out of the ground. Its raw surface can be wrapped with a free auricular skin graft and the donor area depressed with through-and-through sutures tied over a bolster.

This method was first described by me in 1963 for a luetic absence of columella, and its one advantage was the lack of lip skin scarring. It is quite possible that a thin cartilage strut could be threaded up through the new columella as a secondary procedure.

UNIMAGINATIVE USE OF UPPER LIP SKIN

There were several early methods of obtaining skin from the upper lip for columella reconstruction. In 1833 Dupuytren raised
a rectangular flap from the midline of the lip based on the septum, twisted it 180 degrees and sutured its end to the nasal tip with the skin surface forward. In 1842 Serre based his lip skin flap on the vermilion border. Both of these methods were mutilating to the lip and, of course, are now obsolete or should be.

**BUCCAL SULCUS FLAPS**

Columella tissue can also come from pedicles of upper buccal sulcus mucosa. In 1931 Lexer described labial mucosa, in the form of a vertical tube pedicle, being pulled through an opening in the upper lip to supply the columella. He even denuded the base of his pedicle to avoid a fistula and claimed that this mucous membrane became paler and less noticeable after a few weeks of exposure.

Yet in 1918 Gillies was faced with a columella partially reconstructed with lip mucosa. It had had plenty of time to lose its blush, but, as it still looked more like a "nasal hemorrhoid" than a columella, he excised it!

The feisty but realistic Ferris Smith of Grand Rapids, Michigan, one of the American pioneers in plastic surgery, often reminded his residents:

There is nothing new under the sun or a petticoat!

He, too, was with Gillies at Sidcup during the First Great War and later achieved some remarkable results with serial excisions. Smith designed a method of columella construction which circumvented the color problem faced by Lexer. He first lined a mid-vertical lip mucosal strap with a skin graft. Later he divided its upper end and with its base on the tubercle of the free border flipped the flap out of the mouth and up to the nose with the skin graft in front. Finally, the lip attachment was severed and the mucosa-backed skin graft inset as columella.
In rare cases this principle may be of value in the short columella. Variations of the technique were described and illustrated by me in *Plastic and Reconstructive Surgery*, April 1963:

A buccal mucosal flap can be tubed primarily, transported to its final columella position and later resurfaced with a postauricular skin graft. Another approach first lines a horizontal buccal strap flap with a chondrocutaneous graft from the postauricular area. This produces a natural skin color for the future front of the columella and at the same time produces a support and definition to the column. . . . The medial base of the flap is set just past the midline and as soon as the chondrocutaneous graft is well vascularized, the lateral end can be divided, turned over with skin in front, threaded through a slit incision at the future site of the columella base and attached to the nasal tip. Several weeks later the inferior end is divided from the lip mucosa and attached to the lip skin.

**COLUMELLA LENGTHENING BY SEPTAL FLAP**

In 1975 in the *British Journal of Plastic Surgery*, Miguel Orticochea of Bogotá advocated a septal swing flap similar to that described for nasal tip support by Gillies and Millard in 1957. He released the short columella, then swung out a septal flap with its base below to form the lower two-thirds of the columella, suturing the membranous septal skin together in front and uniting it to the columella stub attached to the nasal tip.

This is another method of lengthening the columella, but it leaves a permanent septal perforation and a lack of bridge support, presents a slightly strange-looking columella with a suggestion of eventual adult inadequacy and, of course, poses the possibility of a deleterious effect on nasal growth with such early septal surgery.

Then there are the even more far-out methods that bring tissue
from a distance. The most direct is one described by Labat in 1833 using a flap raised from the skin web between the thumb and index finger. This requires the hand to be held to the nose for at least two weeks in a rather rude “thumbing” position. I used a modification of this once, and once was enough!

**THE UBANGI STRETCH**

In 1977, Kernahan, considering the nasolabial angle sacrosanct and lacking confidence in his ability to create an artistic columella angle during its lengthening in bilateral clefts, admitted reverting to the Ubangi tribal principle. He makes a slit in the membranous septum and, instead of inserting a ring with graduated weights, introduces increasingly larger plastic prostheses in the hope that he can lengthen the columella. The only trouble is, the columella will thin out as stretched and when the prosthesis is removed, it might contract like a released earthworm and snap back into its hole.
42. Columella Lengthening by Nasal Floor and Alar Base Advancement; Methods of Alar Base Advancement

If the mucosa and/or muscles of the lateral lip elements have been joined to each other behind the prolabium, the lip result in scarring and function will probably be quite good and will not show a later stretching, thinning and flattening. This approach, of course, suffers the same short columella-depressed nasal tip "monkey on its back," but here there is no spare lip tissue available to appease it.

In such cases, where the upper lip itself does not have skin to spare, tissue for columella lengthening must be taken from elsewhere.

Shifting Flaps from the Nasal Floor

William Wesley Carter, in 1914 in the New York State Journal of Medicine and in 1917 in Annals of Surgery, described a columella lengthening procedure which, in principle, advanced the nasal floors and alar bases in a medial semicircular direction. With an inverted Y-shaped incision, the columella cartilages were divided. The incisions were continued under the floor of the nostrils to form two flaps, which were advanced into the columella and united in the midline. The incisions in the nasal floor were extended under the alae, liberating them for medial advancement,
narrowing the nose. The Carter procedure was presented again by J. S. Davis in his 1919 book, *Plastic Surgery*.

In 1938 Arthur Barsky diagramed the lengthening of the columella by the medial advancement of similar flaps from the side and floor of the nostril after a transfixing incision. The defects in the nasal floors were closed by undermining and advancing the alar base.

In 1956 Duarte Cardosa, boat builder of São Paulo and innovator in cleft surgery, designed a similar V-Y for columella elongation which he presented at a Congress in Havana, Cuba. The point of his V was directed toward the nasal tip, and the side arms extended along the alar bases. Without entering the lip, he shifted the alae medially and fixed them with steel wire so that the V became a Y as the columella advanced distally.

In 1957 John M. Converse of New York University diagramed a similar columella lengthening with V-Y closure of the donor areas without medial advancement of the alar bases. Here, again, the amount of lengthening is somewhat limited.

CRONIN

Forty-four years after Carter's work, Cronin refined and popularized the ingenious principle of secondary shifting of the nasal
floor into the columella. In 1958 he first voiced his objections to the Gensoul-type operations:

Very satisfactory lengthening of the columella may be obtained but this is at the expense of the horizontal length of the lip . . . and results in a very tight short lip from side to side and a long lip vertically; both undesirable.

He reasoned in 1958:

Observing the wide floor of the nostrils and the frequent occurrence of excessive length of the alae in the case of double cleft lip, it seemed that if the excess tissue could be shifted into the short columella, all three abnormalities would be improved.

The examples shown revealed a definite improvement in the alar flare and the columella length with the secondary scars in acceptable positions. In all cases, however, the columella seemed to be just a little short of ideal and the nasal tip never quite up enough except possibly in one case in which the procedure was carried out twice.

Here is the best of the four examples of bilateral complete cleft of the lip and palate presented by Cronin for the Kazanjian honorary lecture and published in the *Cleft Palate Journal* in 1971. Elastic traction from a headcap had positioned the projecting premaxilla so that at five months both sides of the cleft could be closed in a straight-line Veau III-type procedure, preserving a narrow cuff of prolabium vermilion. At nine months the anterior palate was closed and bone grafted. Then at four years Cronin lengthened the columella with his bilateral nasal floor and alar
base advancements. At six years the nasal tip and columella seemed to be in good position.

**SPINA**

In 1968 Victor Spina and Vincente Zaputovich advocated Cronin’s modification of Cardosa’s alar and nasal floor advancement into the columella aided, in all cases, by a costal cartilage graft in the sub-septum in order to raise the nose tip.

Spina said Cronin and Brown considered this cartilage graft optional but he considered it mandatory.

**NEUNER**

Otto Neuner of Berne University has modified the Carter-Cronin V-Y medial advancement of nasal floors and alar bases toward the columella by the addition of Potter’s intranasal V-Y advancements along with scoring of the alar cartilage domes and suturing their medial crura. He estimates an elongation of the nasal passages by this means up to about 9 mm.
This general principle is a good one, achieving simultaneous alar base and nasal floor narrowing along with columella lengthening without reentry into the lip. Although it is limited in its capacity to lengthen the columella, when extra tissue is added in the form of a banked forked flap that capacity is adequately increased, as has been and will be shown repeatedly.

ALAR BASE CORRECTION

In bilateral clefts, not only do the nasal tip and columella show secondary deformities, but the alar bases begin in flared position and, unless effectively corrected primarily, will remain flared. Indeed, in some circumstances the columella has been lengthened sufficiently but the flaring of the alar bases persists, requiring further surgery.

There is a standard procedure that appears in every textbook but has limited value. When the alar bases turn out severely and the nasal floor is wide, a Z-type double transposition is effective, but the trapdoor flaps ending up in the lip will be responsible for noticeable scarring and should be avoided whenever possible.

There are various V-Y procedures, such as the one championed by Spina of Brazil, which involves a Weir half-moon excision of the alar base followed by an external V-Y medial advancement of the alar base.

The other standard Y-V nasal floor medial advancement of the alar base is a better procedure, and some modification of this is the method of choice.

If the present primary procedure for bilateral cleft lip has been studied carefully and is followed, there will be minimal secondary alar base flaring. If not, then a modification of the tethering that is advocated primarily will serve well secondarily.

SECONDARY TETHERING OF THE ALAR BASES

If the nostrils are wide, the ends of the alar base flaps, extending into the nostril floors, can be denuded of epithelium and their raw tips introduced into a through-and-through tunnel behind
the columella base and sutured to each other across the midline. This tethering should, once and for all, stop lateral alar drifting.

If there does not seem to be enough tissue for denuded tips of the alar bases, the alar bases must be cut as rather thick flaps and each split into a skin flap and a deeper subcutaneous flap. The subcutaneous flap can be advanced to its mate under the columella base, much as in the previous procedure, and the skin flaps can advance without tension in a Y-V across the nasal floor.

If the alar bases are abnormally thick, they can be elevated by the usual circumalar incisions and the subcutaneous "heart" cut out of their thickness but left attached to each tip of each alar base. A suture can narrow each reduced alar base, and the subcutaneous flaps can then be advanced again under the columella base and sutured to each other.
LATERAL V-Y OF THE ALAR BASES

When the alar bases have been advanced medially too enthusiastically, encroaching upon the opening of the nostrils with reduction of the airways, a reverse lateral advancement of the alar bases in V-Y fashion can be effective. Richard Farrior of Tampa, who trained with Huffman and Lierle in Iowa, has promoted this method of shifting the alar bases and opening the nostrils.

![Diagrams of nasal structures before and after lateral V-Y advancement]
DORSAL NASAL ADVANCEMENTS

It seems there are almost "no holds barred" in bilateral cleft nasal tip surgery. The width of the nasal tip has been an excuse for its use.

The first to use the dorsal skin seems to have been the German surgeon Johann Friedrich Dieffenbach, who as a young cavalryman had witnessed the maiming and crippling of young men on the Napoleonic battlefields. Inheriting the sensitivity of his poetic mother, he pursued the study of medicine and, in his 40's succeeded Von Graefe as surgeon at Charite Hospital in Berlin. His fame increased until, it is reported:

The children of Berlin sang, "Who does not know Dr. Dieffenbach . . . the Doctor of Doctors . . . he cuts off arms and legs and makes you new noses."

In fact, as early as 1824 he was practically cutting off half a nose to remake it with a V-Y advancement of the dorsal skin into the tip and columella. His comprehensive work on reconstruction was not published until 1845.
Numerous variations of the principle have been advocated through the past century and a half. J. Szymanowski in 1870 advocated a unilateral skin flap from the dorsum of the nose based inferiorly and slightly off center for columella reconstruction. Although this procedure was not specifically designated for bilateral clefts, it seems to be the forerunner of other methods.

Ombredanne also advanced the nasal tip with a V-Y without concern for external nasal skin scars.

Professor Joseph of Berlin employed an exaggerated V-Y advancement of glabella and dorsal nasal skin downward into the columella and tip in cases of wide and bifid nose often associated with hypertelorism. His name for this procedure is as good as, if not better than, the procedure itself—Glabellare Schizzorhino-plastile.

Some 25 years later, in 1955, Burian of Prague described the use of external incisions extending through both alae so that the alae could be shifted from a slanting position to a more normal horizontal position. This shortened the nose length and gave a relative lengthening to the columella. He advised this approach for extreme cases with the nose shaped like a parrot's beak.
The same principle was elaborated upon by the cool, courteous Daniel Morel-Fatio of Hospice des Incurables at Ivry, Paris, whose restrained confidence is reflected in the unostentatious smartness of his dress, the impeccable technique of his surgery and the repeated use of *absolument* to punctuate his teaching. In 1966 he described his use of dorsal skin for columella lengthening in bilateral clefts with depressed nasal tips. He refined the design by resecting the deeper tissue to thin the thickened nose and to facilitate closure of the donor area on its dorsum. The incisions across the alar arches necessary to slide the dorsal skin over the tip and into the columella give a rolled effect, with the tip and column overly rounded.

Then, in 1973 at the International Cleft Palate Congress in Copenhagen and in 1974 in the *Scandinavian Journal of Plastic and Reconstructive Surgery*, the conscientious René Malek of Hôpital Saint-Vincent de Paul, Paris, also advocated dorsal skin of the nose for the columella:

In bilateral cases, the nose is not deviant but its tip is enlarged and flattened. Shortness of the columella is the main deformity. This can be corrected . . . when the lip is cosmetically acceptable, a V-Y flap raised from the nasal dorsal skin is used. . . . A complete rhinoplasty is usually necessary in a second time.
In 1977 at the Chicago meeting of the American Association of Plastic Surgeons, M. T. Edgerton and J. L. Marsh gave a 12-year follow-up on lengthening the "short nose" in bilateral clefts by sliding nasal mucosa and this same general external V-Y of dorsal skin. The procedure was done at the age of 11 years, long before the nose has its final growth in bridge height and nasal length. Such drastic surgery, if not avoided, should at least be postponed until 16 or 17 years to prevent irreversible scars until growth has a chance to render this action unnecessary.

OTHER DORSAL SKIN MIGRATIONS

The seemingly mild Milton Edgerton, with C. M. Lewis and L. O. McKnelly of Baltimore, noted in 1967, as had Morel-Fatio, that even after the short columella has been lengthened:

The released tip of the nose and nasal dorsum often remain wide and bulky.

They acknowledged that the excess dorsal nasal skin could be used as a free composite graft to the columella, but the amount would be limited to 7–8 mm. Therefore, they suggested two ways of flapping dorsal skin to the columella area:

1. “. . .Use of a 90-degree rotation of an island or 'stalk' flap from the nasal dorsum.” Pedicled on branches of the anterior septal artery, the dorsal skin ellipse is passed through a tunnel at the tip which exits at a transverse releasing incision at the top join of the columella with the nasal tip. The "stalk" flap is let in transversely to lengthen the columella or longitudinally as an overlap for columella retraction. Of the seven "stalk" flaps that had been used up to the time of publication, they reported that "two of these showed necrosis of a significant portion of the flap."
2. "A retrograde pedicle at the superior end of the short nasal columella may be left attached to a midline strip with lateral extensions of the nasal dorsum. This allows downward advancement of the flap into the columella area."

This "retrograde trifoil" procedure had been used five times and was found less "tricky" than the "stalk" flap but it left "slightly more scarring."

After discussing his 12 cases, Edgerton editorialized on his external dorsal nasal scars:

The senior author has now used this external dorsal incision in well over 100 cases. Most of these incisions heal with a fine line scar and are not a source of complaint. Approximately 25 percent of these incisions widen or are noticeable to the extent that dermabrasion of the scar is recommended 6 to 12 months after the initial surgery. No patients have found the scar so unsightly that they or their parents have stated that they wished the operation had not been done.

Edgerton, Lewis and McKnelly gave as one of their prime excuses for scarring the dorsum of the nose the small size of the prolabium, which rendered it unable to supply columella tissue. Yet in the cases they published, the prolabium was unnaturally wide and in actual need of an artistic reduction.

Most plastic surgeons, it is hoped, will not take the exposed route over the dorsum of the nose for transporting skin to the columella. There are times when it is tempting but rarely ever justified in my opinion. It produces a round nose, and after
rhinoplasty the scars remain as seen here. Some scars are excellent, but I have had to try to revise some that were impossible.

Edgerton himself described the bilateral cleft nose problem vividly:

The face has an appearance similar to that seen when a child’s nose is pressed against a pane of glass.

All the more reason for any surgeon contemplating external nasal incisions to consider and reconsider carefully the chance that the nasal tip flatness will be replaced by nasal skin eventually looking as though the pane of glass had actually shattered under the pressure.

**ALAR RIM ADVANCEMENT**

Ray Brauer of Houston, with D. W. Foerster, almost started a Texas shoot-out with his partner Cronin when he reversed the "Cronin" shift by advancing the alar webs into the columella from above. At least this approach is sound in principle as it is taking tissue from where it is undesired and placing it where it is needed.

Brauer thinks of the nasal tip as having three components: (1) dorsal tip above, (2) columella below and (3) two alae, one on either side. Of course, in the bilateral cleft lip nose the dislocation of the alar cartilages presents webbed alar margins that widen the nasal tip and encroach upon the columella length. With a forked design, Brauer first makes his external incisions through skin. Thus he has access for dissection of the medial crus of the lower lateral cartilages out of the columella so that they can be sutured together up into the nasal tip. Then, without including cartilage in the alar flaps, he extends the incisions through the vestibular lining, creating two alar web flaps which are rotated away from the alar rims medially and down into the columella. The tail of each flap is incorporated within the alar margin in a V-Y closure to avoid notching. There is sound economy of tissue shifting in this maneuver, but special craftsmanship is required to blend the alae into the columella at the tip.
without pig’s-ears, notching, columella overhang and visible tip scar marks. Yet, as Brauer indicates, if the prolabium is small and tissue in the nasal floor sparse, the alae are another possible source for columella lengthening.

**ALAR RIM TRANSPOSITION**

In 1946 Claire Straith, of Detroit, adapted the Z-plasty, which by then was famous for its correction of axillary and extremity skin webs, to the congenital alar rim web of the unilateral and bilateral cleft lip nose. The double Z in the bilateral cases not only removed the excess curtain drooping over the upper nostril but gave an illusory lengthening of the short columella on its upper end and, in fact, did elongate it a bit. Although the principle of the zigzag broke the web line, its interdigitation in an area of the gentle curving flow of columella blending into alar arch was responsible for some unnatural abruptnesses.

In 1958 F. Wirth tried to smooth out this design when he transposed alar web flaps with columella side flaps in a similar Z-plasty after dividing the alar cartilages laterally and suturing the medial crura together at the tip.

**OTHER TRANSPOSITIONS**

The ingenious Onizuka of Japan capitalized on the width of the tip above the columella to produce double transposition flaps, which he takes from the lateral vertical axis and interdigitates in the sub-tip as a Z or shortens and brings together in a lying-down H. The effect is a narrowing and lengthening of the columella, but there is an increase in the sub-tip area from the height of the alar arch to the height of the tip. This may be
acceptable in the Oriental but is less so in the Caucasian. The double transposition of medial alar rim into the sub-tip brings with it rather "mod" external scars.

In 1974, Musgrave and Garrett of the University of Pittsburgh, in reference to methods that take skin from the broad nasal tip, stated:

We have had no experience with these methods. However, we are very reluctant to add any further visible scarring to the nasal tip when there is already abundant scarring in the adjacent lip.

In reference to external nasal scars, Herold Griffith of Northwestern University, while a resident at Cornell, did a cleft lip nasal correction using an accepted external scar approach. He recalled:

The early post-operative result was excellent, but about two months later, the patient came for presentation to our team at the Cleft Palate Conference and I was startled to see the scar had contracted enough to cause distortion. There was no way I could hide her in a closet so I had to present her in our conference. Dr. Conway looked at her very critically and after the patient had been ushered out of the room, he turned to me and said,

"She looks great, Hal, and I'll bet she'd look even better if you had had a sharp knife."
44. Free Composite Grafts to the Columella

AN incision at the base of the columella followed by a membranous septal incision can release the nasal tip along the septum. The resulting gap in the lower portion of the columella has been filled with various composite auricular grafts.

König in 1914, Davis in 1919, Limberg in 1923 and Joseph in 1931 all described composite auricular grafts to the nose, but König must be knighted with priority. Gillies advocated the chondrocutaneous ear graft for nasal reconstruction in 1943. Yet it was Barrett Brown with Cannon in 1946, and the entire St. Louis contingent thereafter, who popularized this method.

Robert Meade of New Orleans has given the most elaborate description of the use of the composite auricular skin and cartilage graft for the columella. Possibly overreacting to the super droop of all that Spanish moss in the Cajun bayou, Meade slipped extra cartilage spines behind his grafts.

As illustrated by the fabulous drawings of E. M. Freret in Plastic and Reconstructive Surgery, February 1959, the columella was released and a composite wedge graft from the ear was cut to fill the columella defect. Several extra cartilage struts were inserted behind to add contour and support. My only concern would be the possible interruption of the incoming vascularity by these struts, to the utter dismay of the struggling graft.
Meade philosophized:

Smith, Slaughter and Brodie and Schultz among many others insist that the prolabium is a natural part of the upper lip and should be included in the lip in any plan of repair of bilateral clefts. ... With use of a composite, auricular graft for construction of the columella, the prolabium can be left in its normal position. ... Sufficient time has not elapsed since the inauguration of this procedure to estimate adequately growth factors as related to the nose and the grafts. ... Peer reports observation on the growth of young, human cartilage autografts of ears, septal and rib cartilage. He noted that these grafts retain their characteristic structure, and that there was evidence of growth in the ear and septal cartilages.

FREE SKIN AND FAT GRAFT

Zino, in 1943, seems to have been the first to advocate the use of the composite graft of skin and fat from the lobe of the ear to lengthen a short columella.

