A Rhinoplasty Tetralogy

Corrective

Secondary

Congenital

Reconstructive



D. Ralph Millard, Jr., M.D.

Preface

Two Americans, J. O. Roe and R. F. Weir, were the first to describe endorhinoplasty. Yet it was Jacques Joseph of Berlin who started with external rhinoplasty but eventually did the most in the first half of the twentieth century to develop and teach endorhinoplasty. He also pioneered many aspects of reconstructive rhinoplasty. In 1931 Joseph produced a remarkable 826-page book, the first 505 pages of which were devoted to all aspects of rhinoplasty. This included an excellent description of corrective rhinoplasty with such detail as alar base wedge resection. It also presented composite auricular grafts, nasal bridge support with ivory, reconstructions with assorted flaps, including prefabricated ones, in the corrective treatment of war trauma, burns, destruction by various diseases, and nasal deformities associated with unilateral and bilateral clefts as well as the bifid nose. No other book since has dealt so completely with plastic surgery of the nose.



This book is an attempt through personal experience over 50 years in the second half of the twentieth century to pick up where Joseph left off in the refinement of the craft of rhinoplasty. This is a series of noses that have been collected in their specific section to describe exactly how they have been treated surgically as a primary operation, as a secondary procedure, as a congenital anomaly, or as a reconstruction. Some of the cases have been previously published while describing a special technique, and others have appeared in relation to fundamental principles. Here they have been diligently filed in order that the reader can find an example of the nasal problem he faces and at least review one or more answers to his specific questions.

In the spirit of this book—and as it should be with teacher and student—the second half of this preface has been turned over to one of my outstanding senior residents, Scott Spiro, who has helped in part of the construction of this book. Naturally he is slightly prejudiced. Here are Spiro's observations:

"The publication of this text comes at a critical time in the genesis of knowledge on the subject of rhinoplasty and in the education of beginning plastic surgeons.

There has been a recent explosion of material on the subject of surgery of the nose, most of it dealing with the specific topic of open techniques to rhinoplastic surgery. These texts, penned by single authors, generally display relatively new techniques with limited follow-up.

Prior to the deluge of information on open rhinoplasty, books on the subject of surgery of the nose were essentially editorialized versions of multiple-author texts. A disappointing characteristic of these books is their failure to adequately cover some of the truly difficult cases one may encounter in the practice of plastic surgery.

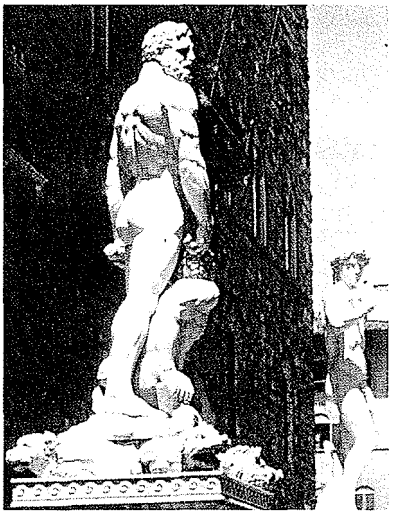
This book is unique. It stands alone in that it is authored by one individual. It fearlessly tackles nearly every conceivable difficult scenario encountered in rhinoplastic surgery. It does so with quality of photography, volume and diversity of material, and the benefit of years of follow-up—all of which make it unparalleled. This is one man's life work; a compilation of tried-and-true techniques placed in a volume that is indeed encyclopedic. The countless pearls contained within serve the beginning plastic surgeon with a sense of security during the pursuit of excellence in surgery."

D.R.M., Jr.

Prologue

A Face Without a Nose Is Almost as Useless as a Sundial Without Its Gnomon

Through the ages man's nose, positioned out in front of his other features, a projecting "bull's eye" of the face, has borne great brunt. It has been mutilated for punishment; shot, blown off, and burned in battle; bitten, avulsed, and sloughed in peacetime; shriveled from within by disease; scorched by the sun; eroded by cancer; deformed by surgery; crunched on the road; and punched in the ring.



Even the noses on sculptured human statues, due to their relative prominence and fragility, are prone to injury from weather, vandalism, and accident. It was most depressing for me in 1949 when I observed so many of the noses of the glorious statues in the Uffizzi Gallery in Florence, Italy, revealed the lines of injury where the nose seemed to have been avulsed and replaced. Dr. Piera Bocci, Director of the Archeology Department of the Uffizzi Galleria, explained to my friend, Dr. Giuseppe Francesconi, "Originally many of the statues were stored in the inner part of the crypts. Due to the aging of the building in which the crypts were located, the statues fell down and the most prominent parts such as the nose were damaged."



The great Sphinx of Egypt, built around 2600 B.C. of sandstone, was shaped at the bottom like a seated lion but with the head of a man and the features of King Ka-f-ra. A great part of his nose is missing, while all else seems intact. Some say when Islam entered Egypt, a Muslim destroyed the nose to prove the Sphinx was but a statue. Others say the nose was blown off by Napoleon's cannons. This is unlikely because Napoleon expressed great respect for the antiquity of

Egypt. It is far more likely that the sandstone nose, the most protruding feature of the face of the statue, suffered injury over time from sun, rain, wind, and sand storms.

As the central and prominent feature of the face the nose commands front billing, and even minor nasal abnormalities and discrepancies draw immediate attention. There has always been an inherent desire in man to look like his fellow man and not appear horrible, peculiar, or different. Six centuries before Christ in ancient India a Hindu surgeon, Susruta Samhita, recognized this fact when he wrote, "The love of life is next to the love of our own face and thus the mutilated cry for help." Any deviation from the normal quickly evokes ridicule, as J.F. Dieffenbach said in 1831 of one possessing a mutilation "at whose presence children cry and dogs bark." William Mayo, American surgeon of the twentieth century, expressed it succinctly: " It is the divine right of man to look human." Each of these sensitive surgeons, spanning a period of more than 1500 years, has defined in a general way the basic purpose of plastic surgery.





There has also been a marked variation in the ability of man to adjust to deformity. Comedian Jimmy Durante, whom I had the privilege of interviewing, used his huge nose to plow his way to fame and fortune, while the swashbuckling Cyrano de Bergerac actually came to his death because of a nose of similar size. Between these extremes the rest of us muddle along to the best of our ability. Yet a huge nose, a peculiarly shaped nose, a tiny nose, a nose with part missing, or no nose at all can elicit despair. It has been so poignantly presented by Edmond Rostand in 1891 in the words of his Cyrano de Bergerac: "Yet I can dream how it would be to walk slowly in the moonlight with someone on my arm. Elated, I forget myself; but suddenly why there's the shadow of my profile on the wall . . . " As the nose is front and center, the skill of its reduction, reshaping, and reconstruction is important, and proof of success of the surgical result rests not only in the harmony of its aesthetic proportions, relationships, and symmetry, but in its *naturalness*.

Personal Introduction

I will tell you where I am coming from so you can evaluate where we will be going. If you have no interest in *why* and only want to know *how,* turn to page 1.

From our genes we get our traits and talents and from our early happy associations we develop our ideas of beauty. My father was a small southern town lawyer with integrity and persistence and no artistic talent. My mother was intelligent, skillfully artistic, and beautiful (Daisy Chain, Vassar College, 1915).

I enjoyed art classes in preparatory school and later took charcoal portrait sketching under Conway at Washington University in St. Louis, while studying at Barnes Hospital, and a night course in sculpturing at Wayne State University, while studying in Detroit.

My first exposure to corrective rhinoplasty was as an assistant resident to Beverley Douglas at Vanderbilt University Hospital. Douglas was an inventor and a genius, but he was also a meticulously slow surgeon. Impatient general surgical residents at Vanderbilt dreaded scrubbing on plastic surgery cases. One resident, William Meecham, later to become a famous neurosurgeon, faked a grand mal at the scrub sink and was excused from all plastic surgery cases that week. Another resident regularly autoclaved the morning paper and quietly sat reading it while Douglas puttered along on some intricate case. During my first nose case with Douglas, he removed a hump and carried out other minor corrections for a quite satisfactory result. The fact it took him approximately eight hours could be explained by his meticulous technique and because he did not do a lot of noses.

This experience impressed on me the possible difficulties in rhinoplasty. Being intensely interested in plastic surgery and feeling quite slow-witted at this stage, I welcomed the time to get acquainted with the specialty. Besides, I could bask in the temporary popularity incurred among surgery residents when they knew they could pass their plastic surgery scrubs off on me.

In London in 1948, I observed Sir Harold Gillies do a number of rhinoplasties as he linked principle to procedure and was especially excited by Sir Archibald McIndoe's showmanship and classic technical style in corrective rhinoplasty. I got to do my first corrective rhinoplasty at Rooksdown House in Basingstoke, England, in 1949. Attending surgeon John Barron stood at the back of the room in whispered discussion with a colleague, leaving me free to more or less operate. Occasionally he would call, "Ralph, have you remembered to do the osteotomies?" At Barnes Hospital in 1950, I assisted Louis Byars, observing his smooth technical ability in rhinoplasty, but I was even more impressed by James Barrett Brown's rhinoplasties because of an additional touch of artistry. When he finished a nose and had pressed it to its final shape before placing the splint, Brown always emphasized that if the nose has been done correctly it would retain in healing the corrections observed on the table at the end of surgery.

The second half of 1950 I spent with Claire Straith in Detroit. He did two or three noses a day at $275.00 a nose. He used a profilometer to measure the preoperative nose and to estimate the postoperative result. He made a preoperative plan list of procedures such as hump removal, osteotomy, lower lateral cartilage reduction, anterior septal resection, SMR, and turbinectomy, which he checked off and used *rigidly* to guide him during surgery. It was always a nagging concern of mine what might happen if the wrong checklist inadvertently arrived in the O. R. with the patient! Straith was a remarkably efficient technician. He did not suture the

lining, depending on nasal packs to maintain repositioning, and thus got an occasional synechia. He averaged 20 minutes for a corrective rhinoplasty and submucous septal cartilage resection but his record was *seven* minutes in one case! This concentrated exposure in multiple rhinoplasties familiarized me with the procedures. He allowed me to do secondary surgery on some of his cases and primary rhinoplasties at very reduced fees on any patient I could bring in to surgery. Thus, I spent many a night at dance halls rhumba-ing with the larger-nosed ladies. Occasionally I would have to duck a slap, but more often it was possible to convince them that corrective surgery was in their best interest.

Of all those I observed reshape a nose, however, it was Gustave Aufricht of New York, a student of Joseph, who impressed me the most. A true aesthetic surgeon with autocratic control of the patient and the operating room, he avoided thick-skinned noses and took on only those cases with the possibility of an excellent outcome. He demonstrated practiced, meticulous technique resulting in fine artistic results. There was absolute quiet in the operating room during surgery, but at the completion of the operation Aufricht would invite questions from the observing surgeons. When he asked me if I had any questions after my first time in his operating room, I admitted I was so impressed I would need time even to think of something to ask. We became good friends.

In 1951 as the first chief resident of plastic surgery at Baylor Medical School, I got further experience when a few of the young doctors and nurses at Jefferson Davis Hospital were kind enough to allow me to correct their noses.

When I returned to England in 1952 to write *The Principles and Art of Plastic Surgery* with Sir Harold Gillies, I accompanied Sir Harold on Tuesdays to Harley Street in London. Bored with his own secondary nasal deformities, he let me take on his secondary nasal corrections in the adjoining operating room.

Over the years it has been my good fortune to observe other rhinoplasty surgeons at work. They have included Tom Rees, Ivo Pitanguay, John Lewis, Jack Sheen, George Peck, and Richard Straith and from each I learned something of value.

It was also my good fortune to have part of my training at Rooksdown House, Basingstoke, England, just after World War II while many of the noses severely deformed by bullets, shrapnel, and burns were going through the process of reconstruction. Gillies taught me the use of the forehead flap and the tube pedicle. Then at Barnes Hospital in St. Louis I learned from Brown the art of composite ear grafts to repair alar margin defects and many years later observed Dan Baker's modification of the composite auricular graft with extended preauricular skin for larger alar margin defects.

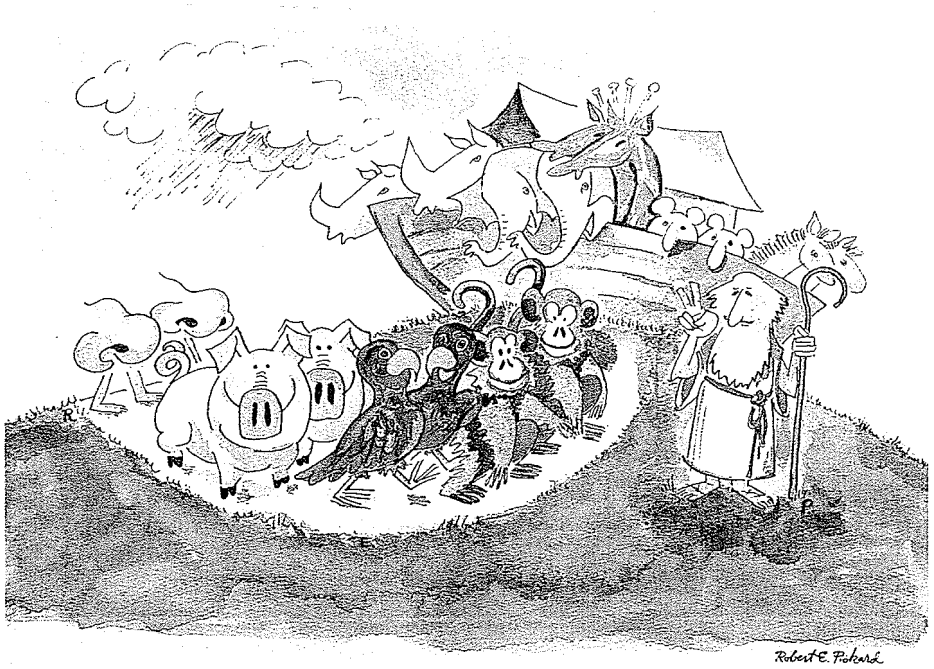
In Korea, as chief plastic surgeon to the U.S. Marines, I had the opportunity to reconstruct Korean nasal deformities resulting from war casualties.

This is briefly the rich but multifaceted background that more or less prepared me to undertake some difficult nasal deformities. I have been willing to take on all cases if the patient seemed psychologically sound. This explains the variety displayed here.

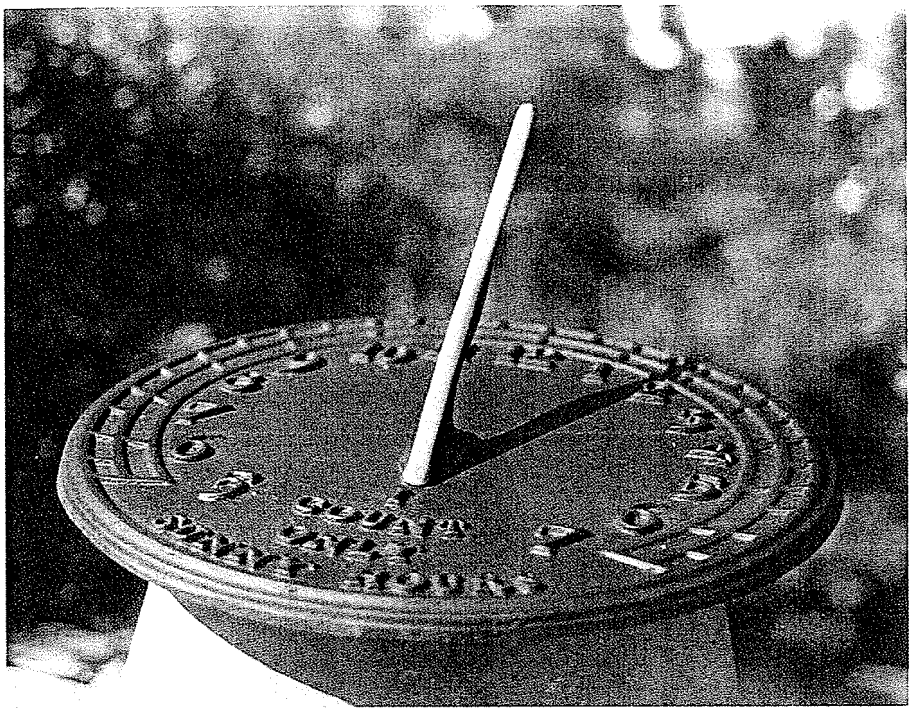
In Biblical history Noah is reported to have built an Ark in preparation for the great flood. Then he collected all animal species and marched them into his Ark, two by two, not only to save them from drowning but to enable them to carry on their species after the flood.

As I have been collecting my cases for this book, so many came in pairs I began to feel a little like Noah. Although under no pressure to get a male and a female, often I have done so. Not confined quite so much for space, it has been possible to bring on more than a pair of examples of numerous problems along with their varying solutions.

When I think back over the work hours involved in all these cases and many, many more devoted to the planning, the actual surgeries, and the postoperative dressings and care,



I get a little weary. A few were routine, many were taxing, some exciting, but most were challenging. Here they are for what they are worth to you and your patients.



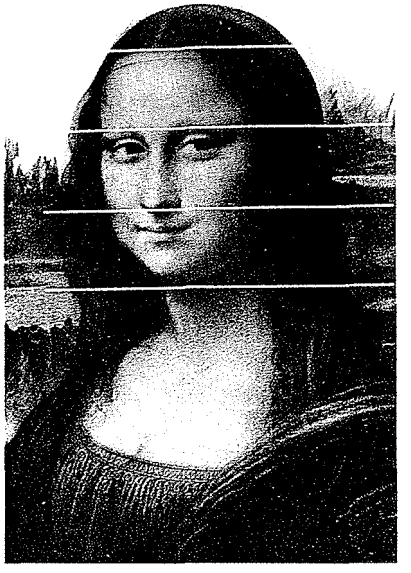


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Corrective, Secondary, Congenital, Reconstructive

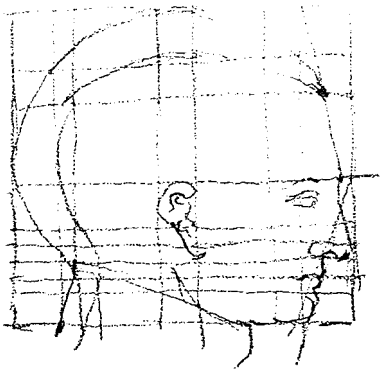
1.
Corrective Rhinoplasty

BOOKS on rhinoplasty invariably devote one or more chapters to anatomy and physiology. They all say about the same thing, because as far as I know anatomy and physiology really have not changed over the centuries. Thus, I am sparing you, the reader of this book, repetition of these chapters because if you have read other chapters on anatomy and physiology you would be bored, and, if you have not, you should do so. Once you understand general normal nasal anatomy then you have the potential to be sensitive to the inevitable individual variation of each nose, and that is essential to accurate diagnosis and adept surgery.



IDEAL, BEAUTIFUL, NORMAL

Great artists like Leonardo da Vinci divided the face vertically into three nearly equal parts: forehead, nose, and lips and chin. Albrecht Dürer's horizontal line extended from the lower lobe of the ear forward to the base of the nose. He similarly divided the face into three parts, one part from hairline to brows, the second from brows to nasal base, and the third







composed of lips and chin. In primary rhinoplasty the most common discrepancy in the three divisions of the face is seen in the long nose or prominent nasal spine, which not only lengthens the nasal proportion but foreshortens the effect of the upper lip.

In 1962 M. Gonzalez-Ulloa established a quantitative plan for the study of the human profile using two imaginary guidelines on the face. The first was the Frankfort or horizontal line extending from the upper margin of the external auditory meatus to the lower orbital ridge; the second was the vertical line extending downward from the nasion, a fixed point on the facial frame, to meet the horizontal line at a right angle. These two crossing lines constitute the axis of a frame from which the following can be mapped out: (1) shape of the skull, (2) angle of the facial plane, (3) size of each segment, and (4) protraction or retraction of each of the constituent segments of the face. As noted by Gonzalez-Ulloa, "In almost all the beautiful faces of history, the relation of the facial plane to the Frankfort line is always very close to 90 degrees, and with all the segments aligned to the facial plane."

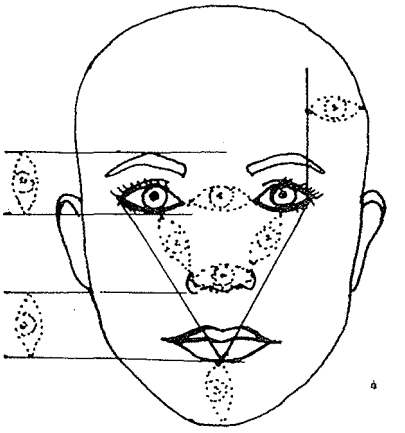
Each race has its own special beauty. For Caucasian beauty the nasal bridge should be reasonably high, straight, and slim. The nasolabial angle should be no more than 90 to 100 degrees in the male and as much as 120 degrees in the female, each with a golden triangle tilt at the tip. In African-Americans, generally the bridge height is low, the tip broad, the columella short, and the nostrils flared. In Asians, the nose seems to lie between Caucasians and Blacks in bridge height, tip width, columella length, and alar flare.

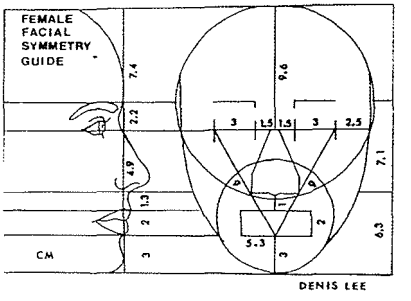
There may be no prototype of classic beauty as crossbreeding mixes traits. Outbreeding among races may at times accentuate the positive to produce beauties such as the exotic Eurasian and Polynesians, Circes of the South Seas, renowned for their beauty of facial blending.

Quest for Guide to Beauty

L.G. Farkas in 1985 discussed the inclinations of the facial profile, art versus reality, comparing ancient to modern, which is worthy of attention.

Medical sculptor Denis Lee in 1982 introduced an interesting female facial symmetry code guide to beauty in the form of a clear plastic to be placed directly over the patient's face or over a one-to-one photograph. The unit of measurement was the width of the female eye, which averages 3 centimeters. The guide was designed after careful measurement of 50 attractive Caucasian women. All of these women's features fit within the guidelines of this device.





University of Indiana medical illustrator Craig G. Gosling polled members of the 1993 meeting of the Association of Medical Illustrators and the Association of Biomedical sculptors on their ideas of beauty. They referred to art anatomy studies done by the masters throughout the ages pertaining to size and proportion of the head and facial components. They were reluctant to get specific. They claimed that since beauty is such a relative, ambiguous, and changing concept depending on views, prejudice, culture, age, and race, no specific guideline was valid. They did agree that moderation was desirable, that too large or too small were easily identifiable as undesirable and something in between was acceptable.



Beauty Is in the Eye of the Beholder

For the Caucasian nose, which is the type I face mostly in corrective, secondary, congenital, and reconstructive rhinoplasty, I prefer a profile that shows an indentation at the frontonasal junction or radix with the relatively high nasal bridge ascending straight until the gentle rise at the tip from the natural prominence of the alar cartilages. The nasolabial angle should be no less than 90 degrees and in the female may be as much as 120 degrees. Yet for me, it is important that the nasolabial angle not be so wide that the nostrils are exposed from front view. Rather if the nasal portion of this angle is broken in its

upper one-third in golden proportion to tilt the tip without further exposing the nostrils, then the effect is provocative. There will be detailed description in how this is achieved.

In noses of Asian and Black patients that I have been requested to alter or reconstruct, the patients have expressed a desire for a nose more in the direction of the ideal Caucasian proportions (i.e., a higher, narrower bridge; a more slender tip; a narrower base with reduction of the flaring alae).

A WARNING

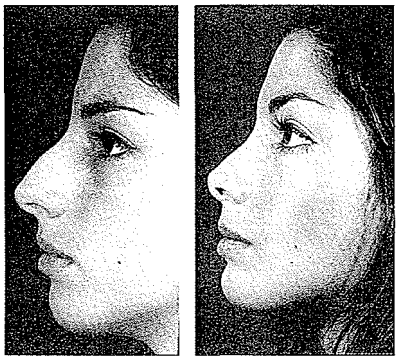
It is generally acknowledged that the penis, the breasts, and the nose are the most psychologically loaded structures operated on by the plastic surgeon. Not surprisingly, of the three plastic surgeons murdered by their patients, one had operated on the penis, one had operated on the nose, and one had shriveled a testicle. This should serve as a warning to us all, and as, so far, only male patients have been the murderers, select your male noses with care and caution. Recently Joan Kron of *Allure* called my attention to an exception when a woman murdered her plastic surgeon after continued pain following a face lift.

CONSULTATION

At the first consultation, I have a list with the primary concern of each new patient noted. When it is the nose, I ask what they do not like about their nose and what they would like to have done. It is essential that the surgeon be cognizant of and understand the true underlying desires of the patient. Only then can the surgeon determine if the requests are realistic, compatible, and possible. If the patient's desires are unrealistic, then the surgeon should attempt to explain what is possible and aesthetic. For instance, a tall patient cannot tolerate a short, up-turned nose because the height places the nose on or above average eye level forcing a view directly into the nostrils. Short patients, on the other hand, usually have people looking down on them so that the effect of the nose is lengthened and there is little chance for a direct view of the

nostrils. In this situation the patient may flourish with a short, moderately turned-up nose.

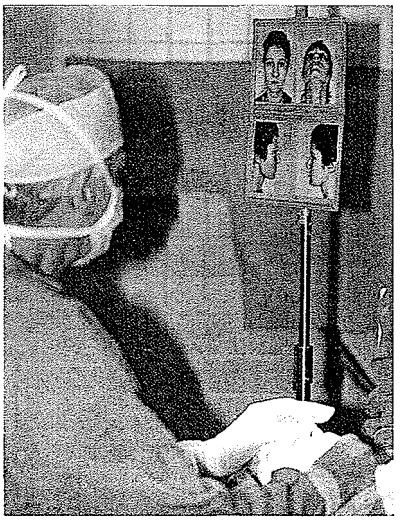
Only if there can be a reasonable meeting of minds should the surgeon accept the surgical responsibility. Once I know the special desires and fears of the patient, I outline my general plan explaining that my goal is to reduce and shape each nose to aesthetic proportions so that it not only looks better but at the same time appears natural. Most patients are happy with this general plan.



