

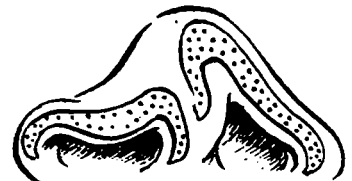
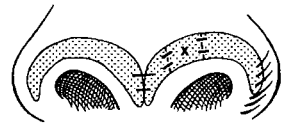
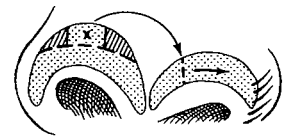
51. Cartilage Grafts

THE cleft side alar cartilage is notoriously "weak-kneed" and even when shifted into normal position does not possess the body and character to stand up against the depressed dorsal skin mold. Consequently, surgeons have turned to additional onlay and strut cartilage grafts.

In 1932 Gillies and Kilner recognized the need for a supporting graft of cartilage in the nasal tip. Barrett Brown preferred preserved L-shaped costal cartilage for nasal bridge and tip support and later used cadaver cartilage preserved in merthiolate. Ed Lamont of Hollywood, California, in 1945 suggested severing the cleft-side alar cartilage at the arch and dissecting the lateral crus to let it slide and then introduced a piece of alar cartilage from the opposite side into the gap. Lamont also advocated rib necrocartilage preserved in formalin and merthiolate for nasal bridge and columella struts. He reported 62 cases with such cartilage, some of which still appeared intact and responsible after as long as three years.

For severe alar slump Gillies, by 1952, had transferred his preference to onlay grafting:

When the deformed alar cartilage is too flimsy to support the nostril arch, it prolapses across the nares. . . . It seems a better principle to reinforce the flimsy cartilage with an additional piece overriding it. Dissect a tunnel under the nasal skin but over the sagging alar cartilage and insert a relatively long strip of autogenous auricular or even ox cartilage, which as a bow-spring arches from a little pocket at the base of the ala to the nasal tip. . . . Needless to say the general improvements in the nose, such as removal of an objectionable hump, will improve the ultimate result. Do not forget the value of shortening the whole nose in cleft lip.



*but not
ox cartilage!*

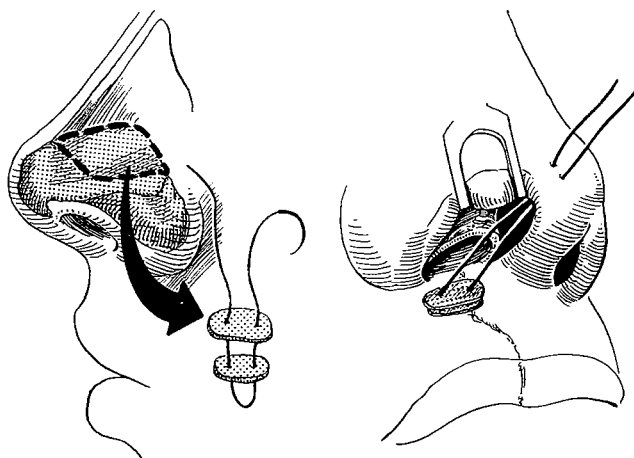
MUSGRAVE



Ross Musgrave

In 1960 Ross Musgrave, artist, actor and sports aficionado, with his chief, Milton Dupertuis of the University of Pittsburgh School of Medicine, wrote a classic on the cleft lip nose. They proposed taking a large part of the superior and lateral portion of the bulbous alar cartilage on the so-called normal side and using it as an onlay graft on the cleft side. This was carried out through a rim incision along the margin of the involved side allowing excision of any excess skin and cartilage on that side. In Melbourne in 1971, Musgrave, dressed in his usual Esquire attire, gave details of the latest fashion in technique of his onlay plan:

It is now almost routine to excise completely the cartilage of the lateral alar crus on the uncleft side, even extending this excision into the alar dome. This tissue is subsequently used as a two-layered "life-boat" cartilage graft holding this in its previously marked location by a mattress suture of 4-0 chromic catgut tied over a ball of cotton.



This tiering of the alar cartilage has become popular and has been copied in various ways.