Meticulous Samuel Milton Dupertuis, of the University of Pittsburgh, who had early training in Paris with Professor René Leriche and later with J. P. Webster at Presbyterian Hospital in New York, in 1946 reported his experience with free composite grafts of the ear lobe to the columella. As a reflection of the frustration experienced in bilateral cleft surgery, Dupertuis once wrote in a letter to Webster:

One sometimes suffers from being a perfectionist, but in most instances it seems manifestly worthwhile.
In Webster’s memoriam to Dupertuis, the story of his ear lobe grafts is complete:

His fairness and integrity are illustrated by his readiness to give credit to others when it was due. For instance, in publishing a series of cases showing excellent results from free grafting of skin and fat as composite grafts from the ear lobe, a method which he independently devised, he discovered that the procedure had previously been described in a little known report and gave that author credit for priority. He later had the courage and broad-mindedness to show cases in which this method had not been so successful as a warning to others of possible limitations in its use.

Influenced by Dupertuis, Musgrave and later Lehman described interesting results with this approach.

Then, in 1974, Musgrave and Garrett published a 14-year follow-up of a composite ear lobe graft which demonstrated a definite lengthening of the columella but a stuck-on unnaturalness without the graceful sweep of the columella into the nasal tip or the lip.

A COMPARISON

In 1949 Donald Pelliciari of Columbus, Ohio, compared the two types of composite auricular grafts. At this time he seemed to favor the lipocutaneous lobe graft over the chondrocutaneous helix graft:

The lobe is especially handy as a donor area since it can be repaired immediately after taking the graft, needs little aftercare and leaves no noticeable scar. It is also a perfect match for color and texture.
The helix graft, however, has several disadvantages:
1. Must be no wider than 1 cm.
2. Requires two stages to repair the donor site.
3. May take on a darker pigmentation.
4. Care must be taken not to separate skin from cartilage.

Yet he acknowledged that the presence of cartilage led to rigidity, producing a columella without creases. This to me is the crux of the choice, for a lobe graft tends to be pudgy like a marshmallow and a chondrocutaneous graft is like the columella it is constructing.

It seems that using the ear for the columella in bilateral clefts, although easier for a compromise result, can be considered somewhat of a desperation move. Nevertheless, fine surgeons find it tempting. In 1973 Broadbent, discarding much prolabium while using rotation-advancement incisions in the Manchester primary bilateral cleft closure, often ended up with a flat nose and short columella. When challenged what he does about this shortage, he admitted using free grafts from the ear. Knowing Broadbent, one could wager he gets quite good results. Then, in 1974 with Woolf, he wrote again about ear grafts:

A composite free graft from the ear may be used to elevate the tip and also avoids operating on the lip.

In the cases presented in 1977, their ear grafts had an unnaturalness. In principle there must be a better way.

Recently, I have had occasion to treat secondarily a bilateral lip cleft which had had transection of the columella at its base and the insertion of an unsuccessful composite auricular graft. This failure compromised my execution of a forked flap and forced use of a less satisfactory method. The case appears in Chapter 39.

ALAR BASE GRAFT

In 1954 Max Pegram of Wilshire Boulevard, Los Angeles, California, described use of composite alar base wedge excisions for staged free grafting of a congenitally short columella. At that time he stated:
The use of the ala composite graft for lengthening of the short columella of the bilateral cleft lip is under study at the present time.

Such action has commendable economy if indeed the alar bases can afford it. Few bilateral cleft lip cases could spare enough to lengthen the columella sufficiently to lift and maintain this elevation. As no further publications appeared from Pegram, I wrote him for an up-to-date report.

This is his answer on June 11, 1974:

I have been very derelict in not publishing a follow-up article on ala grafts to elevate the columella and unfortunately all of my photographs were lost.

It is the only procedure I have ever used to elevate a columella and have used the procedure approximately 25-30 times. The grafts measure 5 mm. along the free edge and they have all survived. On several occasions about six months after the first ala graft, I have taken a second graft from the opposite ala and grafted it in the columella for further elevation. They too have all survived. Trophic changes have been minimal, if at all.

I like the procedure because of its simplicity and the columella looks quite normal.
THE FINISHING TOUCH OF CARTILAGE

Because of the original super flatness of the nasal tip in the bilateral cleft deformity with the absence of septal development, the open angle of the alar cartilages and their actual separation from each other, even when the alar cartilages are brought together, the tip is released and the columella is lengthened, there tends to be a lack of definition in tip projection. Then, too, the columella may not present a smooth convex column from lip to tip. Both of these discrepancies are best alleviated by a straight, slim, stiff strut of autogenous cartilage.

In 1932 Gillies and Kilner, noting the lack of septal development in the bilateral cleft lip nose, advocated a supporting graft of autogenous costal cartilage. Others, before and after that time, followed a similar plan.

As plastic surgery became more sophisticated, the soundness of autogenous grafting was forgotten, and more expedient methods were developed. Barrett Brown became infatuated with fresh and preserved homologous cartilage in 1940. In 1948, with DeMere, he wrote an instructive and persuasive paper on the preservation of cadaver costal cartilage in aqueous Merthiolate. The dynamic Brown was at the height of his power, and most surgeons followed him like sheep into a pen. Hundreds upon hundreds of preserved L and other-shaped costal cartilage grafts were inserted. Lamont, Straith and others published reports of their use of preserved human rib cartilage in the bilateral cleft lip nose. As utilizing human cadaver cartilage was unlawful in England, Gillies became one of several to simplify the process by using preserved ox cartilage, and, not to be outdone, McIndoe began using preserved whale cartilage. Having climbed on the preserved cartilage bandwagon myself and after many hours in autopsy
rooms, I went off to Korea with the marines carrying a bottle of peeled ribs jiggling about in 1:1,000 aqueous Merthiolate. As with many others, it took me about 10 years to realize that this preserved cartilage was gradually absorbed in too great a percentage of cases. It was also noted that smaller, thinner grafts seemed to be easier prey to the phagocytes, being absorbed quicker and more completely. As a columella strut must be slim to be aesthetic, its ultimate chances were nil.

In 1961 Dingman and Grabb advocated preservation of cadaver cartilage by radiation, and to this day Dingman reports little problem with absorption.

Whether suspicious of or disenchanted with the preserved cartilage trend he had started, and always searching for something better, Barrett Brown reported an interest in silicone with Fryer, Randall and Lu in 1953 and again with Fryer and Ohlwiler in 1960. Of course, the general value of silicone is now well established, but its use in the columella can be dangerous, as I wrote in 1966:

And foreign bodies are hazardous when implanted as superficially as the columella or when called upon to produce enough thrust to lift the tip.

RETREAT TO THE EAR

Some surgeons turned to the less supportive autogenous auricular cartilage and devised ways of using it effectively. In 1964 Cronin, for Converse, described taking a long narrow ellipse of auricular conchal cartilage, slicing it into two slim strips, suturing them back to back, except at the upper end, and then inserting this bifid support into the tip above the medial alar crura.

A spoon-shaped piece of auricular conchal hollow cartilage is removed through an anterior or posterior incision. The cupped end is split so that the cartilage curls out like a pair of gull wings. The remaining shaft is scored down its mid-vertical length, folded back on itself for reinforcement of the stem and fixed with sutures.

The gull-wing graft is introduced through a mid-columella incision which "heals to near invisibility," but Gorney and Falces warn:

*Do not bring the incision onto the tip proper, especially in dark individuals.*

Of course, many have continued with autogenous rib cartilage struts, but most surgeons consider this adjunct more or less optional. Victor Spina has not been so tolerant on the subject, proclaiming a costal cartilage strut absolutely essential in the bilateral cleft lip nose.

In 1974 Musgrave and Garrett stated, with respect to their columella lengthening:
A strut of preserved rib cartilage is almost always incorporated in the small child although occasionally we have used the tail of the helix as an autogenous cartilage graft. This inverted obelisk-like graft is anchored to the deficient distal septum with two transverse mattress sutures of 5-0 white silk.

In 1964 I proposed septal cartilage struts for this purpose and still feel that, when available, this is the best method by far. In the symmetrical bilateral cleft secondary deformity there should not be much deviation of the septum, and unless some overenthusiastic otolaryngologist has gotten ahead of us, cartilage for grafting should be ample. Long, slim, straight, stiff struts of septal cartilage, resting on the nasal spine and running up through the columella, will give lift and definition to the tip. It is important not to make the strut so long that the tip skin blanches over its end at rest, or even with smiling. The septal cartilage is stiff enough to be effective and slim enough to allow the insertion of two pieces for extra and symmetrical tip lift and still maintains a sleek column.

In 1967 Paul Tessier of Paris suggested splitting the tip of the septal cartilage strut so that it curled over on each side, not unlike a fleur-de-lis, presenting quite a natural and benign tip for nasal support.

Otto Neuner of Berne proposed the nasal hump, when there is one, as a good tip support in cleft lip cases.

In 1972 J. Pollet of Paris was reported by Stephenson for the 1974 Year Book of Plastic and Reconstructive Surgery also to advocate use of the nasal hump:

The nasal hump removed as a block and thinned can constitute an osteocartilaginous graft whose bony portion is osteosynthesized to the nasal spine and the portion corresponding to the triangular cartilage is sutured to the septal portion. If the hump is too short, a wider piece including the lower septal edge attached to the hump can be removed. The nasal hump with its septal expansion constitutes a large graft whose anatomy is similar to that of the alae with the dome and the lateral crus.

Editor Kathryn L. Stephenson’s personal comment noted that Pollet gives Tessier credit for the trifoliate support and compared this with the auricular gull wing of Gorney:
The septal cartilage has the advantage of giving a bit more rigidity and would possibly be more useful for the secondary repair of cleft lip nasal deformity, where the tissues are scarred and heavy.

No one seems concerned that when the hump is short so much additional septum will have to be removed from the bridge that there is a good chance both tip and bridge may then need support!

In 1974 Oneal, Greer and Nobel, of the University of Michigan, suggested temporary and permanent cartilaginous support immediately after the banked forks have been shifted into the columella for nasal tip release:

We attempt to place the prominences of the “banked” flaps at the base of the columella. . . . This should rotate the medial crura upward and raise the tip of the nose. We have noted some tendency of the tip of the nose to settle with healing. [This may be similar to the mechanism Anderson has discussed for the “pollybeak” deformity following rhinoplasty due to lack of medial crural thrust and downward pull of the healing scar tissue in the transfixation incisions.] This observation has prompted us to insert a columellar strut of septal cartilage between the feet of the medial crura and the premaxilla in older children. In young children, we use irradiated costal cartilage. Even if this cartilage absorbs, it may function initially as support until the active scar tissue phase is passed.

I think this last point is an interesting thought, but I suggest homologous septal cartilage banked in antibiotic solution may be a better early temporary tip support.

**BOWIE KNIFE STRUT**

David G. Dibbell of the University of Wisconsin in 1976 advocated support of the cleft lip nose with a costal cartilage strut shaped like a Bowie knife with the butt of the handle resting on the nasal spine and the scooped tip allowing nasal tip definition. He reported using it in conjunction with a forked flap in secondary bilateral cleft lip nasal corrections. He obtained cover of this graft with forward advancement of the septal mucosa on each side of the septal cartilage to be sutured to the forked flap. As a testimonial to both the forked flap, which Dibbell graphi-
cally referred to as the "elephant's trunk" approach, and his special costal strut, he presented two bilateral cleft cases with impressive secondary nasal corrections.

It should be noted that if this Bowie knife-shaped strut is desired, it often can be cut quite well from septal cartilage. In fact, I cut a Bowie knife-shaped strut out of septal cartilage for a retracted columella the day after I read Dibbell's description. The case appears in Chapter 17.

**STRUTTING COMPOSITE EAR GRAFTS**

Composite auricular chondrocutaneous grafts to the columella, of course, carry their own thin built-in cartilaginous support. As already noted, Robert Meade adds an extra auricular cartilage strut in back of his composite ear graft at the same time to bolster further this portion of the new columella. Certainly ear lobe grafts warrant a cartilage strut at the time of grafting or as a secondary procedure to give a "little spine to the marshmallow."

**PLASTICS**

Although there are exceptions to all rules, in general it is my feeling that the silicones and other synthetic foreign bodies should be avoided when possible in the support of the cleft lip nose. They are the "easy way," and undoubtedly one will sneak by occasionally. Yet when they are inserted into scarred tissue in superficial positions where there are demands for adequate thrust and long-term active support, the chances of a happy ending are by no means constant. As Kilner once said,

They are the Royal Road to contour,

but he promptly dismissed them without reservation.
46. A Note on Vestibular Lining Shortage

As in the unilateral cleft deformity, only in double proportion, there is a bilateral shortness of the vestibular lining. This discrepancy is partially hidden within the nostril and has, more often than not, been ignored. In the original deformity the alae, attached medially to the short columella on the projecting pre-maxilla, arch the clefts with their alar bases flared and dragged backward by their attachments to the retroposed maxillae. The bilateral shortness of the vestibular lining is seen and felt along the intercartilaginous line from the nasal tip to the alar base, and unless this has been relieved, the problem still exists in the secondary deformity.

When the shortness is unilateral, it is more obvious and has stimulated various designs to correct it. Berkeley advocated a primary Z-plasty of the vestibular lining with his horizontal limb along the intercartilaginous line. Uchida used a double Z, Potter incorporated the V-Y principle and Rees added a free skin graft.

In the bilateral cleft, the vestibular shortness may be missed, hidden in its symmetry or overshadowed by columella shortness and alar base flaring, but it still exists. Few have directed much attention to it primarily. Yet, for the posteriorly displaced and flared alar base to move forward and inward during the primary surgery, it is necessary to free it. Most surgeons, I believe, divide the lateral attachments of the vestibular lining to the maxilla, and, as the defect is out of sight, it is soon out of mind but never quite out of the squeezing reach of the fibroblasts. So what may seem to be adequate release will eventually be contracted with
scar pulling the alar bases back and holding the nose in restraint.

I admit to this “sweeping the defect under the rug.” Finally, after years of guiltily casting a last side glance into the vestibular raw area just after the alar base release but before lip closure, I decided to maneuver the pared vermilion from the cleft edge of each lateral lip element to line the release and to put an end to the contractures. This bilateral vermilion flap transposition has been used for years and is described in minute detail in the primary procedure. If this flap or another that increases lining length has not been carried out primarily, the vestibular shortage is still present in some degree and will require secondary attention. As the cleft edge has long ago been shorn of its vermilion, flap 1 is only a memory and it is now necessary to look toward Z’s, V-Y’s or free grafts. Potter had the foresight to combine the V-Y with the columella lengthening, and Neuner followed his example.

It is worthy of note that the lateral extensions on the Gensoul flap as designed by Blair and later Brown and McDowell, as well as similar extensions on the forked flap as suggested by Peskova and Fara, Limberg and later Pfeifer, do fit into bilateral releases of the vestibule at the tip. Thus in a minor way at least a little extra tissue is added across this tight line.
47. Columella Retraction

In bilateral cleft deformities the columella may vary in shortness from near normal to near absence. It also may be retracted, but this condition is not so common and is usually a secondary sequela with columella lengthening. If the retraction is minor to moderate in degree, it may be improved by a columella strut of septal cartilage to increase anterior projection. It may be corrected by a composite auricular graft inserted into a membranous septal releasing incision.

Muir and Bodenham, for Gibson’s *Modern Trends in Plastic Surgery* in 1966, advocated this ear graft for the mildly retracted columella:

A simple and effective method used by the authors utilizes a double-sided elliptical graft of ear lobule let into a horizontal incision parallel to and just above the columella, and below the septal cartilage. The graft is totally surrounded by vascular tissue, takes well and is hidden from view.

This is but one of many examples of direct simplicity in corrective design as advocated by gracious, perceptive Denis Bodenham of Bristol, England, site of the launching of the *Hispaniola* in Robert Louis Stevenson’s *Treasure Island*. An international expert in melanoma and a clear thinker in all of plastic surgery, Bodenham reflected upon the effects of our efforts to camouflage cleft anomalies:

By constantly raising the standards of our treatment of congenital deformities we are enhancing their matrimonial prospects and ensuring for our successors a steady flow of new cases to treat.
RETRACTION PLUS
NASAL TIP SHORTNESS

If there is shortness of the nose associated with retraction of the columella, the membranous septal incision is extended laterally on each side in an anterior vestibular or intercartilaginous incision. This allows the entire front of the retracted nose to come forward, leaving an ominous gap. Reed Dingman of the University of Michigan has courageously designed a composite ear graft which he peels and slices like a "banana split" to fit perfectly into the defect, supplying both lining and support along three axes. Not many surgeons have enough of the daredevil in them to gamble such a large and complex composite graft inside a scarred nose. When successful, however, it promises to be a fine trophy.

The same adventuresome spirit has lured Dingman off to big game country many times. Once on the plains of Uganda, East Africa, Dingman with a Remington 7 mm., a black scout and a white hunter had climbed into an open-backed twig and brush blind about 75 yards from a baited tree. Through a small hole in the front of the blind he could watch a branch cleared of leaves and lashed with the hindquarter of a zebra. There they waited in the hot, steamy afternoon with the flies buzzing. Dingman had just begun to doze when there was the slightest snap of a twig. The white hunter tapped him and pointed over his shoulder with his thumb in a hitchhiking motion, doubly indicative. Dingman half turned his head toward the open back of the blind to face, not 15 yards away, a large lioness, the killer of the breed, crouched ready to spring. The next few seconds were somewhat exciting, but fortunately for plastic surgery Dingman's aim was accurate and it is the lioness' skin graft that adorns the Dingman den!
I have always had a little less love for free grafts than flaps—not that both do not offer their own hazards. Yet here is a case in which there just was no immediate local tissue for flaps, and so the composite ear graft was about the only way out. This secondary deformity actually occurred in a unilateral cleft case but it demonstrated a problem more often encountered in bilateral clefts. Through a membranous septal incision extending laterally as anterior vestibular incisions, the contracted tip and retracted columella were released. Into the three-dimensional gap was inserted a composite chondrocutaneous auricular free graft. In this case, the "banana split" was peeled with only skin for the non-cleft side and skin with cartilage for the cleft side, maintaining an intact main stem of skin, cartilage and skin to fill the releasing space between the septum and the columella.
As a final nasal refinement in symmetry, a strip of alar cartilage from the non-cleft side was used as a second-stage onlay graft for the cleft side.

Moderate to Severe Columella Retraction

Here again the Dingman composite graft can be of value, but for those fearful of large composite grafts’ “taking” inside the nose, other methods are available.

Turning the fork

Otto Neuner of Berne has modified the forked flap for correction of the retracted columella. Two vertical flaps, incorporating the bilateral scars and based on the alar bases, are transposed 180 degrees and let into a membranous septal releasing incision. This maneuver will certainly correct columella retraction, and if the columella is long enough in the first place, there is no reason the forks cannot be used to correct a secondary deformity with a secondary priority.

Transverse lip flaps

When columella retraction is not accompanied by shortness, as after a forked flap, and at the same time the lip suffers vertical length, lip flaps described in 1954 by Richard E. Straith, M. G. Von Linde and J. L. Teasley, of Detroit, or a modification of this principle, can be of value. Straith ingeniously took bilateral flaps from the lip in front of the columella and transposed them into a membranous septal releasing incision, allowing shortening of the central portion of the lip.

A modification that has been used in Miami designs two lateral transverse full-thickness flaps taken high in the lip at its junction with the nose based medially. They also can be transposed into a membranous septal releasing incision, resulting in correction of columella retraction and shortening of the long lip.
In 1974 Randall and Lynch, after experience with primary columella lengthening with the forked flap, noted the problem of retraction:

Some of these columellas have lacked bulk so that the contour in profile has shown a retruded or “keyhole” type deformity. This defect would appear to be easily corrected by inserting a cartilaginous strip behind the columella or inserting a composite graft in the newly constructed membranous septum at a later date.

In their attempt to maintain the extended V wedge of the columella-lip angle on the prolabium, they are forced to take more tissue from the upper columella than probably can be spared from this relatively narrow element. This maneuver may account for their columella deficiency and retraction, which incidentally can occur occasionally even without this extra sacrifice.

**Bilateral alar chondromucosal flaps**

My favorite approach to the correction of the retracted columella, when its length is adequate and the lip is satisfactory, is achieved with flaps inside the nose. It was first described in 1963 and again in 1969 and 1972. It involves the use of alar chondromucosal flaps, and although it can be used in the snub nose associated with columella retraction, its more classic application is in a long or bulbous-tipped nose with overhanging sidewalls and a marked retraction of the columella.

In certain secondary bilateral cleft lip noses that have had their columellae lengthened, there sometimes results a retraction which can be quite deforming.

First, a generous membranous septal incision is made to release completely the retracted columella. Then two standard chondro-
mucosal flaps are cut long and narrow (3.0 × 0.5 cm.), composed of lateral vestibular lining carrying a corresponding strip of alar cartilage. These flaps are based superiorly and anteriorly high up under the tip just above the front point of the septum. They are created by extending the membranous septal incision bilaterally out along the intercartilaginous line and then turning forward and cutting back toward the tip in cartilage-splitting anterior vestibular incisions. Their vascular dependability is remarkable considering the hazardous width-to-length ratio but probably can be explained by the cartilage backing of the flap, which acts as a splint preventing collapse or kinking of the vessels. Based under the tip, these flaps are free to move forward with advancement of the tip and columella following the membranous septal release. Each flap makes half a turn as it swings down into the membranous septal gap to join its mate from the opposite side. With cartilage touching cartilage and mucosa turned out, the flaps are sutured together between columella and septum. The cartilage in the flaps mimics the medial alar crura and maintains the forward projection of the columella. These flaps are usually available even after a conservative rhinoplasty. Taking them from the lateral vestibule offers several welcome assets such as the lifting of overhanging sidewalls and the reduction of a bulbous nasal tip.