Occasionally a patient may have a special request. It is good to know about this before the surgery. This young woman had her bridge lowered but the primary result retained the slightest suggestion of her original hump. A secondary correction was offered but refused as the patient expressed a desire to keep a bit of her ethnicity.

After the consultation the patient sees my secretary who explains any details such as fees, hospital choice, outpatient status, and convalescent arrangements. In cosmetic cases the fee is collected before the surgery is carried out and the patients are happier with their results when the fee is no longer a concern.

Photographic Records



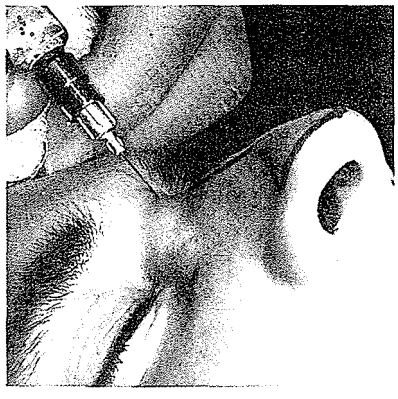
The patient is then directed to the photography room with a slip indicating the photographic views required. In the case of a preoperative rhinoplasty a straight front, a front under the nostrils and both profiles are taken for color 4 × 5 prints and a similar series of color slides are also made. The prints are hung in the operating room for constant reference during the corrective surgery.

Final Count Down

A few days before the rhinoplasty operation the patient is seen again for a final review of the corrective plan and for the physician to carry out a careful physical examination. The patient comes to the hospital as an outpatient, receives sedation and then is placed on the operating table and an IV is started. The nasal vibrissae are clipped, the nostrils cleaned and the

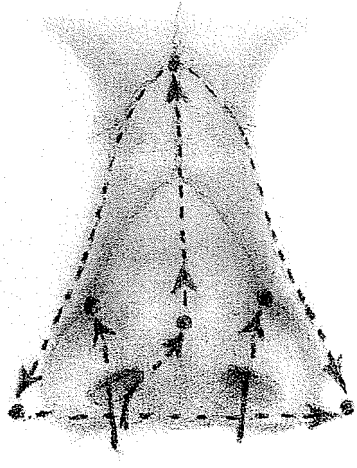
nose and face prepped. Then the face is draped from hairline above to under the chin. It is essential that the entire face be exposed.

While drying my hands after scrubbing and while being gowned and gloved I again study the nose in relation to the face to get a final impression of the preoperative proportions. The patient's photographs are hanging in view to refresh my memory because after the local injection the nose changes as it does during each phase of the corrective surgery. A line is marked along the bridge to indicate the estimated adjustment required. The nasal tip skin is marked bilaterally along the line of desired alar cartilage reduction.



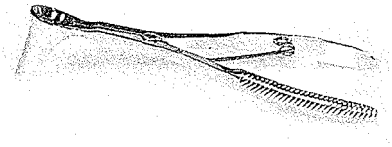
Local Anesthesia

A fine needle starts the injections of 2% xylocaine with 1:100,000 adrenalin at the glabella join to the root of the nose extending down each side of the nose along its join with the cheek. Then at the base of the nose horizontally from ala through columella to ala the nose is circumscribed. Injections through the upper buccal sulcus can be effective. Injections from inside the vestibule laterally to the nasal bones and into the area of the lower lateral cartilages as well as into the tip and subcutaneously along the bridge keeping the amount of injection minimal and equal so not to distort the contours. If the septum is to be corrected then its mucosa is injected which also aids the dissection. The nasal passages are then packed snugly with Vaseline gauze to seal off the flow of blood down the throat. The patient is told to breathe through the mouth. I then sit down to operate, which provides a comfortable but steadier position.



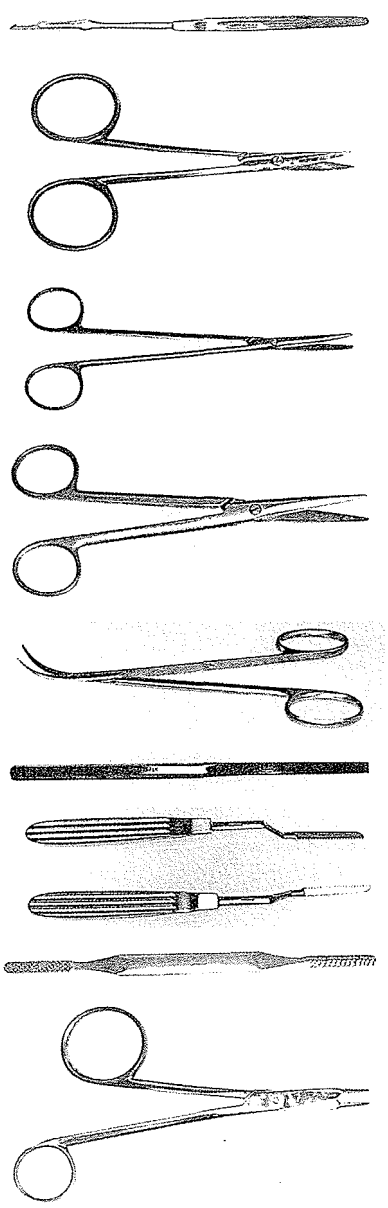
CORRECTIVE RHINOPLASTY INSTRUMENTS

Regular and Special



Most instruments I use in corrective rhinoplasty are standard. A speculum facilitates vestibular and septal inspection. A regular handle carrying a No. 15 Personna plus blade make the membranous septal and anterior vestibular incisions. A

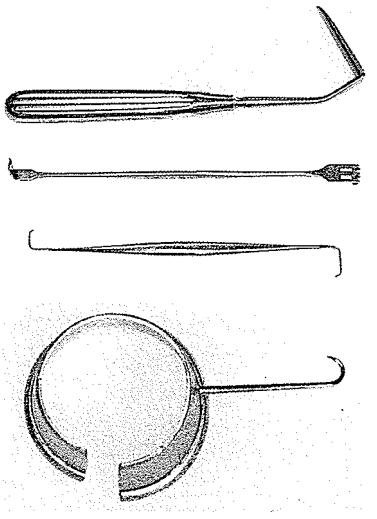
No. 10 P. P. blade does my undermining. The No. 11 P. P. stabs out the alar base wedges. Occasionally the long thin scalpel handle is helpful in deep dissections of limited width. Small sharp pointed scissors are used for dissecting cartilage subperichondrally, Metzenbaum scissors are useful for occasional subcutaneous dissections. Fine straight scissors are used in trimming mucosa, alar and upper lateral cartilages. Large straight scissors serve in cutting septal cartilage. Right-angled scissors are useful for angled dissections and awkward trimming of cartilage. Moderately weighted mallet and large sharp, straight chisel with the edges rounded are used for hump removal. A small chisel is effective for severing any green-stick fracture during osteotomy. Special prong chisel for osteotomies will be described in detail during section on osteotomy. Nasal saws are used for occasional shaving of the hump. Rasp is effective for smoothing rough edges of the bridge. Rongeur is essential for nibbling off bony discrepancies and especially for reducing excess nasal spine. Gillies scissor-needle holder for suturing lining, cartilage and alar bases. The Aufricht retractor and the regular and small Senn retractors help in good exposure. A two-prong hook slipped under the freed skin and snagged on to palpable bridge and tip discrepancies mark the site for careful correction. For submucous septal resection a flat dissector and a blunt elevator are used along with a swivel knife and a narrow chisel.

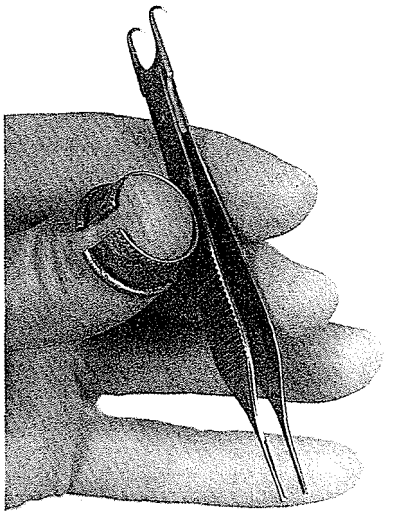


Personal Rhinoplasty Instruments

The dexterity and effectiveness of the hook on the end of the stump of the fictional pirate Captain Hook inspired me to create thimble hooks (1960) for the left thumb in surgery especially useful to pick up the upper end of the severed columella in open rhinoplasty.

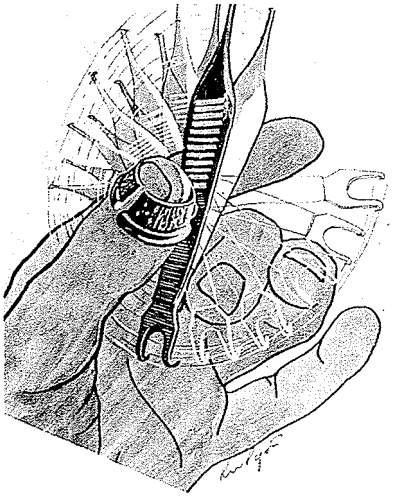
By attaching a double hook to the opposite end of the handle of an Adson forceps and fixing between them a pivoting split-thimble for the thumb, a versatile rhinoplasty instrument is produced which, with a half revolution, presents at will a retractor or a pick-up (1967). It provides the surgical





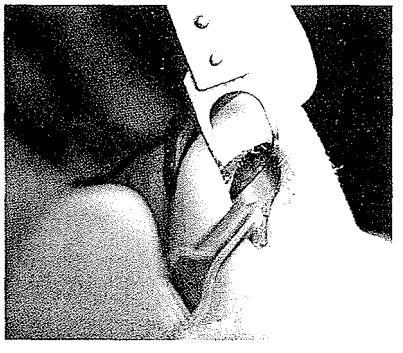
efficiency of two guns spinning on one thumb, each equally available in a quick draw. This instrument by-passes the necessity of constantly putting down one instrument to pick up another with all the eye to hand interruptions associated with each distracting action during the flow of surgery.

The thimble principle leaves the other fingers free to feel, evert and counterpress, and the surgeon has only to disengage his thumb to turn over the retractor to his assistant. This instrument is available at Storz and Padgett. I personally would not do a rhinoplasty without this instrument and those who have learned to use it, agree.

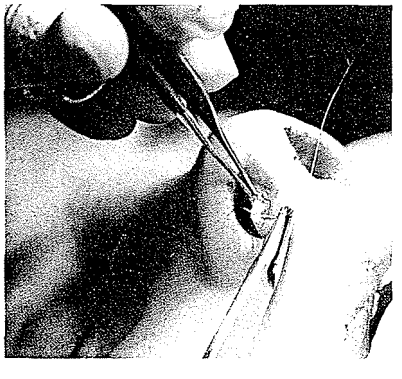


PRIMARY CORRECTIVE RHINOPLASTY OPERATION

Corrective rhinoplasty is a cosmetic operation concerned with surpassing the normal by altering the normal nose to more aesthetic proportions. It is true, however, that the variations of normal can reach such extremes that in reality they can be considered deformed.



The reduction and artistic reshaping of a nose is one of the most exacting procedures in surgery and, if not respected as such, what is presumed to become a portrait may turn out a cartoon. A truly large, thick nose may not reach the peak of perfection that can be achieved by a less difficult one but at least an improvement should be assured. To correct a nose that requires only a fraction of improvement calls for as much skill and more courage for there is less to gain, more to lose with a frighteningly slim margin of error.



There is no blueprint for all rhinoplasties as success or failure is a matter of degrees and millimeters in each case. Only generalities can be taught, for eventually the surgeon is on his own, guided by *inherent artistic instinct and the memory of bitter experience.* It is not possible even to predict a winner. Every time I start a corrective rhinoplasty, in spite of the years of experience, I get a little nervous. Noses are difficult to predict. Some go smoothly with the standard approach and others can

be difficult, almost perverse, requiring far more detailed surgery than was suspected during the pre-surgical exam. Nevertheless, our goal is to improve the size and shape of the nose and still maintain a naturalness with the least possible residual tell-tale signs indicating a surgeon has been there.

At the American Society of Plastic and Reconstructive Surgeons meeting in San Francisco, October 1964, I presented adjuncts to corrective rhinoplasty which advocated a logical change in the order of operative stages beginning with alar cartilage reduction and ending with osteotomies, use of the intracartilaginous approach and adjuncts such as alar base wedge and marginal reductions and columella cartilage struts for tip definition. These were modifications I had effected over a twenty year period and have continued to use with other modifications and improvements for thirty more years.

ORDER OF OPERATIVE STAGES

The order of operative stages has remained as described in 1965 and for good reason. As the nasal tip is encountered first it is corrected first. Then the anterior septal shortening and hump removal or bridge adjustment are next. The vestibular lining is then tailored and sutured. If the septum requires further corrective surgery it is carried out at this time. Then if alar wedge reductions are indicated they are marked and excised but not sutured to give better access to the bilateral osteotomies. A cartilage graft for tip definition is accomplished and finally the nose is ready for the osteotomies.

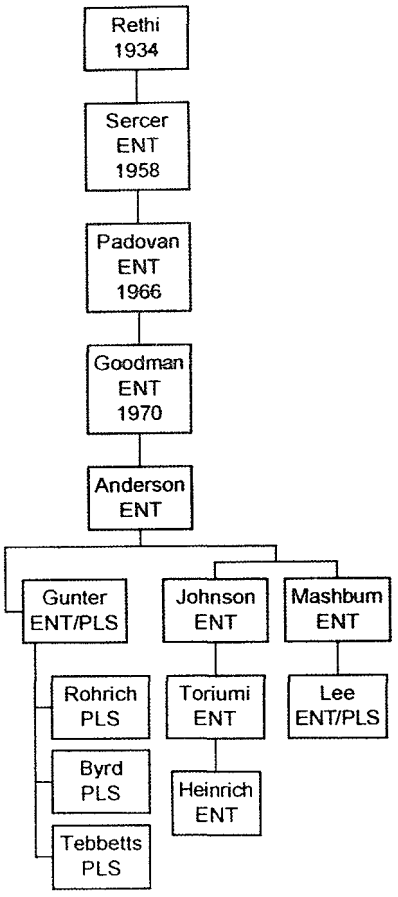
Each phase of the rhinoplasty operation not only affects the anatomy being directly altered, hump removal, septal shortening, but also influences associated structures. Thus there is a continuous changing scene as inevitable as diverse waves of falling dominoes. It is important that the surgeon not be smug in his memory of the original condition but rather alert to and cognizant of all the changes as he literally follows up and evaluates the effect of each step of the operation with a critical eye.

To Open or Not to Open

Open rhinoplasty has become popular among the younger surgeons and even with some of the older surgeons who were never really at ease with the standard endorhinoplasty. There are a few surgeons for whom open rhinoplasty is actually their "raison d'etre." It is enough of a fad that general rhinoplasty books are including it in the subtitle to attract young readers much like a naked lady in a circus sideshow sign serves to bait the yokels to buy tickets.

It has been my good fortune to have Charles S. Lee, a Korean American trained in otolaryngology at Loma Linda University, come to the University of Miami for a residency in plastic surgery. It is interesting to see his observations from this vantage point.

Open Rhinoplasty



When I first heard that endorhinoplasty was emphasized here I thought plastic surgeons might be retarded. I had learned open rhinoplasty from M. Mashburn, and felt that this was a new approach which should be used on every rhinoplasty. As I became familiar with the open rhinoplasty literature including the geneology tree, I saw though, that the issue of open or closed was not new. Jacques Joseph performed his first rhinoplasties externally before he went on to develop the endonasal approach. And the open approach first described by Rethi of Budapest in 1934 was largely ignored, "buried" by the popularity of the closed approach.

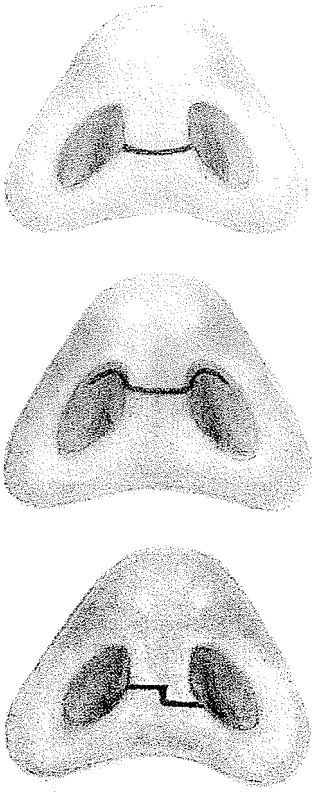
The open approach provides a direct view of the anterior nasal anatomy which may be beneficial to the less experienced surgeon. The trade-off is that the more extensive undermining and shaping of cartilages weakens the structure and can lead to uneven healing. When the skin is replaced, I found there was loss of definition at the tip. I visited C. Johnson to get the details and found that he gets around the problem by thinning the skin and stretching it over a large columella-tip cartilage graft. This seemed like a lot of surgery for the sake of possibly a better view to construct a well defined tip. Now that I've been exposed to endorhinoplasty, I can see it is possible to get the desired result with half the operation. Plastic surgery principles, like anabolic steroids, have given me the confidence to keep the external rhinoplasty in perspective. I prefer the flexibility of endorhinoplasty, which allows individual correction of each nose

to its own aesthetic ideal. I would use the open approach only if the particular case warranted an extensive correction not otherwise accessible.

It's interesting that while a few plastic surgeons are contemplating the open approach, some otolaryngologists who have seen both are going toward the closed. I asked J. Heinrich, a co-resident who split a year in Chicago between M. E. Tardy, who performs mainly endorhinoplasty, and D. Toriumi, whose approach is mainly the open, for his opinion. For most primary noses, he shares my preference for endorhinoplasty."

This is the era of instant gratification, the quick fix and shortcuts to unearned expertise. Still there is nothing wrong with making an operation easier provided the cost of the change is not exorbitant. To open the cap on the columella for more complete exposure of the tip, on the surface, seems to cost only a minor external scar but unfortunately the price of violating the nasal capsule can be far greater. I have seen unacceptable scars, notch contractures, columella trap-door bulge, asymmetrical healing, deep scarring, tip depressions and partial to almost complete loss of the columella.

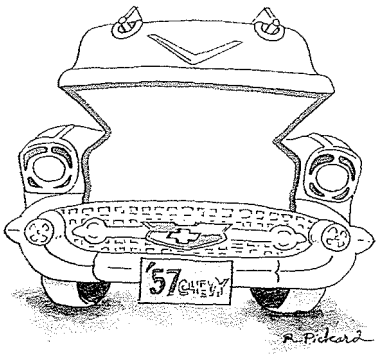
Of course no scar is best but next best is the correct position of the scar which is not so easily determined and may not be the same in each case. If the scar is placed at the base of the columella it fulfills the aesthetic unit rule but it requires a larger transverse scar which may heal poorly. The midtransverse columella scar is shortest but it violates the unit and if it heals poorly or notches it is more noticeable. The scar of the flying bird at the columella join with the tip is more noticeable. Interrupting these scars with a zig-zag, if they heal poorly, can be ugly. Recently on a secondary severe unilateral cleft lip nose due to partial shortness of the columella, I decided to do an open rhinoplasty. My decision was made due to the need for extra length to the columella, the presence of scars in the area already and for the benefit of the residents. Then the

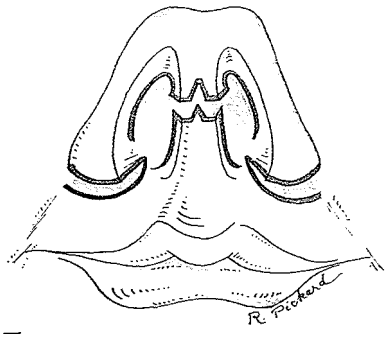


open rhinoplasty incision picked up extra skin from the scarred upper lip which achieved about 0.5 cm columella lengthening. The added exposure, the residents and I confirmed, was not of particular value and the bobbing end of the freed columella was a nuisance.

I would prefer the beginner go to the cadaver lab and carry out a few open rhinoplasties to become familiar with the anatomy, improve the third dimensional sense and practice the corrective surgery at leisure with full exposure. With this preliminary preparation most noses can then be corrected easily without the open approach. Endorhinoplasty as I am describing it provides direct view for more than 95% of the procedure. If the remaining 5% is important to the result then open and lift the columella to fix the problem in the specific case. Do not fall into the trap of making open rhinoplasty a rigid routine.

Fortunately I have had access to the open procedure long before any of the modern surgeons began promotion of this attack. The forked flap, 1958, in bilateral clefts lifts as it lengthens the columella which of course at the same time directly opens exposure to the nasal tip. In the last 10–15 years as the construction of the bilateral cleft deformity has become more extensive even in primary cases the open approach has been useful.

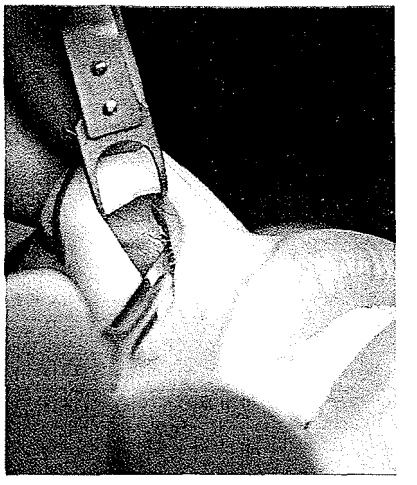




If the surgeon is really determined to operate through an open sky approach R. Picard's '57 Chevy external exposure can be considered. The hood of the '57 Chevy was designed so that when raised there was an unequalled access to the front of the engine and head lights. Picard's external exposure gains access through a horizontal notched incision made across the columella connected intranasally with bilateral intercartilaginous and Weir incisions. In 1990 Picard successfully used his '57 Chevy external approach to give access to the anterior nasal chamber for CO_2 laser ablation of nasal papillomata recurrent despite 18 previous operations.

Whether the surgeon uses the endorhinoplasty approach or opens the nose is *relatively unimportant provided that what is actually done to the nose beneath the skin is in line with what is being described here in detail.*

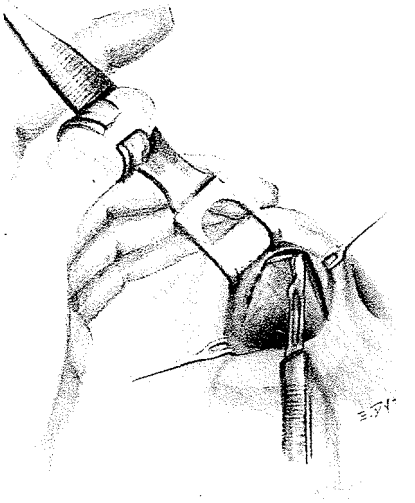
Although the specific procedure described in the text will be accompanied by representative cases, it should be understood that all cases presented, unless otherwise stated, have undergone similar procedures as required by the specific problem. In diagrams recording the extent of surgery cross-hatching indicated the areas and extent of resection. An interrupted line over bone indicates osteotomy.



PREFERRED PERSONAL APPROACH

Membranous Septal Incision

As corrective rhinoplasty is in large part a cosmetic procedure, access incisions are placed within the nasal cavity. I prefer to start with the membranous septal incision which is carried out with a No. 15 Personna-Plus blade passing through and through the membranous septum from the upper tip of the distal septum down to the nasal spine. This exposes the front of the septum and the medial crus of the alar cartilages on the backside of the columella. Remember that what membranous septum is left on the back of the columella can and probably will be retained but what is left on the septum will be removed when the anterior septum is shortened.

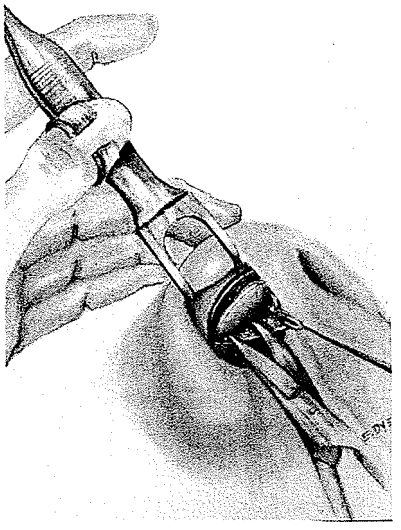


Intracartilaginous Incision

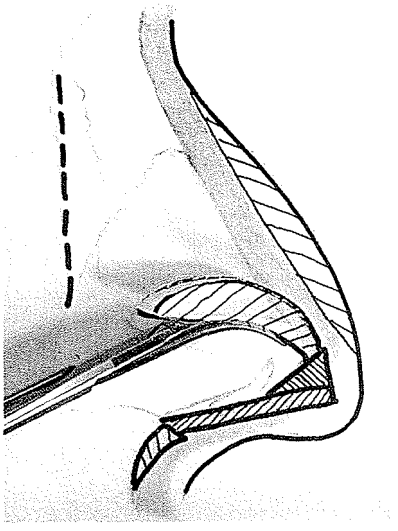
The membranous septum incision is continued laterally on each side in an arch through the vestibular mucosa and splitting the alar cartilage along the line marked preoperatively for tip cartilage reduction. This provides easy and direct exposure to the dissection of the proximal alar cartilage which is designed for resection. This



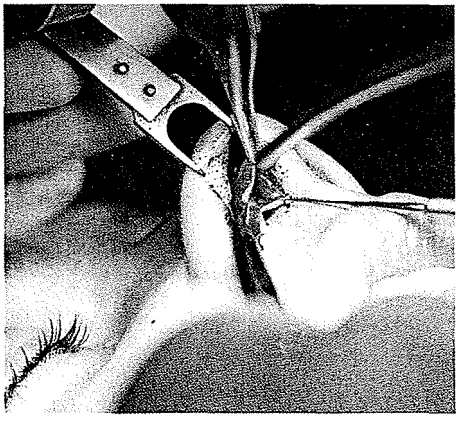
intracartilaginous or cartilage splitting incision is preferred not only for direct access to the offending cartilage but it avoids the intercartilaginous line and the area of the internal valve. Scar contracture in this area can be obstructive.