COSMAN

From 1961 to 1964 Bard Cosman, at St. Albans Naval Hospital and later with Crikelair at Columbia-Presbyterian Medical Center, reported a series of 26 cases, receiving multiple independent maneuvers to correct the unilateral cleft lip nasal deformity. Not once was reference made to Crikelair's earlier advocacy of the

Joseph dorsal external skin excision. Possibly the stigmata of the scar turned the tide. Or was it the indifferent results? In their 1965 paper they outlined a series of interesting procedures, which included septal straightening with a dorsally hinged septal flap, excision of the dome of the normal alar cartilage, total excision of the lateral crus of the cleft-side alar cartilage, free grafting in piggyback fashion of the alar cartilages to the cleft-side alar dome, alar base rotations and excisions and cleft-side alar rim excisions. Total excision of the cleft-side alar cartilage was justified by them because onlay grafting or dissection and lifting seemed to do

. . . nothing to remove the buckle in the middle of the depressed S-shaped abnormal ala . . . and a pronounced tendency for recurrence of this defect seemed to exist. . . .

They even went so far as to suggest cautiously:

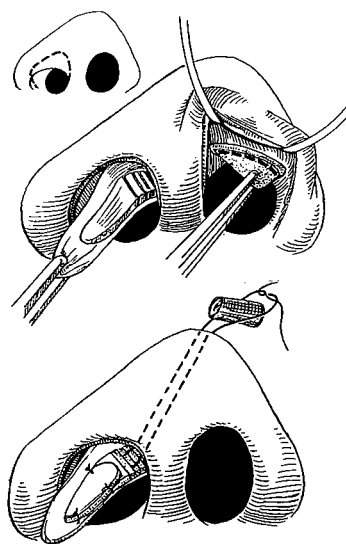
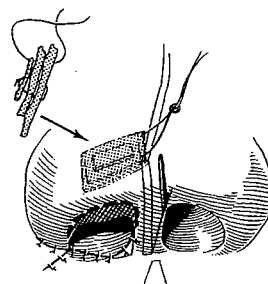
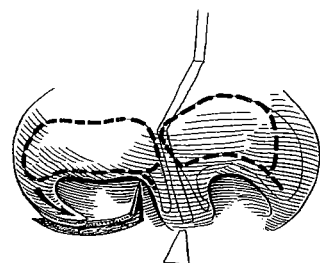
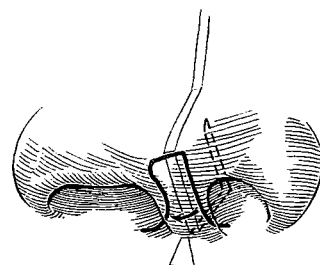
The application of these measures in children can produce striking results but further time must pass before the permanence and the consequences of this early success can be judged.

ANOTHER QUINELLA

Victor Spina of Brazil in 1968 described what he considers a winning quinella in the unilateral cleft lip nose. He combined the marginal alar web excision which I described in 1960, Potter's V-Y advancement of the chondromucosal flap of the vestibule, scoring of the cartilage in the medial portion as proposed by Rees and Converse, bolstering of this cartilage in its lateral portion with an onlay graft from the normal ala as advocated by Musgrave and a Weir half-moon excision of the alar base with a V-Y medial advancement.

ALAR BASE SUPPORT

In 1964 I noted that even after successful rotation-advancement, there could be relative asymmetry in the position of the nasal floor and alar base:



This seems due primarily to a lack of bone in the supporting platform which allows the lip to fall in and the nose to tilt.

A secondary refinement was suggested for certain cases, with acknowledgment to Schmid, Johanson and Schuchardt:

A partial remedy for this problem is the addition of new bone and the method used is a slight variation of that described by Brauer, Cronin and Reaves. The bone of the maxilla on each side of the cleft is exposed by turning mucoperiosteal flaps in to line the nasal side. Then an autogenous rib graft is strutted across the alveolar gap with bone to bone approximation . . . it also balances the nasal tripod and gives the lip and its vermilion the support it needs for symmetry.

The italics are mine

Thus, it was slightly puzzling to me when after six priorities had been given up to 1964, Jack Longacre, with Halak, Munick, Johnson and Chunekamrai in 1966, reported "A *new approach* to correction of nasal deformity following cleft lip repair" using split rib grafts under the alar base.