A classic example using the procedure just diagramed is seen in this bilateral cleft lip and palate case from Bombay, first treated in India and then by Gillies in London. When seen in Miami at age 26 years, the patient had a short, tight upper lip with a slightly protuberant lower lip, a humped nose with a hooked tip and a retracted columella. Remarkably enough, the columella had been lengthened adequately.
Cleft lip rhinoplasty included hump reduction, septal shortening and bilateral osteotomy. Bilateral alar chondromucosal flaps based anterosuperiorly were swung into a membranous septal releasing incision achieving five things: (1) The long sidewalls were elevated. (2) The retraction of the columella was corrected. (3) The nasal tip was elevated. (4) The alar cartilages were reduced. (5) The airways were improved. The upper lip was divided in the middle and a midline shield-shaped $2.0 \times 1.5$ cm. Abbe flap inserted. The pedicle was divided after 10 days.
Six months later, double-breasted-vest-type scar revisions were used on the lip, but the final result was never recorded as the patient returned to India.

COLUMELLA RETRACTION WITH ALAR ASYMMETRY

Here is an asymmetrical bilateral cleft which, after 33 years and numerous operations, presented a tight upper lip and an odd nasal distortion. The retracted columella was the key to the correction. Bilateral chondromucosal flaps from the lateral sidewalls were used to symmetrize the alae and release the columella. Then an S.M.R. (submucous resection) produced a septal cartilage strut which was inserted into the columella for skeletal support. The tight upper lip was divided in the center and a midline shield-shaped 2 cm. Abbe flap transposed into the defect with its tip inserted into the columella base. The pedicle was divided after 12 days.

COLUMELLA BASE RETRACTION

There is columella base retraction which is unattractive and eye-catching but quite common following certain columella lengthening procedures. The major portion of the columella is prominent enough in profile or, more often, it actually bulges with greater than ideal prominence to present the appearance of a hanging columella. Then, at its base join with the lip it fades
away in retraction forming an acute nasolabial angle, often referred to as a reentrant angle.

This secondary deformity is rather likely to follow the use of the entire prolabium for lengthening the columella. The natural column shape of the original short columella is difficult to duplicate with the thick, flat prolabium attached to it, even after thinning and rolling it into a column. Moreover, the end of the prolabium flap may not be quite long enough so that it flattens out at the base of the columella where it is forced to tuck in at an acute angle as it joins the lip with an encircling scar. Of course, the superior bulge accentuates the inferior tuck!

When there is enough prolabium to lengthen the columella adequately and still split its end to splay into the nostril sills or even to tailor it into a point to extend several millimeters back into the center of the upper portion of the lip, the deformity may be avoided.

If this little deformity does occur, the principle of a solution is the same as that in most problems, large or small, of plastic surgery. With the ideal in mind, determine what is missing, search for what you have but do not need that can be used to make what you do need and then execute the shift.

Determine the amount that the columella bulge requires for ideal reduction. Mark this as a lozenge-ellipse and circumscribe the area with an incision maintaining an inferior subcutaneous pedicle base with parallel incisions; use a back-cut in the pedicle for extra release if necessary. From the lower end of the lozenge-ellipse incision extend a midline releasing incision vertically down through the retracted columella zone, the encircling scar and a short way (mm.) into the actual lip. Then advance the lozenge-ellipse out of the columella hill across the gully to round out the nasolabial angle with one clean sweep.
This patient was first operated on in infancy by a pioneer plastic surgeon in Miami. After several operations by other surgeons, the result presented a prolabium half in the lip and half in the nose with grief to both, a tight lip and a depressed nasal tip.

The remaining prolabium was thinned, rolled and advanced into the columella with release of the nasal tip, and an Abbe flap immediately followed in its wake.
After one attempt at defatting of the columella 10 years later, the deformity of base retraction under a columella bulge still persisted. The lozenge-ellipse from the bulge was advanced on a subcutaneous pedicle across the scarred nasolabial angle with reduction above and filling out below.

When first seen at 18 years of age this girl had already had a prolabium advancement into the columella and an Abbe flap but she still had a flattened nasal tip. Transfer of more tissue into the tip left the base of the columella retracted. The retraction was corrected in turn with the lozenge-ellipse advancement across the reentrant nasolabial angle.
48. Outline of My Approach to Secondary Bilateral Cleft Lip Rhinoplasty

The cleft lip nose is renowned for its stubborn resistance to correction. Musgrave and Garrett in 1972 expressed the surgeon’s frustration eloquently:

As have many of our colleagues, we have whittled, pared, maneuvered, coaxed, and even lashed together these ponderous alar cartilages with what looked to be a fair result on the operating table, only to be most disappointed with the end results months and years later. The patients’ families are frequently pleased with our gamesmanship, but we usually are not, and neither are the young adults whose misfortune it was to have been thus affected.

It is indeed extremely difficult to transform a flat and flared nose into a graceful, natural one but it can be done.

The secondary bilateral cleft lip nose usually presents a reasonable symmetry. There is, of course, the inherent central shortness of the entire frontonasal component as reflected in the flatness of the nasal tip, acute angle of the alar cartilages at the tip and their separation and downward dislocation, shortness of the columella, shortness of the vestibular lining with contracture folds, webbing overhang of the medial alar rims, width and flatness of the nasal floors, flaring of the alar bases and retroposition of the maxillary platform under the alar bases. Any or all of these can appear and must be dealt with to the degree of their need.
TIP FLATNESS AND COLUMELLA SHORTNESS

For nasal tip release and columella lengthening I most commonly use three methods.

1. In general, if the lip is not tight in its upper portion, the F.F. forked flap is first choice.

2. If the lip is already slightly tight and the lower lip is relatively protuberant, the total prolabium is shifted with an Abbe flap to follow. When the prolabium constitutes the full length of the central lip segment, it is shifted as a single unit into the T.P. columella and an Abbe flap is transposed to fill its place.

When the prolabium has an inferior spear shape with lateral lip flaps joining tip to tip beneath it, the prolabium is shifted into the columella similarly, but its point is split to accept the tip of the Abbe flap.
When the prolabium constitutes the upper half of the central lip segment with lateral lip flaps beneath it, the entire central segment can be cut as a unit out of the lip and shifted into the columella and an Abbe flap switched to fill the philtrum defect.

3. If the upper lip is natural and in good relationship with the lower and the columella is not severely short, advancement of the nasal floors and alar bases is a possibility.

COLUMELLA RETRACTION

This deformity occurs in bilateral clefts and should be treated according to its severity.

1. Septal cartilage strut graft. S.C.S.
2. Composite ear lobule graft. E.L.
3. Banana split chondrocutaneous auricular free graft. B.S.
4. Lip skin flap transpositions. L.F.
5. Lateral alar chondromucosal flaps. C.M.F.
6. When associated with a flat nose, costal osteochondral hinge graft. C.O.C.H.

REDUCTION RHINOPLASTY

Both the forked flap and the prolabium flap require a membranous septal incision which can be extended laterally as anterior
vestibular incisions, bringing about exposure for reduction rhinoplasty. At this time alar cartilages can be reduced, hump lowered, septum shortened and nasal bones narrowed by osteotomy.

A.C.S. If the alar cartilages are severely separated, they can be sutured to each other during the reduction rhinoplasty.

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**SUBMUCOUS RESECTION**

S.M.R. There may be a septal deviation, explained by the accordion principle. Early closure of the lip over the projecting premaxilla produces pressure with varying degrees of telescoping as reflected in the septum by its deviating curves. Yet in the bilateral cleft a submucous resection, although occasionally relieving obstruction, more often produces fine cartilage for struts valuable for columella and nasal tip support.

S.C.S. A septal cartilage strut is inserted in the columella to obtain column contour and retain elevation of nasal tip after a forked flap or prolabium advancement and also to give that little extra tip definition of which the septum of the bilateral cleft lip nose is incapable.

S.C.S.1 One straight strut.

S.C.S.2 Two straight struts.

S.C.S.3 Fleur-de-lis split-end strut.
When septal cartilage is unavailable, then cartilage struts from the nasal bridge, rib, or concha can be used.

**SHORTNESS OF VESTIBULAR LINING**

If the mucosal paring flaps from the lateral lip elements during the primary lip closure have not been introduced across the vestibular lining shortness with release, evidence of this shortness will become apparent secondarily as vestibular folds. They can be lengthened by a V-Y or a Z-plasty or skin can be free-grafted.

**FLARING ALAR BASES**

It is important to cut the alar bases free from the lateral lip elements so they can advance medially even more than the lip elements. The best method of correcting the alar base in a simple flare with a normal nasal floor width is an alar base wedge resection.

When the flare is severe and nasal floors are wide, flaps of this area are denuded at the tips, advanced to each other and sutured with Vicryl to the septum at the nasal spine.

When the flare is not wide, the alar bases are taken as thick flaps, and each is dissected into a skin flap and a subcutaneous
flap. The subcutaneous flaps are sutured to each other at the nasal spine, and the skin flaps form the nostril sills.

When the alar bases are flared and are also thick, subcutaneous pedicles are cut out of their "hearts" and left attached at the tip to be used as "tethering strings" to be sutured to each other at the base of the septum. Closure of the donor areas, of course, narrows the alar bases.

**ALAR BASE WIDENING**

V-Y lateral advancement of the alar bases can open a constricted airway and when carried out unilaterally can symmetrize the nostrils.

**ALAR RIM**

Bilateral webs overhanging the alar rims can be treated according to the severity of the deformity.
1. Marginal excision. A.R.1
2. Alar margin rim flap turned to the side of the columella (Z). A.R.2
3. Alar margin rim flap turned into vestibule. Either of these can round out a sharp columella-ala angle. A.R.3
4. Alar margin folding up of cartilage and tucking in of lining. A.R.4

RETROPOSED MAXILLA

When the maxillae do not supply enough anterior projection for an adequate platform to the alar bases, additional contour is necessary. If maxillary osteotomy is not indicated, implants are used. Through upper labial sulcus incisions the retroposed alar bases are dissected free of the hypoplastic maxilla. Then cancellous bone chips and strips from ilium or rib are implanted as onlays beneath the periosteum to maintain the forward positioning of the alar bases.

In certain cases Silastic sponge has been inserted under the alar base on top of the periosteum for the same purpose.
49. The Lip-Switch Flap Principle

Before dealing specifically with cases involving a combination of a short columella and a short or long and tight upper lip, I believe it is well to review their constant savior and righter of wrongs, SUPER flap, also known in the specialty as lip-switch or Abbe flap.

The lip-switch principle has been called upon often in secondary cleft lip surgery. It has already appeared in Volume I and in primary bilateral cleft surgery and now reappears in the bilateral cleft secondary surgery, but it first deserves a general basic introduction. Let it be understood that, had the primary surgery been planned and executed correctly, a lip-switch flap would be most unlikely ever to be required. Unfortunately, this is not the case because tissue misappropriations, violations of principles, destruction of landmarks and retardation of growth have set up too many bilateral clefts in which tissue must be brought in from outside and used to remove scars, bring in muscle continuity, create a philtrum and even a bow, correct free border defects and, of course, relieve tension.

Cause and Effect

In congenital clefts of the lip there are varying degrees of actual missing tissue in the first place. After parings, excisions and scarring have taken further tissue toll, the horizontal shortness may become acute. When primary and secondary maxillary platform retraction is added, the effect of the tissue lack is multiplied.
SIMILAR KIND OF TISSUE

Only the upper or lower lip has similar tissue in kind for the opposite lip. As a normal lip can usually spare as much as one-third its width, switching flaps from one to the other is a principle that has been found of great value through the years in secondary cleft deformities as well as other defects.

SABATTINI

In 1837 Pierre Sabattini of Imola, Italy, carried out what seems to be the first lip-switch flap. A patient had lost the center of his nose and lip by a saber cut. Sabattini used an Indian forehead flap for the nose and a full-thickness flap from the lower lip to fill the upper lip defect. Schuh, Crikelair and Cosman noted in the British Journal of Plastic Surgery, 1970, that he divided the pedicle at seven days, goaded by “the incessant prayers of the patient.”

STEIN

Poul Fogh-Andersen, a Dane, brought attention in 1948 to the hundredth anniversary of another Danish surgeon, Professor Sophus August Vilhelm Stein, of the Royal Fredericks Hospital in Copenhagen, who in 1848 published a “new method of cheiloplasty” in Danish, using the principle of replacing a defect in the lower lip by a transposition flap from the upper lip. Actually, his patient was a 48-year-old sailor with an extensive lower lip cancer which, after excision, presented a huge V defect. Stein used a double transposition-plasty from the upper lip with two vermilion bordered pedicles that divided the oral orifice into a medial cleft. The pedicles were divided after three weeks and the clefts closed.
N. C. Petersen has reported a hospital record of another of Stein’s cases in which he transposed a single-pedicled flap of the philtrum of the upper lip to a gunshot deformity of the lower lip, dividing the pedicle after five weeks.

These procedures, having taken the entire philtrum, seem to have created a secondary deformity in the upper lip, similar to a postoperative congenital cleft, while treating a lower lip defect.

BUCK

It is interesting, as noted by Conway and Stark, that in 1862 Gurdon Buck at the New York Hospital was rotating full-thickness lower lip flaps on the coronary vessels to fill defects of the upper lip. His flap was similar in principle to a design used by Gillies during the two great wars and, as it rotates like a fan, became known as the fan flap.

ESTLANDER

The Finnish surgeon J. A. Estlander became professor of surgery and ophthalmic surgery at Emperor Alexander University, Helsinki, Finland, at the age of 28 and died in Italy and was buried there at the age of 35. During just seven years he became famous for a thoracoplasty procedure and a lip-switch flap. In 1865 he treated several lower lip deformities: The first was the result of a resection of an epithelioma; the next two followed typhus with gangrene. Estlander repaired these defects with flaps from the...
lateral portion of the upper lip utilizing the coronary artery at the angle of the mouth. As the blood-supplying pedicle consisted of the mucosa and vessels at the commissure, the permanent oral orifice was reshaped at once and the operation usually completed in one stage. Estlander published his method in Germany in 1872 and in France in 1877, and thus it entered the world literature and textbooks.

The present fine Finnish plastic surgeon Borgie Sundell is working in the hospital that Estlander planned.

NEUBER

From Aachen, Germany, Momma, Koberg and Mai noted that a German named Kreche in 1899 reported that another German, Neuber, had been using the lip-switch flap since 1891.

ABBE

Yet, as Abbe was the first actually to switch a lower lip flap into the upper lip for a cleft deformity, this flap will be referred to simply as Abbe in this book. Richard Stark, also of St. Luke's Hospital, New York, researched and later reported on the life and works of Abbe. A descendant of the French who escaped to England during the Huguenot persecution, Robert Abbe was born on Dutch Street in New York City, destined to become a brilliant American surgeon. He set up his practice at 32 East 20th Street and often drove his horse and carriage past Theodore.
Roosevelt's home, just down the street, on his way to the hospital.

Abbe first considered the lip-switch idea in 1895, and in 1898 he wrote a description of “A New Plastic Operation for the Relief of Deformity Due to Double Harelip” that was published in a weekly journal, The Medical Record:

A lad of twenty-one years recently presented himself for a conspicuous deformity of the lips, the sequel of an operation for double harelip in infancy, consisting in an extreme flatness and scantiness of the upper lip, with an enormous pouting and redundancy of the lower one. . . . Their inequality was admirably corrected by transplanting the middle portion of the lower lip into the upper. . . . A median vertical incision was made in the upper lip, and the central scar portion excised so as to obtain edges of an excellent quality of skin. The gap thus created was about three-fourths of an inch in width. A flap taken from the central portion of the lower lip, a little wider than the upper gap, was then made, in such a way as to make a hinge upon one side containing the lower branch of the coronary artery on the left, which flap was turned upward so that its lower edge on the skin was placed beneath the columna nasi. The vermilion border was exactly stitched on one side, as shown and numerous very fine stitches were applied so as to secure apposition around three-fourths of the flap. . . . On the twelfth day, the flap having grown perfectly in its new position, its base was very carefully cut from the lower lip so as to leave an ample portion of the red middle lip. . . . The lower lip was then refreshed and sutured. The nutrition of this transplanted flap by its new capillary nourishment was so perfect that in color and texture, it seemed to have been always a part of the upper lip. . . . The two lips were afterward in about their normal proportion, and gave the patient perfect satisfaction.

This Abbe was a remarkable man, a pioneer in neurosurgery and in photography, the founder of radium therapy in America and an innovator in general as well as plastic surgery. He was as courageous in life as he was in surgery. Conscious of a growing tightness of his hat, he had his suspicions of Paget’s disease confirmed by X-ray examination and then, as an aplastic anemia took him down, revealed the true measure of his character in a letter to a friend:

So closely do I note every sign that I almost feel that I have never before done justice to any one. This makes me wish to start life again and to do better.
He died at age 77 and was buried in the chapel of St. Luke's Hospital, where he had trained and later served so brilliantly.

KAZANJIAN

In 1947 Varaztad Kazanjian of Boston noted that secondary deformities in cleft lip and palate cases often are not apparent in infancy and young childhood but become quite marked in adulthood. He stated:

With the improvement in surgical technique the patient as well as the surgeon has become more critical of the final result.

He presented a series of 50 cases treated over an eight-year period which varied from tense, retracted upper lips to cases with loss of upper lip tissue, marked with ugly adherent scars and combined with retraction of the alveolar processes and loss of many teeth. He advised excision of the original scar to allow the lip elements to separate into a triangular defect. Into this defect he transposed a triangular flap of the desired size from the lower lip which he called the Estlander-Abbe operation. In unilateral cases the flap was placed in unilateral position and the pedicle divided after two weeks.

BLAIR

As early as 1925 Vilray P. Blair commented on the value of secondary cleft correction:

The results of operative repair of harelip vary from nearly perfect to plain bad; but unless the original operator has been more than ordinarily inconsiderate in his denudation and suturing, the tissues can usually, by secondary operation, be rearranged to produce an approximately happy result.

Twenty-five years and a horde of lip-switch flaps later, Blair prefaced a 1950 presentation with a typical V. P. B. twist:

The broad idea of switching a flap from one lip to the other is old and one or another pattern of it has been claimed and credited to many people, so much so that Dr. Jerome P. Webster started looking for the original publication. He found first a publication by S. A. C. Stein of Copenhagen reporting a case of lip-switching in 1848. Later in his research he found that
Pietro Sabattini of Bologna had done one in 1837. How these ancients steal our thoughts!

Through all those years Blair did a tremendous volume of secondary cases sent to him from all over midwest America. He was in such demand that he had two or even three tables going at one time. Swathed in gauze and comfortably outfitted in a pair of old white sneakers, he would sit and hum while he worked at one table, then move over to the next. His artist, Hance, recalls:

He had a terrible temper and in a rage would kick over a table but the next day send roses to the operating nurse.

His eccentric combination of artistry and kindness caused him to have the walls of his operating room at Barnes Hospital decorated in color with fanciful jungle scenes and such children's bedtime stories as Little Red Riding Hood and the Three Bears. These were over the head of the infants, but children and adults coming up for secondary cleft work were particularly delighted.

In January 1950 Blair, with Gordon Letterman, published in *Plastic and Reconstructive Surgery* an impressive group of 22 secondary cleft deformities treated with a flap switched from the lower lip. Those that could be reproduced reasonably well have been included here. As the authors noted:

The majority of these cases had had more or less complicating attempts at correction before coming into our hands. . . . Some had had lip pits removed and most have an upper advancing denture to give the desired curves and to hold the upper lip forward in proper relation to the lower. . . . Most of the cases have a real protrusion of the lower lip due to the transverse shortening of the upper and the switch gives both needed fullness to the upper lip and better symmetry to the lower.
In his typical manner of using eye and hand for preliminary measuring, Blair suggested:

A tentative plan is to mark off on the mucocutaneous border of the lower lip the amount desired for transplant, and then to draw each of these marks in turn to a little beyond the midline. This procedure will give a fairly good idea of the amount available for the upper lip without too much distortion of the lower. . . . The flap is taken from the center of the lower lip where the scar is less noticeable; however, if the upper defect is one-sided, the pedicle is retained on the opposite side.

The cases reported revealed a variety of flaps—some narrow, some wide, others short or long and most oblong but occasionally triangular in shape. They were inserted unilaterally in unilateral clefts and centrally or unilaterally in bilateral cases. Portions of the upper lip were shifted by oblong or trefoil flaps into the nose and columella prior to transposition of the lip-switch flap. The results were truly dramatic, particularly considering the secondary problems, but according to modern standards some might be considered unrefined or even rough-hewn.

THE VALUE OF A NARROW PEDICLE

It is well to emphasize that the pedicle required for the transport of these flaps need be little more than the coronary vessels themselves. The main inferior labial artery runs between the mucosa and the orbicularis oris muscle along the upper inner edge of the free border of the lower lip. Thus the flap can be cut loose well across the vermilion anteriorly and down to a frighteningly narrow base. The position of the vessels, varying slightly in each case as it does, only adds to the sport. For those who are
not gamblers, the exact position of the vessels can be spotted, of course, during the complete severance of the lip while developing one side of the flap. Once the base has been narrowed, it allows almost complete inset of lower lip flap in the upper lip position during the first operation.

Writing in 1952–1953 for publication in 1957, Gillies and Millard described in laborious detail this specific aspect:

To cut the flap, first ease through the skin and muscle with a No. 10 scalpel, pick up spurters, then divide the remaining mucous membrane with scissors. At the tiny base of the flap the incision should be carried just through the vermillion border in front, so that when the flap is rotated 180° it can be sutured into position plumb vis-à-vis, requiring no important readjustments on division of the pedicle.

In fact, it was Gillies’ feeling that, even if the coronary vessels were divided, so vascular is labial mucosa that the flap would survive on a mere mucosal hinge. This prized piece of lip tissue is so valuable, however, that he never challenged his theory by actual trial.