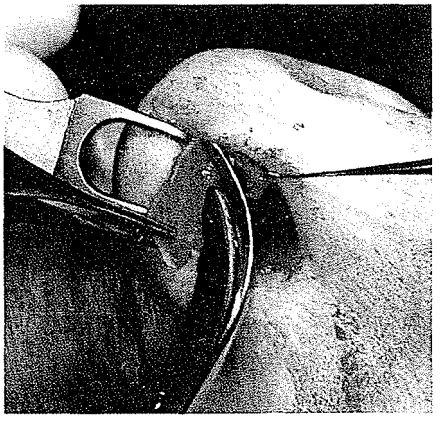


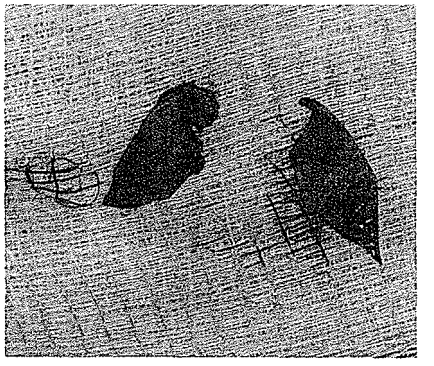
Reduction or reshaping of the lower alar cartilage depends on the alar cartilage. In the majority of nasal reductions I remove the proximal 1/2 to 2/3 of the lower lateral alar cartilage. When the cartilages have bizarre shapes then the reshaping depends on the specific abnormalities and the cartilage is carved to as natural a shape as possible. I do not find scoring of the residual cartilage of great value in most instances but occasionally can be of use.



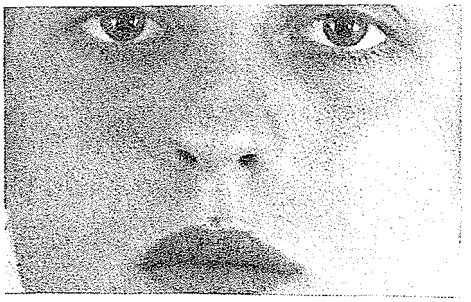
A fine pointed scissors will dissect the perichondrium with the vestibular mucosa off the underside of the alar cartilage and a right angled scissors frees the upper side of the cartilage from the nasal skin. Then this piece of cartilage is excised cleanly with a right angled scissors. When the cartilages are bulbous then the excess portion is marked for excision maintaining an intact distal rim of cartilage at least 3 to 4 mm in width to support the alar rim. The resected portions of alar cartilage should be retained temporarily for comparison to insure symmetry of excision.

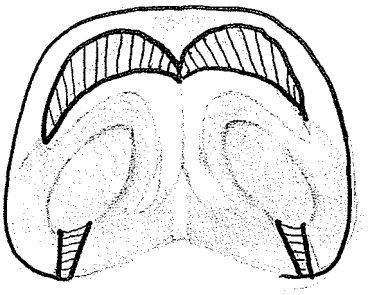


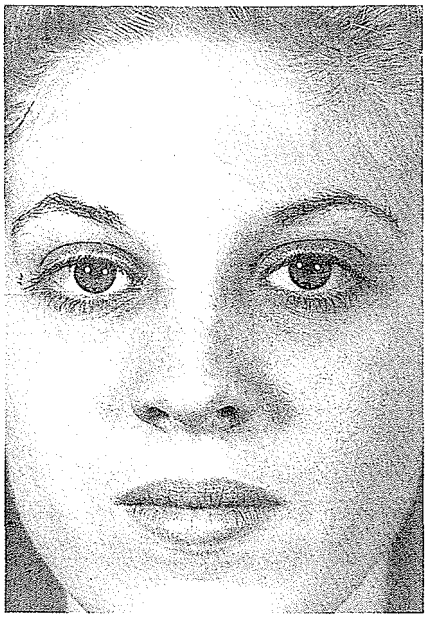


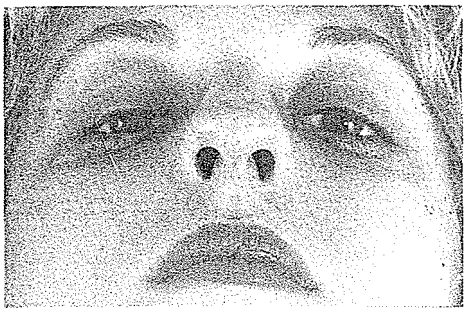


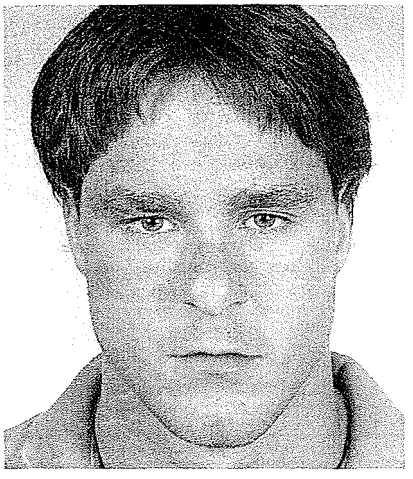
Here are a few examples of the alar cartilage reduction, along with whatever associated procedures were indicated.

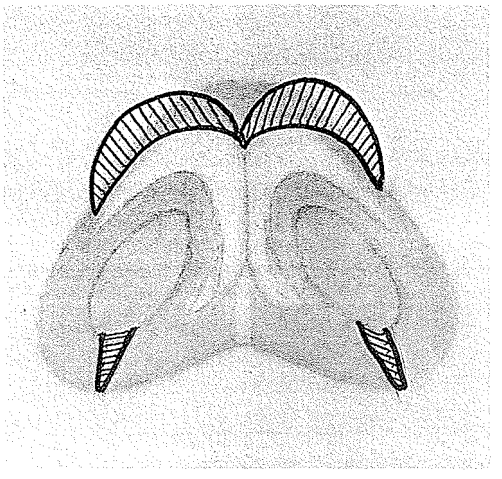


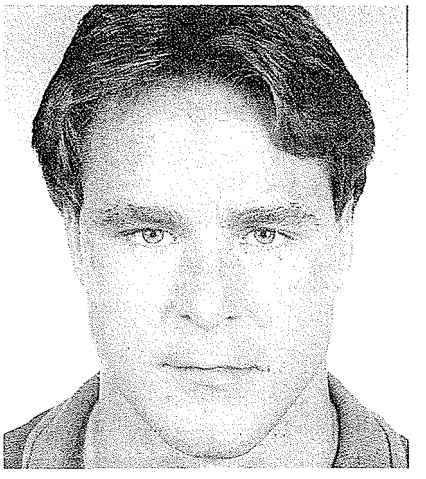


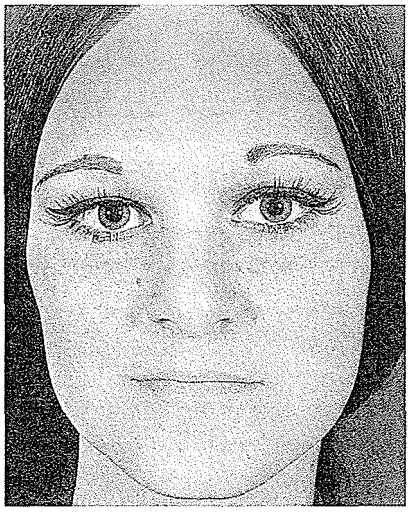


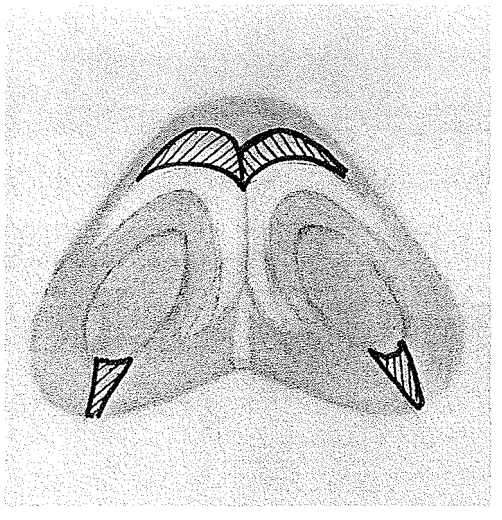






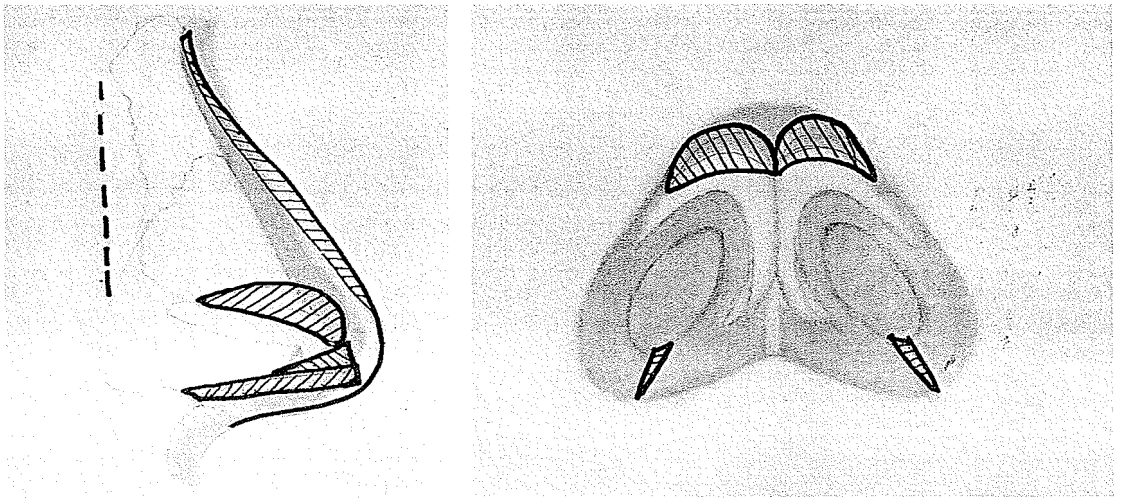


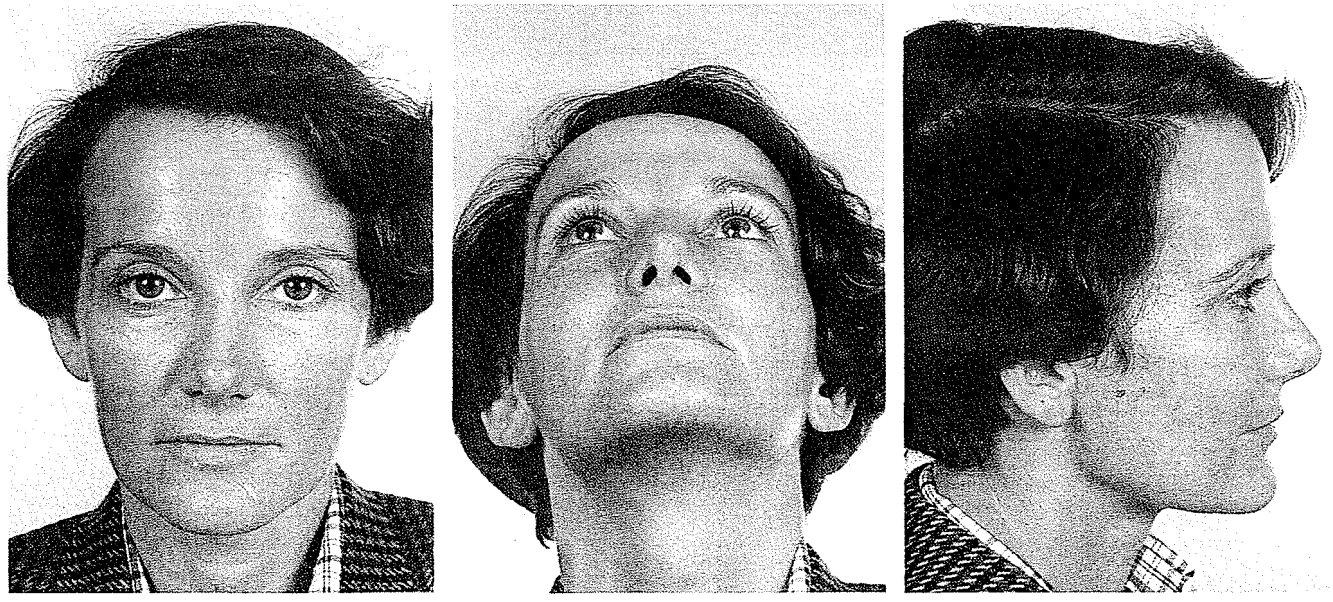




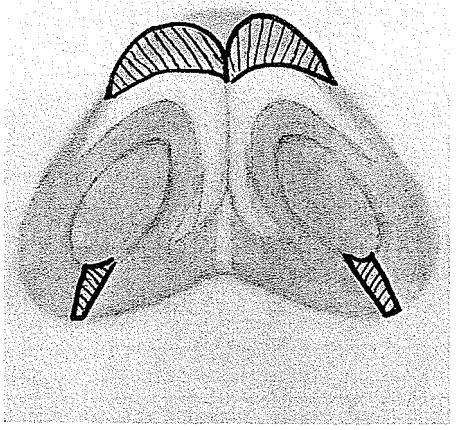






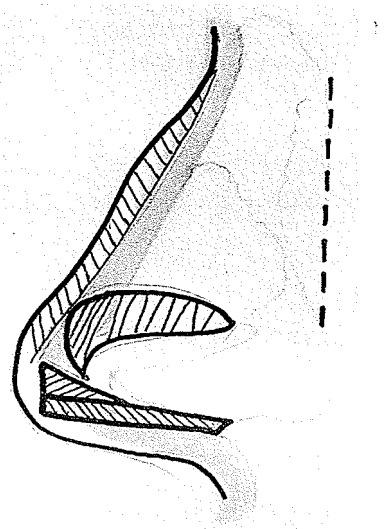






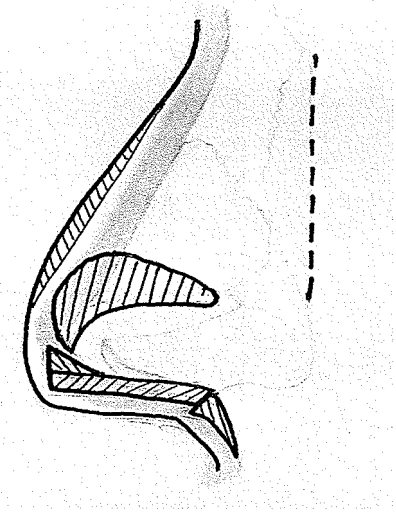




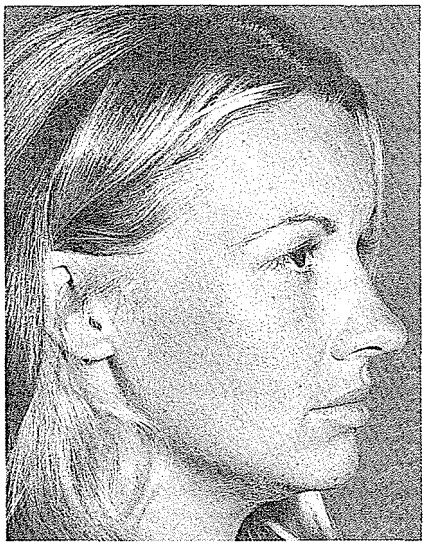


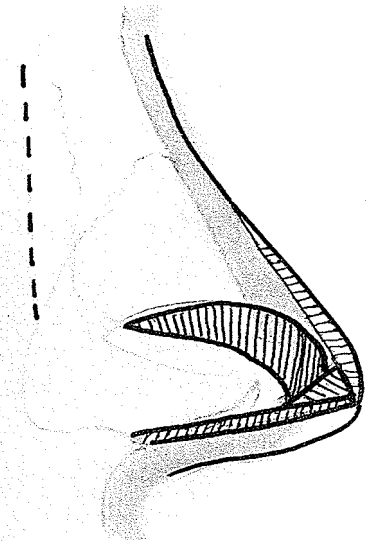


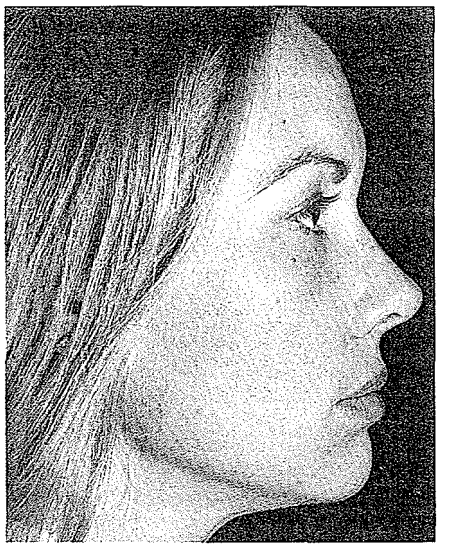




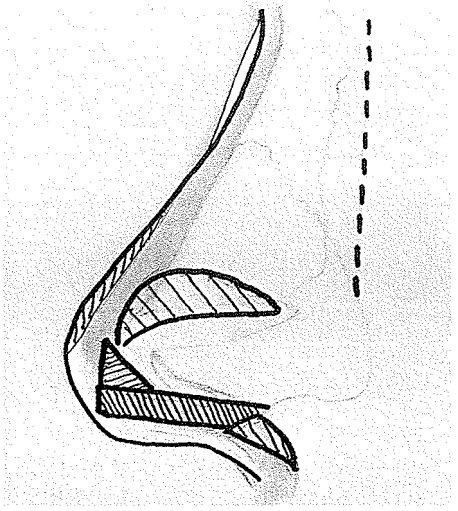


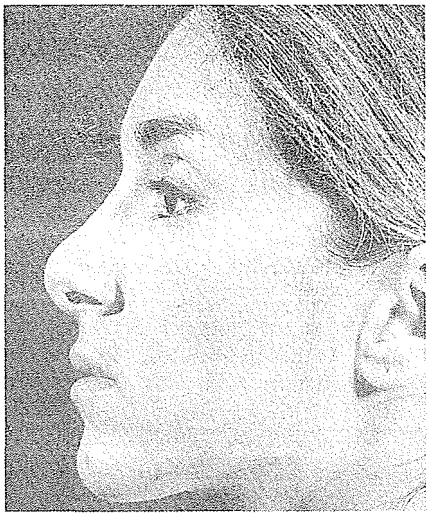


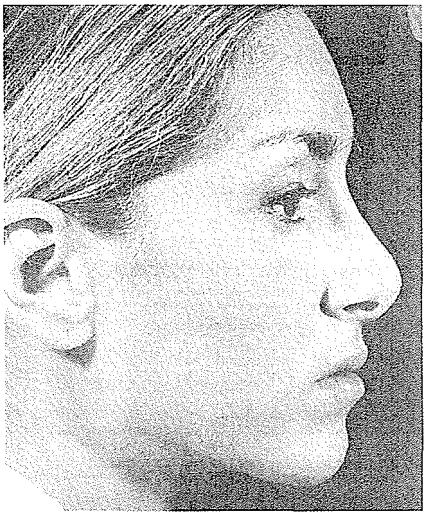




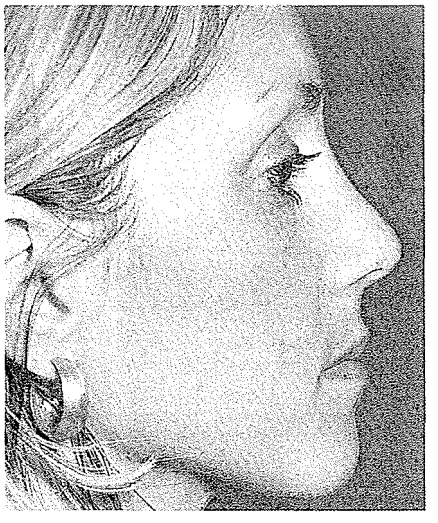
This nose with an unusual shape required bridge, septal, and alar cartilage resection and a septal cartilage onlay graft to the upper root of the nose.









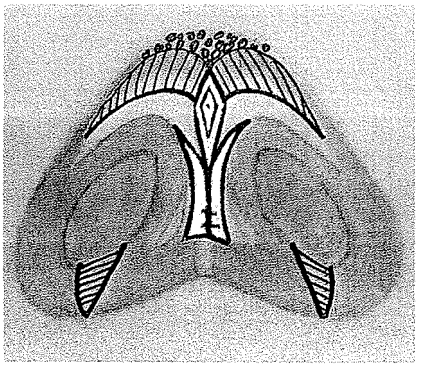


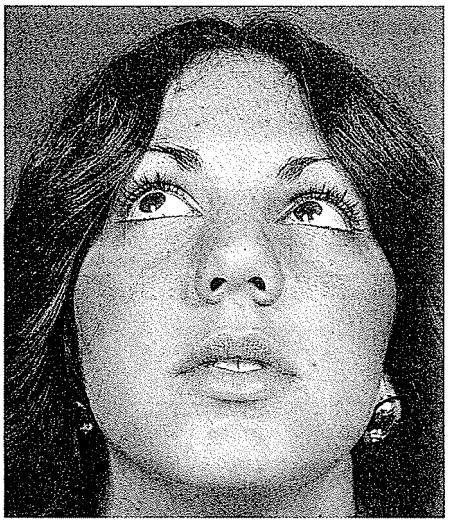
In 1965 I advocated more radical lower lateral cartilage excision leaving in some cases only a 1–2 mm intact rim and in the wide tips excising a pie-wedge of cartilage completely through the remaining thin cartilage arch just at its angle join with the medial crus. Experience has shown that this is too radical. I agree with Peck that the integrity of the alar cartilage rim at least in primary rhinoplasties should be kept *sacrosanct.*

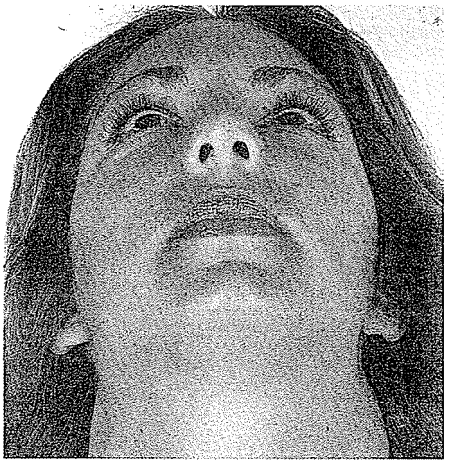
There are some nasal tips that are excessively bulbous and these often have subcutaneous fat in addition to broad alar cartilages. Thus their correction involved alar cartilage reduction but also defatting of the under skin of the tip with right angled scissors. In this specific case, in addition, a two-tier cartilage graft to the tip, reduction and suturing of the medial crura of the alar cartilages and alar base wedge resections added to the refinement of the result.



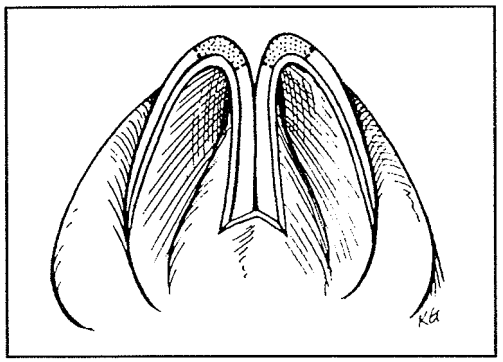


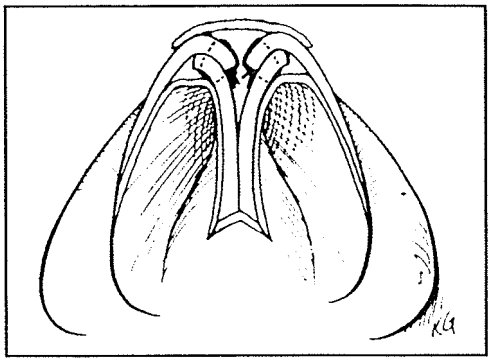


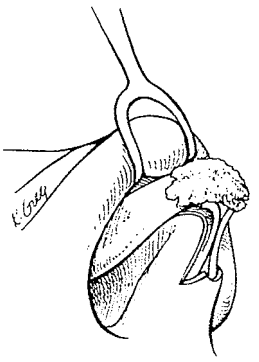




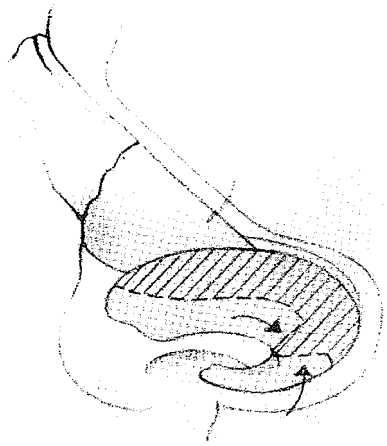
Numerous surgeons have advocated the interruption of the cartilage dome in the nasal tip. I. B. Goldman 1957 divided the cartilage lateral to the dome, and J. Safian 1970 divided the cartilage through the center of the dome. E. M. Lipsett 1959 divided the cartilage medial to the dome, but H. G. Brennan in 1983 not only divided the cartilage medial to the dome but overlapped the lateral over the medial crura. S. Hamra in Plastic and Reconstructive Surgery in 1993 also divided the cartilage medial to the dome and overlapped the lateral over the

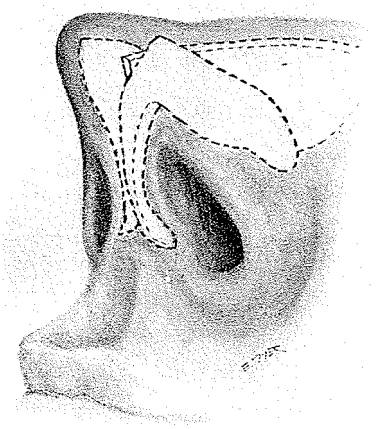






medial crura and fixed them with sutures. To hedge his bet he covered the interrupted cartilage with cartilage mush. E. Muti in Aesthetic Plastic Surgery in 1993 presented a more complex peripheral cartilage reduction with a V wedge taken completely through the center of the arch. Although it is usually possible to obtain an aesthetic result without interrupting the cartilage, under certain circumstances these variations could be considered. Personally I prefer the lateral freeing of the alar cartilage in elongated tips and feel it is one of the most efficient procedures in all of rhinoplasty.