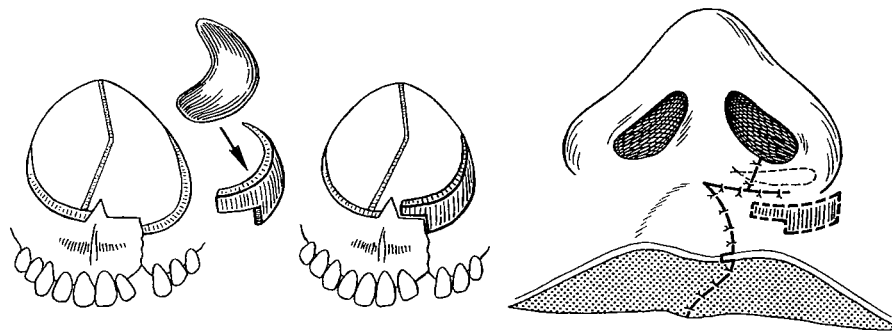
In 1969 Igor Kozin, of the Moscow Research Institute of Cosmetology, described his combination of corrective procedures for unilateral nasal deformity at the time of secondary rotation-advancement correction of the lip. He reported having operated on 121 noses with all patients over 15 years of age, and the case he published was impressive.

Using what he referred to as a modified Pauer incision in the shape of a bird along the free edge of both nostrils, he freed up the flattened alar cartilage. With the aid of an S-shaped septal incision, he straightened the anterior portion and fixed it between the normal alar cartilage arch and the advanced flattened arch from the cleft side with "kapon mattress sutures." Kozin also placed homologous cartilage grafts in two strategic positions. One was used to fill the lateral defect after medial advancement of the alar cartilage. The second was a craftsmanlike half-cone with a step he described in 1971 as:

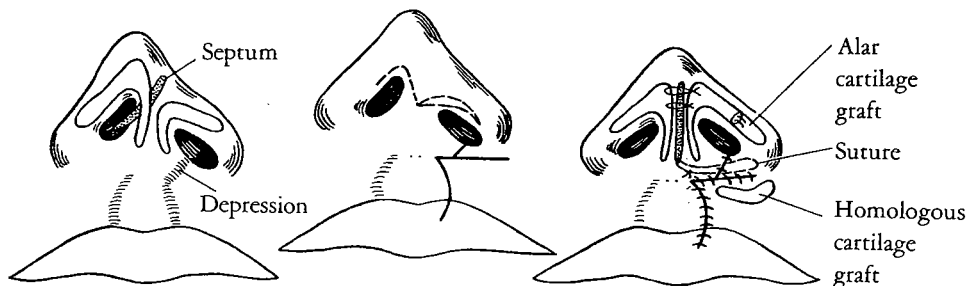
The shape of a narrow and bent triangle with a notch at its base facing forward and downward with its apex facing backwards.

He advocated its insertion into a tunnel under the alar base to build up

the insufficiently developed pyriform aperture and alveolar process of the maxilla.



In 1972 Kozin repeated this general plan in three rare cases of unilateral cleft lip nose without cleft lip. His interpretation is interesting:



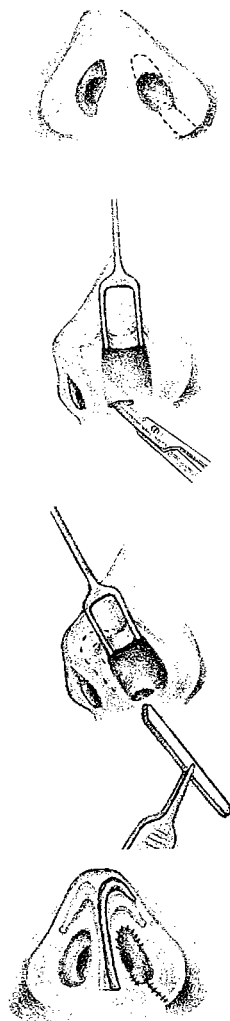
The rare deformity of the nose as in unilateral congenital cleft of the upper lip, but without any sign of cleft in that lip, explains how such a deformity may develop even after successful primary cheiloplasty.

This is why most patients who had a successful cheiloplasty performed in their childhood, require surgical correction of the nose at an adult age.