In 1953 Cannon and Murray in Boston emphasized the advantages of cutting through the anterior mucocutaneous junction line on the pedicle side of the Abbe flap to form a thin posterior pedicle and facilitate more accurate inset of their split-tail flap with its tips in the nostril floors.

J.-L. Grignon of Paris described his way of reducing the size of the pedicle for the Abbe flap in 1962. To less daring surgeons this frightening encroachment on the pedicle by Grignon’s scalpel might be considered another Grand Guignol theatrical but actually it is both safe and sound.

In 1963 McGregor reemphasized the importance of cutting the pedicle narrow by extending the incision through all skin so that the flap is tethered only by mucosa and the inferior labial vessels to facilitate accurate insertion of almost the entire flap.

AN OPPOSING VIEW

Although most surgeons agree with a narrow pedicle divided early, there are some who do not. Professor Karl Schuchardt, at
his 1964 Hamburg Congress, took an opposite stand with typical dictatorial eloquence:

If you use an Abbe-flap for whatever indication, it is advisable not to sever the pedicle too soon, as the longer you leave the triangle flap from the lower lip attached to the vermilion border, the better it stays and the less atrophy occurs (I leave it at least 4 weeks!).

The professor has always been impressive and convincing, but this seems nonsensical.

John Erich, one of the plastic pillars of the Mayo Clinic, also held to the old standard Abbe rules ignoring philtrum shape, central donor area, narrow pedicle, and early division when he wrote for Converse’s book in 1964:

The proposed triangular flap on the lower lip should not be located in the center of lip but to one or the other side of the midline. . . . The incision on the pedicle side of the flap should fall 2 or 3 mm. short of the mucocutaneous border, ensuring that the inferior labial artery will not be severed during elevation of the flaps. . . . When healing is complete—a matter of three weeks—the pedicle is divided.

Conservatism outside of politics can hamper effectiveness.

TOO WIDE OF THE MARK

In 1974 Momma, Koberg and Mai of Dusseldorf and Aachen reported their experience with the Abbe flap in detail, presenting one pleasant case out of a series of 204. They noted the width of their Abbes at the vermilion border to be 8 to 30 mm., averaging 18 mm., which is a bit wide for a philtrum. The upper lip width after the Abbe flap of 49.3 mm. compared favorably with the 52 mm. of their normal controls. They found 74 percent satisfactory upper lip scars, with 44 percent of patients having complaints about vermilion border and 33 percent unhappy with the lower lip scar or the vermilion bulge. They concluded with the profound statement that the Abbe flap plasty should be used as seldom as possible, as often as necessary.

As seldom as possible, as often as necessary.

In what must have been a language misunderstanding, they made these incorrect statements:
Opinions as to the indications for Abbe operation are diverse in the literature. Whereas Antia and Honig (1964) recommend Abbe-plasty in all bilateral clefts of the lip and palate, Millard (1964), Schuh, Crikclair and Cosman (1970) and Perko (1973) more or less deny Abbe-plasty its right to existence.

These assertions are nonsense.

**POSTOPERATIVE HANDLING OF AN ABBE FLAP**

When the usual rhinoplastic procedures have been combined with columella lengthening and an Abbe flap, the postoperative course requires a little closer supervision. Nasal packs for 24 hours ensure adherence of the mucosal lining and prevention of hematoma. Yet they temporarily block the nasal airways, and with the lips attached, free breathing is hampered. Stiff rubber tubes inserted on either side of the Abbe pedicle and long enough to be held by the teeth will facilitate an airway until the patient regains his confidence. Then they can be discarded. A Logan bow is placed across the lower lip to reduce any tension, as this is the only lip that has been tightened. There is no need to wire the teeth or wrap the head to hold the jaw shut, because tenderness of the stretched pedicle is enough warning to the patient that the mouth is open too wide. Feeding during the flap attachment time is limited to fluids and any soft diet that can be sneaked through either side of the pedicle. The patient is allowed to go home as soon as he adjusts to the lip synechia—often as early as the first postoperative day. Skin sutures are removed at 3 to 4 days, and after 7 to 12 days the pedicle is divided.

**A FUNCTIONAL FLAP**

Not only is the lip-switch flap effectual in achieving an artistic lip reconstruction but also it is capable of regaining its function.

When writing the cleft lip and palate section of our *Principles and Art of Plastic Surgery*, Gillies and I recalled a patient who had
had an Abbe flap placed in his tight postoperative cleft lip. Review of the case caused us to note in 1953:

Recent review of this case suggests that the muscle in the Abbe flap itself has become reanimated. It is difficult to test electrically, but it seems to contract with whistling. He is a flutist.

James W. Smith of the New York Hospital-Cornell Medical Center, in 1960 and finally in 1961, studied return of function in vermillion bordered lip-switch flaps. He concluded:

An analysis of 50 consecutive cases is presented in which Abbe or Estlander flaps were used. . . . Fifteen of these cases have been studied extensively to determine the ultimate functional role they play in their new site. Examinations were made on the regeneration of sensory, sympathetic and motor nerves. It has been conclusively demonstrated that complete return of sweating and of sensitivity to pain, touch and temperature occurs within two years. Electromyography has shown that the transplanted muscle is reinnervated within one year.

Smith won honorable mention in the Educational Foundation Essay Contest for his electromyographic studies demonstrating the return of muscle function in the transplanted flaps. Jim recalls that when he was preparing to submit his award-winning paper for publication Dr. Herbert Conway refused to approve the illustrations. His keen eye caught the discrepancy that all the sketches, the preoperative, the postoperative and even those showing the flap in transfer, revealed the same ideal lip relationships. Only after Smith and the artist labored several months sketching in the preoperative deformities did Conway finally give his permission, muttering,

Who were the Foundation judges? Anyone awarding a prize for such unrealistic sketches must have poor vision and should not be selected to judge again!

In 1961 the austere and innovative Noel Thompson of Middlesex Hospital, London, with morbid anatomist A. C. Pollard of Stoke Mandeville Hospital, Aylesbury, Bucks, studied the motor function in Abbe flaps and gave a report based on biopsies taken at intervals of from 11 months to 10 years after separation of the flap from the donor lip. They concluded:
Following histological and histochemical investigation of muscle biopsies taken from the Abbe flap and the normal lateral lip elements of six patients, evidence is submitted to support the concept of motor reinnervation occurring in such flaps. Such evidence is based chiefly on the demonstration in the flaps of:

1. Normally striated skeletal muscle elements.
2. Motor end-plates exhibiting cholinesterase activity of normal intensity.
3. Nerve axons exhibiting some of the characteristics of motor nerve fibers.

Professor K. Schuchardt, in 1964 in Hamburg, reported the findings of one of his assistants:

Dr. Lentroidt, one of my assistants, made an electromyographic investigation on the reinnervation of Abbe flaps after they had been sutured into the upper lip. Twenty patients were investigated and in 15 it was possible to follow up the innervation for from 1 to 2 years. . . . 2 to 4 weeks after the operation there was a total deinnervation, and no electromyographical response. Between the fourth and sixth postoperative week a recovery of the action potential was recorded. This was probably due to a rest-innervation through the unsevered pedicle . . . after the pedicle was severed there was a complete de-innervation . . . After 2 months in most of the patients, mostly after the 3rd month, a slow progressive re-innervation occurred . . . the re-innervation started from around the ala wing and columella . . . nerve growth into the flap was innervated half a year postoperatively, and this was found in all our patients. . . . Muscular function is markedly improved in the second half year after intervention. The maximal result is observed near the end of the first postoperative year and differs only slightly from the function of normally innervated muscle.

At this point Bengt Johanson of Göteborg rose to remind Schuchardt of his studies on the subject three or four years before:

They are really very careful studies over a very long period of years. We have shown exactly where this reinnervation starts in the Abbe flap.

In fact, in 1962 I. Isaksson, B. Johanson, I. Petersen and U. Sellden reported:

Reinnervation of ten Abbe flaps and five fan flaps was studied by an electromyographic technique. Results of the two groups were equivalent.
Voluntary activity was not manifest until at least five weeks had elapsed. Although electromyographic findings evidenced a high degree of functional restitution, in no case was complete normalization observed.

Takahashi, with Koto in 1966 and with Koto and Ishii in 1967, reported studies on the degree of motor function, changes in skin temperature and function of the salivary glands in the transplanted part of the lower lip living in the upper lip. They found that in their series functions became normal within nine months of the Abbe transposition.
50. Shaping the Abbe Flap for Secondary Bilateral Deformities

Surgeons have varied the design of the lip-switch flaps, beginning with the bell shape by Abbe himself. Kazanjian seemed to prefer the triangular shape while Blair favored the oblong. Then there are the cookie-cutter surgeons who copy a set design for all cases.

Splitting the Tail of the Prolabium

Gillies had a favorite little trick of shifting most of the prolabium into the columella, leaving its distal portion in the lip. He then split it and inserted the tip of his rather wide triangular Abbe flap into the slit.
A SPLIT-TAIL ABBE

Bradford Cannon of the Massachusetts General Hospital was the son of W. B. Cannon, renowned Professor of Physiology at Harvard Medical School, and is the father of four expert glider pilots. He was trained by Vilray Blair in St. Louis and later joined James Barrett Brown to help head the plastic surgical service at Valley Forge General Army Hospital in Phoenixville, Pennsylvania. Fellow Bostonian Joseph Murray of the Peter Bent Brigham and kidney transplant fame capsulized Cannon’s talents:

His skill as a surgeon, his knack for three-dimensional planning . . . his unassuming low key method of bedside teaching. . . . But in the long run, I think it is his innate ability to reduce a problem to basic components, and then apply general principles to the specific patient’s problem that is his major talent.

In 1941 Cannon suggested splitting the tail of the Abbe flap to accommodate a Y incision in the upper lip, with the fork of the Y placed at the base of the columella. This maneuver achieved partial vertical lengthening when the upper lip was short as well as tight.

He presented two cases. One was a tight postoperative bilateral cleft lip. The second was a partial double cleft lip closed in childhood but still showing a diminutive midsection of upper lip. Cannon suggested that his split-tail Abbe be used in such cases at the age of 10 or 12 years to replace the prolabium, which he excised and threw away.

Twelve years later Cannon, with Murray, gave “Further Observations on the Use of the Split Vermilion Bordered Flap,” noting:
It has been customary in secondary harelip repairs with vermilion bordered flaps to insert the apex of the triangular flap into one nostril or the other, or to amputate the tip and leave a horizontal scar beneath the columella. By splitting the apex of the flap, a symmetrical correction of the upper lip can be obtained. With such a flap the vertical lateral suture lines of the upper lip lie equidistant from the midline and the scars disappear within the floor of the nose. Oblique suture lines emerge from the nostrils and meet at the base of the columella where they are not apparent.

**THE W SHAPE**

This split-tail design has been elongated and modified and has become popular through the years. Cannon, after personal communication, determined that Gordon New, a Canadian who joined the Mayo Clinic staff in 1910 and served as the head of their Section on Laryngology, Oral and Plastic Surgery for 40 years, deserved priority credit for the W-shaped Abbe. Cannon wrote in 1953:

New and Havens . . . have used the split vermilion bordered flap but have outlined the flap on the lower lip in its final form. Closure as a Y instead of a vertical line may reduce the tension on the suture line and minimize the scar.

The W-shaped flap is most appropriate where the prolabium has been shifted into the columella, leaving an M-shaped defect in the upper lip. Then the W-shaped flap, when switched, becomes an M with its prongs straddling the columella and the points entering the nasal floors. The donor area is closed with the scar in an inverted Y. Of course, its shape is best adapted to bilateral clefts as diagramed by Tessier in 1969.
Another surgeon infatuated by the W-shaped Abbe flap was Onizuka of Tokyo. When the lateral lip elements have been pulled together below the prolabium, there is often a long lip but there is always a tight lip, especially in its lower portion. A Y-shaped excision of the scar releases the purse-string effect as the upper lip springs open into a W-shaped defect. If our goal were simply stamping cookies with a cookie cutter and not the construction of a natural philtrum, Onizuka's W-shaped Abbe would be perfect for a W-shaped defect. However, it brands the upper lip with a strange M-shaped scar which may be an improvement but is not ideal.

Musgrave and Garrett in 1974 expressed preference for the M shape over the split-tail Abbe flap:

When the reconstruction involves the entire vertical dimension of the lip, an M-shaped flap probably will be most satisfactory. . . . Usually the "M" configuration is best achieved by in situ design, with actual excision of tissue from the tip of the flap . . . rather than by just splitting the apex of a wedge-shaped flap.

I was taught the W flap at Rooksdown House in 1948–1949 and, considering it both clever and appropriate for bilateral scars, used it in my first few cases—that is, until I was mature enough to get back and look beyond the obvious improvement in the case toward an ideal normal. . .

One of my early cases in 1951 has an interesting story. The patient was a young Texas cowboy who had become a junior rodeo champion in calf roping. As a plastic surgery resident at Jefferson Davis Hospital in Houston, I used to spend my day off each week involved in the same sport and was impressed with this boy's ability to throw his loop and dismount. Starting to get off a quarter horse at full speed while he draws up to a dead stop was always the most difficult part for me in reducing my roping time. I was watching this young champion closely when I noticed that he always went in and came out of the shoot with his hat pulled down over his face. Closer observation revealed a severely short, tight, secondary bilateral cleft lip with the usual depressed nasal tip. After an introduction, we arrived at the happy arrangement of a facial dismantling and reassembling for him in
What was left of the scarred prolabium was shifted into the columella, with a dramatic release of the nasal tip. A W-shaped Abbe flap was transposed into the upper lip defect. This arrangement encouraged the cowboy to tip his hat back, and he was soon back “home on the range” demonstrating the tricks of riding and roping.

**Placement in Bilateral Clefts**

Central positioning of the Abbe flap in bilateral clefts would seem obvious and is necessary when the total prolabium is shifted up out of the lip into the columella. When the prolabium is halfway up the lip, it would seem expedient to make up the lower half of the lip with a small square Abbe flap.

John S. P. Wilson of Great Britain, with hobbies in sculpturing and painting, presented an interesting, if segmental, design in 1964 in Hamburg:

Repaired bilateral clefts of the lip may present with various degrees of tissue shortage. . . . The free border of the lower lip should be taken as the base line. This should ideally be 1 mm. above the incisal edge of the upper incisors (Gillies and Millard, 1957). . . . The rational procedure is to release the scar of the lip and allow the lateral elements to drop to the base line but
no further. . . . The exact tissue defect is now established and is reconstructed by a midline Abbe flap cut to pattern.

Wilson showed a rectangular Abbe flap stuck under the prolabium which, indeed, filled his defect and improved the lip but with too much of a segmented effect. If the remaining prolabium in the upper center of the lip has any semblance of a groove, then Wilson’s small rectangle, if also carrying a midline groove, can be lined up so that this plug, in spite of its mid-transverse scar, can be camouflaged as part of a natural philtrum. If not, it seems more artistic to shift the rest of the prolabium into the columella or nasal floor and construct a total philtrum with one Abbe component.

When the prolabium is present in the lip but the lip is still too tight, there may be a temptation to split the prolabium in the middle and insert the Abbe. Resist this temptation; it adds two scars to the bilateral scars for a total of four.

An even more unbelievable action is the introduction of the Abbe flap into one of the two bilateral scars in an asymmetrical unilateral position, which then presents a mind-boggling problem! A solution is shown in Chapter 39.

**MIDLINE PLACEMENT OF ABBE**
**THE TOTAL LIP LENGTH**

In the secondary bilateral cleft deformity, when an Abbe flap is indicated, every effort should be employed to have this flap form the total central vertical length of the upper lip. It will then resemble the natural philtrum and, if correctly shaped, can appear quite normal in spite of its scars.
PHILTRUM-SHAPED ABBE

Of course, the use of an Abbe flap is decided in the first place by the need of the upper lip. Some might even say that the actual shape of the Abbe should be dictated primarily by the defect in the lip. The various odd shapes that have been advocated are the surgeon's interpretation of what was needed. Some years ago it occurred to me that unnatural shapes such as the W that end up an M or the weird patterns of lopsided sickled Soviet stars are actually more reminiscent of primitive scribblings on the walls of caves than natural lip landmarks. In fact, to cut odd-shaped flaps caters too much to the apparent upper lip defect and not enough to the shape of the coveted normal philtrum. There are, of course, circumstances in which the shape of the lip flap must take into account the lip deformity, but in general the lip of a secondary bilateral cleft deformity can be coaxed to accept the shield-shaped philtral flap quite happily. This flap should be taken from the middle of the lower lip, transporting any central depression that might be present to simulate a philtrum even more realistically.

In 1974 Garrett and Musgrave acknowledged:

Millard properly points out that central flaps in patients with prominent central dimples of the lower lip offer an advantage in reconstruction of the philtrum dimple.

Sometimes the upper lip defect seems too wide for a philtrum-sized Abbe flap. Then, rather than cut an Abbe flap that is large and unnatural, as shown, it may be to advantage to reduce the size of the defect. To this end the principle of perialar crescentic excisions has been used. In 1908 Stone described partial closure of a wide central quadrilateral upper lip defect by approximation of the sides of the lip aided by advancement of the cheeks following excisions. This action reduced the size requirements of the Abbe flap and might occasionally be of value in those adult cases in which the entire prolabium is shifted into the columella. J. P. Webster later elaborated on this principle; diagrams appear in Chapter 54.

A cleft lip surgeon must know the beautiful normal by heart and ever work toward its creation with heart and soul. The advice
of a wise English Jewish merchant during the post–World War II period was to me pertinent:

You can make a living in fish, fruit, furniture or furs. If you’re not in one, get in it.

Here are some rules for those with an artistic sense. Anyone without this sense is in the wrong business and might be better off in one of the above four F’s!

Besides the general avoidance of odd-shaped flaps, there are three no-no’s in Abbe flaps in bilateral clefts.

1. Do not insert the flap into the middle of the prolabium—four scars!
2. Do not insert it into one of the bilateral scars in lopsided position.
3. Do not insert it halfway up the vertical length of the lip so that it appears as a stuck-on half philtrum.

There are exceptions to all rules, but beware breaking these.

‘‘FRINGE’’ BENEFIT

When the prolabium is completely bald and the columella is very short, there is no excuse to postpone transfer. The prolabium slides out of the lip into the nose making way for an Abbe flap from the lower lip to bring in hair to amplify the center of the mustache.
A CHALLENGE FROM BELOW

Rules just set to guide the preparation of the upper lip defect and the positioning of the Abbe flap were suddenly threatened in Boston by a scar of the lower lip. Again the supreme plastic surgery principle of using what we have to make what we want was called upon and in the O.R. at the M.G.H. under the shadow of B.C., no less!

A bilateral cleft lip and palate with lower lip mucous pits was treated primarily by incorporating the prolabium as the entire central segment of the lip. Subsequently the pits were excised with rather severe scarring. At age 15 years, at the Plastic Surgery Clinic of the Massachusetts General Hospital, Boston, the patient presented a marked maxillary retrusion, a tight upper lip with a wide, flat prolabium, a short columella, a broad nose with a snubbed tip and a protuberant scarred lower lip. The chief plastic surgery resident, Joshua J. Tofield, carried out a Le Fort I osteotomy which brought her maxilla forward 12 mm. and achieved normal dental occlusion. This was well healed when the patient was presented to me in March 1974 while I was visiting professor at Harvard.

The flat nasal tip and short columella accompanied by a wide, flat prolabium, of course, tempted me to suggest a forked flap. The tight upper lip and protuberant lower lip were better points in favor of an Abbe flap. Yet destruction of the central, normal mucocutaneous junction with scarring of the lower lip following mucous pits excision posed a dilemma.
The specific procedure designed for this case could be of value in other such cases. It was a pleasure to assist Tofield in his skillful execution of the plan. As much prolabium as necessary to release the snubbed nasal tip was shifted into the columella. Still left was an intact strip of unscarred skin including the mucocutaneous junction line spanning the defect of the upper lip. This bridge maintained its inferior natural curve along the mucocutaneous junction but was cut in a flat inverted V above so that when inset in the Abbe flap the V point would push from above a slight cupid’s bow V in the mucocutaneous line. Of course, the V out of the prolabium columella flap merely allowed the prongs to spread and join with the advancing alar bases as nostril sills across the nasal floors. The alar bases were cut as flaps and their tips denuded of epithelium. Then they were advanced medially and their tips sutured to each other and the septum at the nasal spine. This maneuver also reduced the width of the central lip defect. Then the posterior mucosa of the prolabium, still attached to the premaxilla, was folded as a flap over the raw area of the premaxilla to line the back side of the upper labial sulcus. Now the stage was set for the Abbe flap.

A shield-shaped Abbe flap of philtrum dimensions was cut out of the center of the protuberant lower lip. The border scarring was excised from its mucocutaneous junction area. Then the Abbe flap, ducking under the mucocutaneous junction bridge, was slid into the upper lip defect, force-fitted like a piece in a
handmade jigsaw puzzle and fixed with sutures. The pedicle was divided 14 days later, and shortly thereafter a bilateral osteotomy was used to narrow the bony bridge of the nose.

Time and minor surgery will help perfect the final result.

RESHAPING THE DONOR LOWER LIP

When the highly touted shield-shaped lip-switch flap is used, closure of its donor area tends to lengthen slightly the line of union, thus offsetting any straight-line contracture. The closure of the lower lip donor area is achieved with 4-0 chromic catgut sutures in the posterior mucosa, one deeply buried 4-0 Vicryl in the center of the muscle, 4-0 and 5-0 chromic catgut in the remaining muscle and subcutaneous tissue and 6-0 silk in the skin. During the 8- to 18-year age period, skin scars often heal here with hypertrophy and may need revision later. Resist any temptation to do a Z-plasty on this scar as the natural line is vertical and the length of the skin edges has already been increased; there is no need for further assistance.