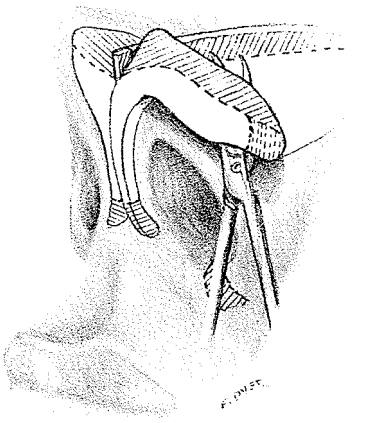


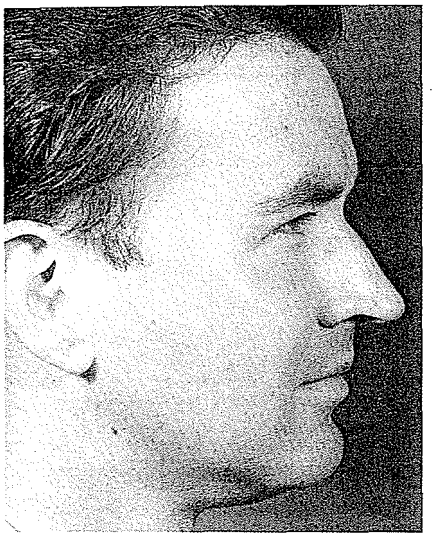


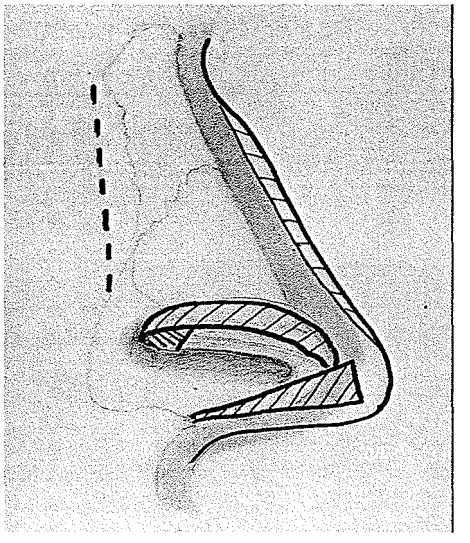
The Elongated Tip

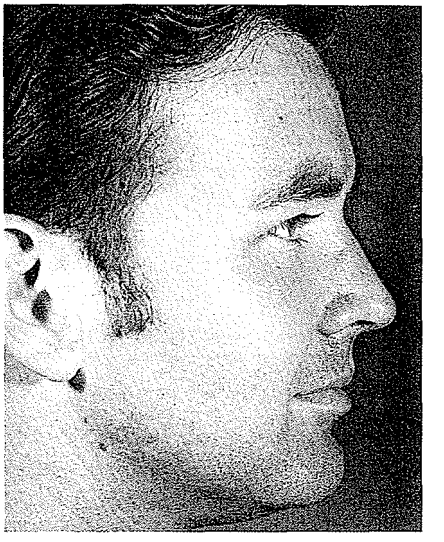
When the alar cartilages have an acute angle forcing an elongated projecting nasal tip then the reduction of the superior portion of the alar cartilage reduces some of the projection and the same 3 to 4 mm width of intact cartilage is maintained. Rather than divide the cartilage arch producing multiple cartilaginous points in the tip I prefer to free the lateral leg of the alar cartilage completely from

all of its attachments so that it dangles free and then amputate the lateral one-third or whatever is indicated in the specific case. By thus reducing the projection of the lateral leg of the nasal tip tripod, the pointed projection is noticeably shortened and softened. This is also effective on thick tipped noses. I use this approach often and Peck, I believe, also uses a similar procedure. Here are some examples which have also benefitted by other usual rhinoplasty procedures.

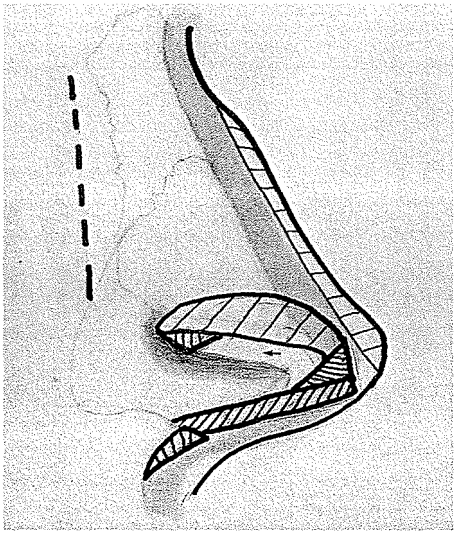




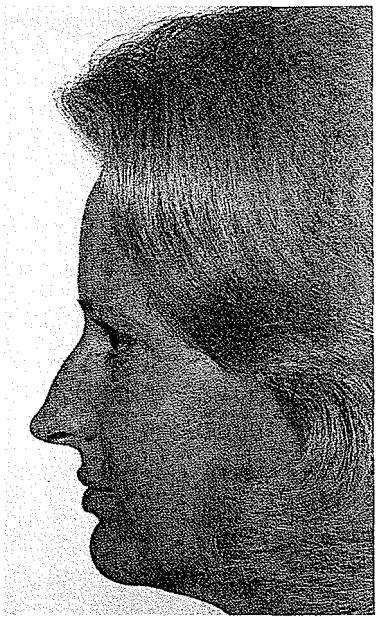


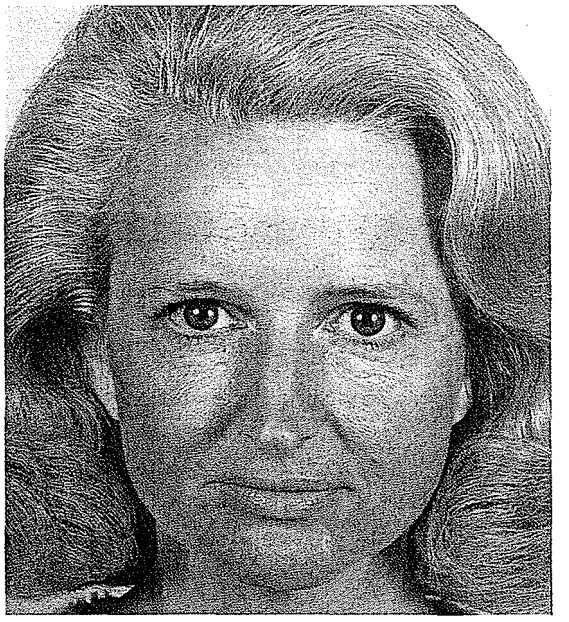


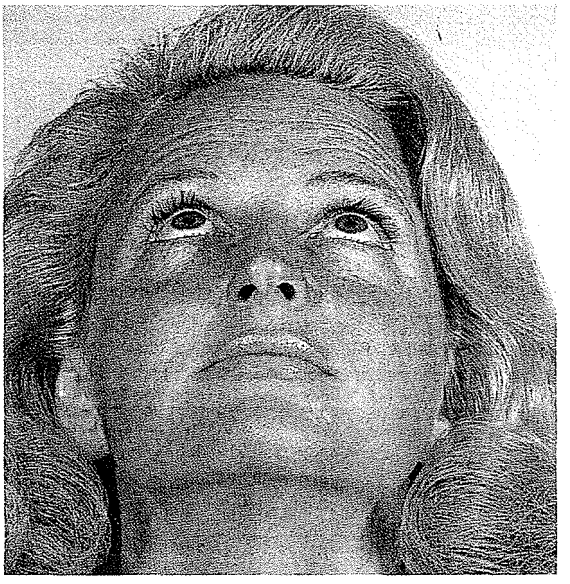


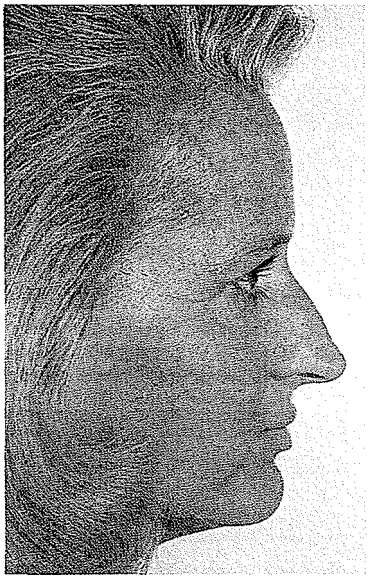


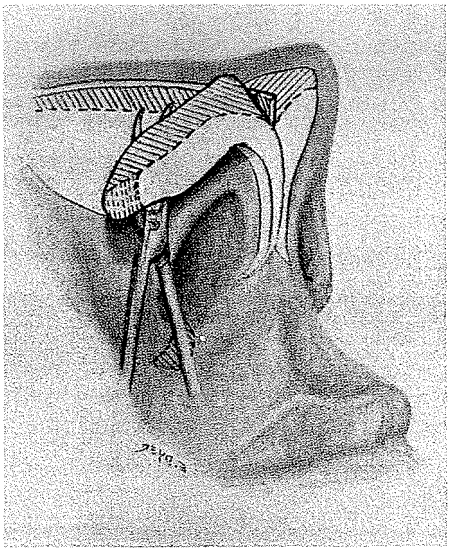


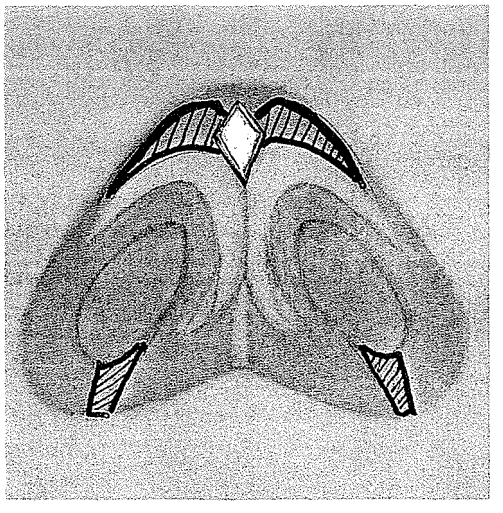


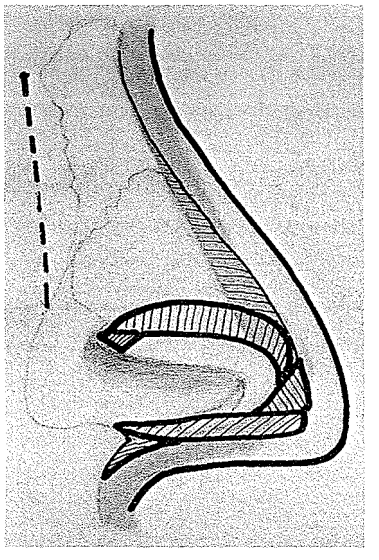




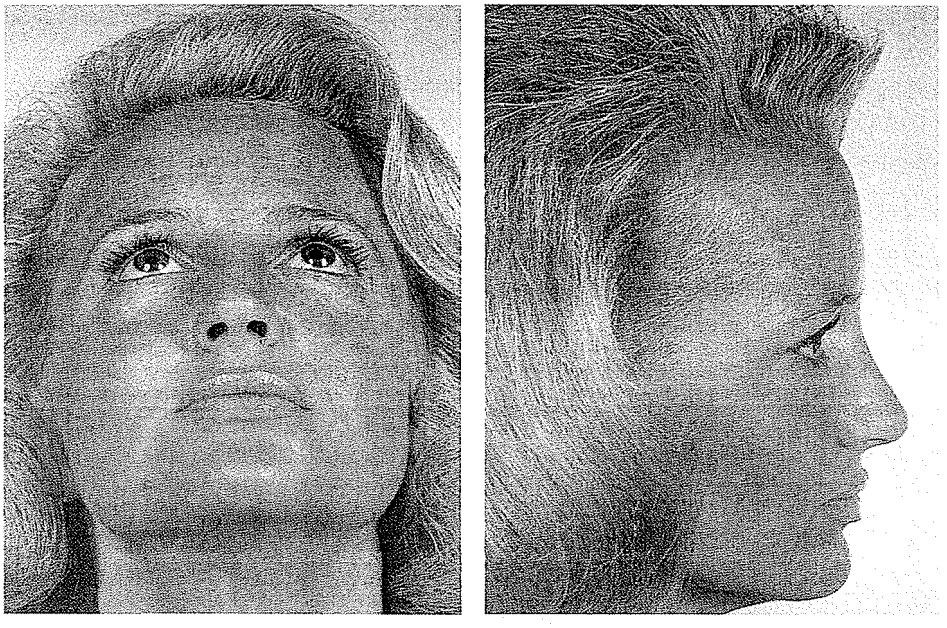


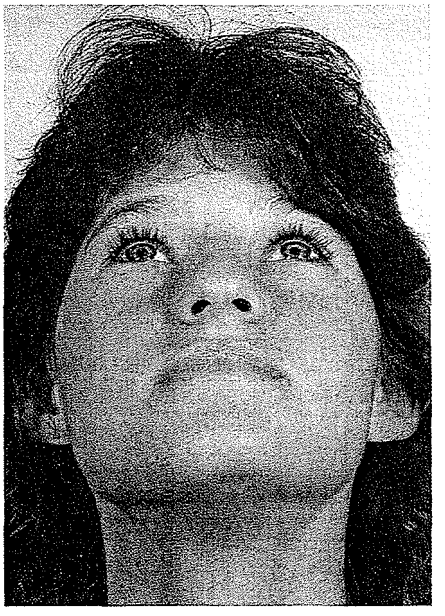
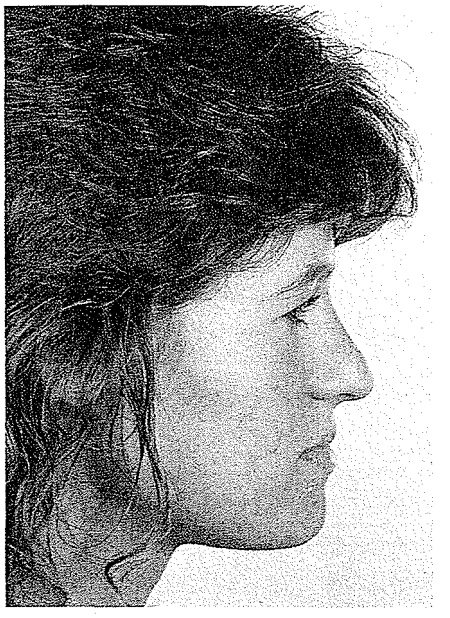
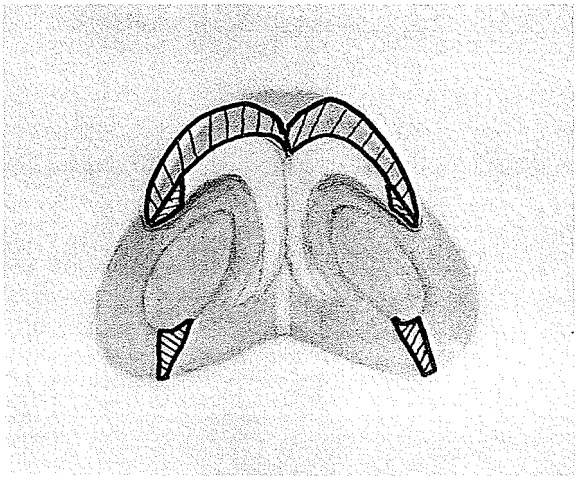
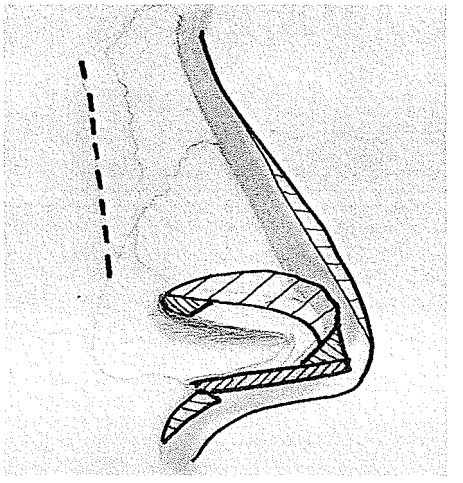


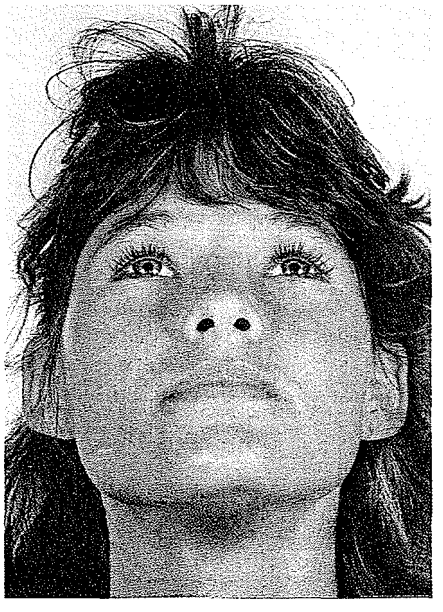


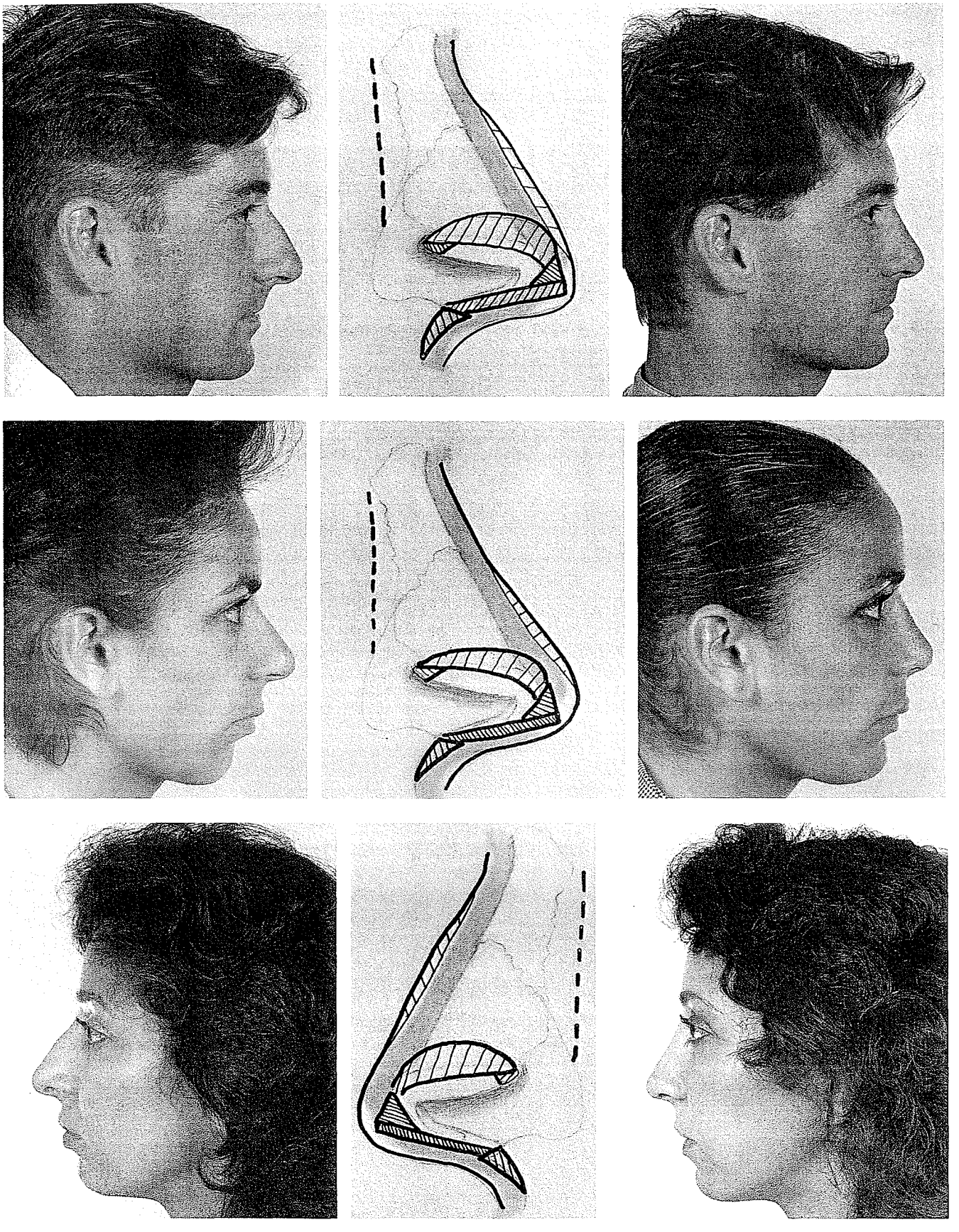


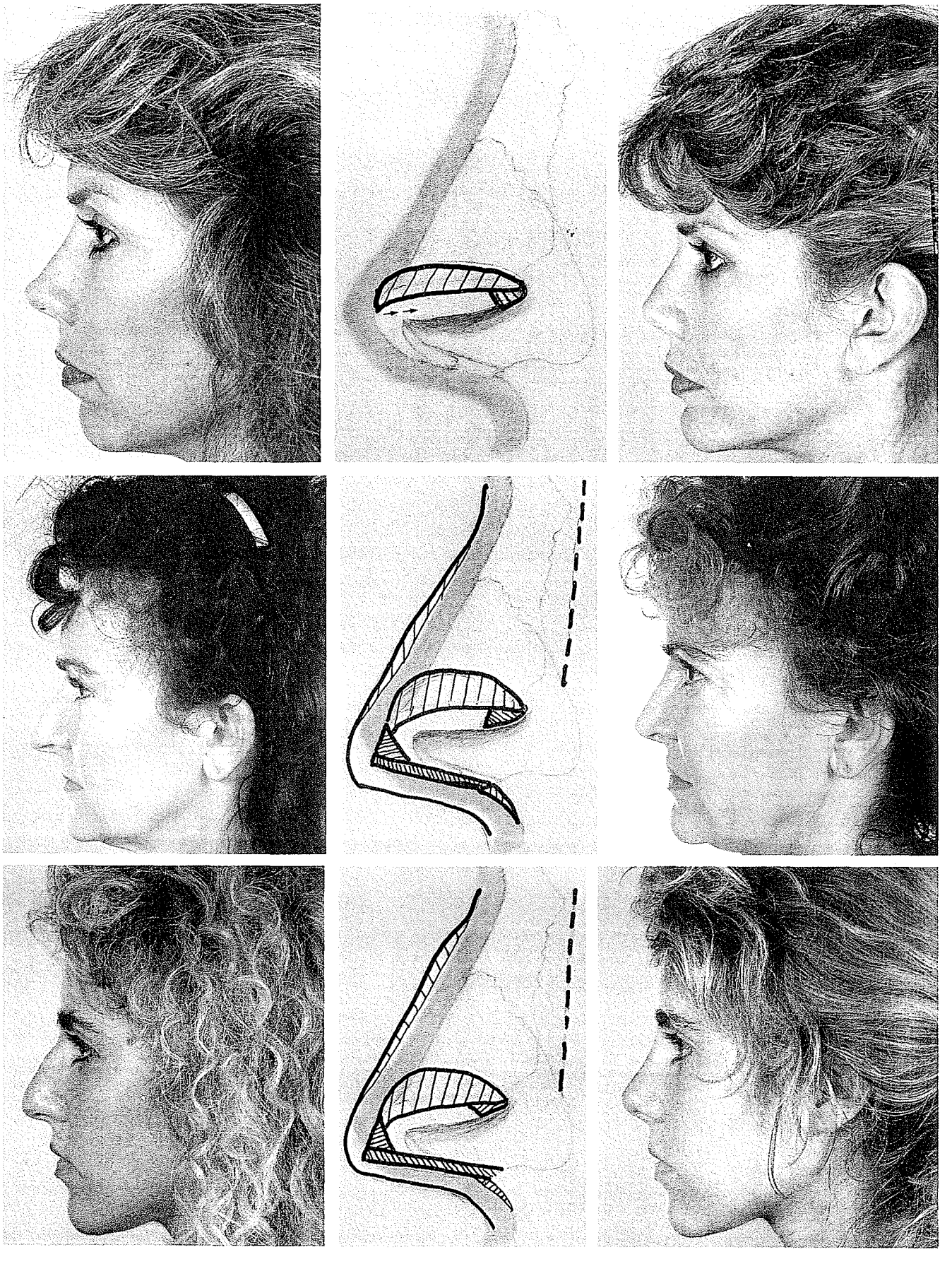




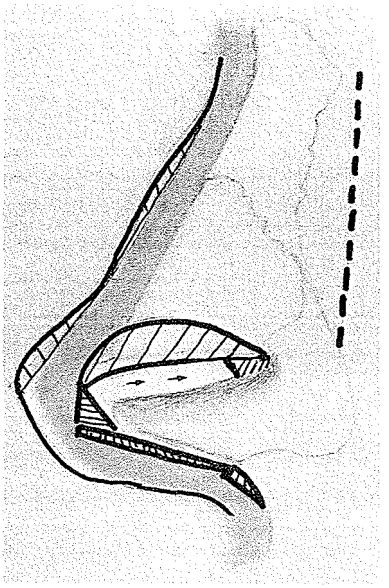






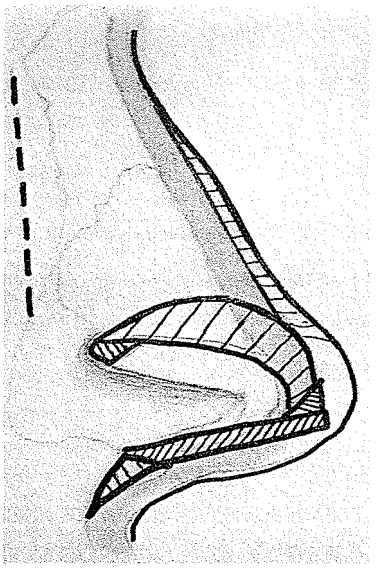




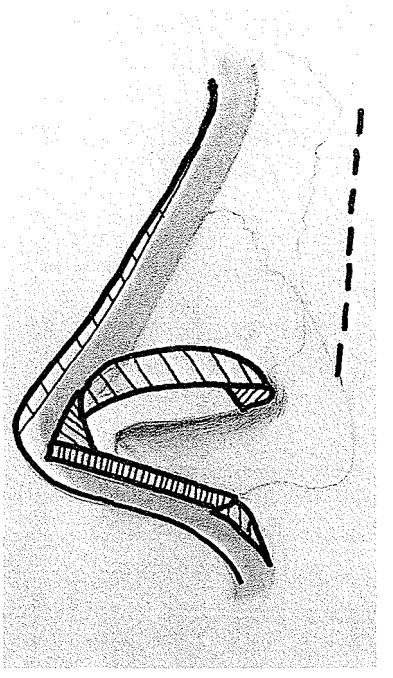






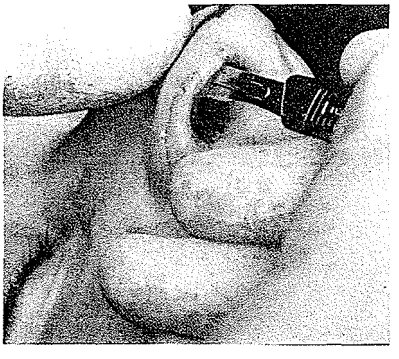




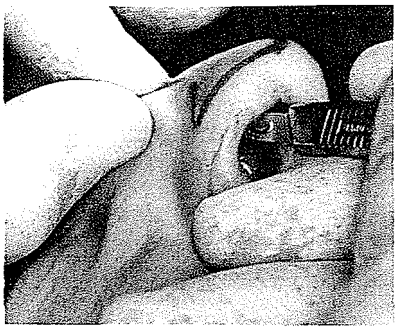

IN REVERSE. When the nasal tip is flat, freeing the lateral wings of the alar cartilages and not amputating them but rather advancing them forward and fixing them with sutures gives more material projection to the tip. Of course, a tip graft could be added.