UPRIGHT SEPTAL GRAFTS

In 1964, after another plea for primary correction of the nose as occurs spontaneously with the rotation-advancement lip closure, I described a secondary nasal procedure which has been effective in certain cases:

When the rotation-advancement approach has not been used primarily and the nose reaches maturity with the original classical cleft characteristics then the correction is more difficult and calls for a five-point plan. (1) The anterior septum can be freed, weakened, shifted and fixed into the midline. (2) A modified rotation-advancement can correct the columella shortness and slant and, at the same time, reposition the alar base and



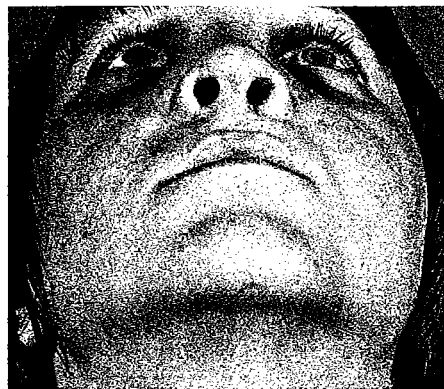
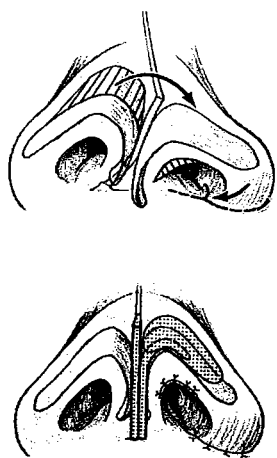
narrow the nostril floor. Usually an elliptical excision of the wide nostril floor is sufficient. (3) Three-fourths of the normal alar cartilage is used as a free onlay graft to bolster the flat side and is inserted through (4) the alar web excision. (5) Because of the poor quality of the flattened alar cartilage on the cleft side and the need for actual thrust in the tip support, a *septal cartilage strut* has been found most effective.

Septal cartilage removed during the usual submucous resection is cut into two long (3 cm. \times 3 mm.), slender strips. Through a stab at the base of the columella on the flat side a narrow pocket is dissected just under the skin anterior to the medial crus up over the alar arch. The inferior blind end of the *cul de sac* presents a dependable platform for the thrust of the strut. When one or two septal strips are forced into the pocket the spring of the cartilage lifts the slump out of the alar arch. The combination of septal correction, nasal floor excision, alar web excision, alar cartilage onlay graft and septal cartilage strut is preferred to methods requiring external incisions such as the unilateral columella-tip advancement or the external excision of Joseph.

Reduction rhinoplasty. Of course, in addition to these specific actions to correct the asymmetric deformity, any unattractive aspect of the nose whether hump, hook, length or width deserves the service of osteotomy and septal shortening. Any or all aspects of reduction rhinoplasty are available and should be used to shape the cleft lip nose to its best potential.