A common but minor problem that arises in maybe one in seven Abbe flaps is a mild midline lump in the free border mucosa at the site of the closure. This is caused by the piling up of excess mucosa plus the tendency for mucosa to hypertrophy at the site of any trauma. Correction of this minor but eye-catching bump is its posterior, transverse, elliptical excision just behind the free border and out of sight. The excision includes what deep tissue and scar are necessary to thin as well as flatten the vermilion edge.
Almost every author concerned with Abbe flap procedures has emphasized the value of a narrow pedicle. It has been whittled down until the procedure has become an island flap. Gillies used to say that lip vermilion is so vascular that it would probably nourish an Abbe flap even if the main coronary vessel were inadvertently divided. He never taxed his theory to the point of cutting one because of the irreplaceable value of this prime cut of lip. Pursuing the principle to the end point, of course, would mean dividing the pedicle completely and free-grafting the wedge of lower lip into the upper lip.

The modest, retiring southern surgeon Wiley S. Flanagin of Augusta, Georgia, had the ingenuity and courage to be the first. In 1956 he reported four composite free grafts from the lower to the upper lip of 1 cm. in thickness. He also ignited a chain reaction that has flared up in many plastic surgery centers: Kingston, Buenos Aires, Paris, London, Tokyo, and Livingston, New Jersey.

Late in 1962 in Kingston, Jamaica, I treated a secondary bilateral cleft lip deformity with a composite free graft, 1.25 cm. wide, taken from the relatively protuberant lower lip. As such a graft has two edges of approximation, its width can be 1.25 to possibly 1.5 cm.

The patient was a young Jamaican female in whom a primary cleft had been closed with the lip’s lateral elements pulled together below the prolabium resulting in a short columella, absence of a philtrum and cupid’s bow and a bulky superior
As I wrote at the time:

The free graft approach has several obvious advantages such as requiring only one operation, by-passing the inconvenience of a fortnight of lip-tie and allowing a slightly more accurate inset. These factors must be weighed against several disadvantages. Of course, there is always the possibility of a tragic loss of the graft. Then the amount of tissue that can be transported is limited. The temporary circulatory embarrassment during the struggle for survival and "take" may leave scarring or at least remove some of the natural portion of the upper lip with a tight lower border. A short forked flap lengthened the columella and tightened the superior portion of the lip. The tight border of the lip was released by a midline incision, and the lower lip composite graft was meticulously sutured. This action achieved relaxation of the lip with eversion of the free border and formation of a philtrum and its dimple along with the suggestion of a cupid's bow. This Kingston Public Hospital case was published in the *British Journal of Plastic Surgery* in January 1964.
velvet-like quality seen in flaps and so often missing in grafts. Then, too, the chance of survival of hair follicles is even less likely in the composite graft... This prediction has been corroborated by Flanagan (1963) and serves as a contraindication for the use of the free composite graft in the male. Growth of hair, of course, in the flap is normal and allows the culturing of a moustache which can serve to camouflage the scars.

When the free-graft approach is to be used then every precaution for a perfect take must be employed including meticulous approximation of all layers and strict immobilisation of the upper lip. Suggestions outlined for small lip-switch flaps also are appropriate for free grafts. The mid-vertical position for the insertion of the graft again is advised whether in postoperative lips of bilateral or unilateral clefts. As in the lip-switch flap the full-thickness composite free graft should be taken from the mid-portion of the lower lip so as to incorporate any groove that is present. It is of interest that this dimple also persists after grafting and serves well to imitate the natural philtrum.

Another to become infatuated by the free graft Abbe was the genteel, honorable, enthusiastic Hector Marino of Buenos Aires, who whether at Alberto’s in Rome or at Jackson Memorial Hospital in Miami has epitomized what Shakespeare’s Mark Antony said of Brutus: “This was the noblest Roman of them all.” In 1967, with Juan Rabinovich, he published four cases of composite lower lip free grafts in unilateral cleft cases. They emphasized the importance of young vascular tissue and complete excision of scars to ensure adequate vascularity to the graft. Description of the graft was courageous:

The base of the triangle should not exceed 2 to 2.5 cms.

Indeed, their grafts were an impressive size and revealed good results in spite of their unilateral placement! Their report of the results is candid:

Two of the cases presented no complications whatsoever. In the other two, there was central necrosis of the graft which, however, did not change the satisfactory result.

A letter to Marino requesting his latest thoughts on Abbe free grafts and a possible example in a bilateral case received this charming response on June 5, 1974:
Unfortunately I do not have such a case in my files because in these last years I had the luck of being able to solve most of my secondary double harelips using rotating flaps from the vicinity. . . . Besides, in the few cases in which I performed the classical Abbe operation I refrained from employing the free transplant of tissue perhaps because old age is making me a bit wary of taking avoidable risks.

On the other hand I have employed this procedure in a number of hopeless, scarred secondary single harelips in which, for different reasons, I could not expect that the patient would tolerate the locking of both lips together for any length of time. Of these I have color pictures . . . one of which is quite interesting as it shows the composite graft looking of an absolutely normal pink hue just 12 hours after the operation.

I seem to remember that Jack Penn told me that he has used the free transplant in all his cases in the last years attributing his unfailing success to the immediate and constant cooling of the graft.

This large free graft is quite remarkable not only in its size but in its rapid revascularization. Moreover, it has been placed in the midline of a unilateral cleft lip creating a pleasant philtrum.

Also in 1967 Claude Dufourmentel, with Mouly, Preaux and Marchac of Paris, expressed their pleasure with a simplicity of "la greffe composée libre de lièvre à lièvre." As noted by Gola:

C'est le procédé d'Estlander-Abbé sans pédicule.

They had the courage to combine shifting a skin flap out of the center of the upper lip to lengthen the columna and filling the lip gap, which was now under some tension, with a free composite graft.
In 1969 the confident F. T. "Jerry" Moore, one of McIndoe's favorites, with P. G. Lendvay of the Queen Victoria Hospital, East Grinstead, England, wrote a colorful paper on the "Free Composite Lip-Switch Procedure." They reported that since 1965 a series of 25 patients aged 5 to 30 years had had lip free grafts with no total losses and gave their reasons for a one-stage lip-switch:

1. The danger of post-operative airway obstruction.
2. Discomfort of the patient in having upper and lower lips connected by a pedicle for a period of two weeks.
3. The necessity of lengthy hospitalization and for two separate operations.
4. The technical difficulty of matching skin and vermilion junction at the time of pedicle division when the tissues are still in a reactive and indurated phase.

They suggested that the graft be no more than 1.5 cm. wide and that it be cut on the oblique and inserted in similar fashion to capitalize on the tongue-in-groove principle advocated by Davenport and Bernard in 1959 for increasing contact apposition in composite free grafts. Corroborating McLaughlin's 1954 findings in composite auricular grafts, they reported:

The color of the graft, initially dead white, is noted to have a pale pink tinge 12 hours post-operatively; 24 to 48 hours after operation it shows cyanosis, but with obvious return in colour. A final healthy colour is noted at about the third day.

John Walker and Robby Meijer of St. Barnabas Medical Center in New Jersey were also tempted by the simplicity of the one-stage procedure. In 1971 they reported 14 free composite lip grafts, with an average width of 1.24 cm. and an upper limit of 1.5 cm., with no total losses and minimal graft contraction.

In 1973 in Copenhagen, Shugo Soeda of Tokyo University gave some interesting findings on composite grafts. Experiments with 22 composite grafts in rabbits involved removal of the graft from the lip or nose and replacing it in its original site. Microangiography revealed that some of the large vessels connected directly to the recipient vessels in three to four days while the
capillary penetration from the bed could not be demonstrated except near the margin at the same time.

Soeda also reported over 30 composite lip grafts, measuring 0.8 to 1.5 cm. in width, which he had inserted in secondary cleft lip deformities without any total losses. He used the obvious midline insertion in bilateral clefts.

In unilateral cases he was obsessed with the insertion of the graft into the off-center position of the old scar and advised taking the graft from "the contralateral side" of the lower lip to get the natural curve and thickness to match the upper lip.

Histological study of four cases revealed patent large vessels and almost normal muscle fibers in the graft after six months. At the same time electromyography showed positive activity. This is encouraging when it is recalled that Magnus in 1890 and Volkmann in 1893, in animals, and Eden in 1919, in humans, found that free autogenous muscle grafts were replaced by connective tissue.

A critical study of the cases Soeda showed at the Cleft Palate Congress in Denmark revealed composite grafts that had taken well. In the unilateral cases, however, the unilateral position was
jarring, and in both unilateral and bilateral cases the grafts were too short in vertical length, not extending the full length of the lip and giving a stuck-on effect rather than simulating a philtrum.

A HALF LOSS

It has been noted constantly that there have been no total losses of these composite free grafts, but even a partial loss can be undesirable and it does happen. I used a composite free lip graft in an impatient old lady with a cancer defect and lost the posterior mucosa, which was far from ideal, requiring revision. Yet it is not fear of graft loss that has limited my use of this procedure.

FLAP VERSUS GRAFT

The natural quality, size, amount of scarring and chance of survival are all better in the Abbe flap, and toleration of the nine-day coronary lip-tie is preferred. Of course, when microsurgery has progressed to the extent that the labial coronary vessels can be anastomosed with a very high percentage of success, the anastomosed free graft will have everything to offer that the flap has plus the abolition of the inconvenient little eight- or nine-day pedicle.

In the meantime, the only vote for a standard "Abbe" free graft is convenience. When convenience means actual feasibility of switching a lower lip segment into the upper lip at all, then, of course, the free graft is available. If used, it should be no more than 1.0 to 1.5 cm. in width and be shield-shaped like a philtrum. Unlike any free grafts published, including mine, it should be made long enough to reach the base of the columella. The length of the graft does not endanger its chances of survival and does increase its similarity to a philtrum.

There are times when the graft may come in handy, as in the case Gillies labeled his "quickest Abbe." An adult cleft lip patient who had had an Abbe flap meticulously sutured into place was sent back to the ward. The extracautious anesthetist left the
intratracheal tube in position with the metal angle-piece strapped to the chin. Back on the ward less than an hour later, the patient began to swallow, which reaction gripped and pulled the tube out of the angle-piece and down into the trachea. The house officer could just reach the tube with the tip of his fingers. Senior surgeon Basil happened by and, seeing the cyanotic patient and the struggling house officer, grabbed up a pair of bandage scissors, chopped through the pedicle and retrieved the tube.

A note by H. D. G. on this case suggested:

If such should ever happen to you, don’t forget you could save the flap by slipping one finger into the mouth and ripping out the precious piece from its stitches in the upper lip.

Or, if the Abbe flap was not more than 1.5 cm. wide, it has suddenly become a free graft and should be treated as such.

Better yet, do your Abbe flaps under local anesthesia. It is easier anyway.
An Introduction to Nasal and Labial Corrections

Unlike unilateral cleft procedures, in which secondary nasal and labial corrections can and usually should be carried out separately, in the bilateral cleft, combined nasal and labial corrections are mandatory. Because of the varying degrees of shortness of the entire frontonasal component in bilateral clefts, the nose depends on the lip to fork up or otherwise defray extra nasal expenses, and the lip must pay its nasal “tax” before trying to balance its own budget. If there is still lack of lip funds, then, as the lower lip usually has a surplus, a draft can be drawn from below. The important point is to consider the entire residual bilateral cleft upper lip, nose and lower lip anatomy as the total remaining capital setup in three separate checking accounts with freedom to crisscross funds as needed by the process of deposit and withdrawal.

Depending upon the condition of the columella and the state of the lip, the secondary surgery is planned. As a result of the primary bilateral cleft lip closure, there are four typical designs that seem to present themselves most often for secondary correction. They all have a flat nasal tip and short columella in common and may show in addition a wide prolabium (A), a whistling deformity (B) or triangular (C) or quadrilateral (D) flaps joining each other below the prolabium.

In addition to the revision of scars, approximation of muscles, balance of the free border and creation of the philtrum dimple, cupid’s bow and upper sulcus, there are basic adjustments. Part or the whole of the prolabium may be shifted out of the lip; it may
be reduced or just revised. An Abbe flap may be transferred from the lower lip. In fact, every trick available should be used in an all-out effort to create the ideal normal.

The next three chapters will demonstrate the following:

First: Results of the various primary portioning of funds have been responsible for the maintenance or production of the big four common basic problems.

1. Short columella
2. Short lip
3. Long lip
4. Tight lip

Then, to confuse the issue further, seldom does just one of these appear alone. Far more likely is a combination of as many as three of the four all in one case! In addition, there are multiple deformities associated with each of the four main categories.

Second: Secondary attempts, guided by principles, have been used to balance the total budget toward a happy norm. Remember that, although the three chapters deal with short lip, long lip and tight lip, the example cases used often have a short columella and can be either short or long but tight too. There is a reason why each specific case appears in a certain chapter, but keep flexible and look out for the sometimes subtle ancillary aspects.
52. Short Upper Lip

When the upper lip is short in vertical height, it exposes too much of the incisors and requires lengthening. Several methods have been described to increase vertical lip length. They call upon tissue from the ear, lateral lip elements and cheeks. Then, too, as will be demonstrated in specific cases, varying degrees of short lip correction can be achieved without exclusive focus on lip lengthening. Scar excisions, the forked flap, advancement of the total short prolabium into the columella followed by an Abbe flap, with minor adjustments to the lateral lip segments, can achieve not only scar improvement, columella length and philtrum construction but lip length as an extra dividend.

Ear Grafts

The simplest method of minor central lip lengthening which also ingeniously creates the semblance of a cupid’s bow was described by the interesting British team of Muir of Aberdeen and Bodenham of Bristol for Gibson’s 1966 *Modern Trends in Plastic Surgery*. They stated:

Occasionally a simple way of lengthening the short scarred lip is required. A through and through transverse incision is made along the mucocutaneous margin . . . and the red margin allowed to drop. The lozenge-shaped defect is then filled with a suitable shaped, double-sided, full thickness lobe graft from the ear, the width of the correction being planned to simulate the natural cupid's bow.

Its only detraction might be the encircling scar and the stuck-on effect of a little ear in a scarred lip.
LATERAL LIP FLAPS

The introduction of lateral lip flaps across the midline can, of course, lengthen the vertical dimension of the lip. When this principle is used during the primary bilateral cleft lip surgery, it too often results in a long lip. When the surgery is carried out secondarily after five years of age, it can achieve length under more controlled accuracy. Then the main deterrent becomes the unnatural position of the scars and the lack of muscle continuity.

LOW ADVANCEMENT

G. Ginestet’s stair-step method of advancing the lateral lip elements medially under the lower border of the prolabium as a secondary maneuver is mentioned only to condemn it. The cost in unnatural scarring and side-to-side tightening is too great for the vertical lengthening achieved.

If this is bad in primary clefts, it is just as deforming in secondary deformities!

MIDDLE Z-PLASTIES

The Z-plasty is renowned for its ability to lengthen a short segment along one axis, but remember, this is at the expense of tightening in the opposite axis. Although bilateral Z-plasties have been and will continue to be used in short bilateral cleft lips, in my opinion the scars violate natural lines and landmarks and should be used, if at all, with caution. Remember, the interdigitations will not increase the total center length of the short prolabium but only the zigzagged sides.
HIGH TRANSPOSITION

The transposition of vertical flaps to the horizontal position, as described by Trauner, Marcks and Wynn, can be called upon to lengthen a short lip even more than to lengthen a columella. There is an unnatural box-like square effect of the scars following the elevation, 90-degree turn and insertion of bilateral flaps.

HIGH ADVANCEMENT

Of all the methods using the lateral lip elements to lengthen the short lip, it seems that the high advancement is closest to achieving the normal. It tightens under the base of the nose where width is usually the most abundant and the least desirable and leaves the lip free border relatively relaxed. Bilateral medial advancement of the lateral lip elements at the top just beneath the alar bases and columella presents scars of union along the natural nasal creases and philtrum curves. Yet, to preserve the full philtrum effect, when vertical shortness is not present, these flaps are better brought just short of tip to tip.

Only when the lip is extremely short should the lateral flap tips touch or crisscross even by millimeters.

FORKED FLAP LENGTHENS LIP

Lest the forked flap be considered only a columella lengthener, it is well to point out that it also lengthens the lip vertically as it tightens it from side to side. This effect is obvious if the action during closure of the donor area is studied. After the fork with the scars is advanced out of the lip, there is some release. Then when the lateral lip flaps advance toward each other at the tip of the philtrum’s little pointed head, the lip grows longer. This is an
ABBE FLAP OFTEN FOLLOWED BY UPPER LIP LENGTHENING

Whether the prolabium is advanced out of the lip into the columella to make room for an Abbe flap or the central scar is excised and the lip divided to receive the Abbe flap, the final Abbe flap insertion not only releases the side-to-side tightness but can allow lip lengthening. The reason is that preparation of the upper lip for the Abbe flap has required the shifting of a short tight prolabium or the excision of scars, and either or both could have been acting to some degree as a shortening restraint. Thus, it is important to note whether or not the lip is of satisfactory vertical length prior to the lip-switch surgery. If the lateral elements, when freed, become too long, they can be tailored. The Abbe flap should be cut to match the correct length and not the released length, for indeed the Abbe is the enforcer which, if fashioned correctly, can keep the lip right.

JOINING MUSCLES LENGTHENS LIP

Many of us have noted that when the lateral lip muscle fibers are joined to each other across the cleft behind the prolabium there is some increase in vertical length, often immediate but at least eventual.

CHEEK FLAPS

When the upper lip is both short and tight and the lower lip is not redundant, the surgeon must turn to the cheek for tissue. Varying amounts are available from the cheeks depending on the need.
Bilateral nasolabial cheek flaps were described by Dieffenbach in 1845 for reconstruction of the upper lip. As he published no diagrams, the scholarly J. P. Webster carefully interpreted this design from the German text.

Esser also transposed bilateral nasolabial flaps into the upper lip, bringing both body and length to the lip without sacrifice of the lower lip. The donor scars of closure hug and are hidden in the alar creases.

The charming John N. Barron, another New Zealander who became a plastic surgery leader in Britain, trained with Mowlem, served with Gillies and later developed his own super unit at Odstock on the Salisbury Plain within the “shadow” of Stonehenge. Barron, skilled in joinery whether in wood or flaps and grafts, was one of my early teachers while he was at Rooksdoun House, Basingstoke. I recall vividly his generosity, resonant voice, fluent French, original design of subcutaneous pedicled flaps and this 1948 secondary bilateral cleft case of his in which he cleverly designed Esser cheek rotation flaps.
In 1946 August Lindemann advocated cheek flaps for construction of the upper lip and columella in a severe secondary case. His design was, in principle, similar to his primary design for a severe bilateral cleft in which he shifted the prolabium into the columella.

In 1967 Pere Gabarro of Barcelona stated his preference for this bilateral cheek rotation while shifting the prolabium into the columella for his secondary correction of bilateral clefts. He is an artist and these are his own sketches.
PERSONAL CASES

Cheek flaps and Abbe flap

Here is a case in which the prolabium had been partially advanced into the columella and the lateral lip elements drawn together in the midline with retention sutures. The result was a short, tight, scarred lip with an invisible free border vermilion. The correction required a simultaneous thinning and further advancement of the prolabium into the columella, radical midline lip scar excision, bilateral advancement of cheek flaps, bilateral elliptical cupid’s bow skin excisions above the mucocutaneous junction and midline lip closure of mucosa, muscle and skin with medial advancement of the alar bases.

One and a half years later the lip result was not as good as the early postoperative condition promised.
Improvement in the nose was permanent, but evidently the original lip discrepancy had been too great for local tissue shifting by advancement flaps. The presence of a midline scar, the lack of a philtrum and cupid's bow and the relative tightness of the upper lip in relation to the lower have more or less forced a second-stage small shield-shaped Abbe flap. The pedicle was divided after 14 days, and the patient, happy with his flap and growing a mustache, returned to his island in the Bahamas and was never seen again.

_Prolabium into columella and Abbe flap_

This patient's bilateral cleft of the lip and palate was closed with the Blair-Brown inferior triangular flaps in infancy in Tennessee. At 26 years he had a short, tight upper lip with a central bulging prolabium, short columella, flat nasal tip, asymmetrical nostrils and flaring alae more marked on the right. The nasal deformity was accentuated by the high nasal bridge and the deviated septum.
Here is a case in which there is a definite advantage to correcting the nose and lip at the same time.

The prolabium was elevated out of the lip. With the aid of a membranous septal incision diverging laterally as anterior vestibular incisions, a reduction rhinoplasty was possible. The alar cartilages were reduced, the hump was lowered, the septum was shortened and a submucous resection removed the airway obstruction. In the course of lowering the bridge, a cartilage flap was turned toward the tip to offer extra support. The prolabium was thinned and rolled on itself as a hemi-column and, after being advanced along the septum to elevate the tip, was sutured.

The inferior end of the prolabium flap was split and splayed to form a columella base to join the alar bases across the nostril sill. The upper lip was now completely divided in the midline, and a 1.7 x 1.7 cm. shield-shaped Abbe flap was transposed from the lower lip to create a philtrum. The pedicle was divided after 10 days, and 18 months later, sandpaper abrasion of scars gave the finishing touch.

29 years

Forked flap and Abbe flap

Asymmetrical bilateral complete and incomplete clefts of the lip had been closed in infancy in California. By the age of 14 years the patient revealed a short columella, snubbed nasal tip, asym-
metrical nostrils, short upper lip with prolabium forming the central segment but with everted, thickened vermilion free border riding high with a single mucocutaneous arc and no semblance of a cupid's bow. There was evidence of sparse hair in the prolabium which, at first, discouraged its use for columella lengthening.

A forked flap incorporating the bilateral scars allowed columella lengthening and release of the nasal tip. Scars and incisions evidently disheartened what hair follicles were included in the fork as they never reared their shoots thereafter. Advancement of the lip elements to close the forked flap donor area did give some vertical length to the lip, yet the inherent shortness of tissue was still reflected in the reentrant nasolabial angle. Subsequent thinning of the vermilion free border and a Gillies cupid's bow operation were only moderately successful.
Slight retraction of the columella and long sidewalls prompted bilateral alar chondromucosal flaps based superiorly to be transposed to each other into a membranous septal releasing incision.