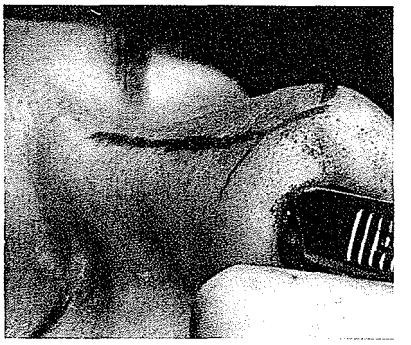
Careful observation and palpation of the tip following alar cartilage reduction will indicate asymmetries and projection contour which can be corrected by inverting the alar rim, freeing the distal residual alar cartilage and trimming the remaining excess. This is all done under direct vision.

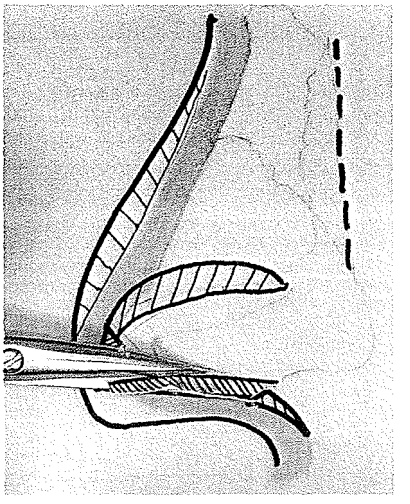
FREEING THE DORSAL NASAL SKIN. Into the bilateral pockets created during alar cartilage reduction a No. 10 P. P. blade is slid for dissection of the skin from the remaining skeletal structures. The skin of the nasal tip area is relatively thick while the skin of the nasal bridge is thinner. Thus the scalpel dissection of the nasal tip skin is aided by fingertip pressure to render the skin as thin as is safe while the thinner skin overlying the bridge is lifted by thumb and finger to assist the scalpel to pass deep under its full thickness skin providing the best possible cushion cover of camouflage for any unnoticed final minor discrepancies of the corrected bridge. The

same maneuvers are advocated with the scissors if the surgeon is more comfortable. Once the skin of both sides of the nose has been freed I use the right angled scissors to sever any remaining minor attachments along the midline. In those cases where osteotomies will be necessary I prefer not to free the skin attachments too generously from the bone laterally. These remaining attachments afford better control of the bones freed by osteotomy avoiding their possible slippage into the nasal cavity. Only when the bridge height is extreme, requiring greater resection, then the lateral nasal skin freeing must be extended laterally to allow lateral repositioning of the excess nasal skin. Once the skin is totally free then a retractor will give easy exposure.

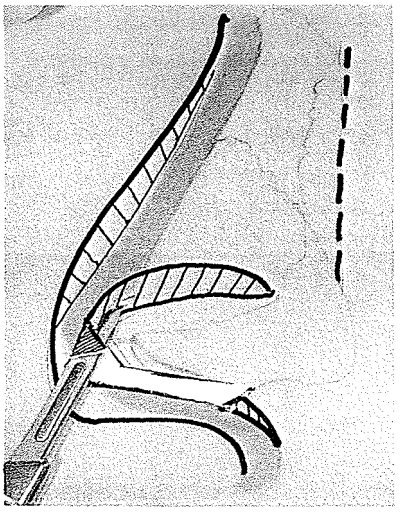




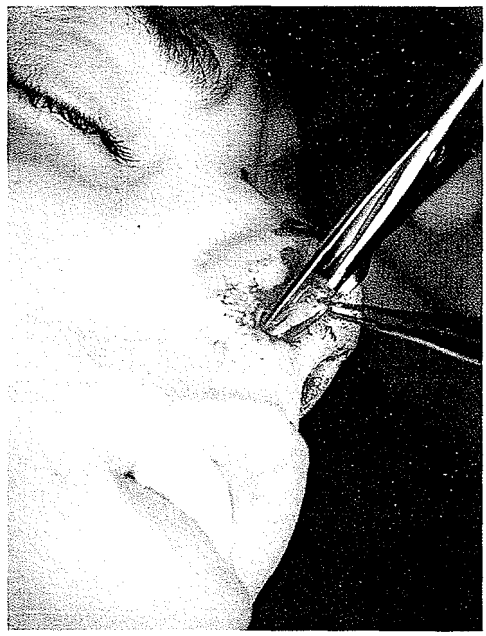
SHORTENING THE NOSE. Once the alar cartilages have been reduced and the nasal skin has been freed, the nasal tip will tilt back, giving the impression that the nose has been shortened. *Do not* be fooled by this illusion. Check the profiles of the preoperative photographs to determine the amount of nasal shortening necessary and be guided by this when approaching the anterior septal resection and shaping of the nasolabial angle.

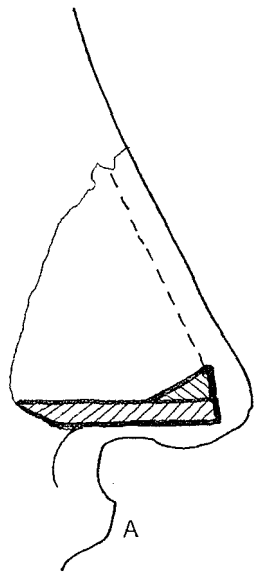


In correction of a long nose there are several aesthetic factors to consider. If the length is too great from the nasion to the nasal spine, overpowering the upper lip but the nasolabial angle is satisfactory, a rectangle (a) is resected from the anterior septum. I usually use a pair of large straight scissors. Once the composite block has been removed the exposed septal cartilage can be further tailored.

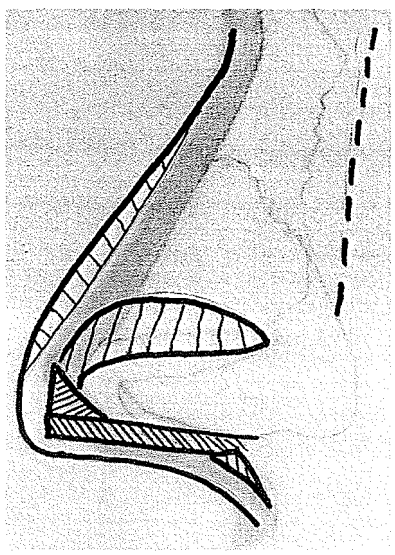


Once the anterior septum has been corrected in length and general angle, to obtain an added aesthetics, I almost always resect a small triangle at the distal one-third of the tip to obtain a profile with an angle of golden proportions, 1:1628. This does not turn up the entire nose and expose the nostrils but allows adequate shortening in the nostril area and then tilts only the tip more acutely in a provocative golden angle.



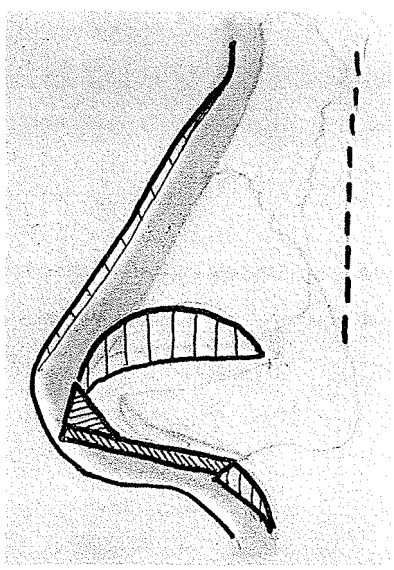

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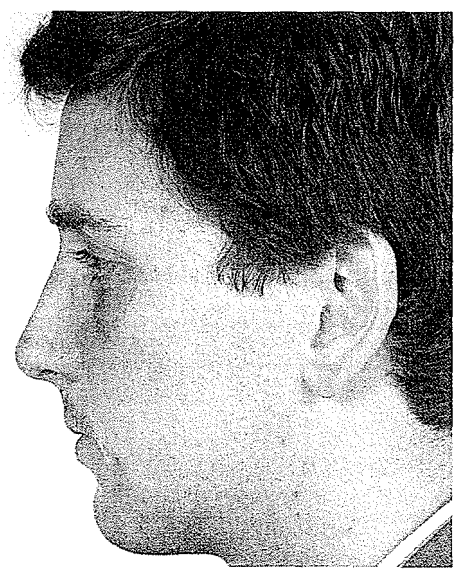


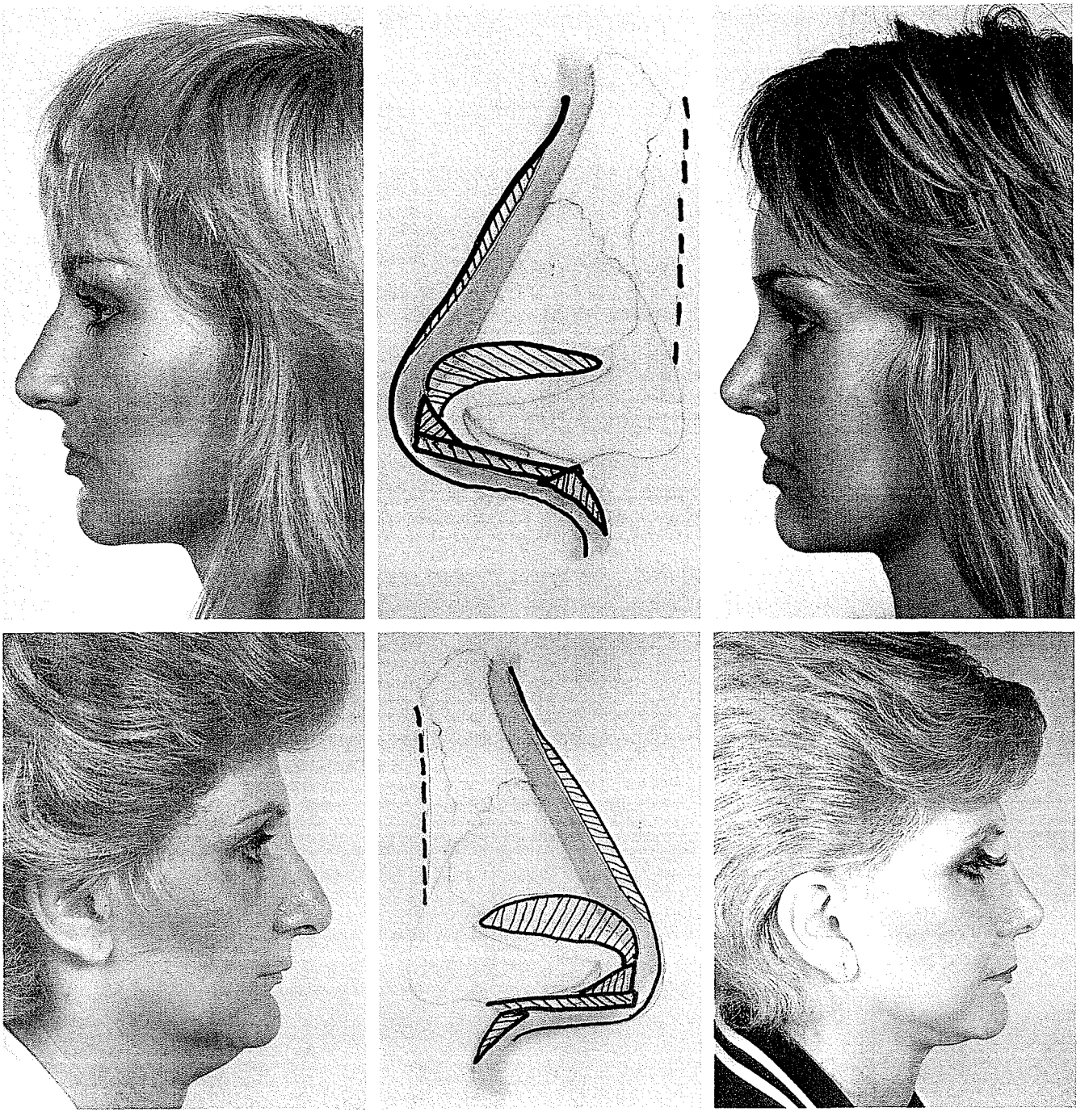




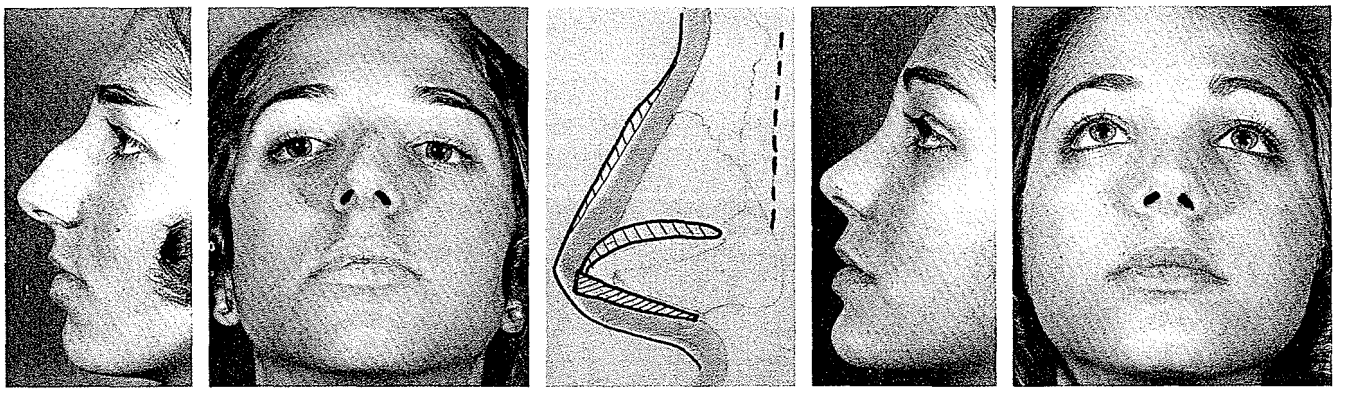


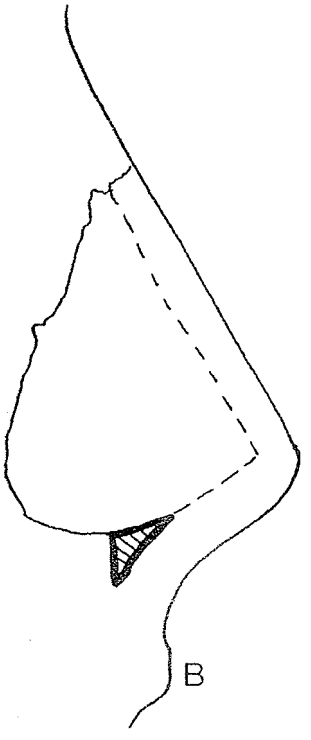




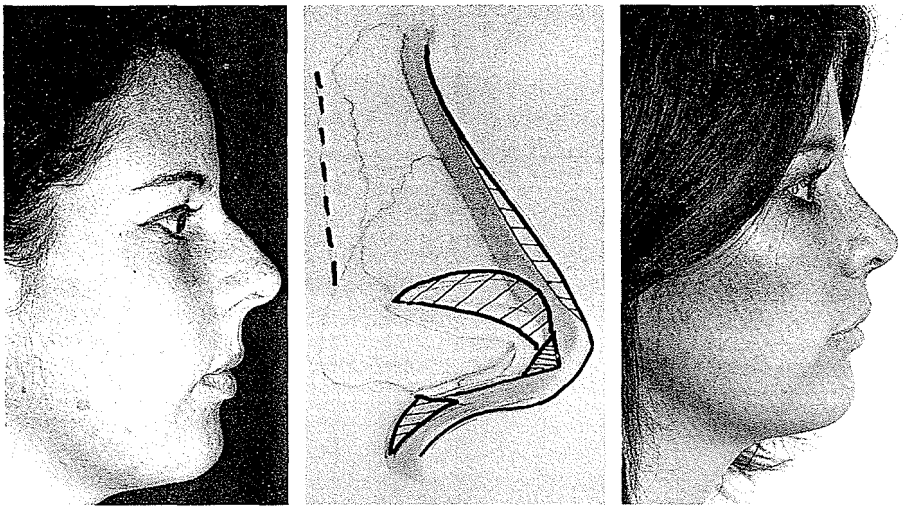


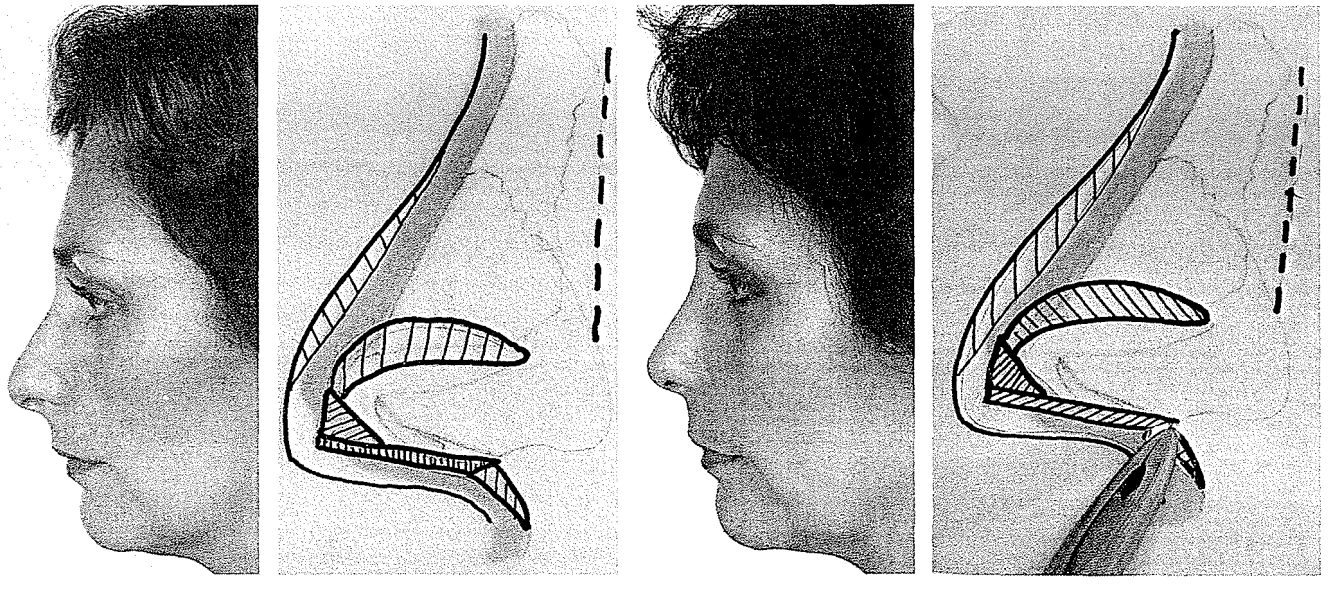
To emphasize the value of the golden angle, observe this case which was operated before I was creating the angle. A gentle triangle was excised from the distal septum which shortened the nose but did not achieve as an aesthetic line.



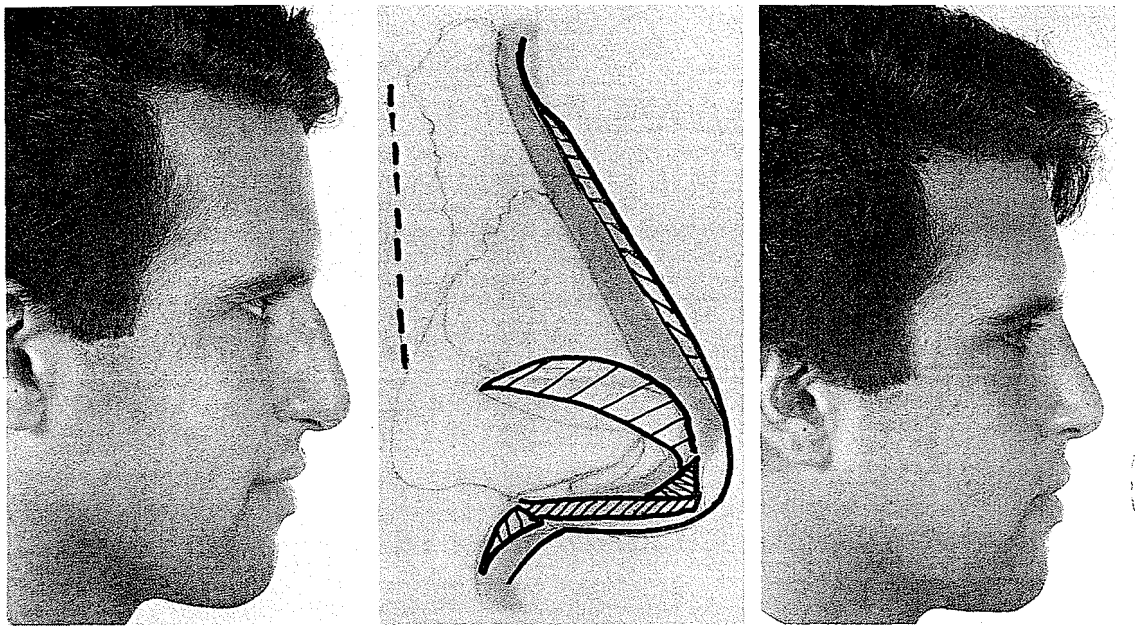


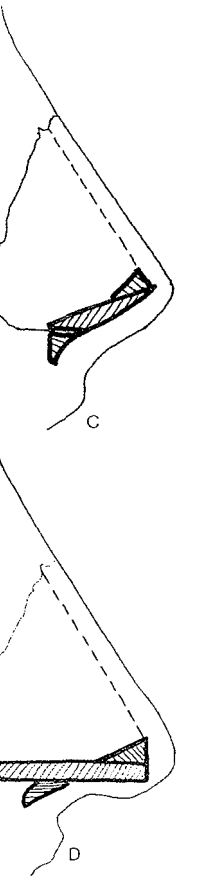
If the nasolabial angle is wide open or the tip too short, the nasal spine (b) may be reduced with a rongeur to improve relations.



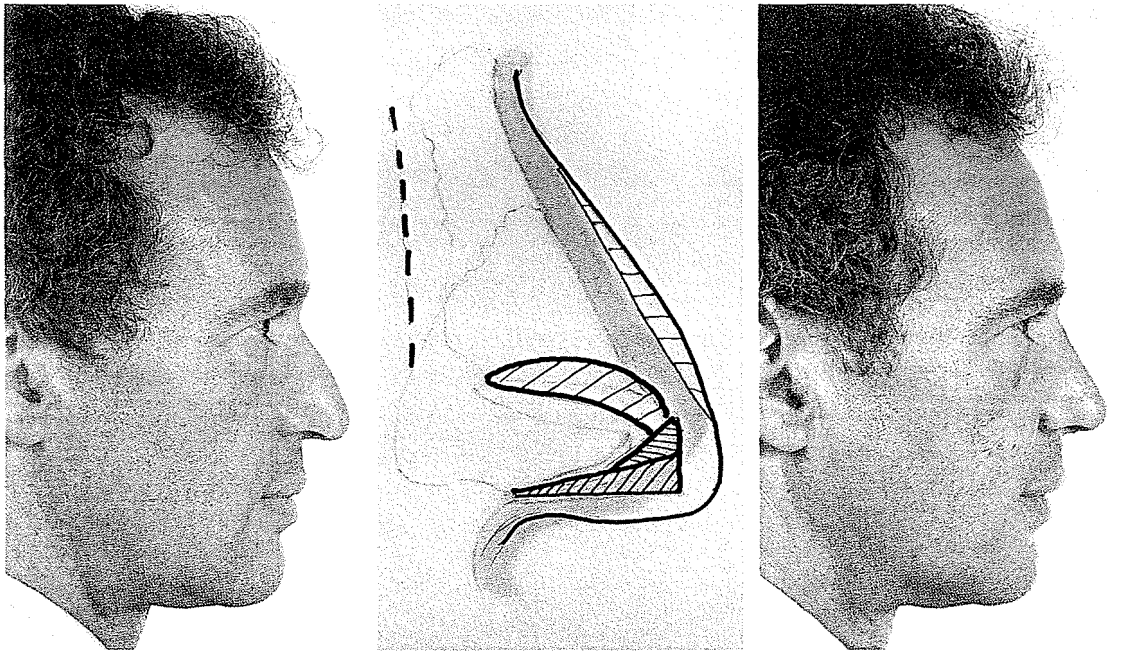


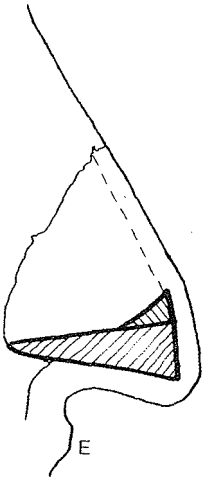
If the nose is too long from nasion to nasal spine but the tip is turned up, resect a narrow triangle with the base at the nasal spine (c). If the tip is too long and the nasal spine prominent a septal rectangle or triangle and spine reduction is indicated (d).



