

40. *Forked Flap Craftsmanship*

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.

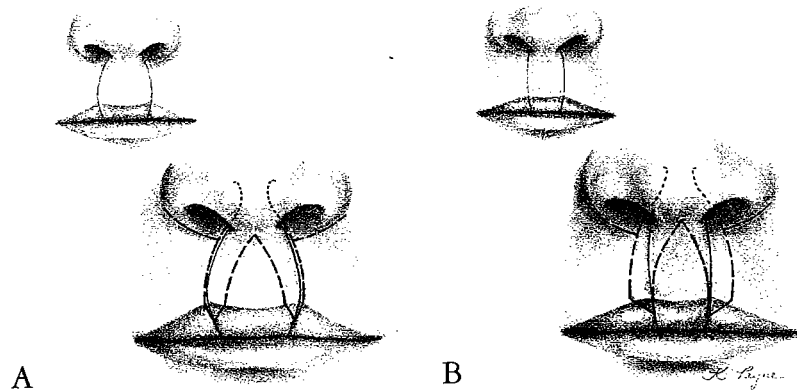
SPARING THE FORK

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

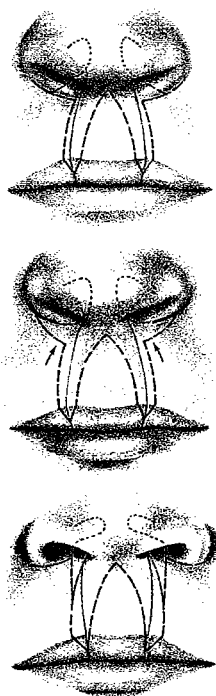
Of course the center guidelines are the old bilateral scars. Forked flaps are hardy and have survived old scars crossing their base and body. In fact, I do not recall a loss, and the forked flap has been taken out of many a maze of scar.

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.

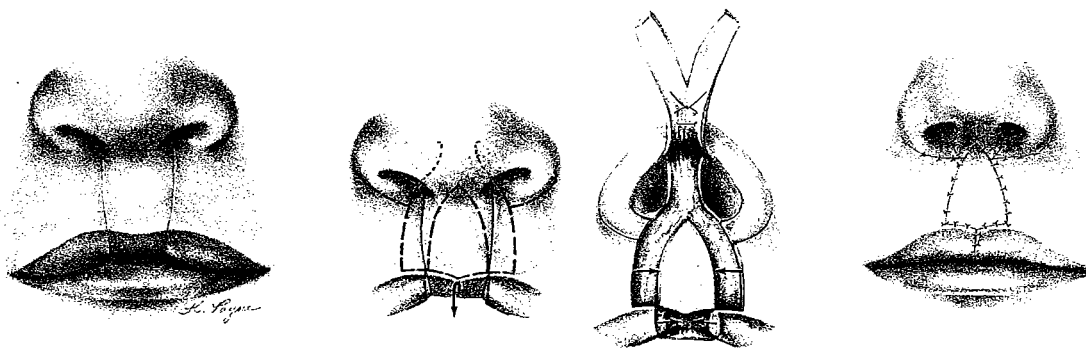
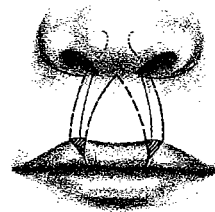
DEPTH OF FLAPS

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.

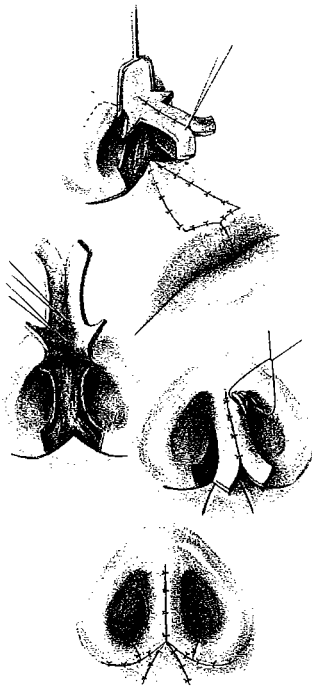
Masters and Craft in 1974 also acknowledged the advantage of this vermillion advancement in association with the forked flap.