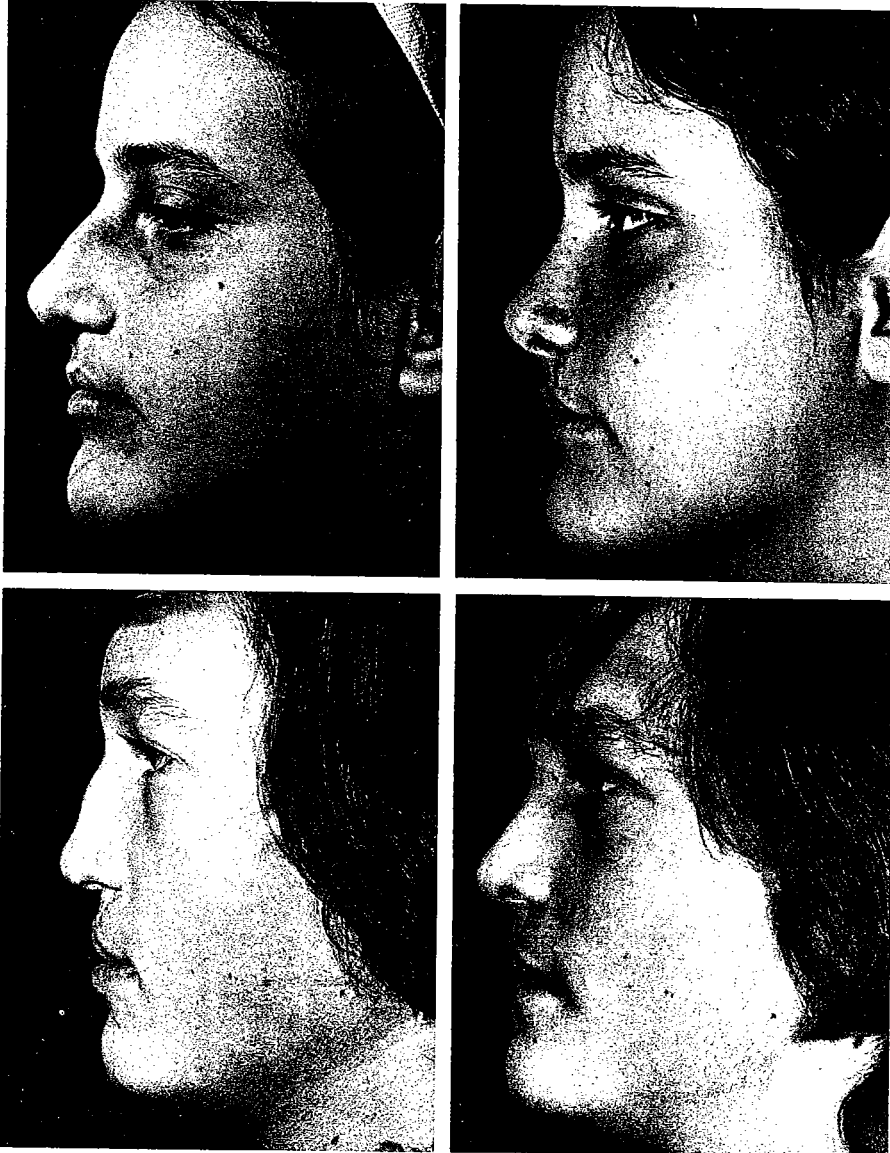
Two septal struts

A nine-year-old boy with a reasonable LeMesurier lip closure, presenting the usual secondary nasal deformity, had medial advancement of his alar base and excision of his alar rim web. Then, at 16 years, three-quarters of the normal alar cartilage was resected and grafted as an onlay over the cleft alar cartilage. A submucous resection opened the airway and procured enough septal cartilage to shape two struts to be inserted into the columella. One was inserted exactly vertical as central tip support,



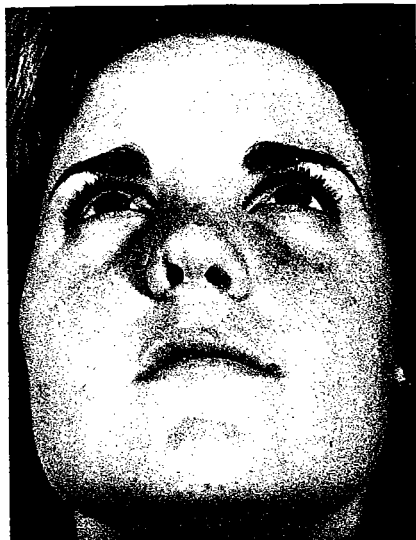
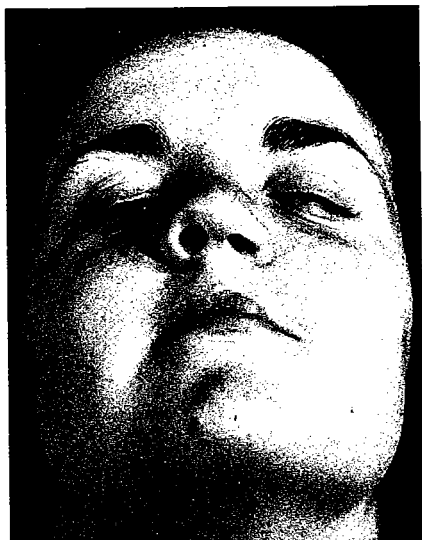
the second was longer shunting under the slumped cleft side for extra support.

In fact, there are cases, such as these shown in profile from the cleft side, in which the reduction rhinoplasty will play as important a part in the final improvement as did the alar lift, alar base advancement and septal cartilage strut to the tip.