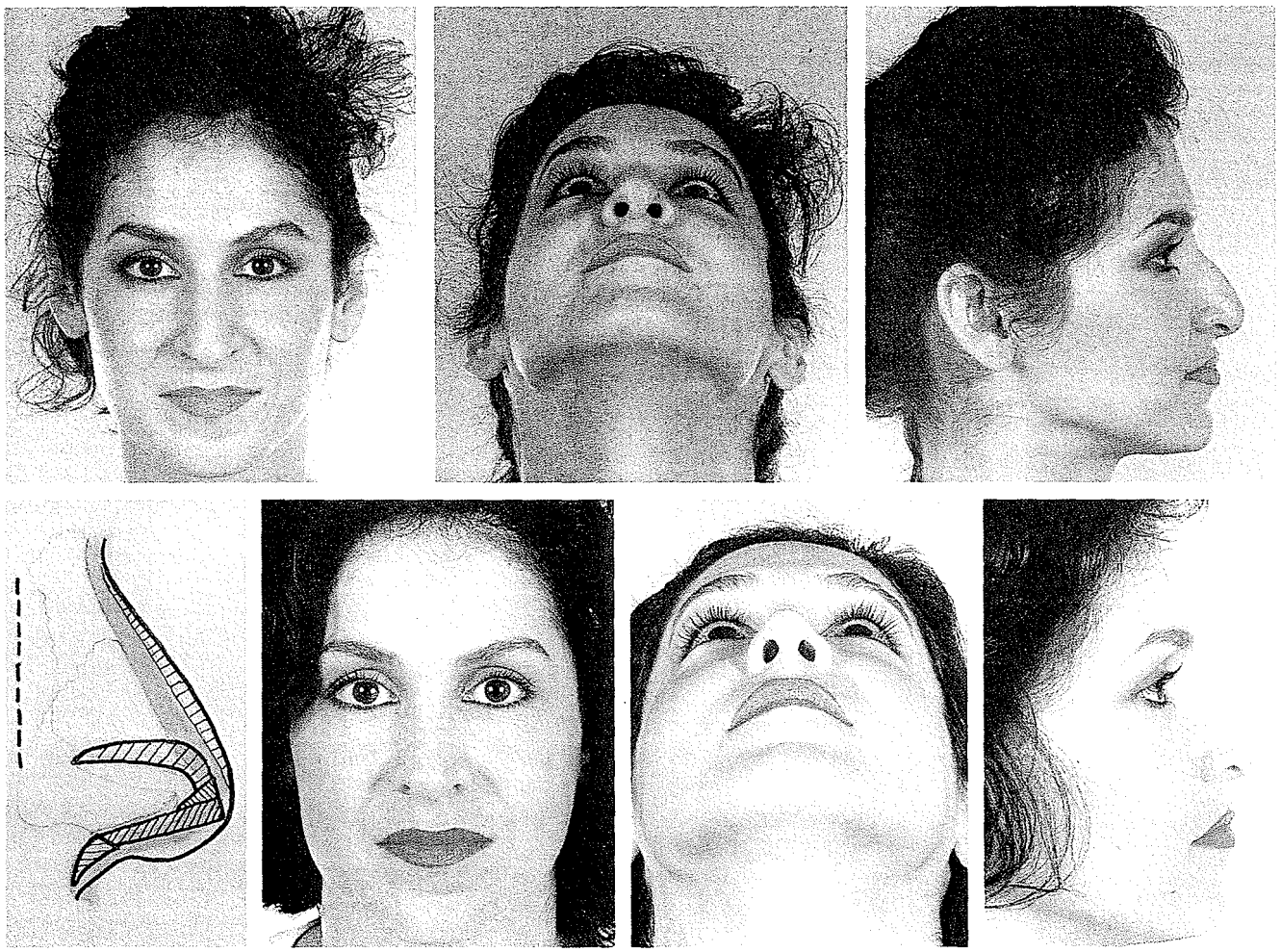


If the nose from the nasion to the nasal spine is the correct length but the tip hooks over, a triangle (e) with the apex above the nasal spine is resected from the anterior septum to lift the tip.





Here is an example where the nasal spine is quite prominent and the septum is long and the tip hooked so that the nasolabial angle is partially obliterated with encroachment on to the upper lip. Correction of this deformity beside lowering the bridge, reducing the alar cartilages and infracture called for reduction of the nasal spine, excision of inferior edge of the septum in a long narrow triangle followed by a small tip triangle for a golden proportion.





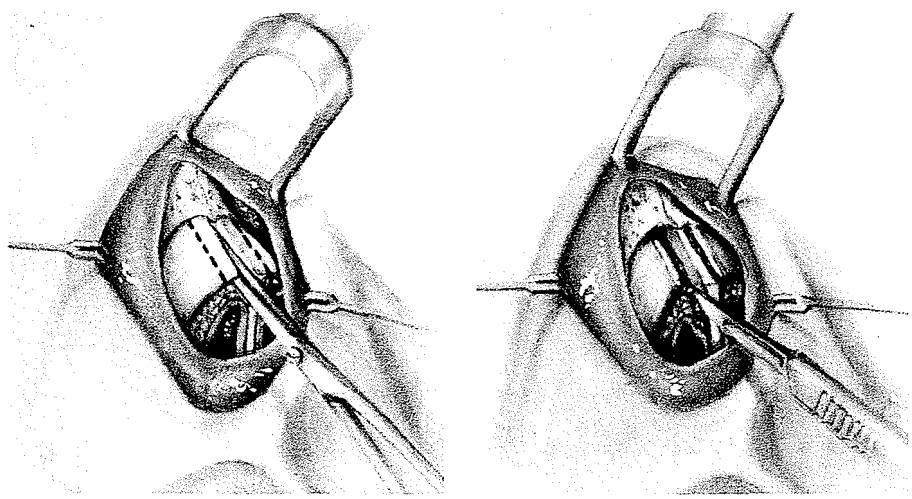
This is an example of a long nose with a strong nasal spine which was inadequately reduced leaving unnatural upper lip projection (arrow).

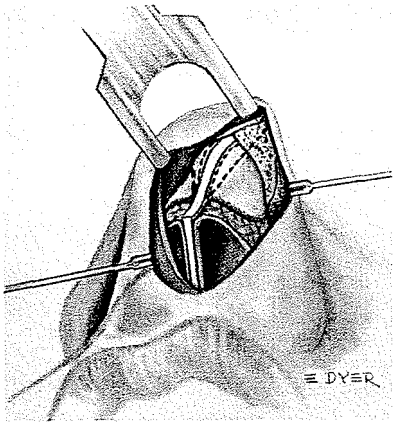
In summary, depending on the specific case, shortening the nose usually involves ± spine reduction, full thickness resection of a rectangle of anterior septum, and resection of a golden triangle at the distal tip.

Correction of the Bridge

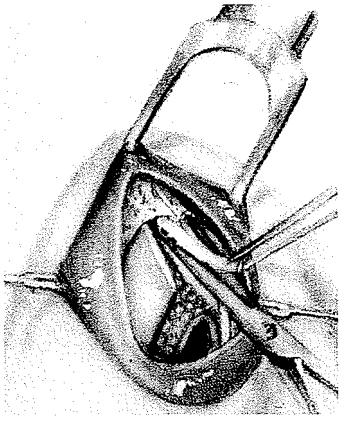
Once the nose has been shortened the next logical step is to adjust the bridge. Originally I was taught to lower the bridge and hump with a nasal saw. It is a safe but crude way to cut off the excess bridge. It can be a taxing experience. I remember J. B. Brown was exhausted after sawing off the hump. For these reasons I have refined my approach to this phase of rhinoplasty.

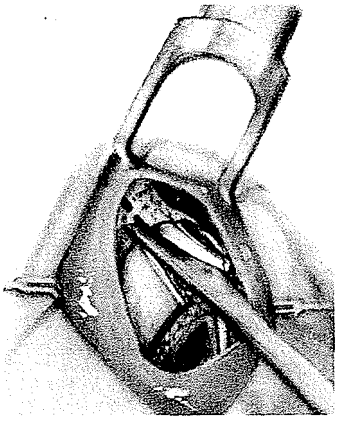
Before lowering the bridge I had also been taught to sever the lateral sidewalls from the septum completely on each side with heavy scissors. This was followed by trimming the sidewalls and the bridge as desired, leaving the three raw edges to approximate at random, and to heal with scarring and subtle contracture. In 1953 E. Eitner and in 1968 J. Anderson described extensive submucous dissection of the septum to expose the cartilaginous and bony bridge for reduction. This intramucosal approach had one great asset: the mucosa of the lateral walls was maintained intact with that of the septum thus reducing the potential contracture of the severed mucosal edges. I have modified this maneuver which has reduced the incidence of residual bridge supratip humping. With a retractor and good lighting, the naked bridge is under direct vision. I prefer to free the mucoperichondrium from the free anterior edge of the shortened septum for several millimeters and then extend this freeing along the entire cartilaginous septal bridge for 1 cm on each side. At the juncture of the upper lateral cartilage to the side of the septum it is necessary to





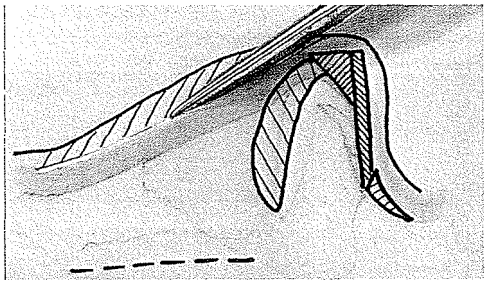
divide this attachment with a straight scissors and then free the mucoperichondrium off the septal cartilage with a scalpel maintaining an intact mucoperichondrial bridge from lateral wall to septum on each side. This insures better healing with less possibility of contracture. It is done under direct vision. The excess cartilaginous bridge is now exposed and can be lowered with a scissor cut from the front which is carried back to the nasal bones. Into the cartilaginous cut a chisel is inserted and driven through the nasal bones on a straight line to remove

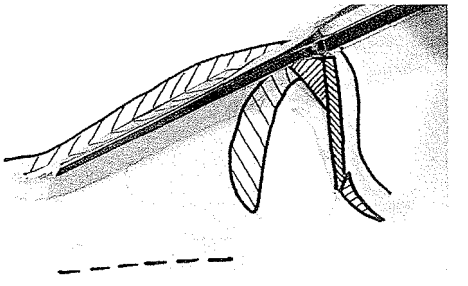






the hump. In a diagrammatic reenactment of bridge lowering, first the scissors, then the chisel.

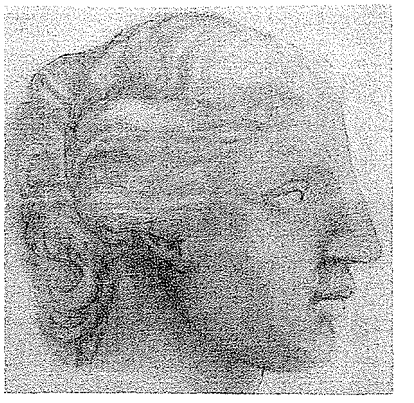


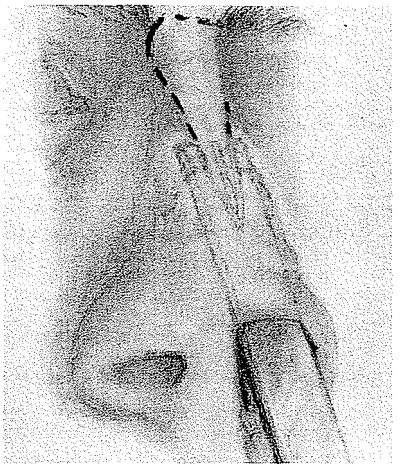


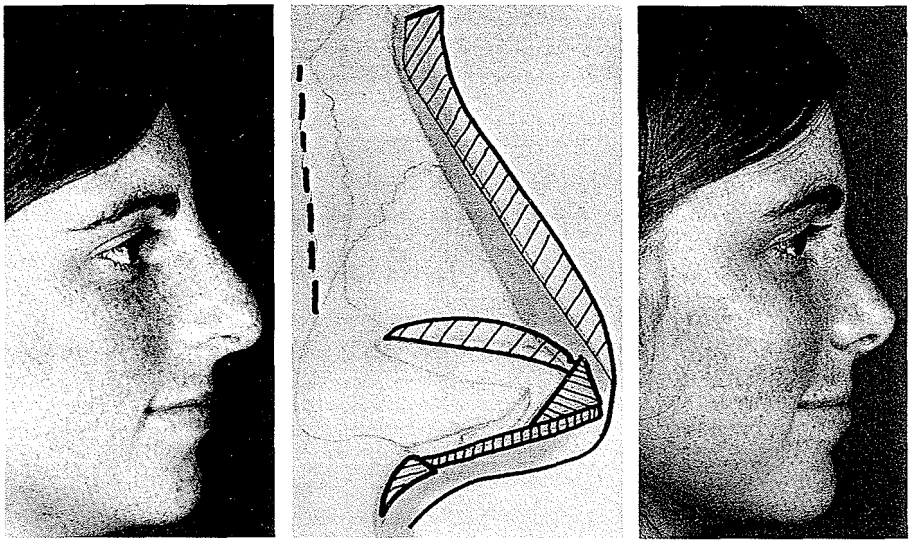


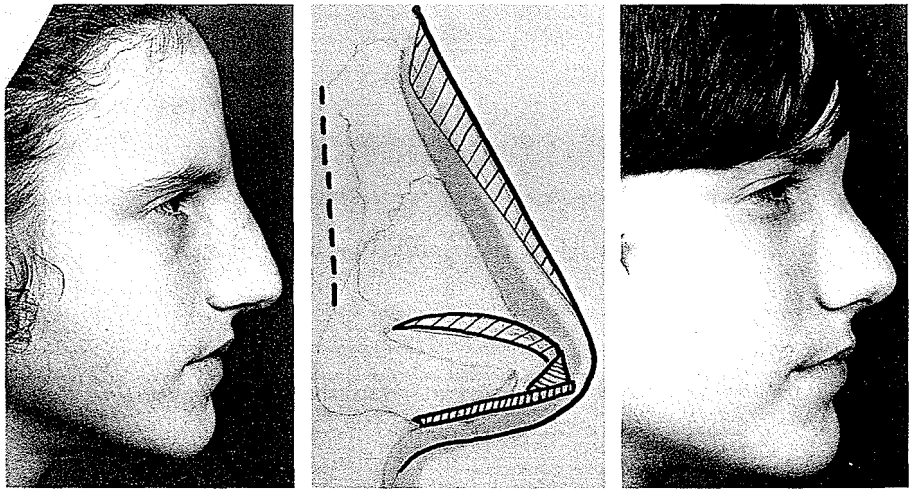
When a sharp chisel is being used to reduce the bony hump, there are two precautions that can and should be taken. First make certain that the skin over the bridge has been well freed from its attachments to the bone. In one case this was inadvertently neglected and the chisel lacerated the dorsal skin requiring sutures. The second safety step is to round off the sharp lateral edges of the chisel so there is less chance of lacerating the under dermis of the dorsal skin. A laceration of the dermis creating a subcutaneous crease sometimes can be more difficult to deal with than complete laceration of the skin.

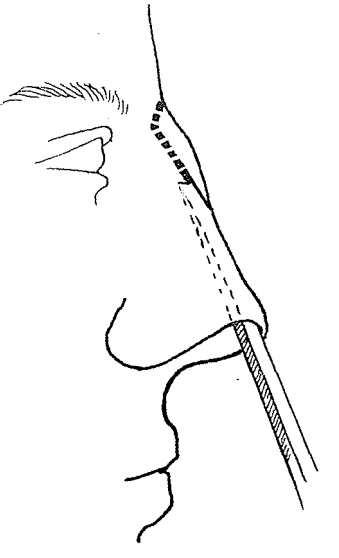
When the nasal profile has no dip at the glabella junction and flows directly into the forehead, an Egyptian and Greco Roman feature once considered beautiful enough for Gods, Goddesses, heroes and heroines, is no longer popular. To correct this the chisel must continue past the hump at the radix to lower the upper bridge of the nose all the way to the frontal bone. A rasp will *not* accomplish this maneuver as well. Here are four examples, three primary and one secondary, corrected with the chisel.











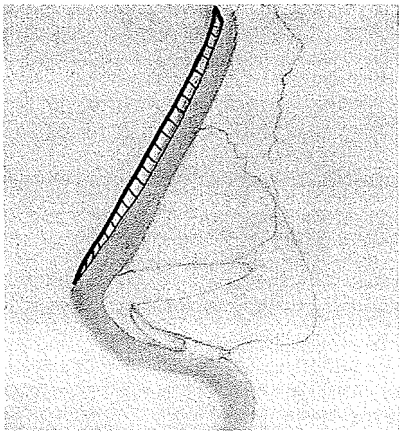
In the same manner during corrective rhinoplasty the chisel was used to shave down the upper bony bridge and a chin implant enhanced the profile.





a secondary correction











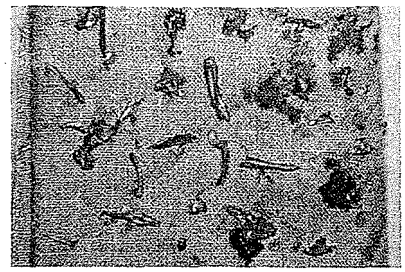
Here is a high bridged nose which was subjected to an amateurish corrective rhinoplasty. Unfortunately the surgeon did not follow these instructions but rather made three common errors in bridge correction. He gauged too much from the midportion, he left too much in the supratip area and probably because he tried to lower the nasion with a rasp instead of a chisel he failed to level the upper bridge aesthetically.

Style of Resection

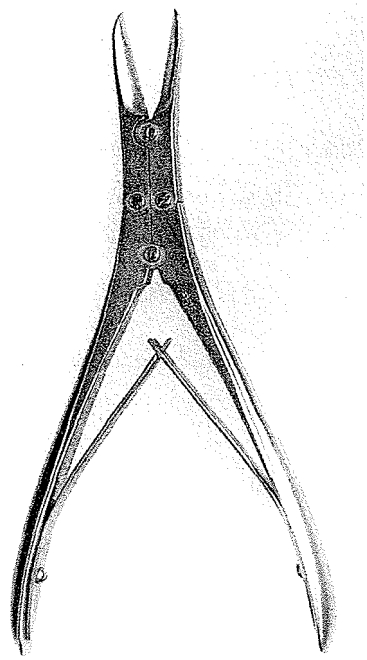
There are some surgeons who prefer to take the bony hump, septal bridge and portions of the upper lateral cartilages of the sidewalls in one bold piece. I have done this occasionally in the huge hump as shown. A more timid surgeon will pick at the nose taking piece after piece in as many as 40 to 50

pieces as I did through my earlier years. The experienced surgeon will take the hump and bridge in two or three pieces, each of the alar cartilage reductions as a piece each, the anterior septum as a piece or two, pair of mucosal lining trims, and both alar bases when wedges are indicated. This adds up to about a dozen pieces in all.



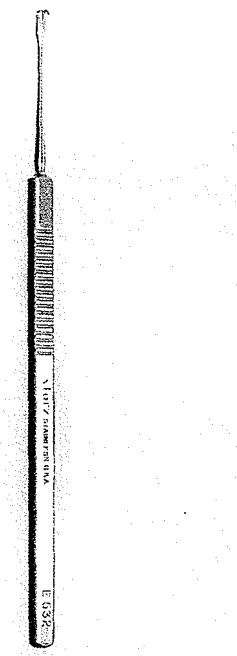


Of course it is ideal when the cartilaginous septum and bony hump can be removed in one piece. Sometimes the septal piece comes free and then the chisel is inserted separately to shave off the excess bony portion of the bridge. When a bony portion of the bridge continues to stand too high as a sharp edge it can be safely lowered with an Echoff bone cutting forceps.

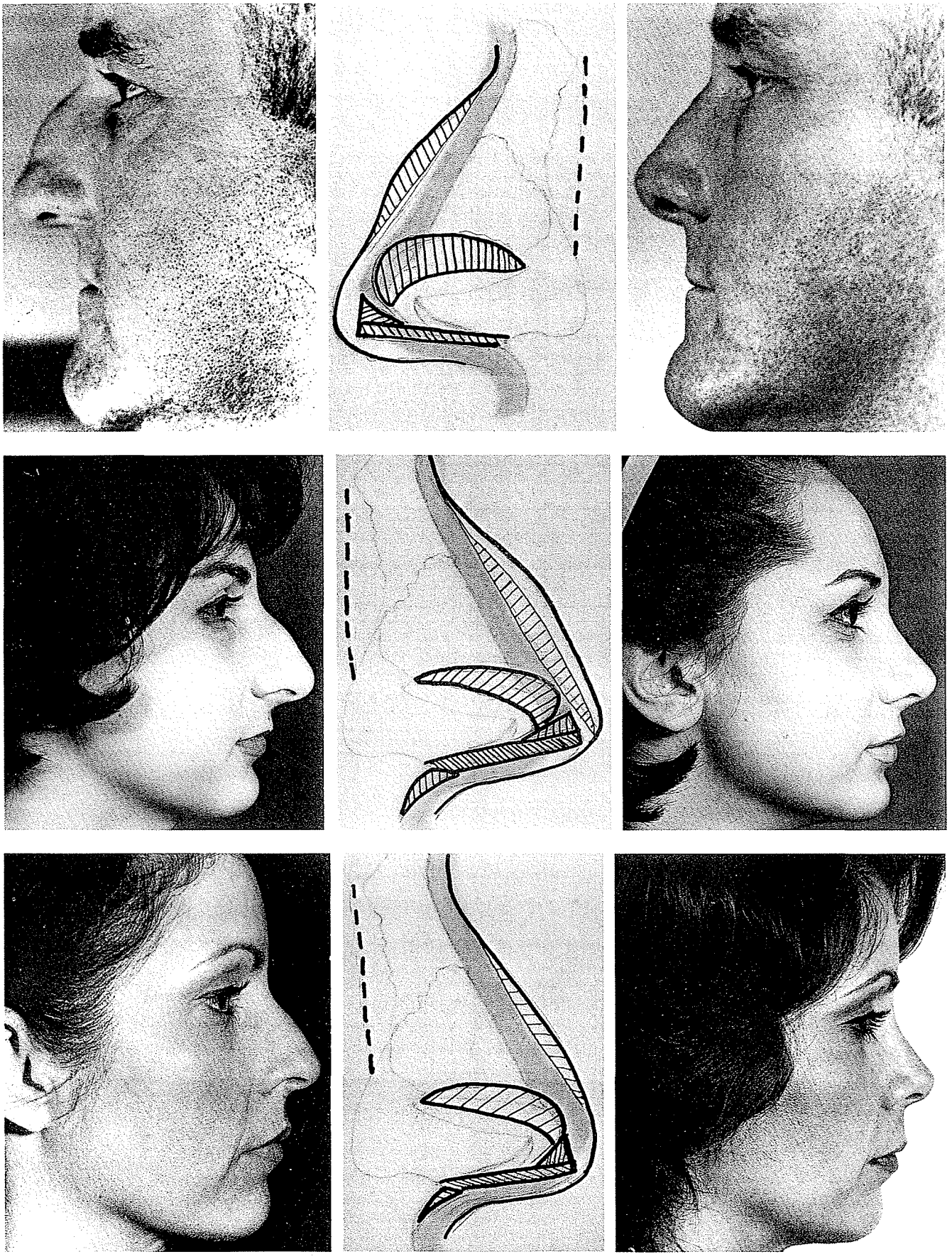


Remember the character of the nose depends on the bridge line and to remove too much can be disastrous. It is far better to resect conservatively until you have obtained your ideal goal. Final meticulous tailoring of the bridge with chisel shaving and rasp smoothing is aided by a small two-prong hook slipped under the skin to locate, by snagging, the area of objection. Then with a retractor for direct vision the excesses and irregularities can be shaved smooth.

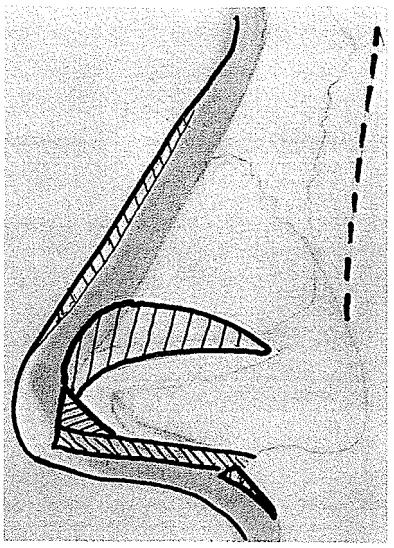
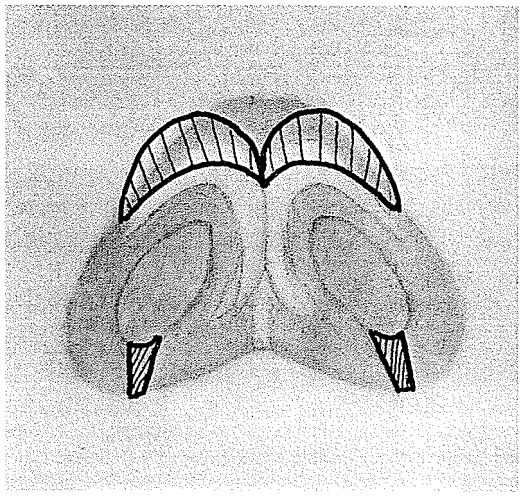
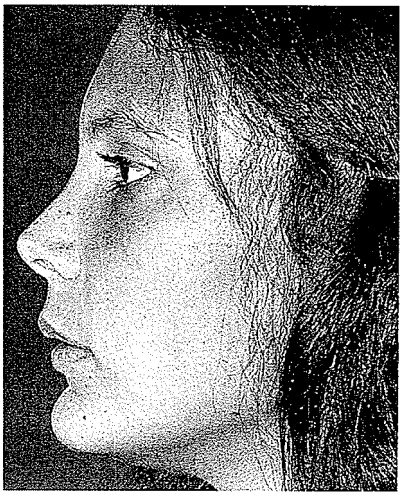
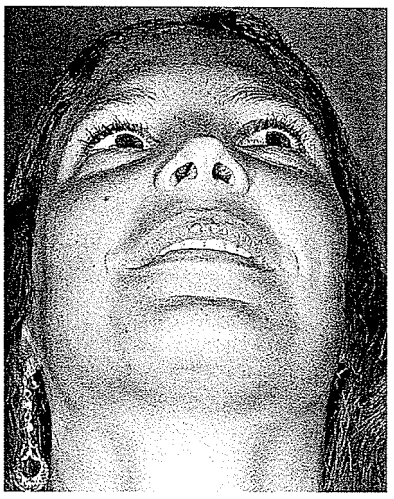
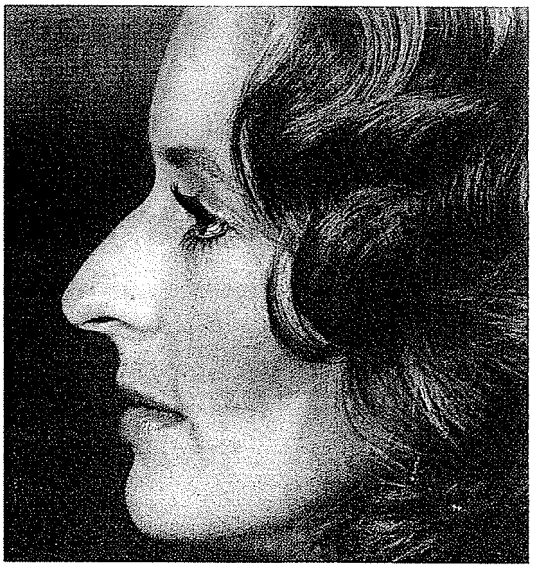
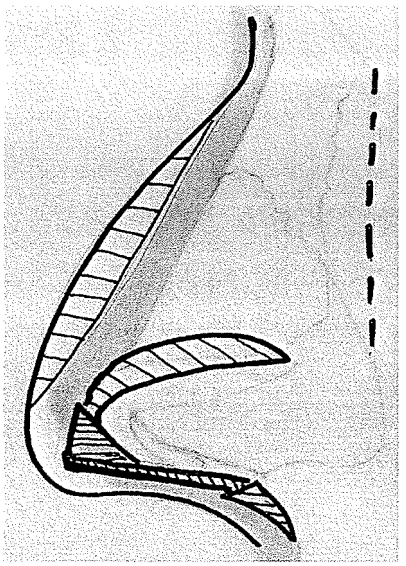
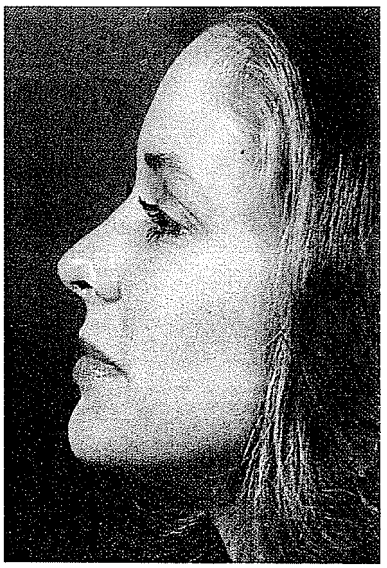
T. Skoog, during a routine rhinoplasty, inadvertently removed a major portion of the bony bridge. Rather than panic he took this opportunity to shape the free piece and then inserted it back into its original position. Skoog even went so far as to advocate this approach for bridge correction. It is not known how many of these grafts, by aseptic necrosis, were in part or totally absorbed but on this basis alone the procedure is not the method of choice. As removal of excess bridge can and has been experienced by surgeons, the possibility of shaping and reinsertion is mentioned only as a lifeboat.