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

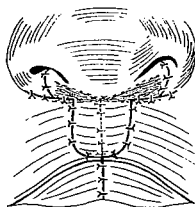
floors, but it is there nonetheless, and available three weeks, three months or three years later when the straps are recut and advanced into the columella.

CASES IN POINT

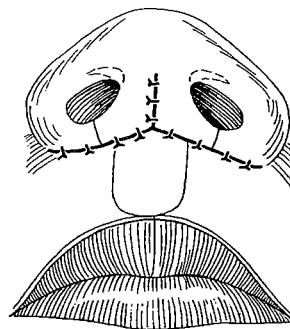
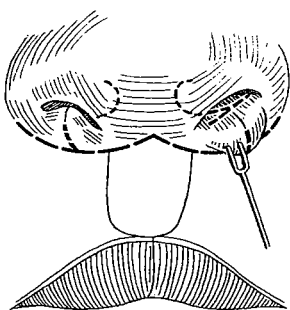
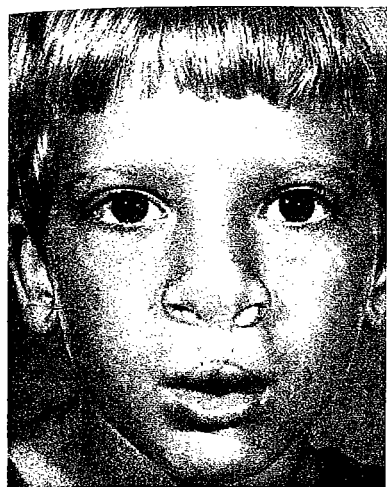
A bilateral complete cleft of the lip and palate was closed in infancy in New York. Lateral triangular flaps were inserted below the prolabium without joining the muscles or creating an upper sulcus. There resulted a wide prolabium and an irregular arrangement of the free border with the suggestion of 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.



3 years



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.



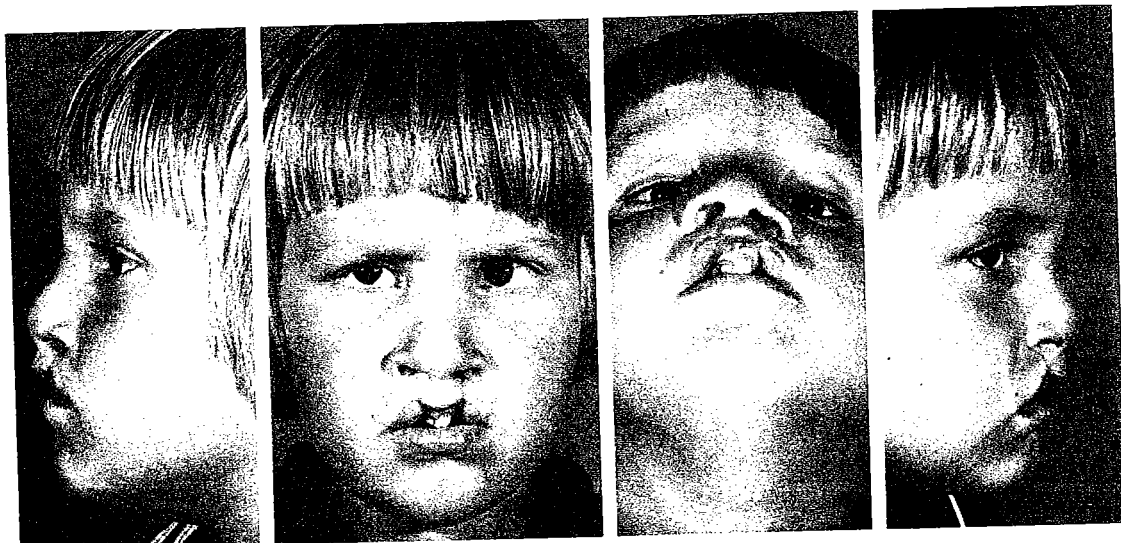
At age 16 years, two long autogenous septal struts will be used to fill the columella and give that extra permanent lift to the nasal tip.