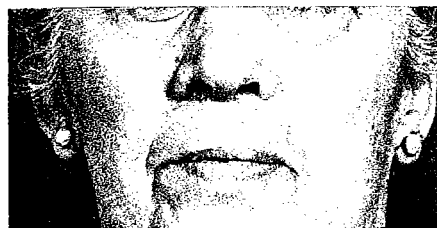
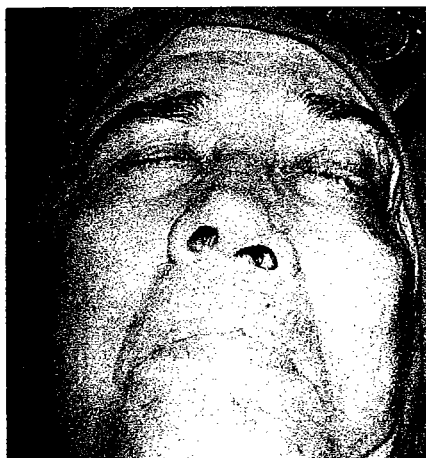


Yet, it is the combination of reduction rhinoplasty and specific cleft lip nasal procedures plus lip correction that produces the best results.

Here are four cases demonstrating this combined action which were published in *Plastic and Reconstructive Surgery* in August 1964.



This young woman had a reduction rhinoplasty plus an alar web excision, septal cartilage strut to tip in columella pocket, alar wedge excision on normal side and small midline Abbe flap.



This 63-year-old woman suffered with this secondary deformity until alar web excision, alar cartilage onlay graft, nasal floor reduction, septal cartilage strut through columella pocket to cleft-side nasal tip and lip revision were carried out.



A Jamaican boy with tight upper lip and difficult nasal deformity was corrected with osteotomy, septal shortening, alar web excision, alar cartilage onlay graft to cleft side, alar base positioning, septal cartilage strut through columella pocket curving under cleft side ala to support tip and midline Abbe flap.



This young woman had a reduction rhinoplasty with bridge shaping, osteotomy, three-quarter normal alar cartilage used as onlay graft to cleft side through alar rim incision, septal cartilage strut in columella pocket to support slumped tip and a small midline Abbe flap.

Muir and Bodenham, for Gibson's *Modern Trends in Plastic Surgery*, gave this septal cartilage strut approach a vote of confidence:

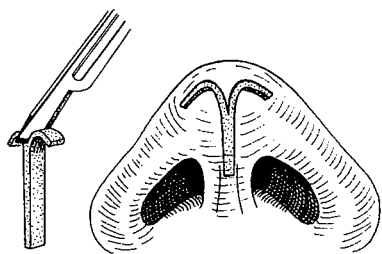
Ear cartilage often lacks the necessary rigidity to have the desired effect, and the Millard (1964) septal cartilage graft is stiffer and preferable. . . .

The method has been modified, is still found of value and will be described in detail.

In 1969 Paul Tessier spoke of his sagittally split septal graft:

Even in favorable cases, it is always worthwhile to assure the projection of the point with a solid support.

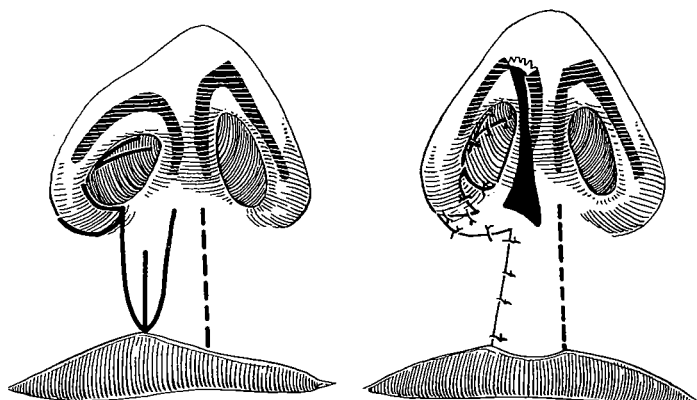
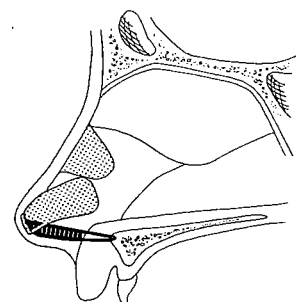
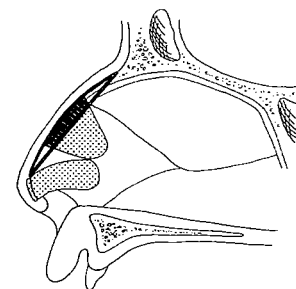
In this regard, septal cartilage is irreplaceable. For the last three years, the "fleur de lys" graft which fills out the domes has given us results quite superior to those obtained previously. This bilateral graft is preferable to the unilateral graft since the normal side suffers from the shortness and retraction of the cleft side.