The upper lip was split in the midline and released from above by high transverse incisions laterally to give width and length to the lip. A W-shaped Abbe flap was turned 180 degrees into the defect in the upper lip and the pedicle divided after 14 days. C.M.F.

The excess of columella above and its inferior deficiency was not treated, but a solution to this nasty little problem was later developed, is described at the end of Chapter 47 and is available for this fine gentleman should he ever return.

*Prolabium into columella and Abbe flap*

During and after the original operation on this bilateral cleft lip and palate, which incorporated the prolabium in the lip, there had been a 27-year tug-of-war between the nasal tip and the upper
lip. As often happens, both were losers as the lip was pulled up and the tip pulled down.

At 27 years the prolabium was advanced into the columella with exposure for alar cartilage and hump reduction, septal shortening, bilateral osteotomies, submucous resection, septal cartilage strut to the nasal tip and bilateral advancement of the lateral lip elements to each other in the midline.

In spite of the slight tightening of the upper lip, the release of the nose presented a face with contented composure which lasted three years. Finally the patient was prevailed upon to accept a small midline shield-shaped Abbe flap. It became functional and was embellished with a mustache, definitely in vogue today.
This bilateral cleft lip and palate had had several operations in Chicago and elsewhere. By age 16 years what remained of the patient’s prolabium, after Z-plasty interdigitations of lateral flaps into its sides, was of minimal value to the lip any more. The lip was so scarred, short and tight that even in repose it exposed the entire incisors and compared unfavorably with the protuberant lower lip. The nose, with its flared alae, asymmetrical nostrils and short columella, posed an unusual challenge as its “Roman” bridge rounded abruptly at the flattened tip with a forward projection little better than that of the lower lip: a classic “nose pressed against a windowpane.”

The prolabium was cut out of the lip, elevated and attached to the base of the columella. Exposure through a membranous septal incision extended bilaterally as anterior vestibular incisions made possible reduction of the alar cartilages with suturing of their medial crura at the tip, lowering of the bridge with saw and chisel and narrowing of the nasal bones by bilateral osteotomy. The prolabium was thinned, rolled on itself and advanced as columella. The alar bases and superior portions of the lateral lip elements were advanced medially and sutured with nylon to the septum at the nasal spine. An Abbe flap 1.5 cm. long (skin length) was transposed into the upper lip defect and the pedicle divided after 10 days.
Eight months later rounded tip and hanging columella were treated with alar cartilage reduction, septal shortening, bridge lowering and alar base resections.

One year later final refinements included membranous septal S.M.R. excisions of columella overhang, submucous resection with septal S.C.S.2 cartilage struts inserted into the columella to support the tip, S.C.S.4 another strut along the alar rim and denuded tips of alar base A.B.2 flaps sutured to each other at the septum with Mersilene.
Forked flap and rhinoplasty

An asymmetrical bilateral cleft of the lip had been closed in infancy in South America by approximation of the lateral lip elements to the sides of the prolabium. At four and a half years of age this boy had a short central segment of the lip with the original prolabium vermilion still present and a moderately short columella with slight drag on the nasal tip.
A forked flap, taking the bilateral lip scars and reshaping the philtrum, was shifted into the columella with release of the nasal tip. Six months later the prolabium vermilion was turned down and lateral vermilion flaps were used to overlap it, creating a more natural vermilion free border and tubercle.
At 17 years a corrective rhinoplasty included reduction of alar cartilages, lowering of the bridge, bilateral osteotomy, alar wedge resections, columella thinning with an elliptical excision, submucous resection and two septal cartilage struts in the columella to refine the tip. A Silastic sponge implant to the chin was inserted into a pocket through a stab incision in the lower labial sulcus.

Main problems at this point were short, undimpled prolabium with a transverse crease at its join with the columella base and, of course, a severely protuberant lower lip. The patient refused an Abbe flap offered to improve the upper lip while reducing the lower lip because he did not want to risk the extra lower lip scar.

Therefore, a revision of the cupid’s bow through a mucocutaneous line incision allowed elevation of the prolabium skin, dissection of a subcutaneous flap out of the center of the prolabium and tunneling of this flap under the upper lip crease into the columella. The prolabium skin was tacked with buried 4-0 Mersilene (Ethicon # R-691G) into the excavation and further molded as a philtrum dimple with a through-and-through suture tied over a cotton bolus. The lower lip was reduced by a long transverse excision of an ellipse of posterior mucosa and orbicularis oris marginalis.
Prolabium into columella and Abbe flap

A bilateral cleft of the lip and palate had been closed in Michigan in infancy with a moderate amount of scarring and a shortness of the columella and lip.

It was predicted that a composite wedge resection of the lower lip, including skin, will be necessary to tighten the lip to ideal proportions.

At 11 years the best portion of the prolabium was advanced into the columella to release the nasal tip, and its inferior end was split to receive a midline shield-shaped Abbe flap from the lower lip. The pedicle was divided after 10 days. Minor scar revisions followed.
Forked flap

This eight-year-old boy had his bilateral cleft of the lip and palate closed by approximation of lateral elements to prolabium with spread of the prolabium, snubbing of the nasal tip and flaring of the alae.

A forked flap, incorporating the bilateral scars and portions of the prolabium, was advanced along the membranous septum, tubed on itself in the upper portion and allowed to splay at the bottom to join the medial advanced alar base.
Rhinoplasty and Abbe flap

This bilateral cleft of the lip and palate was treated by many operations in New York. By age 16 years the patient revealed a high-bridged, hooked nose with large nostrils and a scarred, retracted columella overpowering a short, tight, "whisker"-scarred upper lip which, in repose, exposed both central incisors in their entirety.
A corrective rhinoplasty included reduction of alar cartilages, removal of hump, slight septal shortening, bilateral osteotomies and cartilage strut from the bridge grafted into the columella for nasal tip definition. The "whisker" stitch mark scars of the lip persisted.

One year later the scarred skin of the central lip was excised, and the mucosa and vermilion were used to cover the raw area of the upper labial sulcus. The alar bases were cut free from the lip elements so the alar bases could be advanced to the columella and the lateral lip elements sutured to each other in their upper portion. This procedure reduced the amount of skin scarring, lengthened the lip but produced a central gap. A midline shield-shaped 1.25 cm. Abbe flap was transposed into the defect and the pedicle divided in 10 days. Other minor revisions included denuding the tips of the alar base flaps and suturing them together at the nasal spine for final reduction of alar flare, V-Y advancement of vermilion of Abbe flap to create a central tubercle and methylene blue painting followed by sandpaper abrasion of remaining skin scars.
Rhinoplasty, prolabium into columella and Abbe flap

This bilateral cleft of the lip and palate had the lip closed in infancy with incorporation of the prolabium into the lip. Most of the premaxilla had been lost, and the wide cleft in the palate had never been closed, so that the patient had to use a dental plate with a palatal prosthesis and pharyngeal bulb. At age 23 years he presented a short upper lip with a whistling deformity, a hairless prolabium, short columella, depressed nasal tip and flaring alar bases. There was a relative prognathism of the mandible when compared to the lack of premaxilla and deficiency of the cleft maxillary segments. Even a mustache and beard did not help much.
The prolabium was cut out of the lip and, with the aid of membranous sepal and bilateral anterior vestibular incisions, was elevated out of the way to facilitate a reduction rhinoplasty. The alar cartilages were reduced, the hump was removed and the septum was shortened. The small bony knob of the premaxilla was smoothed down and the mucosa used to surface the area. The prolabium was thinned, shaped and rolled on itself with subcutaneous 4-0 chromic catgut sutures to form a natural columella, then advanced along the membranous septum and sutured. Its inferior base was split to receive the tail of the Abbe flap. The alar bases were freed from the lateral lip segments by circumalar incisions; then each was divided into two flaps, a subcutaneous flap and a skin flap. The subcutaneous flaps were sutured to each other at the base of the septum, and the skin flaps were advanced across the nasal floors to the columella to form the nostril sills. The lateral lip segments were advanced medially and hung to the septum creating a philtrum-sized defect.

Then a 2 cm. shield-shaped Abbe flap, measuring 1.3 cm. skin length, was transposed into the upper lip with its tail tucked into the prolabium, split to camouflage the new union of lip and nose. The pedicle was divided after 11 days. When the patient was last seen, three weeks after the operation, the possibilities of a maxillary advancement were discussed.
Prolabium into columella and Abbe flap

This bilateral cleft of the lip and palate was closed in infancy with the Blair-Brown type of lateral triangular flaps introduced above the inferior edge of the prolabium but with a small amount of original prolabium vermilion retained in the center. At 11 years of age, the upper lip was short, tight, with a trapdoor prolabium, a tiny whistling deformity and a large left buccal sulcus oronasal fistula. The short columella, flattened nasal tip and flaring alae gave the usual angry, snorting effect.

As visiting professor at the Massachusetts General Hospital, I was invited to carry out my usual one-stage nasal and labial correction. The prolabium was freed from the lip, thinned and curled on itself and advanced along the septum as columella with release of the nasal tip. The alar bases were cut as flaps, denuded of epithelium at their tips, advanced and sutured to the septum at the nasal spine. The mucosa of the prolabium was used as a flap to close the oronasal fistula.

Then a midline shield-shaped Abbe flap was transposed into the center of the upper lip to create a philtrum. The pedicle was
divided after 12 days, and the photographs were forwarded by Josh Tofield about two months after the surgery.
53. Long Upper Lip

The lip that is long in the vertical dimension is seen most often under three circumstances:

1. The surgeon, in a misguided effort to lengthen a prolabium he considers too short, introduces composite flaps of skin and vermilion from the lateral lip elements below the inferior edge of the prolabium.

2. Some lengthening may also occur when the lateral flaps are introduced above the prolabium.

3. In complete bilateral clefts, when the prolabium has been cut free from the nose during columella lengthening in the infant or very young child, the strong lateral lip musculature pulls on the unanchored prolabium. In many cases this persistent traction during the growth period gradually stretches the lip in the vertical dimension.

Correcting Lips with Lateral Composite Flaps Below the Prolabium

Usually the composite lateral lip flaps have been introduced below the prolabium primarily to lengthen a seemingly short central element and secondarily to avoid dragging the nasal tip quite so far down into the lip. Such disjointed allotment of upper lip tissue tightens its transverse dimension while increasing its vertical length, which, with eventual stretching, will be exagger-
ated into a tragically comical curtain. These inferior flaps can be triangular (Mirault-Rose-Blair-Brown), joining tip to tip, or quadrilateral (Maas, Hagedorn, LeMesurier, Barsky), joining square end to square end. The amount of lengthening is in direct proportion to the width of the inferiorly transposed flaps. Thus the quadrilateral flap is potentially the champion lip lengthener.

This entire fiasco has also been branded with an unbelievably unnatural position of scars that cannot ever be completely "unscrambled." To add insult to injury, the short columella and depressed nasal tip usually are still respectively short and depressed. If then a flap is taken out of the center of the prolabium for columella lengthening, not only is another vertical scar added to the previous two but the columella usually remains inadequate.

**SHORTENING THE VERTICAL LIP LENGTH**

If the columella has won out in this type of surgical proportioning with the lateral lip elements joined beneath the prolabium and is of sufficient length, then shortening the vertical lip length and correction of the unnatural position of the scars get priority. Some surgeons have been content with just shortening the lip. Various methods have been proposed, none of which end up with an artistic final result.

*Erich*

Erich, of the Mayo Clinic, reduced the vertical length of the lip by excision of the bilateral scars and reduction of the length of
the probium. This maneuver does shorten the lip in direct relation to the amount of inferior probium amputated but does nothing about the unnatural shape of the Y scar in the philtrum area.

**Vaughan**

Along a similar but more radical pattern Vaughan designed a shortening of the vertical length of the lip in 1940. With the old bilateral scars in his line of action and with extensions lateral, he resected the scars and the desired amount of tissue not only from the inferior border of the probium but also laterally from the nasolabial junction. With the resection shaped not unlike a Viking's winged headpiece, the upper lip is shortened in its vertical dimension along its entire width. Here again, however, the resulting winged scar makes no pretense of imitating a philtrum.

**Ragnell**

In 1946 British-trained Alan Ragnell of Stockholm designed a similar scar excision in bilateral cleft lip which served to shorten a long lip and medially rotate flaring alar bases at the same time. This, at least, produces scar configurations that fall somewhere within the general area of natural landmarks and seems to be the best of this series of total lip-shortening procedures.

**Holdsworth**

When the central vertical length is near normal and the scars are reasonable but the lateral lip is too long vertically on each side, a variation of Holdsworth’s subalar excision will achieve shortening and place the scars in natural creases.
ADDITION OF VERMILION FLAP

Rex Peterson, the sophisticated plastic surgery cowboy of the Arizona Crippled Children's Hospital, Phoenix, with Ellenburg and Carroll in 1966, warned that the apparently deficient prolabium in bilateral cleft lip should not become a surgical trap.

For those cases already caught by the introduction of lateral lip flaps beneath the prolabium, he has corralled an interesting combination of procedures. Again, the rare condition of sufficient columella length was assumed, but the upper lip was horizontally tight, vertically long and mismatched by a protuberant lower lip. Rex's rodeo freed the prolabium, shortened the lateral lip segments by wedge excisions along the nasolabial line and ended up with a true swayback whistling deformity. His final roundup reduced the lower lip by cutting an Abbe flap out of it and, after trimming off the skin portion, turned the remaining portion of the flap to fill the defect, incorporating only the vermilion margin, the muscularis and varying amounts of labial mucosa.

In principle, this vermilion-bordered flap is somewhat similar to one described in 1957 by Gillies and Millard.

In 1973, O'Malley of Orlando, advocated a similar "skinned Abbe" for secondary bilateral clefts presenting a whistling deformity and lack of an upper labial sulcus.

Such multiple corrective actions as designed by Peterson are not as "rough riding" as they may seem because he has repositioned his brands more compatibly with the philtrum, has shortened the vertical lip length and has reduced the relative excess of the lower lip.

If the lower lip were not redundant, it is possible, after excision of the flaps of skin beneath the prolabium, that there would be enough mucosa available to fill the whistling deformity without a form of Abbe flap.
DOUBLE TROUBLE

When the lateral lip elements have been joined beneath the prolabium resulting in excess vertical lip length and the columella is still very short, a most infuriating secondary deformity is presented. Some cases have been treated by excision of the flaps beneath the prolabium in a radical cupid's bow procedure. Use of this procedure to shorten long bilateral cleft lips calls for some modification, as indicated by Gillies and Kilner:

When the "cupid's bow" operation is being used to shorten the "up-and-down" length of the lip, obviously the central point cannot remain fixed; the entire vermilion border, therefore, must advance up and the lower border of the orbicularis be trimmed shorter before it is nicked at the cupid's bow.

Thus the vertical length of the lip is reduced and the misplaced flaps are removed. Yet the columella is still lacking in length, which cannot be spared from a lip that is already too tight from side to side. This inadequacy led to another approach, as demonstrated on pages 665-667.

PERSONAL LIP SHORTENING
BY SIMPLE EXCISIONS

The most effective vertical shortening of a long lip, if all other labial and nasal aspects are satisfactory, is the transverse full-thickness excision of the required amount of superior upper lip along its entire join with the nose. Variations in the execution of this action depend on the specific case, but it is seldom that a bilateral lip is only too long and just as rare that mere shortening will complete the correction.

Discarding skin below prolabium

This patient, born with an incomplete bilateral cleft of the lip, was one of twins, and his twin had a incomplete unilateral cleft. The bilateral cleft was treated in infancy with what appears to
have been a Brown-Barsky type of closure. The introduction of lateral lip flaps below the prolabium did not pull on the almost adequate columella but did tighten the lip from side to side in its lower portion and produced unnatural scarring and vertical lengthening.

All scars bordering the prolabium were excised, and all skin except the mucocutaneous ridge was excised from between the inferior edge of the prolabium and the vermilion. The lip shortening in this central segment was balanced by bilateral full-thickness wedge resections transversely in the upper lateral lip elements at their join with the alar bases and nostril sills. This procedure placed the prolabium in a more natural philtrum position, shortened the long lip and actually improved its relationship with the lower lip.
COMBINING LIP SHORTENING WITH OTHER CORRECTIONS

As will be seen in specific long lip cases, scar excisions, the forked flap, total prolabium-into-columella followed by an Abbe flap—all can be used to improve scars, lengthen columella and construct a philtrum, but with extra effort they can be forced to shorten a long lip. Of course, this action is dependent upon simultaneous shortening of the lateral lip segments and keeping the Abbe flap short enough (average 1.3 to 1.5 cm. skin length). Remember, the model upper lip at rest should expose the inferior one-third or slightly less of the upper incisors.

PERSONAL CASES

Prolabium into columella and Abbe flap

Evidently this bilateral cleft lip and palate had been treated in infancy with lateral lip flaps sutured to each other below the prolabium. At two and a half years there must have been an attempt at columella lengthening. At six years, the columella was still short with a flattened nasal tip and flaring alae. The upper lip hung long like a curtain, marked with three vertical and one transverse scars, showed very little free border vermilion and was slightly tight in transverse dimension. The lower lip showed some protuberance.
A year later a small shield-shaped Abbe flap was transposed into the center of the lower two-thirds of the upper lip, after scar excision, and the pedicle divided in 13 days.

A center portion of the prolabium was shifted into the columella and the lip shortened in vertical length by skin excision of a portion of the inferior flaps above the mucocutaneous junction.
At age 15 years corrective rhinoplasty included reduction of alar cartilages, lowering of nasal bridge, shortening of septum, bilateral osteotomy, alar base wedge resection, alar margin sculpturing and cartilage strut from the bridge inserted into the columella to support the nasal tip.

One year later, submucous resection and diamond excision of skin reduced tip-columella thickness. After another year, alar base flaps were dissected into skin flaps and subcutaneous flaps. The subcutaneous flaps were sutured to each other with Mersilene at the septum behind the columella base with reduction of the alar flare. The alar skin flaps were slid across the nostril floor toward the columella to create the nostril sills.

Forked flap

This bilateral cleft of the lip and palate was treated with composite flaps of skin and vermilion from the lateral lip elements placed below the prolabium. Then, to add insult to injury, as has been done so often, a flap was taken out of the center of the prolabium to lengthen the columella partially. Photographs of this girl at six years of age show a projecting premaxilla, a flat nasal tip with flaring alae and a small blob-like columella. The lip is vertically long, hanging like a curtain and tight along its free border. The scar pattern of three vertical and one transverse has caused irreversible marking of the lip.
At nine years a forked flap, incorporating the bilateral scars and reducing the square prolabium to a narrower, more philtrum-like central component, lengthened the columella and released the nasal tip moderately. In addition, the ends of the fork splayed into the nasal floor to join the alar bases to form nostril sills. This procedure was followed later with a minor cupid’s bow correction.

It will be necessary to remove the entire scarred prolabium, advance the lateral lip elements and fill the defect with an Abbe flap. A reason to postpone this as long as possible has been the lack of slack protuberance of the lower lip.
A switch and then a fork

Here is an interesting plan specifically designed for the case with lateral rectangular flaps joining each other below the prolabium, which also suffers a short columella and a long upper lip.

To correct vertical length and columella shortness a rather complicated but logical rerun in reverse of the first abominable operation picked up the lateral lip flaps from their stuck-on position below the prolabium and replaced them in their original position in the lip on either side of the prolabium. These flaps were composed of skin and subcutaneous tissue, leaving the vermilion mucosa to border the inferior edge of the prolabium. Thus the vertical height of the lip was shortened and tissue positioned for columella use. Later these repositioned flaps were incorporated into a regular forked flap and were shifted into the columella with nasal tip release. Even after all the finagling, the lip ended up with only two vertical scars. An example follows.

Recuperating the forked flap

A bilateral complete cleft of the lip and palate in 1966 had composite flaps including skin from the lateral lip elements transposed below the prolabium as a primary Jalaquier-Hagedorn-Barsky procedure. At age two and a half years the patient came under my care and, as would be expected, revealed a long vertical lip unnaturally scarred and a short columella.
and F were taken as flaps and transposed back where they came from along the sides of the lateral elements. The mucosa beneath them was used to deepen the upper labial sulcus, and the free border vermilion was merely elevated and sutured along the inferior border of the prolabium where it belonged in the first place.

Four months later, delay incision inscribing a forked flap and including these replaced skin flaps was made. Then, five weeks later, a forked flap was cut. It was elevated with the aid of a membranous septal incision, and the alar cartilages were exposed and sutured together. The prongs of the fork were approximated and advanced along the septum with release of the nasal tip. The lateral mucosa and muscles were sutured together behind the prolabium, which maintained its viability through its vermilion border attachment.
Because of the persistent excess protrusion of the premaxilla, the lip lost some of its shortening, but with the aid of orthodontia by Berkowitz the alignment was improved. In 1974, revision with lip shortening, muscle reapproximation and dimple formation was completed. It might almost be said that this "egg" had been unscrambled.

Prolabium into columella and Abbe flap

An incomplete bilateral cleft was closed in Chicago by the Blair-Brown triangular flap inserted below the prolabium. At five years the patient had a long lip with a Y-shaped scar, no cupid's bow, philtrum or tubercle and a short columella with a slightly restrained nasal tip.
Excision of scars included some skin to transform the triangular flaps into quadrilateral flaps in an attempt to create the LeMesurier cupid’s bow. This was only partially successful so 10 years later more radical surgery was used.