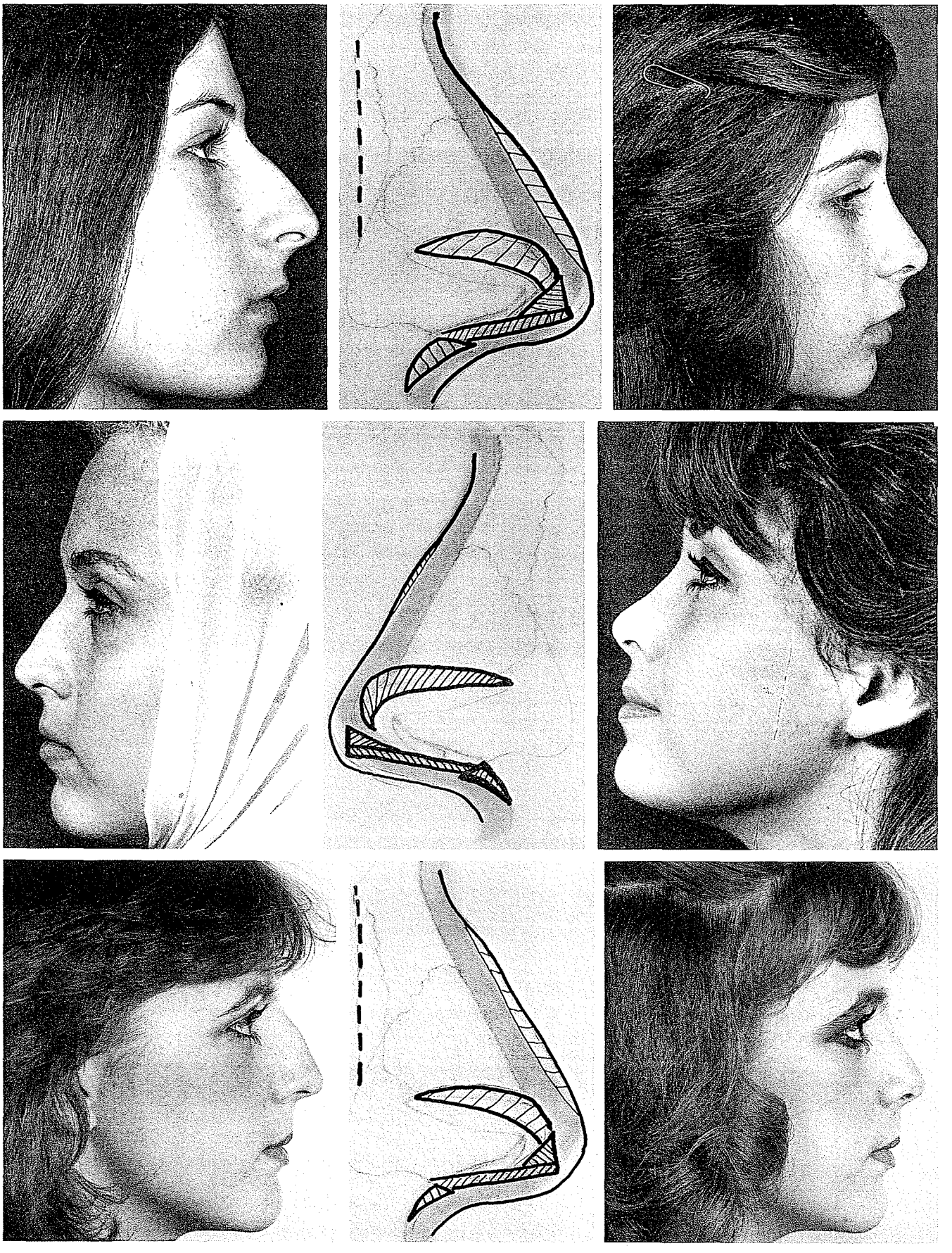


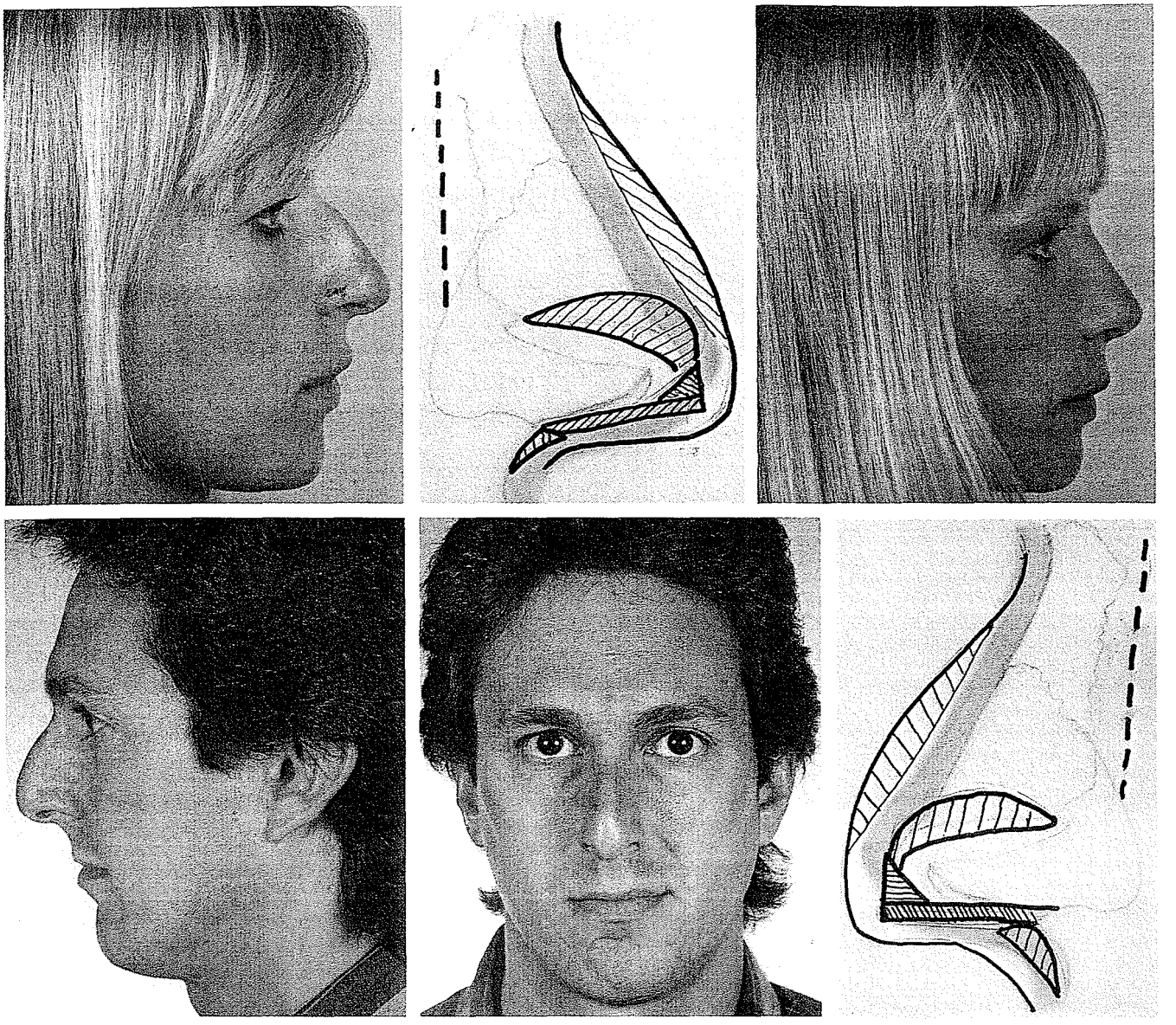
The extent and angle of bridge lowering depends on the patient's nose and expressed desires, which rests in the hands and aesthetic sense of the surgeon. Several examples follow.