The forked flap can also be banked secondarily in whisker

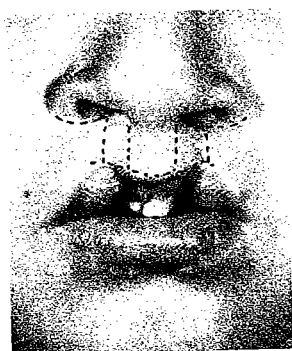
fashion and, any time after three weeks, can be advanced into the columella.



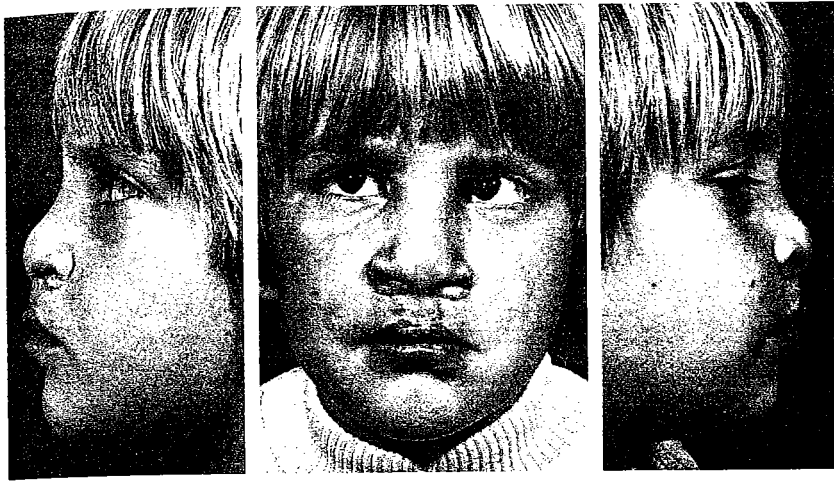
This 6-year-old boy had his bilateral cleft lip closed in Louisiana in almost an adhesion-type procedure in infancy.



6 years



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 mucocutaneous 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.



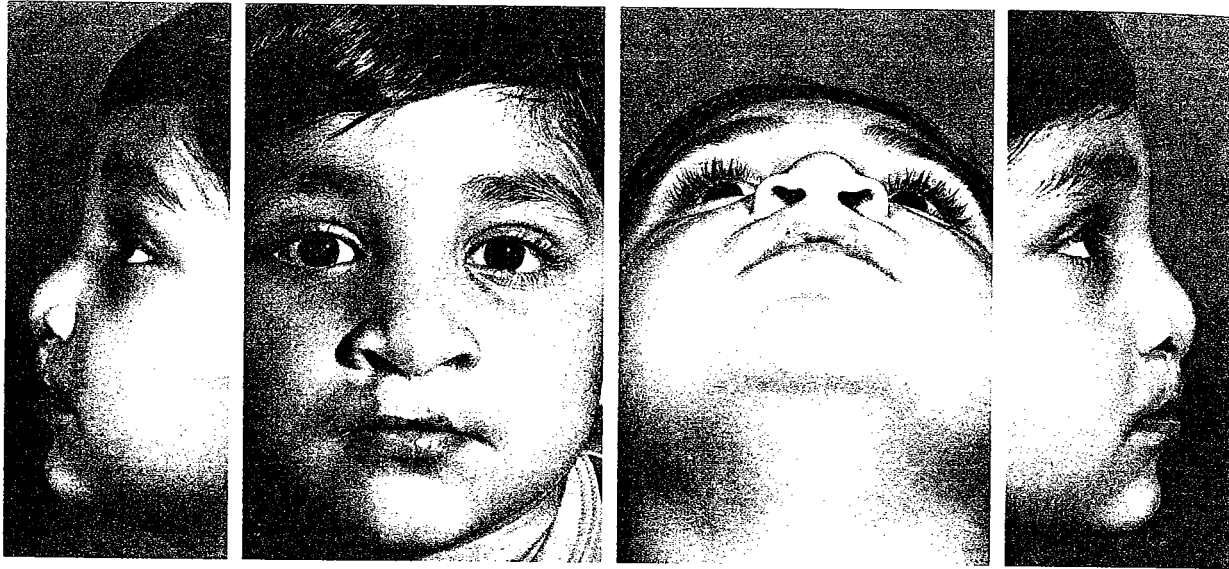
Six weeks later the forked flap was reelevated. With the aid of an inverted V incision at the columella base and a membranous septal incision extending bilaterally high in the vestibule, the nasal tip was released. Small lateral flaps cut from the sides of the forked flap were inserted into the darts 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.