ANOTHER EFFECTIVE COMBINATION

For the unilateral cleft lip nose, Neuner also combines several procedures in his striving for correction. He splits the tail of

a one-sided forked flap, which is transposed as nostril sill, being interdigitated with the tip of the alar base. To this he added a Potter V-Y of intranasal mucosa and cartilage, scoring of the deformed alar cartilage dome and suturing of the medial crura. As an extra crutch, he used the nasal hump as a strut inserted into the columella to support the unilateral slump of the alar dome, similar in principle but different in angle to my septal cartilage graft.



GORNEY'S GULL WING GRAFT

In 1972 artistic Mark Gorney, with Edward Falces of St. Francis Hospital, San Francisco, presented the gull wing auricular conchal graft for nasal tip support. The first cases were done at Children's Medical Relief International, Saigon, in 1970.

In 1973 Gorney noted:

Sometimes one is faced with the fact that whatever you do to a post-cleft nasal deformity, by whatever technique, falls short of the ideal. We feel that this happens for two reasons:

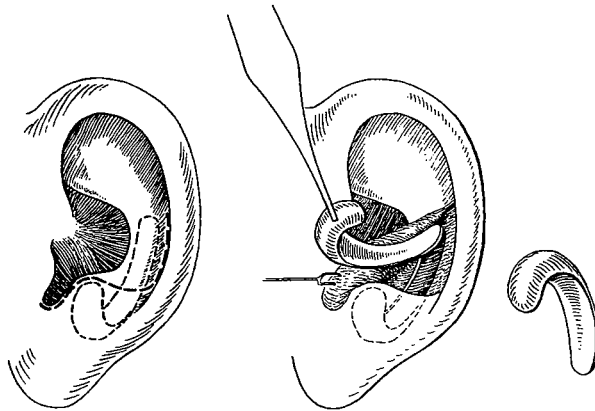
1. There is not only a deformity of shape and position of the alar cartilage; there is not enough of it.

2. Most techniques for repair are based on the principle of suspension and do not take into account gravity and growth. One can overcome these objections by adding what is missing and providing structural support to the nasal tip simultaneously. One also substitutes and repairs with nearly ideal material—imitating exactly the normal anatomy. We have found no better way of adding "thrust" to the nasal tip to bring it above the level of the dorsum, and to give the missing fullness on the abnormal side in unilateral cases.



Mark Gorney

Gorney makes an incision inside the helical rim around the antitragus and stops short of the tragus, but he admits the cartilage graft can also be taken through a posterior incision. He takes a cartilage graft shaped like a jai alai basket with the lowest conchal cupped portion to be the alar lift; he uses the left ear for a right unilateral cleft lip nasal deformity, or vice versa.



Here is one of Gorney's cases in which the auricular half gull wing graft was used during the primary rotation-advancement closure of the lip.



Another unilateral half gull wing or jai alai basket graft was used as a tip support during a secondary lip correction.



This example of Gorney's gull wing graft, even in half proportion, is really flying high, with his alar base advance, alar rim revision and unilateral auricular cartilage tip lift. Mark's early result is dramatic.