The prolabium was elevated out of the lip and the anterior septum shortened to correct the hanging columella. Then the prolabium was reduced, advanced into the columella base, split and sutured to the alar bases. The upper lip was divided, and the lateral lip elements were advanced medially to the septum and sutured with 4-0 Mersilene to create a philtrum-sized midline defect. A shield-shaped 1.7 cm. Abbe flap was transposed into the center of the upper lip and the pedicle divided after seven days.
This 9-year-old boy with a bilateral incomplete cleft of the lip had bilateral composite flaps placed below the prolabium in Cuba. This presented a long lip with unnatural scars and a short columella. At age 10 years, the scars were excised as marked, including bilateral triangles from the upper portion of the lip bilaterally to shorten the vertical length of the lateral elements. The prolabium was advanced into the columella and the lip elements advanced medially, presenting a philtrum-sized defect. A shield-shaped Abbe flap was transposed into the philtrum position with its tail inserted into a split in the prolabium base. The pedicle was divided after one week.
Forked flap and rhinoplasty

A bilateral cleft lip and palate patient with mild hypertelorism had undergone numerous procedures. At age 14 years, the lip and nose revealed the specific fallacies of the standard principles used. The prolabium, trapped between the columella and the lip, served neither well. The short columella had snubbed the nasal tip spatula flat. Lateral lip flaps had been pulled together below the prolabium causing the lip to be long in vertical length but tight from side to side, particularly along its lower border. The situation had provoked the surgeon to insert a small Abbe flap unilaterally to relieve this specific tension.

A surgeon must have the ideal normal as his goal and set his aim and plan his surgical campaign accordingly. Otherwise, his is but a craft darting hither and thither in open seas with enough fuel but no charts, no compass and an uncertain destination. One error is followed by another, each launched to correct the last but merely compounding the problem by adding insult to injury to the point of irreversible disorder. This was a difficult deformity from the beginning, no doubt, but there was even less chance of total recovery now.

At age 15 years, a modified forked flap incorporating the bilateral scars and portions of the prolabium was used to lengthen the columella and partially release the nasal tip. A reduction rhinoplasty lowered the nasal bridge and narrowed the bony base.

Subsequent corrective procedures over the next four years were too numerous to describe in detail. They did include a cupid's
bow operation, alar base advancements, alar margin sculpturing, bilateral osteotomies, a vomer strut in the columella, a Silastic sponge chin implant, lip scar revisions and abrasion.

One time during the latter part of this period, when I thought the patient was progressing reasonably well considering her original problem, a kind woman befriended her. The new acquaintance assisted the patient in getting a room and then inquired into her financial status, saying, "Dear, I would like for you to see a good plastic surgeon." Whereupon my patient loyally explained she already had one!

At age 20 years, the patient had a baby boy with a complete unilateral cleft of the lip which was treated with a rotation-advancement closure. Since then she has had two babies with bilateral cleft of the lip and palate, one with the alveolus intact on one side and one complete with projecting premaxilla.
Abbe flap and lip-shortening procedures

This classic story of a long lip is a special favorite of mine, but you have to follow it play by play to understand why. Born with an asymmetrical bilateral cleft lip which was closed at two months and revised at 17 years, Sheldon Gloger, at 34 years, had an asymmetrical nasal distortion with the prolabium trapped above the lateral lip flaps, which joined each other below it. In the spring of 1972 a letter from this patient arrived in Miami. Here are excerpts:

Why I travel so far . . . very suspicious of doctors because of previous bad experiences. I searched cleft lip literature for problems similar to mine . . .

lip:  nose:
tight  depression of nasal tip
stiff  alar cartilage protruding into right nostril
scarred

When not smiling, my lip gives impression of anger and meanness. When smiling, my upper lip does not move hiding the smile. To project a smile, I must force movement of the lip with many facial muscles.

The patient was seen in Miami, and an Abbe flap was proposed.

One month later he wrote:

One item worries me. Unfortunately I was too shy to mention it during consultation. The previous operation . . . resulted in too long a vertical length in the upper lip. It hangs one centimeter below the upper teeth, hiding the teeth from view even when laughing.

Will your operation improve this?
My answer:

Your upper lip does not look long in your smiling photographs. . . . When we shorten your nose, this will increase the effective length of your lip but, if necessary, I can shorten the actual length when the Abbe flap is inserted.

On August 8, 1972, the midline scar of the lower portion of the upper lip was excised and the prolabium reduced and shifted onto the columella base. Then the lip was opened in the midline and a 1.5 cm. (skin length) Abbe flap was inserted giving release, symmetry, and a philtrum to the upper lip. The pedicle was divided after 10 days.

Ten days later he wrote:

Your Abbe flap is masterful. I now have a normal lip and corrected nose for the first time in my life. I mentioned disappointment at not having a shortened lip only as an honest reply to your questioning.

Four months later he wrote:

The sag while smiling or laughing is terrible—like an old man with his dentures out—both comical and hideous. Even with a forced grin, the sag still covers the upper teeth. This is a great handicap to my work where talking, with pleasant facial expressions, is important. My lip is still quite stiff. Is it possible the sag will improve when the stiffness disappears?

If my problem were corrected by further surgery, what would be the harm?

My response:

Give the lip another month or two and then we can shorten it.
Six months after the Abbe flap operation, the alar cartilage was reduced on the right and grafted as an onlay on the left, the septum was shortened and then a full-thickness transverse wedge, 1 cm. wide, was excised across the entire upper lip along its join with the nasal base. With smiling the upper teeth were exposed, but he wanted it shorter!

Seven months after the lip shortening the patient wrote:

During the operation your assistant said it was shortened 8–11 mm. One day after the operation I had the same overly long upper lip, the same toothless smile as I have today. What happened?

My response:

I am sorry that you are not pleased with the excellent result. We can go ahead and do a little more work if you would like.

This was his response:

Thank you for your courteous reply and offer, but no, I won’t be coming to Miami anymore. You have done what you promised. . . . It seems I did not communicate well what is extremely important to me: a shortening of my overly long lip that hangs like a wet curtain when I smile or laugh. Now I do insist. I want my upper lip shortened a full ½ inch. Nothing else will do. That or nothing. So, I must seek another specialist. . . .

I have already consulted several plastic surgeons who have offered to attempt a ¼ inch shortening, each by a different method. . . . You know my lip better than anyone, what harm might I expect if a ½ inch shortening is attempted?
One surgeon wants to operate under the nose, from nasolabial fold to nasolabial fold; another wants to excise "all the way through," another surgeon would operate just above the red line of the cupid's bow; one plastic surgeon feels that the lip has already had too much surgery, another surgeon wants to "tuck under and up" the whole visible mucosa. None of these fine gentlemen have performed such an operation, which scares me, although there is a reference to this problem showing before and after photos (Holdsworth, W. G., *Cleft Lip and Palate*, 4th Edition, 1970, pp. 160-161).

As a last service, please tell me some things to help me finally get the job done or convince me that it's a lost cause.

My response one week later:

No, it is better that I do this for you and at no charge. I want you as happy as possible. I did shorten you over a ½ inch before, but it will take more and my hope would be to let a small amount of your upper teeth show.

His answer:

O.K. Set me up for the operation as soon as possible—whenever. I will drop everything and fly to Miami.

He enclosed photos to show "our" lip at repose, smiling and grinning and illustrated with a couple of his own arrows.

So, 10 months after the last lip shortening, a 1 cm. wide, transverse, full-thickness ellipse of upper lip skin, muscle and mucosa was excised from alar base to alar base. During the operation the patient was encouraged, "Sheldon, at least I can say at this time your teeth are easily visible through your lip!"
The defect was closed as the lip was lifted and sutured to the nasal base with exposure of the lower one-third of incisors at rest. On the fourth postoperative day the sutures were removed.

My note in the patient's chart after this visit stated:

Shortest lip in Miami, but swollen. Lip measures approximately 11 mm.

Eight months later, not having heard a word from the patient, I wrote asking how he was, terrified that he would write, "Only one thing, doctor, you have made my lip too short!" Instead, he
wrote four and a half single-spaced typed pages, but the message can be condensed to:

I only wish you had taken more out during your last operation.

He did give me an even clearer insight into his magnificent (lip) obsession when he wrote:

Some fine experiments were carried out by psychologists, as reported in Krech and Crutchfield. Volunteers were fitted with masks that hid all but one feature of their faces. In some, it was the mouth that showed, in others, only the eyes, etc. Then these people were subjected to various stimuli (electric shock, tickling, onions for crying, etc.)... Observers, unaware of the stimuli, were facing the masked volunteers and were asked to judge the emotions, their only guide being the expressions of one facial feature. Conclusion: only the mouth region communicated the person's true feelings. And this is something I knew from experience, ever since that operation at age 17, I suddenly wasn't being understood by in-person contact. My upper lip, inflexible, long, hiding the teeth, could not reflect my emotions... Look at motion picture actors and actresses. It amuses me to notice that the bad guy, the heavy ugly in a film, may have a scar on the forehead, a hooked nose, an eye that half opens or a missing ear. But, in all cases, this horrible creature has a beautiful mouth, excellent set of teeth, and his use of that mouth region is what produces the intended aura. Only I notice it, but it's very true.
These are photos he had taken for this book in Mark Gorney's office. In spite of what scurrilous letters Sheldon may write me in the future, I am proud of his result as he is now quite handsome.

Resident Tony Wolfe, slightly obsessed with bony structure and teeth prior to his year with Tessier and Obwegeser, after reviewing this case suggested:

It would have been easier to lengthen his teeth!

*Lip lengthening following early division of columella and prolabium*

When the lateral lip elements have been introduced across the top of the prolabium until they meet tip to tip as in the original adaptation of the rotation-advancement principle in bilateral clefts, this action can also lead to lengthening of the lip vertically. If the complete division of the columella base from the prolabium is carried out in infancy or early childhood, the chances of the baby's pulling a long lip are enhanced. If the division is postponed until five years of age, there seems to be less vertical lip lengthening. In cases that have developed vertical lengthening there are two main methods of shortening. Again, the procedure should be postponed until school age.

**Superior.** If there is a natural mucocutaneous ridge and cupid's bow as usually created with the rotation-advancement principle, then a transverse superior full-thickness excision along the join of the lip with the alar bases, nostril sills and columella is the method of choice.

**Inferior.** If the mucocutaneous junction, cupid's bow and vermillion free border are unnatural and scarred, requiring radical
After early forked flap

An early forked flap in a complete bilateral cleft places tissues in their correct position during the surgery. Yet, with the complete division of the lip attachments to the columella during infancy and early childhood, when muscle pull exaggerates growth, the lip develops too long in its vertical dimension. The lack of septal support in the nasal tip also allows the forked flap to slip partially back down into the lip. By re-advancing the forked flap up into the columella, supporting it with a temporary homologous septal cartilage strut (if under 16 years) or autogenous septal cartilage (if over 16 years) and lifting the lip will achieve and maintain nasal tip elevation and lip shortening.

Or, even better, use my modification, which creates not only a bow but philtrum columns and a dimple and at the same time shortens the vertical lip length but retains the white roll.

After early forked flap

adjustments, then Gillies' cupid's bow operation can be used to revise the bow and also shorten the vertical length of the lip. Leave the mucocutaneous junction "white roll" with the vermillion if it is still present.

Or, even better, use my modification, which creates not only a bow but philtrum columns and a dimple and at the same time shortens the vertical lip length but retains the white roll.
SHORTENING LIP WHILE AIDING COLUMELLA

When the lip is long but the columella short or retracted, it is well to use in the columella what must be taken from the lip. The lip shortening can be accomplished by transverse excision of wedges of skin, subcutaneous tissue and whatever sparse muscle is present from very high in the lip along its join with the alar base and nostril sill. If this tissue is not amputated but is based medially on the sides of the columella base, it can be advanced on each side medially and upward, like the forked flap, along the incised membranous septum to increase the columella length and at the same time elevate and shorten the long lip.

If there is columella retraction, these flaps can be based medially inside the vestibule and transposed out of the lip and into a columella releasing membranous septal incision as described in Chapter 47.

This is the same general principle as described in 1919 by John Staige Davis of Baltimore for reconstruction of the columella. He advocated bilateral transverse skin and subcutaneous tissue flaps raised from the upper lip and with the raw surface turned inward toward the midline, sutured together, skin surface outward. The free end of the approximated flaps was sutured to the tip of the nose. As Davis explained:

This type of operation for reconstruction of the columna is suitable only for those cases in which the upper lip is very long. It accomplishes the double purpose of shortening the lip and forming the columna.

Of course, the modern modification has refined the procedure appreciably.
54. **Tight Upper Lip**

**TIGHT UPPER LIP WITH PROLABIUM**

In certain cases the prolabium has been incorporated into the full vertical length of the lip with depression of the nasal tip, but either because of the smallness of the original prolabium or because of the union of the lateral lip elements at the inferior border of the prolabium, this prolabium has not stretched. The general effect is of a relatively tight upper lip exaggerated by a slack, protuberant lower lip. Such a case for some surgeons will cause the thought “Abbe flap” to flash on automatically; then, as no other information is flashed with it, the prolabium is released by being split up the middle, and the lower lip flap is switched into it. This is an unacceptable solution because it immediately increases the vertical scars to four and leaves the depressed nasal tip unrelieved.

Believe it or not, there are other surgeons who jump the track completely and actually place the Abbe flap unilaterally in bilateral cases. The reasoning is difficult to understand, but the correction is even more bewildering.

Actually, the best method of handling the relatively tight upper lip with the small prolabium incorporated in it is to shift the entire prolabium up into the columella, and there is seldom a columella that will not welcome the additional tissue. Then an Abbe flap can be transposed into the defect left in the upper lip.

Shifting the entire prolabium is preferred in order to reproduce the philtrum as a single lip-switch flap unit. Prolabium advancement into the columella will call for the standard membranous
septal incision carried up over the bridge of the septum. The prolabium will require thinning and shaping and may have to be rolled on itself with subcutaneous sutures particularly at the nasal tip to simulate a columella. In the male there may be hairs, which can be discouraged by follicle excision. Hairs in this area usually are sparse and any that survive surgery can be kept clean during the morning shave. The end of the prolabium can be split and splayed at the base of the new columella.

With the prolabium slid up into the nose, the upper lip presents a yawning gap which has frightened many a surgeon to cut an Abbe flap too wide, too long, and unimaginatively straight. It plugs the upper lip with an inartistic square segment which in no way can be mistaken for a philtrum.

MY FIRST BILATERAL SECONDARY

Anyone who cuts the lower lip flap the exact size dictated by the upper-lower lip relation before the switch, without accounting for the simultaneous reduction in the lower lip at the time of the switch, is in for a shock. This kind of calculating has a double backfire, producing very big upper lips ballooning over their lower lips, now drawn irreversibly too tight. This is the course I took in 1949 in my first Abbe flap case, and Gillies, who used quite large Abbes himself, ticked me off for it.

The case was a 27-year-old British army veteran with the typical secondary tight upper lip, flat nasal tip and flaring alae of a complete bilateral cleft lip and palate. He had been the welterweight boxing champion in both the Egyptian and Italian theaters of war, and the absence of an impressive muscle on his body caused me to suspect that he had terrorized opponents with his
frightening flat face. Such a thing could happen in the service even though a smart boxer seldom fears a pounded face as the bearer obviously has repeatedly been an easy target. Having given up boxing, the veteran was anxious for any improvement in appearance. His prolabium was advanced into his columella and a corrective rhinoplasty carried out. This left a gaping upper lip defect, into which was transposed a huge W-shaped flap planned to fill the hole exactly. It turned out to be too long, too wide and totally unnatural, requiring several reduction procedures. Persistence and a cartilage graft to the nasal bridge finally achieved a happy transformation—yet not without my learning the impor-
tant lesson that these flaps need not be large and, in fact, are best shaped the size of a normal philtrum.

If the defect is just too big in the upper lip to be satisfied with a philtrum-shaped or sized Abbe flap, then, again, J. P. Webster’s perialar crescent excisions will allow the cheeks to aid in the upper lip construction by reducing the size of its defect.

Although some surgeons, more concerned about the position of the pedicle, prefer shifting the Abbe flap donor area off the midline as shown here, it is suggested that a flap taken from the midline of the lower lip not only may carry a dimple but can be maneuvered into the upper lip defect just as easily. Remember to keep the circumalar incisions high and in the shadow of the nasolabial join.
OTHER PERSONAL CASES WITH PROLABIUM STILL IN TIGHT LIP

Forked flap and rhinoplasty

This 27-year-old woman, whose complete bilateral cleft of the lip and palate had been treated in Cuba, presented a short columella, flat nasal tip with several external nasal skin scars, asymmetrical nostrils, flaring alae and short, tight upper lip with unnatural scars.

A forked flap with nostril extensions was elevated, and lateral lip muscle elements were freed and joined. A Z-plasty lengthened the short posterior lip mucosa. Septal cartilage grafts were made.
to the nasal bridge and columella. A diamond excision of nasal tip skin and suturing of the forked flap allowed columella lengthening, the lateral wing extensions being folded into the vestibular releasing incisions to elevate the nasal tip.

Later cleft lip rhinoplasty included reduction of alar cartilages, bilateral osteotomies, septal cartilage strut into the columella and lateral mucosal flaps transposed between columella and membranous septum. The tips of the alar base flaps were denuded of epithelium and sutured to each other with Mersilene behind the columella to reduce the flare.

The final labial and nasal revisions included abrasion of skin scars.
When he was first seen in Miami, orthodontic manipulation to spread the maxilla was started by Michael Krop.

At 12 years, a forked flap revised the lip scars and reduced the prolabium. Exposure allowed removal of the nasal hump. The forked flap was advanced along the membranous septum with release of the tip, and the ends of the fork were splayed to join the advancing alar bases to form the nostril sills.

The young lady has blossomed, has learned to use makeup and does the very most with what surgery has been able to give her.

In the next case, complete bilateral cleft of the lip and incomplete cleft of the palate were initially treated in New York. The 1955 operative notes from the Maxillo-Facial Service of New York Presbyterian Hospital described a left-side LeMesurier lip closure and, three months later, the same on the right with mucoperiosteal flap closure of the anterior palate. At three years a partial vomer resection and Kirschner wire fixation achieved premaxillary pushback. Some time thereafter, Dupertuis in Pittsburgh applied one of his auricular lobule free grafts to lengthen the columella.

By age 10 years the patient showed a moderately depressed, rounded nasal tip, short scarred columella, tight upper lip with scars and stitch marks, a hypoplastic maxilla and a protuberant lower lip.
Two months later, alar margin excisions and reduction of the columella ear lobe graft sculptured the nasal entrance. A Silastic sponge chin implant was inserted through a lower labial sulcus incision. At age 16 years mandibular osteotomy was carried out by oral surgeon Arnold Weiner.

*Short fork, then total prolabium to columella and Abbe flap*

A bilateral cleft lip and palate was closed in Boston using a Tennison-type Z-plasty, one side at a time, for the lip. At six years the patient had a short columella, flared alae, a tight upper lip, unnatural zigzagging of lip scars without muscle continuity or natural philtrum landmarks, a vermilion whistling deformity, some lack of maxillary development and a protruding lower lip.
At seven years a forked flap was taken out of the lip to lengthen the short columella and to shape the prolabium more like a philtrum. The lateral muscles were freed in the upper portions and sutured together in the midline and the flaring alar bases cut free and advanced medially between the forks and the membranous septum. It was necessary to maintain a blood supply to the prolabium through the free border vermilion.

Some improvement was achieved, but the tight upper lip exaggerated by the lax lower lip demanded more radical surgery. At nine years of age the remaining prolabium was cut out of the lip, rolled into a tube and advanced along the membranous septum. The closure was exact enough to allow insertion of a banked homologous septal cartilage strut for temporary nasal tip support. The lateral lip elements were advanced medially and supported by upper muscle flaps sutured to the septal base. Thus the defect was reduced to philtrum proportions so that a 1.5 cm. shield-shaped Abbe flap could be transposed into the defect.
Time and minor revisions will smooth out the final result. If necessary, at 16 years an autogenous septal strut can be inserted. Further reduction of the lower lip may be required.

**TIGHT UPPER LIP WITH HALFWAY PROLABIUM**

Bilateral cleft cases closed by the Blair-Brown, Hagedorn-LeMesurier, Barsky and other methods which introduce lateral lip flaps to each other below the prolabium often result in a long lip. There are some lips, however, that are not too long vertically but suffer transverse tightness in the lower portion. With the prolabium in halfway limbo, the nasal tip is still flat and the columella still short. Here the prolabium must go the whole way into the columella, and then an Abbe flap can construct a philtrum.

**PERSONAL CASES WITH TIGHT LIP AND HALFWAY PROLABIUM**

*Prolabium into columella and Abbe flap*

Bilateral cleft lip and palate closure brought composite flaps of skin and vermilion from the lateral elements below the prolabium. At 11 years, this operation had resulted in a snubbed nasal tip, short columella, tight, unnaturally scarred upper lip and relatively protuberant lower lip.
At 13 years the scarred prolabium was elevated out of the lip, thinned, rolled on itself into a hemi-column and advanced along the membranous septum to release the tip and elongate the columella. The remaining upper lip was divided in the midline and tailored. Then a $1.5 \times 1.25$ cm. Abbe flap was transposed into the upper lip defect and the pedicle divided after 10 days. A year later, tips of alar base flaps were denuded of epithelium and advanced to each other at the septum behind the columella. Double-breasted-vest revision of the upper lip scars was used.

Prolabium into columella and Abbe flap after 50

This bilateral cleft lip and palate was closed in infancy by approximating the lateral lip elements beneath the prolabium. The palate was never closed but fitted with a plate. At age 53 years, the patient presented for surgery. Release of the lip and slight
advancement of the prolabium made room for a midline Abbe flap. The pedicle was divided in two weeks. The more advanced age of the patient possibly reduced the flap's ability to blend as a philtrum, but additional years and the Florida sun did bring wrinkles to the face and Abbe alike.

_Prolabium into columella and Abbe flap_

This bilateral cleft lip and palate was treated by the Blair-Brown method in St. Louis. The photographs at 23 years show the lateral triangular lip flaps joined to each other below the prolabium with a single arc elevation of the vermilion, a tight upper lip, short columella, rounded nasal tip and protuberant lower lip.