7 years

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

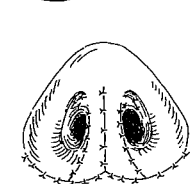
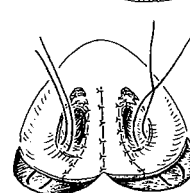
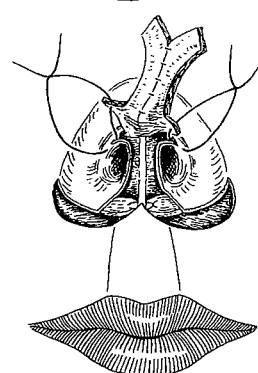
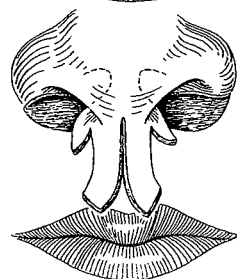
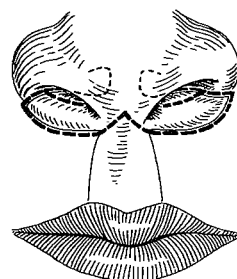


Mersilene suture picking up dermis in this split was sutured down to the newly united muscle to suggest a dimple. The better portions of the free border vermilion on either side of the prolabium were used to overlap a turndown flap of prolabium vermilion to produce a tubercle. The prongs of the forked 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 $\frac{1}{2}$ 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.



4½ years

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.

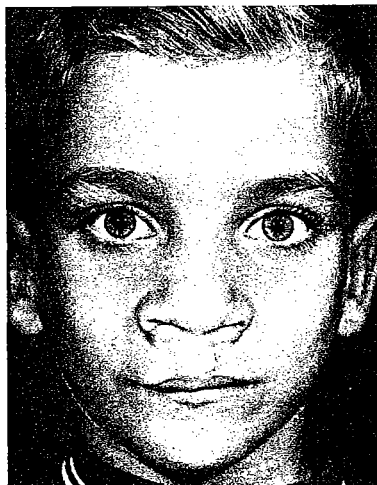
Finally, at seven years, a secondary forked flap was banked in whisker position so that the lateral muscles could be joined behind the reduced prolabium. Six months later, the forked flap was shifted into the columella. One modification is of interest. V-shaped extensions on the banked fork were taken from the nasal floor, and as the forked flap advanced along the columella,



6 years

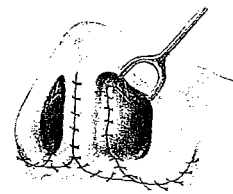
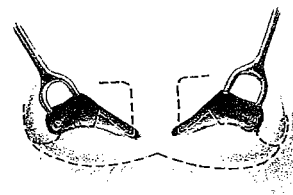


6 years



Banked fork

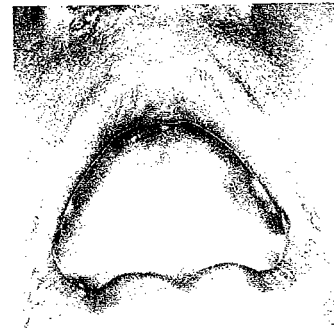
these side flaps fitted into the bilateral vestibular releasing incisions to give a more secure tip elevation. This also facilitated medial advancement of the alar bases with their subcutaneous extensions being sutured with 4-0 Mersilene to the nasal spine. It is well to overcorrect the snubbed nasal tip because in adolescence when the nasal bridge develops the nose will grow into proportion.



Fork up



Tip up



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.