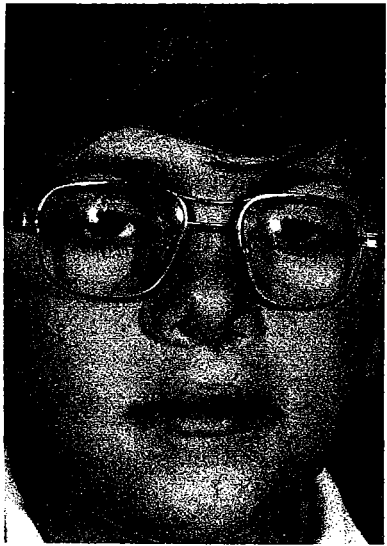


EARLIER NASAL CORRECTION

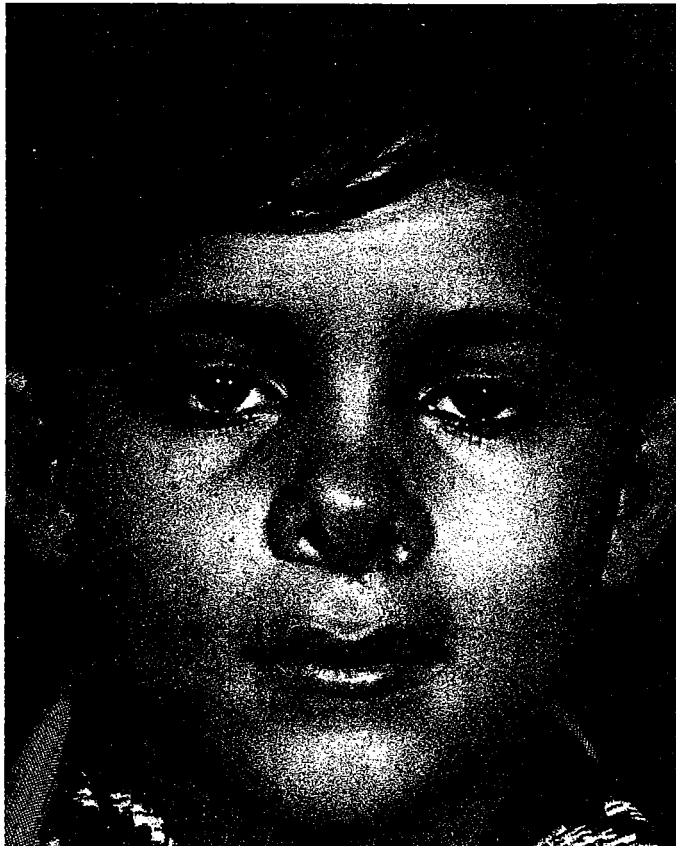


3 months

In this personal case, the alar rim in the original deformity was so severely creased that even after rotation-advancement lip closure and minor nasal correction, the residual knock-kneed posture was still unacceptable. Rather than wait until 16 years for a septal cartilage strut, at 9 years a half gull wing *auricular graft* was inserted from the upper columella around the sharp angled alar arch to round out the curve and improve the tip contour on the flat side. Advancement of the alar base completed the nasal revision. An early photo was taken before he returned to Puerto Rico.

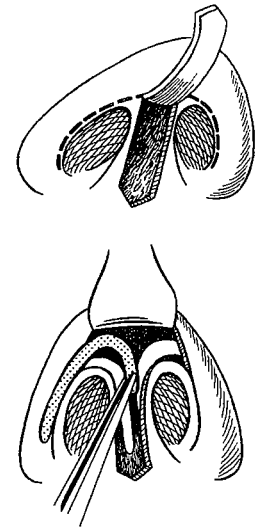


9 years



Norbert Schwenger, of the University of Tubingen, West Germany, uses rib cartilage for his extra support. In 1973, considering the total deformity as one unit, he advocated simultaneous nasal and labial correction and presented several cases, one of which had had a nasal correction and a unilateral placement of an Abbe flap. He noted his preference of Rethi's 1929 decortication technique for "open reduction" of the cleft lip nose, agreeing with Sercer and Mundnich that this incision affords a clear view and thus justifies the disadvantage of visible scars. From this exposure, he sutures the alar cartilages together and the slumped alar cartilage to the upper lateral (triangular) cartilage. Schwenger uses Cottle's septal correction, Trauner's one-sided columella lengthening, Ragnell's scarred muscle flap and Straith's alar rim Z-plasty. In severe deformities, he states:

Very often parts of the cartilaginous structure must be replaced. The required material is either autologous rib cartilage, especially where osteoplasty must necessarily be done, or otherwise a homologous preserved rib cartilage. The preservation is done in cialite, an organic compound of mercury. The cartilage implant serves as a partial or total replacement of alar cartilage, for re-lining nasal dorsum or for improvement of the tip. . . .



*use autogenous
not homologous*

BEWARE THE FOREIGN BODY STRUT

Beware the use of stiff foreign body struts, such as Silastic, in the columella as a royal road to tip lift and support. If well covered, they may serve as quiet contour bolsterers, but when they are called upon to do work, look out! In general, the pocket is too superficial, but more important, there is the danger of perforation when the strut has a lifting work load. Sooner or later the strut will pierce its way through the skin of the nasal tip.