The prolabium was cut out of the lip, thinned and split into a forked flap. The alar cartilages were reduced, the septum was shortened and the columella was lengthened, the ends of the fork joining the alar bases as nostril sills. A midline shield-shaped Abbe flap, $1.5 \times 1.25$ cm., was transposed into the defect. When the pedicle was divided after 11 days, a Silastic sponge implant was inserted into the chin through a lower labial sulcus stab incision.
In the next case, what seems to have been an asymmetrical bilateral cleft of the lip had been closed in Ecuador in infancy by bringing the lateral lip elements together below the prolabium. At 17 years the upper lip was tight and scarred, revealed almost no free border vermilion and compared unfavorably with the protuberant lower lip. The diminutive prolabium bulged at the base of the short columella, which pulled a slight hook in the nasal tip.
The lip scar was excised, opening a midline full-thickness defect. The prolabium was reduced, split and advanced into the columella. Then a shield-shaped 2 cm. Abbe flap was transposed and the pedicle divided after 10 days.

At 19 years a corrective rhinoplasty included alar cartilage reduction, hump lowering, septal shortening, bilateral osteotomies, alar base wedge resections, alar web excisions, submucous resection and septal cartilage strut in the columella for nasal tip support.

In this case, lateral lip elements were joined to each other below the prolabium in infancy resulting at 10 years in a slightly snubbed nasal tip, short columella, asymmetrically flaring alae, tight upper lip with unnatural scars and no philtrum landmarks.

At 13 years the prolabium with lateral flaps was elevated from the lip, rolled on itself and advanced along the septum to release the tip and elongate the columella. A submucous dissection of the deviated septal cartilage allowed it to be freed from its off-center position on the nasal spine, to have its concavity scored and to be placed in the midline. The upper lip was split in the middle, the alar bases were freed from the lip and advanced to the septum and the muscles of the lip elements were attached to the septum to reduce the central defect. Then a midline shield-shaped
1.5 cm. Abbe flap was transposed into the upper lip and the pedicle divided in nine days.

This 13-year-old boy had had a Blair-Brown type of lip closure in infancy in northern Florida. He showed a flat nasal tip, short columella, bulging prolabium without natural landmarks of cupid's bow or philtrum, tight upper lip and relatively protuberant lower lip.

At age 13, under local anesthesia, his prolabium was elevated T.P. out of the lip, thinned, rolled on itself and split at its distal end. With the aid of a membranous septal incision extending well
over the tip, the prolabium was advanced into the columella and the lip defect filled with a 1 cm. wide, 1.5 cm. long Abbe flap from the lower lip. The pedicle was divided after 11 days.

At age 16 a cleft lip rhinoplasty included reduction of the alar cartilages, straightening of the bridge and septal shortening. The alar bases were cut as flaps, thinned by cutting subcutaneous flaps out of their center, and then advanced medially by suturing their subcutaneous flap extensions to each other at the septal base. A submucous resection of septal cartilage produced a strut for support of the columella and the elevated nasal tip. Another smaller strut was used along the right alar rim.
As an infant, this boy had a Blair-Brown type of lip closure in the Navy. At 18 years, he revealed a short, tight upper lip with a humped prolabium trapped by triangular flaps joining tip to tip below it. He had a whistling deformity and a protuberance of the lower lip. The nose was high-bridged and hooked, the nasal tip dragged down by the relatively short columella. The total prolabium was elevated out of the lip and freed for advancement by a membranous septal incision which was extended bilaterally into the vestibules for extra tip release. The alar cartilages were reduced and the hump was lowered. The septal cartilage removed during a submucous resection was sutured as a strut along the end of the septum. After upper lateral flaps were cut from the prolabium as wings to fill the vestibular defects, the remaining prolabium was thinned, rolled and advanced along the septum for columella lengthening. The base of the prolabium was split to receive the tip of the shield-shaped 1.5 cm. Abbe flap. The pedicle was divided after eight days.

18 years

3 months postoperative

T.P.
R.R.
S.M.R.
S.C.S.1
Rhinoplasty and Abbe flap

Born with an incomplete bilateral cleft of the lip, this patient was treated first in Cuba in infancy and later in Florida. When seen at age 21 years, she had a prolabium seated halfway up the lip with lateral lip flaps joined beneath it. This condition produced an unnatural columella, one convex curve of the mucocutaneous line without a cupid's bow, a whistling deformity and a tight upper lip with transverse scars too wide for complete excision. As the nose had a bulbous tip and a slight hump, the usual combined correction of both lip and nose in bilateral secondary deformities was planned.

The prolabium was elevated out of the lip and as much scar as possible excised from the center of the lip. With the aid of membranous septal and bilateral anterior vestibular incisions, the alar cartilages were reduced, the tip was defatted and the hump was lowered. The prolabium was thinned, rolled on itself and advanced into the columella. A V wedge from its base not only sculptured the excess cuff but opened a split for the Abbe tail. The lateral lip elements were advanced medially by suturing their subcutaneous edges together at the tip, thus producing a natural-sized defect in the upper lip. A midline 1.5 cm. shield-shaped Abbe flap was transposed into the gap and the pedicle divided
after seven days. Note the ideal length of the upper lip, exposing the lower one-third of the upper incisors.

_Prolabium into columella and Abbe flap_

This bilateral cleft lip and palate was closed with lateral triangular flaps brought together below the prolabium. By seven years of age, the premaxilla was gone, the upper lip was tight from side to side particularly along its free border and the prolabium bulged like a trapdoor in the upper central portion of the lip, accentuated by the horseshoe-shaped scar and its "quotation mark" stitch marks. The columella was short, the alae were flared and the nasal tip was so flat that its projection was successfully challenged by the protuberant lower lip!
In 1959 the prolabium was elevated out of the lip, thinned, rolled and advanced into the columella. As I had not yet become infatuated with the shield-shaped Abbe flap, an oblong lip-switch flap with a forked tail 1.5 cm. long by 1.25 cm. wide was transposed the usual 180 degrees with the tips of the split tail straddling the columella base.

Two years later a minor modified cupid's bow operation improved the blending of the Abbe flap along the mucocutaneous border. As the patient grew, so did her nose, especially with the tip free, and this incited me to reduction surgery a little earlier than usual.
By 13 years she was five feet, five inches tall. Thus, at age 15 years her columella was reelevated as a trapdoor, thinned, split for shortening and replaced after standard corrective rhinoplasty procedures of alar cartilage and bridge reduction, septal shortening and bilateral osteotomies. At age 16 years alar base-nasal floor flaps denuded at the tips were advanced and sutured to each other behind the columella base. At 17 years the lip scars were abraded. A subcutaneous pedicle cut out of the center of the Abbe flap was tunneled up into the columella, and a small Z-plasty of the scar join between the Abbe flap and the columella rounded the acuteness of the nasolabial angle.

_Prolabium into columella and delayed Abbe flap_

In this bilateral cleft lip and palate the projecting premaxilla and diminutive prolabium caused a dilemma for the primary surgery. The lateral lip flaps had been brought together below the prolabium. By age eight years the tug-of-war had caused the prolabium to be suspended between the nasal tip and the lip without benefit to either.
The prolabium was freed from the lip, thinned and advanced along the septum to lengthen the columella and release the tip. The lip was simply approximated in the midline.

A year later the scar was excised from the midline of the lip and a shield-shaped Abbe flap inserted with division of its pedicle in 14 days. Two years later the columella bulge was reduced by a vertical elliptical excision and two years after that the tips of the alar base flaps were denuded of epithelium and advanced to each other behind the columella.
TIGHT UPPER LIP
WITHOUT PROLABIUM

If the prolabium was shifted bodily into the columella, the upper lip probably will be tight from side to side, may be long in vertical dimension and certainly will have no central element to suggest a philtrum.

The nose should be satisfied so that most of the surgeon's attention can be directed toward the tight upper lip. Vertical scar excision will release the lip, and it will spring apart in happy relief! If there is excessive vertical length, it can be reduced by bilateral full-thickness transverse wedge excisions along the lip join with the nose. Now there is a gaping full-thickness defect in

The tissues were now well distributed. Only the refining remained. Upon recall for final revisions at age 18, it was discovered that the patient had died in an automobile accident. This is a terribly sad event to record, as such a part of his life had been shadowed by either facial deformity or a stage of healing between the many surgical procedures. He was a fine boy and had been a good patient, and just as he was obtaining a happy result at the prime of his life, suddenly it all ended for him.

13 years
the center of the upper lip, and Abbe found the answer in a full-thickness flap from the lower lip as a natural replacement of the missing tissue.

PERSONAL CASES OF TIGHT LIP WITHOUT PROLABIUM

Abbe flap

This bilateral cleft lip and palate had been treated by shoving the prolabium almost into the columella and bringing the lateral lip flaps together below it. At 15 years of age, short bulging prolabium columella, flat nasal tip with kinked alae, flaring alar bases, tight upper lip and protuberant lower lip and receding chin added to the general problem of cerebral palsy.

The prolabium was freed, thinned, rolled on itself and advanced into the columella with relief to the nasal tip. The upper lip was divided in the midline and an Abbe flap transposed into the defect. The pedicle was divided after 14 days.

Six months later, corrective rhinoplasty included reduction of alar cartilages, lowering of the bridge, septal shortening, bilateral osteotomies, alar base wedge resections, submucous resection and septal cartilage strut in the columella to elevate the tip.
Prolabium into columella and Abbe flap

This bilateral cleft lip and palate was treated in infancy with lateral lip flaps joining beneath the prolabium. A central flap was taken out of the prolabium to lengthen the columella. At age 22 years the upper lip had no philtrum or cupid’s bow and was flat and unnatural. The slightly short columella ended abruptly in the lip, as did the alar bases, with no natural flow of contour along the nostril sill.

The prolabium was elevated out of the lip, split and advanced into the columella with the tails joining the alar bases across the nasal floors as nostril sills. A midline shield-shaped Abbe flap released the lip, producing at least the semblance of a philtrum. The pedicle was divided after 10 days.
Lip scar into columella and Abbe flap

This 20-year-old Cuban elevator operator, who had had four operations on his bilateral cleft lip and palate, was seen in consultation in Miami in 1963. He revealed a flat, almost bifid nasal tip with flaring, crinkled alae and a short, retracted columella. His upper lip was tight and retracted. It had a mass of scar in its center and no vestige of the prolabium. The lower lip was protuberant. A plan for surgical rehabilitation was outlined.

In 1964 this letter arrived:

Dear Doctor,

I am writing to you this letter to remind you about my operation. Please, doctor, I hope you don’t forget about it, because this is one of my best wishes and hopes in the world.

The other day I saw a girl and I asked her if she wants to be my girlfriend, and she told me "no," you know how I feel after that, because I think because of my defect she didn’t want to have anything to do with me.

Thank you doctor for everything that you can do for my lip and I will appreciate it forever.

The scarred central portion of the lip was advanced and rolled on itself to lengthen the columella. The alar cartilages were reduced. The lip was divided in the midline and freed from the maxilla. Into this gap was transposed a 2 cm. (skin length) Abbe flap. The pedicle was divided after 13 days.
Four years later, the alar bases were reduced and alar margins sculptured. As there had never been any cartilage left in the septum, a small Silastic implant was inserted into a pocket in the columella but only as a dormant contour builder and not a working tip lifter!

The following year the patient had a final island flap pushback of his palate and a minor nasal revision resulting in good facial form and function.

The patient has flourished, mustached and married!
Prolabium into columella and Abbe flap

This 31-year-old medical student had been born with a bilateral incomplete cleft of the lip and a white forelock. His bilateral lip cleft was treated in Minneapolis with a Blair-Brown-type closure with lateral lip triangles touching under the prolabium. This left the lip tight in its lower border with inversion exaggerating the redundancy of the lower lip. The columella was slightly short with the nasal tip mildly depressed.

The prolabium was elevated out of the lip, thinned, rolled on itself and advanced along the septum to raise the tip and lengthen the columella. It was split at its inferior end. Subcutaneous pedicles developed under the alar bases were advanced and sutured to each other on the septum at the nasal spine. Then the alar bases were sutured to the split ends of the columella to reduce the alar flare and create nostril sills. The result was a 1.4 cm. philtrum-shaped defect in the upper lip, which, including osteotomies, alar base wedge resections, submucous resection and Abbe flap. The inferior lip flap based on the coronary vessel was rotated 180 degrees and inset, and after eight days the vessel pedicle was divided. Although this action balanced his face and improved his nasal and labial relationship, he proudly proceeded to grow a luxurious mustache.
It is of special interest that this patient's daughter was born with an incomplete unilateral cleft of the lip, a bilateral cleft of the palate, normal hearing (at three months) and the white forelock. She had a lip adhesion, soft palate closure and myringotomy with tube insertions at three months, and a rotation-advancement lip and nose correction at seven months and is progressing well.

**NASAL TIP DEPRESSED WITH PROLABIUM ALREADY IN COLUMELLA**

When there is no prolabium in the lip because it has been shifted into the columella (but not sufficiently to raise the nasal tip), the
The columella has to be rereleased, and the alar cartilages must be sutured together to support the tip. The vertical midline scar in the tight upper lip can be excised and an Abbe flap fashioned long enough to extend into the columella to make up the deficit. Depending on the columella defect, the tail of the Abbe flap may be maintained as a point or trimmed as a blunt fork. In 1971 Onizuka of Tokyo specifically designed a longer Abbe flap to be used both for release of the tight upper lip and to fill in the lower portion of the columella after the short columella had been shifted farther into the nasal tip.

It is interesting that in 1968 Vilar-Sancho Altet and I independently designed similar columella construction with an extended Abbe flap in median clefts. Do not forget the value of a couple of autogenous septal struts inserted in the new columella to help maintain nasal tip lift.
There are certain cases in which several procedures have made subtle improvement in the total effect. The deformity is not always glaring, the solution not necessarily exciting, but the little change makes everyday existence a little easier as it helps the patient blend into his surroundings without being constantly picked out as odd or just different.

A ROUND TIP AND A REENTRANT ANGLE

This bilateral cleft of the lip and palate had been operated on in three excellent medical centers. A wide Abbe flap had already been transposed and a Silastic implant to the nasal tip had been and gone! The patient was a pleasant 18-year-old girl with a suggestion of a parrot’s beak of the nose and inequality of scarring of the lips.
Through the Potter-type marginal “flying bird” incision, the
columella skin was elevated, presenting exposure for bridge
lowering and alar cartilage reduction. Subcutaneous tissue and a
cartilage strut in the columella were turned up for nasal tip
support and columella reduction. A V-Y advancement length­
ened the upper lip slightly.

The roundness of the columella in profile was exaggerated by
the reentrant nasolabial angle. Six months later, despite previous
incisions, a midline vertical ellipse of excess columella skin, based
on a subcutaneous pedicle directed inferiorly, was incised and
advanced down into a releasing incision across the retracted
nasolabial angle where the columella joined the lip.

Final improvements included minor scar excisions and sand­
paper abrasion. The abrasion was aided by a common trick of
painting methylene blue over the irregularities to mark the pits and to ensure complete de-epithelialization.

After the last surgery the patient faced her greatest test when she started teaching. She wrote a happy note that the students had accepted her—but she says it best:

I am so excited and pleased with my surgery. The redness and roughness were gone within a very few days. I have gotten so many compliments on your work. I started my teaching field experience and I passed the greatest test of all. Usually with first question I ask how they are the children is what has treated my face. They have been told to me if they can tell the other they have asked but are very happy. Soup that make me feel good.

AN OVERTREATED COLUMELLA

Here the columella of a bilateral cleft lip and palate had been lengthened, probably then became retracted and was overtreated with a Silastic implant. At 14 years, the nasal tip was flat, the alae were flared, the nostrils were without sills, the columella was thick and prominent and the central vermilion of the lip showed a whistling deformity.
R.R. The alar bases were advanced across the nasal floor to reduce the flare and create nostril sills. Midline longitudinal elliptical excision of the columella and removal of the Silastic implant reduced the mid-column. Reduction of the alar cartilages and the hump and bilateral osteotomies and alar cartilage folded as free grafts to the membranous septum improved the nose. A V-Y advancement posterior mucosa created a tubercle in the whistling deformity of the lip.

THE SHARP-ANGLED NOSTRIL AND COLUMELLA RETRACTION

This bilateral cleft lip and palate patient, after an untold number of surgical procedures, presented retroposition of the maxillae, most noticeable in the alar base areas, a columella with retraction, a peculiar asymmetry of the nostrils, a protuberant lower lip and a receding chin.
Cancellous iliac bone grafts were placed between the maxillae and the prexmaxilla and under the alar bases. A Silastic sponge was inserted through a labial sulcus incision to improve the chin projection, and a wedge resection of the lower lip reduced its protuberance. Then a reduction rhinoplasty was carried out, and cartilage from the hump and septal submucous resection was inserted into the columella through a midline vertical skin-splitting incision. Finally, a left alar marginal "excision" was retained as a flap based superiorly and medially and transposed back into the vestibule at the top of the arch to round out the sharpness of the ala-columella angle and to symmetrize the nostrils at the same time.
The patient would now benefit by an Abbe flap and eventually may accept it.

**GRIDIRON LIP SCARRING**

A 17-year-old girl, born with a complete bilateral cleft of the lip and palate and a pair of mucous pits of the lower lip, was treated at various U.S. naval hospitals and provides a case against the armed services' shifting of patients from doctor to doctor. Evidently the lateral segments were attached to the prolabium primarily, resulting in the usual stretching and flattening of the prolabium, which bulged against the projecting premaxilla.
At one stage, as shown, circumalar cheek incisions were used, probably in a frantic attempt to mobilize the cheeks to aid the lip. A Gensoul-type flap was shifted into the columella, with reasonable nasal tip release, but the price of this maneuver totaled three vertical scars in the upper lip, which also tightened the lip to even more noticeable flatness.

This situation stimulated another surgeon at another naval hospital to call upon an Abbe flap. It had to be taken from an unsatisfactory lower lip that had previously had a pair of mucous pits excised and reexcised. The cost of this action was the addition of two more scars or a total of four vertical upper lip scars, not unlike a gridiron.

When first seen as a secondary problem, the patient was 17 years old with a retracted columella, cheek scars, a flat lip with four vertical scars and one scar of the lower lip. Her maxillary and
mandibular relationship and occlusion were considered within normal limits by orthodontist Berkowitz. Even more impressive was her cheerful, optimistic and appreciative personality.

Bilateral upper labial sulcus incisions with back-cuts allowed freeing of the labial mucosa and its medial advancement. After the orbicularis oris muscles had been sutured together behind the prolabium, the posterior mucosal flaps were rotated and sutured, giving more fullness to the free border. A submucous resection of septal cartilage supplied two struts, which were introduced into the columella to relieve its retraction and give improved definition to the nasal tip.

S.M.R.
S.C.S.2

The flatness of the lip and the absence of the cupid's bow inspired the use of my modification of the cupid's bow operation. As the lip was not long vertically, it was necessary to keep this a
“mini” procedure, further bolstered by the grafting of subcutaneous tissue in the mid-tubercle area. Sanding abrasion of alar base, cheek and all four vertical lip scars gave some improvement. The final result has been touched up with routine makeup.

ASYMMETRIES, ANGLES AND BORDER SCARRING

This bilateral cleft patient was born one of twin girls. Over her first 10 years she had 14 operations, which included a forked flap, a Cupid’s bow procedure and bilateral commissurotomies. At 11 years of age she revealed a nasolabial angle snubbed abnormally wide open, asymmetrical nostrils, scarring of the normal mucocutaneous junction ridges and destruction of the natural commissure angles with widespread irreversible scarring. The upper lip was slightly tight in relation to the lower, but its vertical height was within normal proportions. This result represents inartistic use of accepted standard procedures, which while improving the original deformity also creates some extremely perplexing secondary problems.

I first saw the patient at 11 years and stalled secondary surgery for six years, during which time more thought and worry were spent on her than on any other cleft case in my experience. In the first place, the problem was extremely difficult because a Cupid’s bow operation had scarred the natural mucocutaneous ridge and a forked flap had lengthened the columella with asymmetry and an unnatural nasolabial angle. As the little patient and I shared
Finally, at 17 years, a cleft lip rhinoplasty included alar cartilage reduction, bridge lowering, and septal shortening at the nasal spine. A V-Y lateral advancement of the alar bases opened the nostrils and lowered the strangely elevated nostril sills. Upper labial sulcus incisions with bilateral mucosal advancement gave the lip more freedom and body.

One year later, further alar cartilage reduction and more radical bridge straightening followed by bilateral osteotomy improved the general shape. A submucous resection improved the airway and provided septal cartilage struts which were used to improve
the columella. One strut was inserted in the upper columella to give nasal tip thrust; a second strut was used to increase the columella convexity in profile.

Free border vermilion trimming and a soft tissue free graft to the tubercle improved the lip shape.

She is in college and having a happy time.
LOOKING BACKWARD
AND FORWARD, BILATERALLY

As we glance back, it is almost painful to recall how the evolution of a sound, staged solution to the primary bilateral cleft lip deformity has demanded such a prolonged, rugged climb interrupted by side-tracks, dead-ends, drop-offs, detours, lay-bys and back-tracks. True to the motto of striving for the beautiful normal, guided by basic principles and influenced by critical evaluation of results, I am continually trying to formulate and put into action a design that can both promise and produce happy results with minimal secondary deformities requiring fewer corrections and offering greater potential for perfection.

Yet possibly almost as encouraging is the hope that can be offered to those cases in which many basic principles already have been severely violated, producing results that are truly frightening. If the same old principles are conjured up again, they can be used to correct seemingly irretrievable secondary deformities and actually achieve end results that are near normal and sometimes even attractive.

Semper investigans, nunquam perficiens.
Always seeking, never quite achieving perfection.