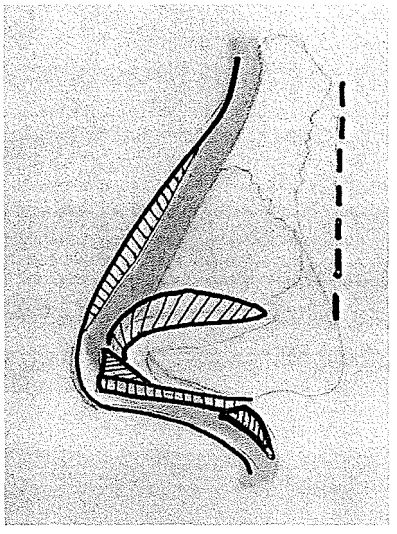




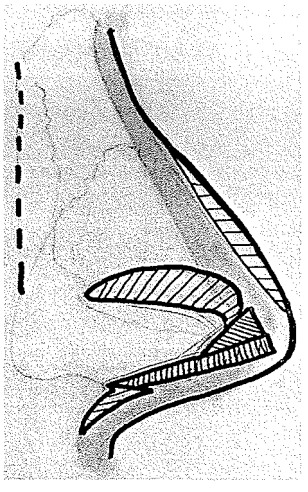








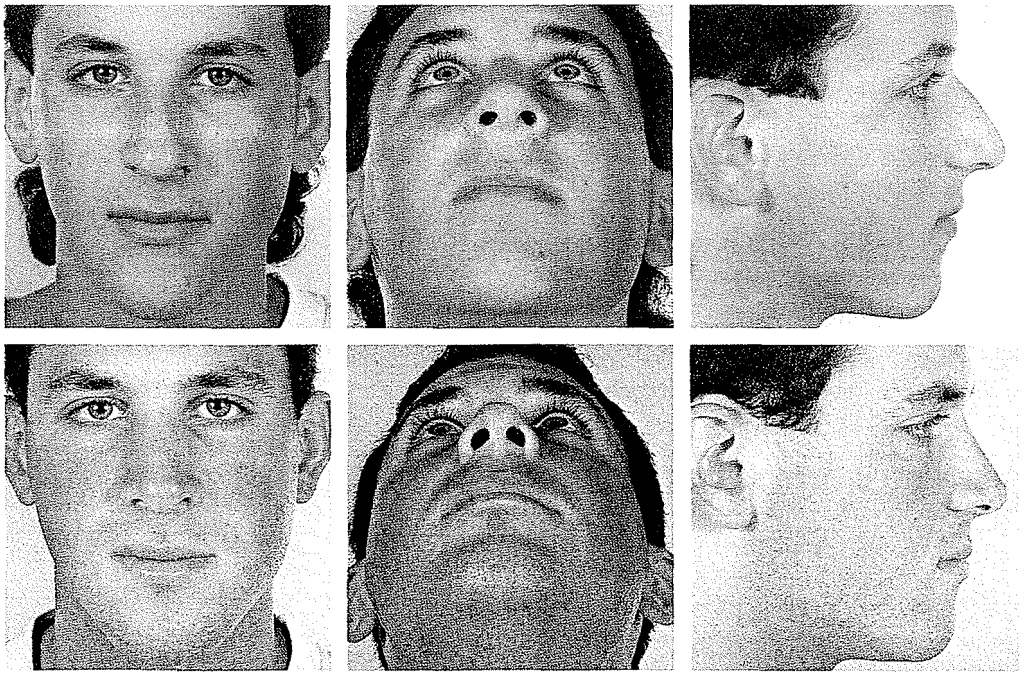


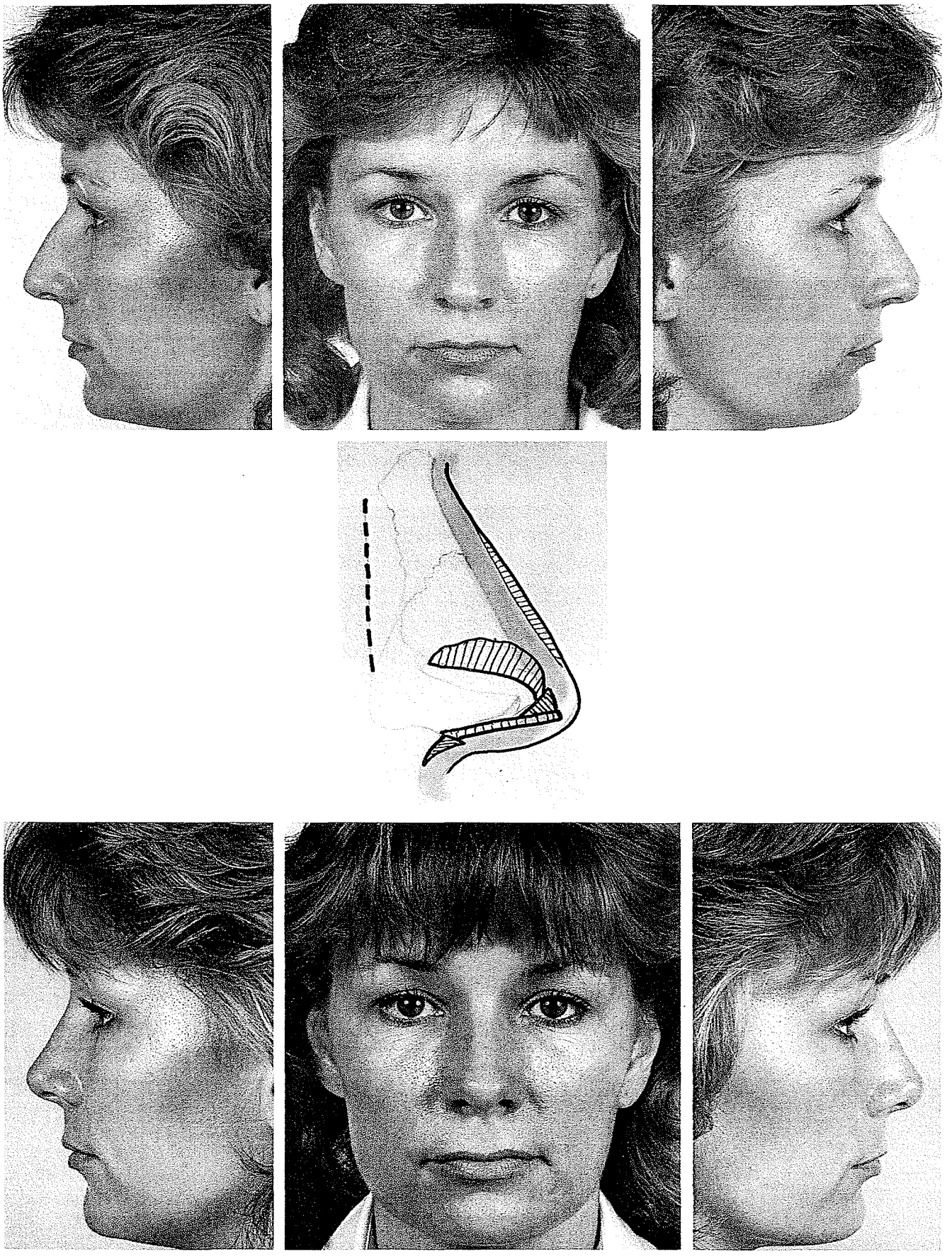


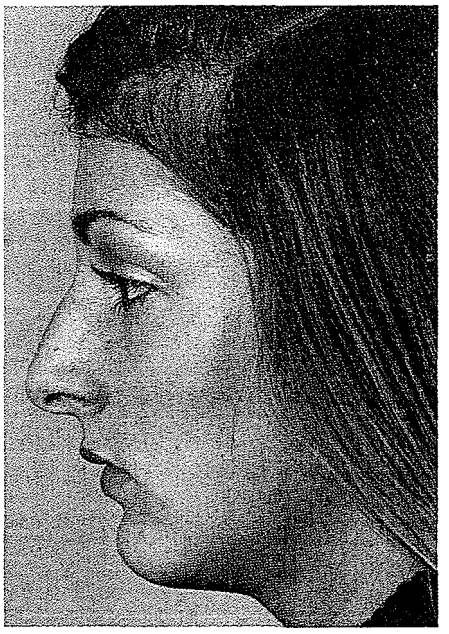


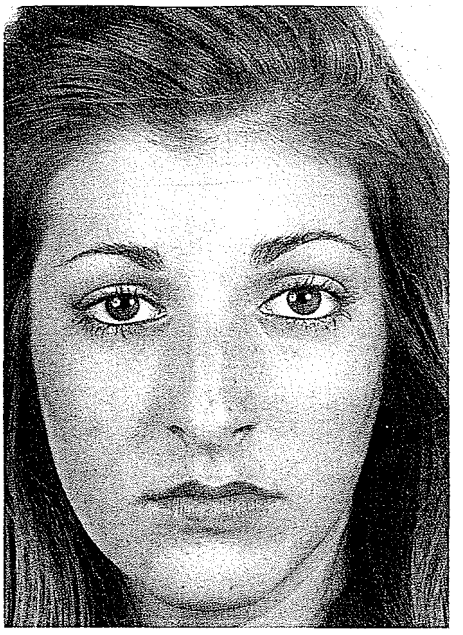


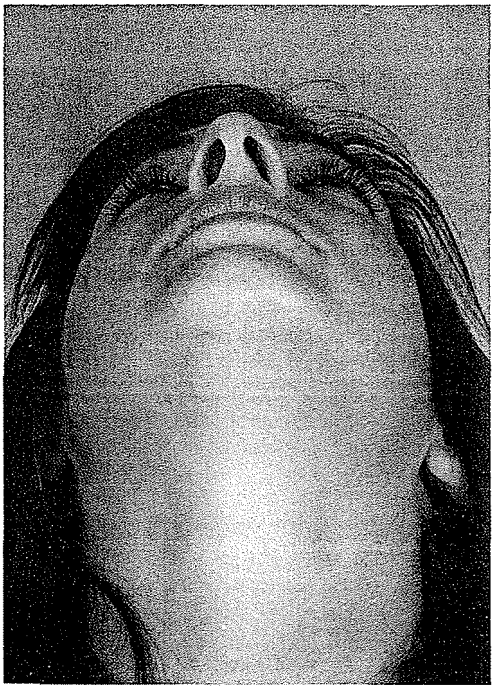


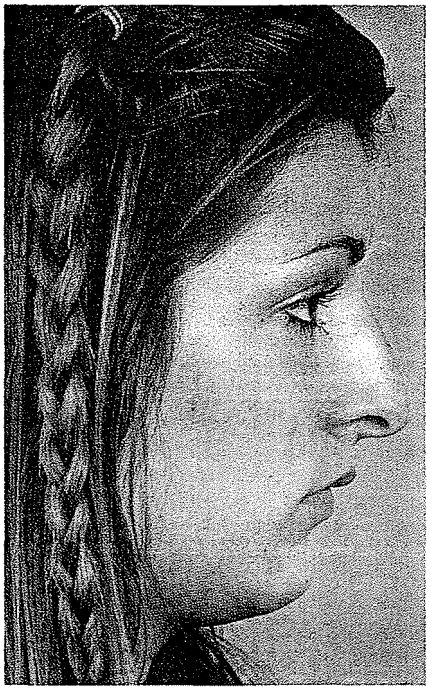


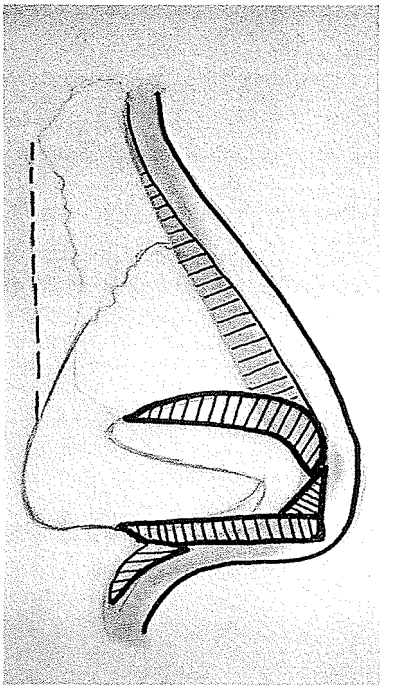




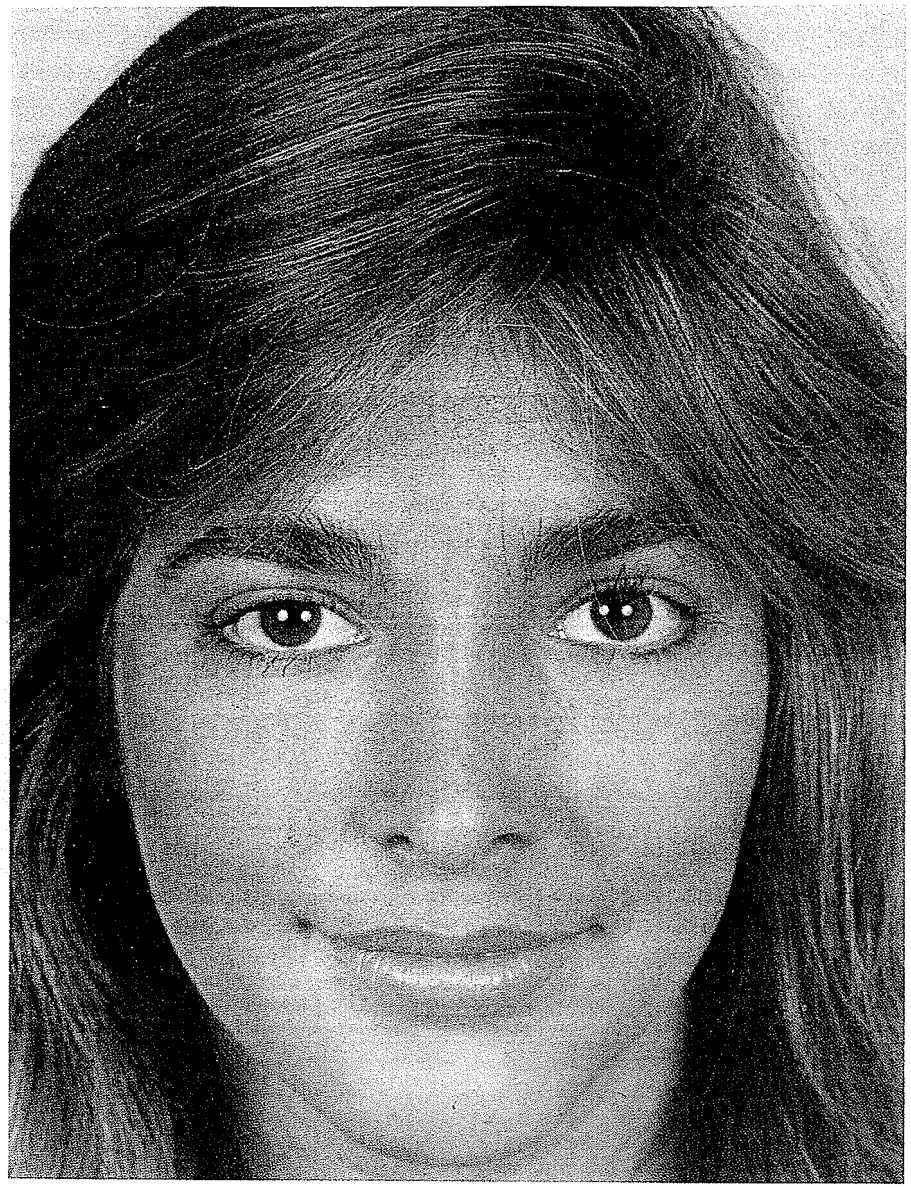


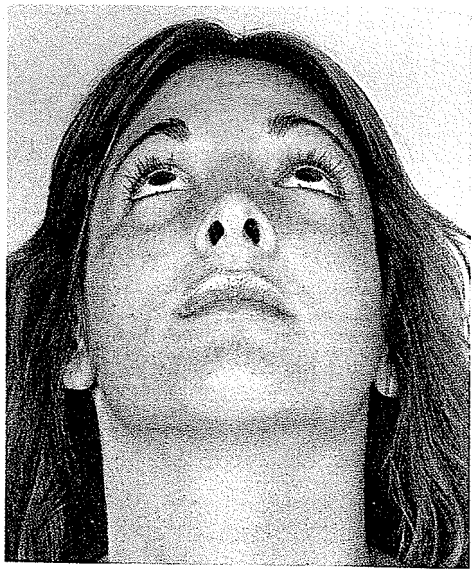


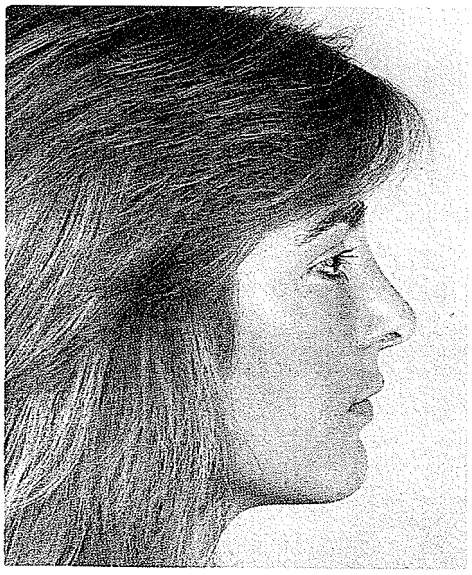


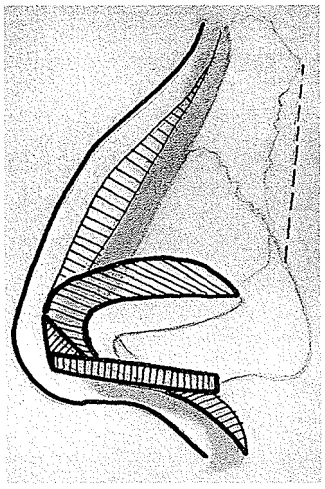


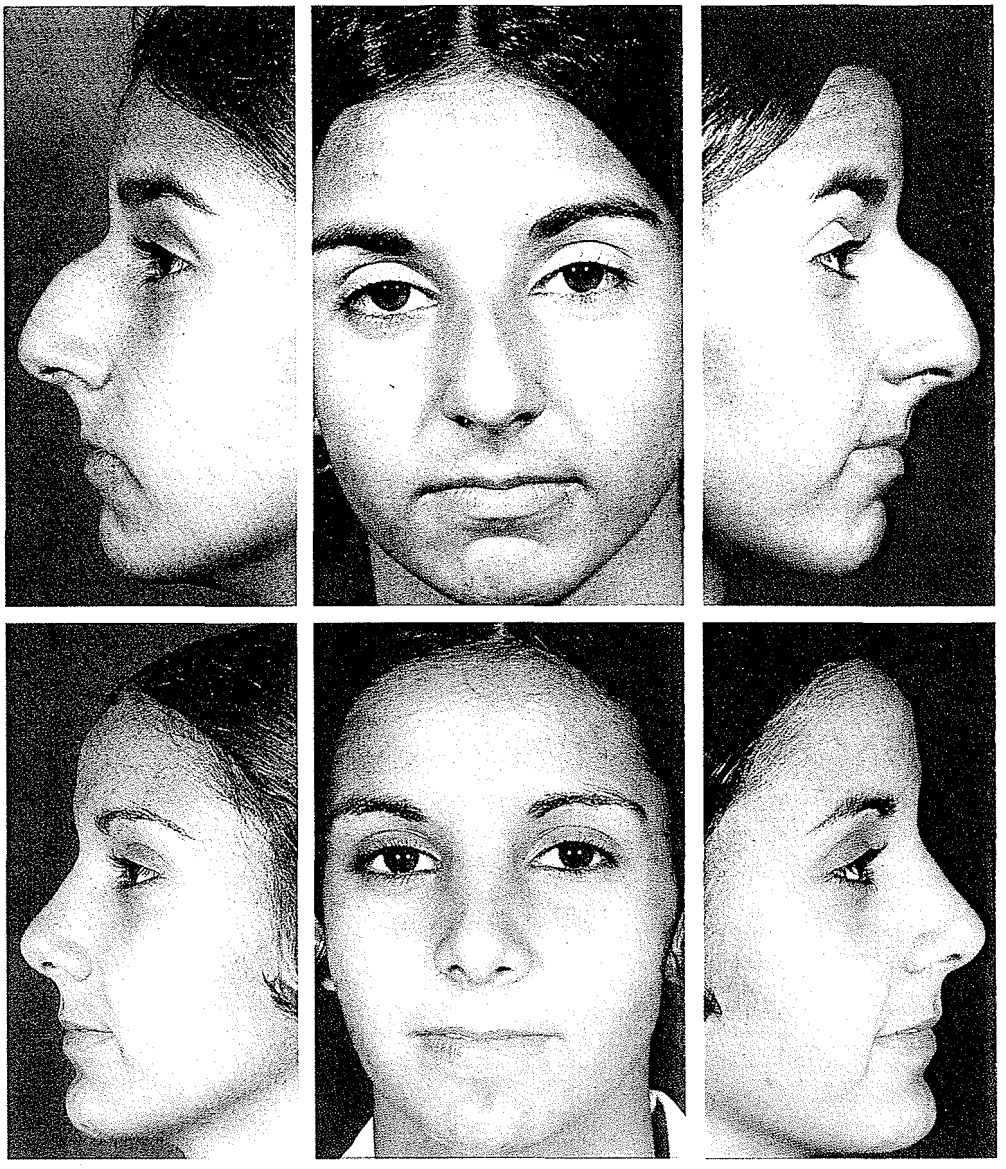








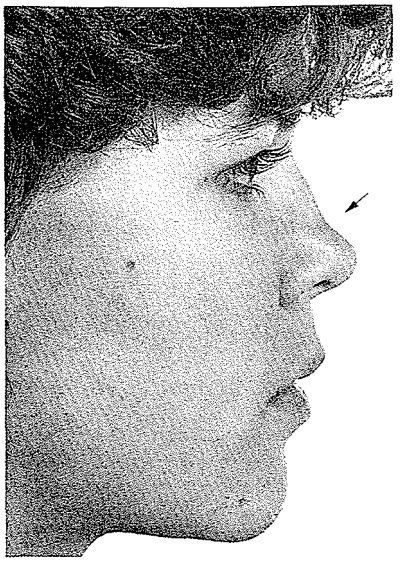


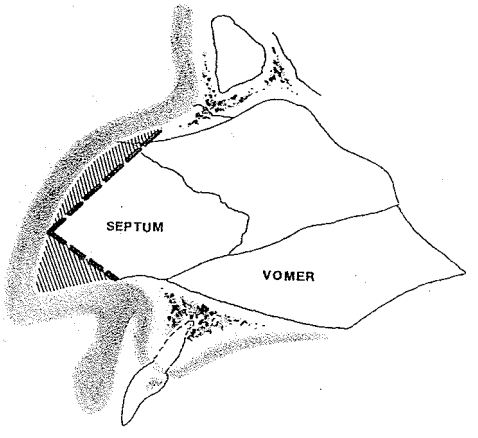


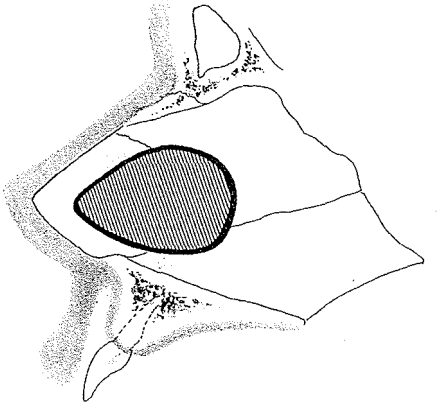
PRIORITIES IN SEPTAL CORRECTION

As noted in 1986 in *Principlization of Plastic Surgery,* when corrective rhinoplasty is combined with submucous septal cartilage resection, the safe order of priorities is important. Some otolaryngologists whose cases I have had to follow with corrective surgery obviously were not cognizant of the order of priority, being evidently more confident and better trained in septal surgery than in aesthetic rhinoplasty. They had gone in first and with expert technical skill removed even the slightest deviation of the septal cartilage, wherever it was, before starting the corrective rhinoplasty. This procedure not

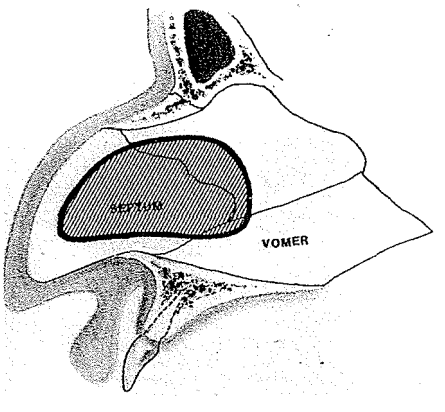
only depletes a valuable bank of cartilage but reflects a dangerous and incorrect order of priorities which may result in varying degrees of bridge deformity. When the septal obstruction deserves correction, the order of surgery is vital. It is essential to leave an adequate L-shaped septal cartilage framework to maintain bridge and columella support. Those steps in correction rhinoplasty such as hump removal to lower and straighten the bridge and anterior septal resection to shorten the nose, should be carried out first. Thus the desirable peripheral borders of the L that must be preserved are established. Then if a submucous cartilage resection (SMR) is carried out, it can be kept safely within these boundaries. If a

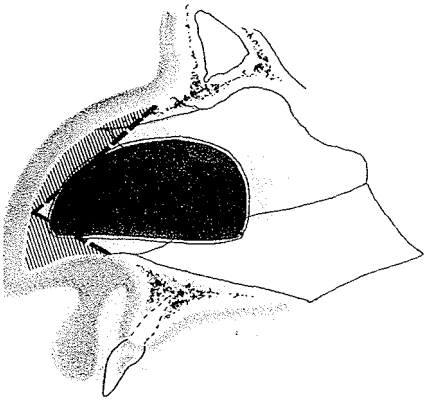


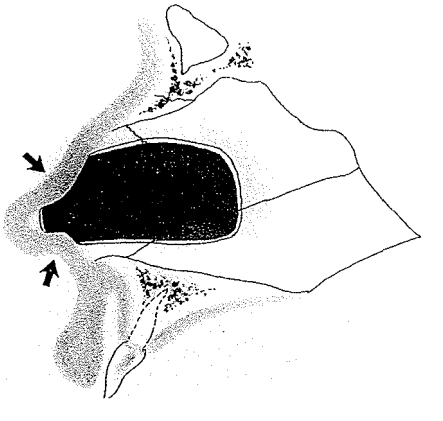




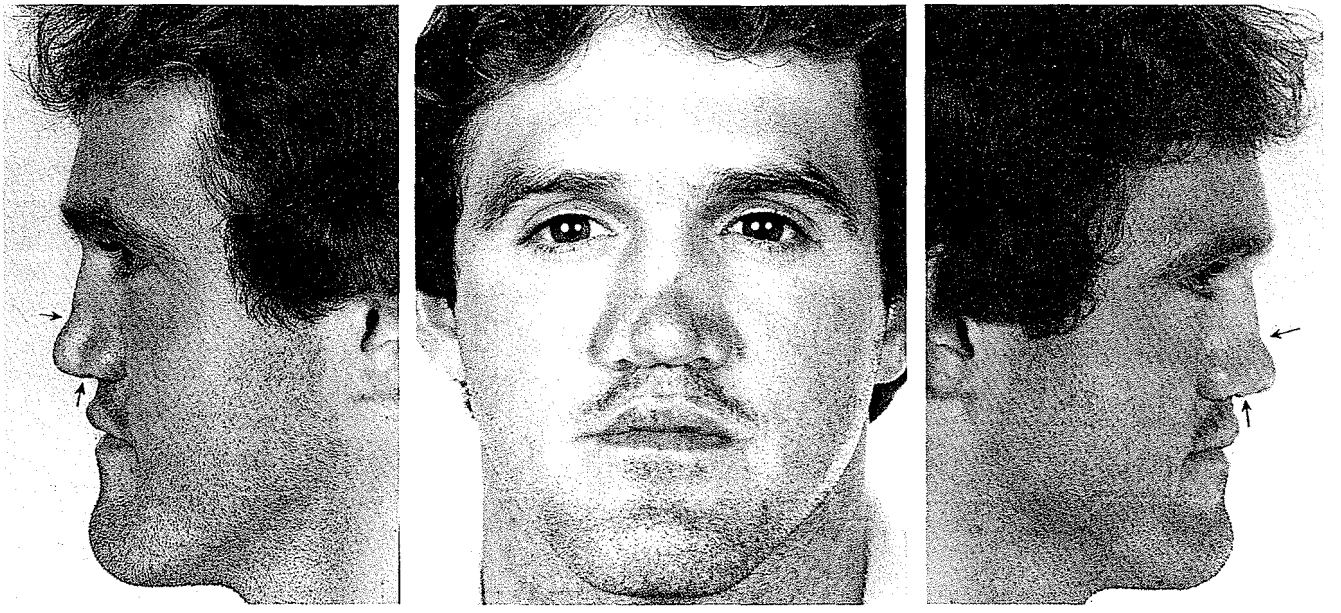
generous SMR is done first, the surgeon, when he takes off the hump, may find to his dismay that he has lost the continuity of the septal cartilage along the bridge. The ultimate result is a saddle nose collapse—a not infrequent complication of rhinoplasty. If the SMR has been carried too far forward, when the anterior septal resection is carried out to shorten the nose there may be no anterior cartilage left.





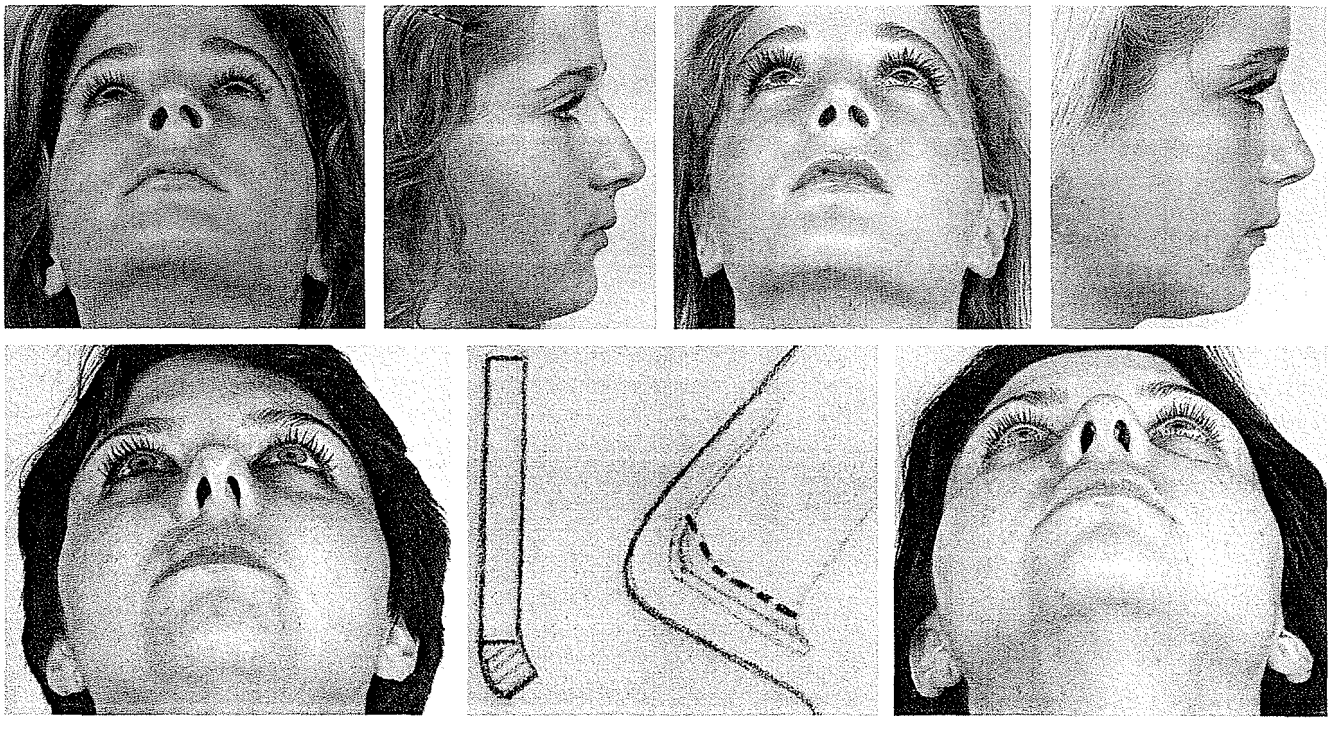


The result will be varying degrees of columella retraction and tip collapse, also not an infrequent complication.

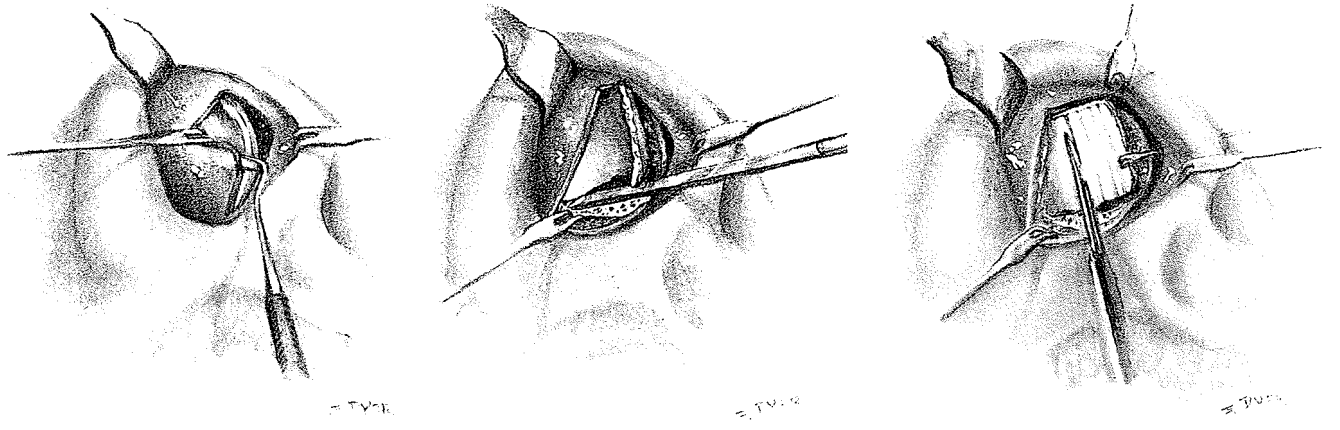


Anterior Septal Deviation

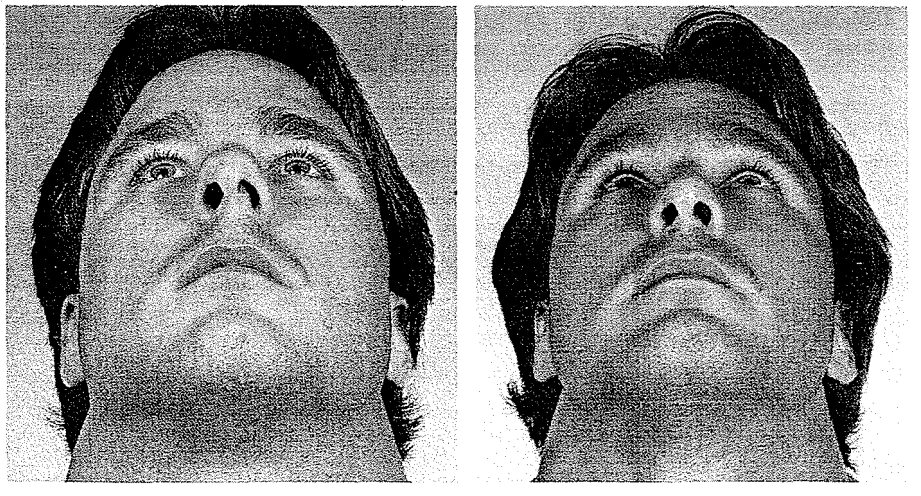
After the membranous septal incision the anterior septum is presenting. When the deviation is anterior then sometimes the amount of anterior septal resection required for nasal shortening may be enough to remove the deviation as seen in these two patients.

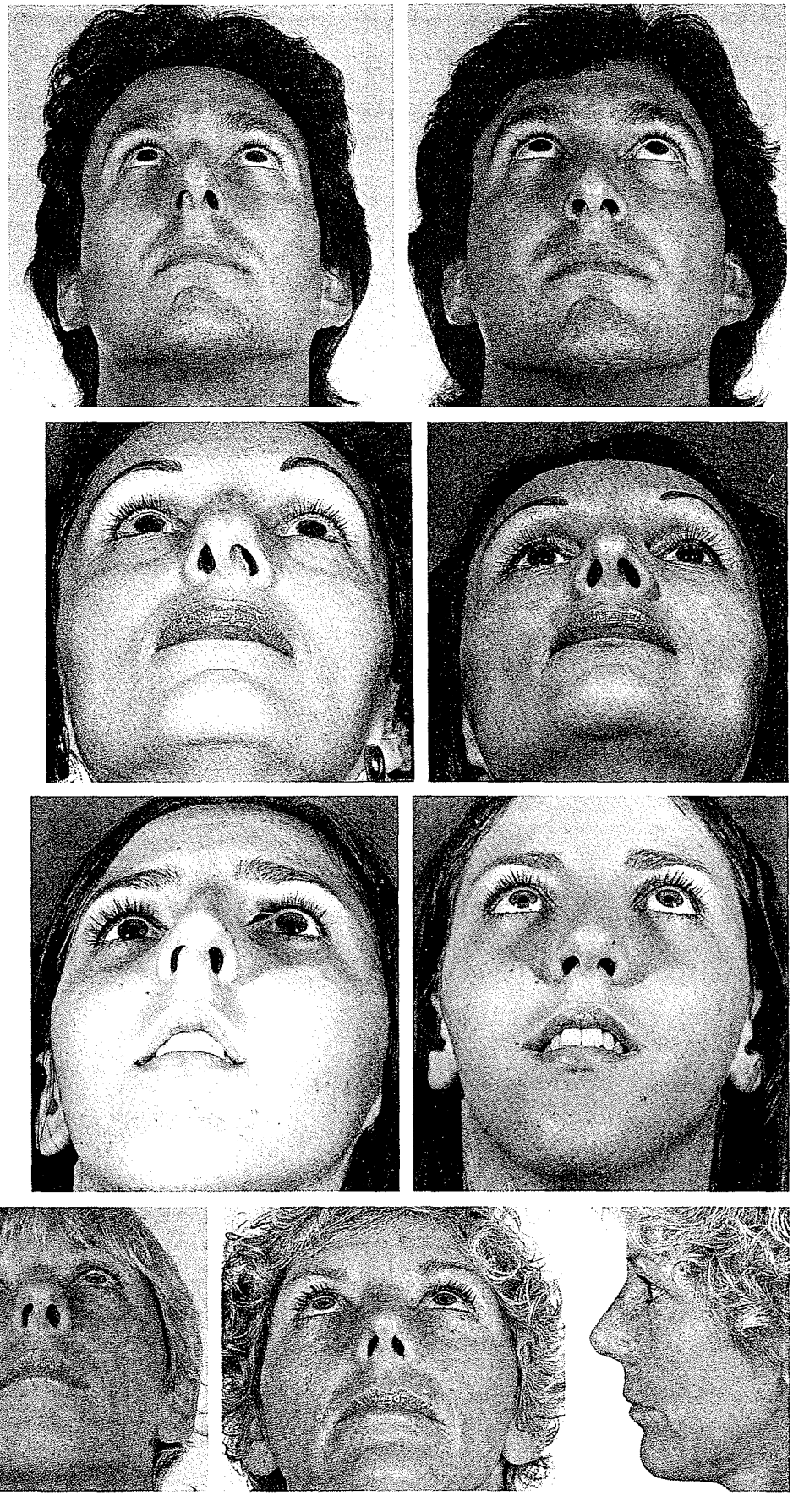


When the deviation involves more of the septum than can be resected the mucoperichondrium on either side of the septal cartilage is peeled off with scalpel and elevator under direct vision presenting the deformed cartilage. I find that in most anterior septal deviations that scoring the concave side of the septum in accordance with Gibson's rule, freeing the septum with a narrow chisel from the nasal spine and along its abnormal attachments in displaced position out of the vomerian groove, the anterior septum can be brought into straight alignment. It is held in corrected position by sutures to reapproximate the anterior septum to the columella but picking up the edge of the septal cartilage on the side toward which the septum is being directed. This should place and maintain the anterior septal cartilage in the midline hidden behind the columella.



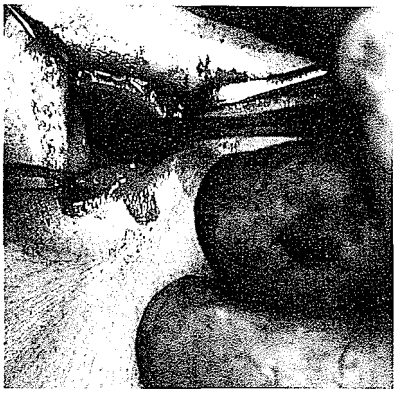
Here are several cases of anterior septal deviation that have been corrected as described.

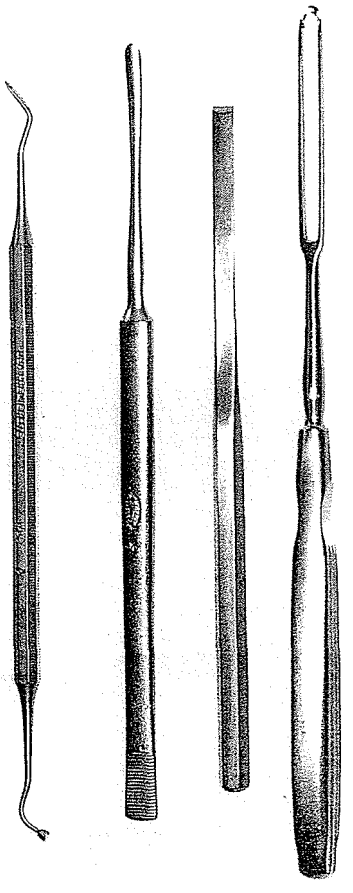




Submucous Septal Resection

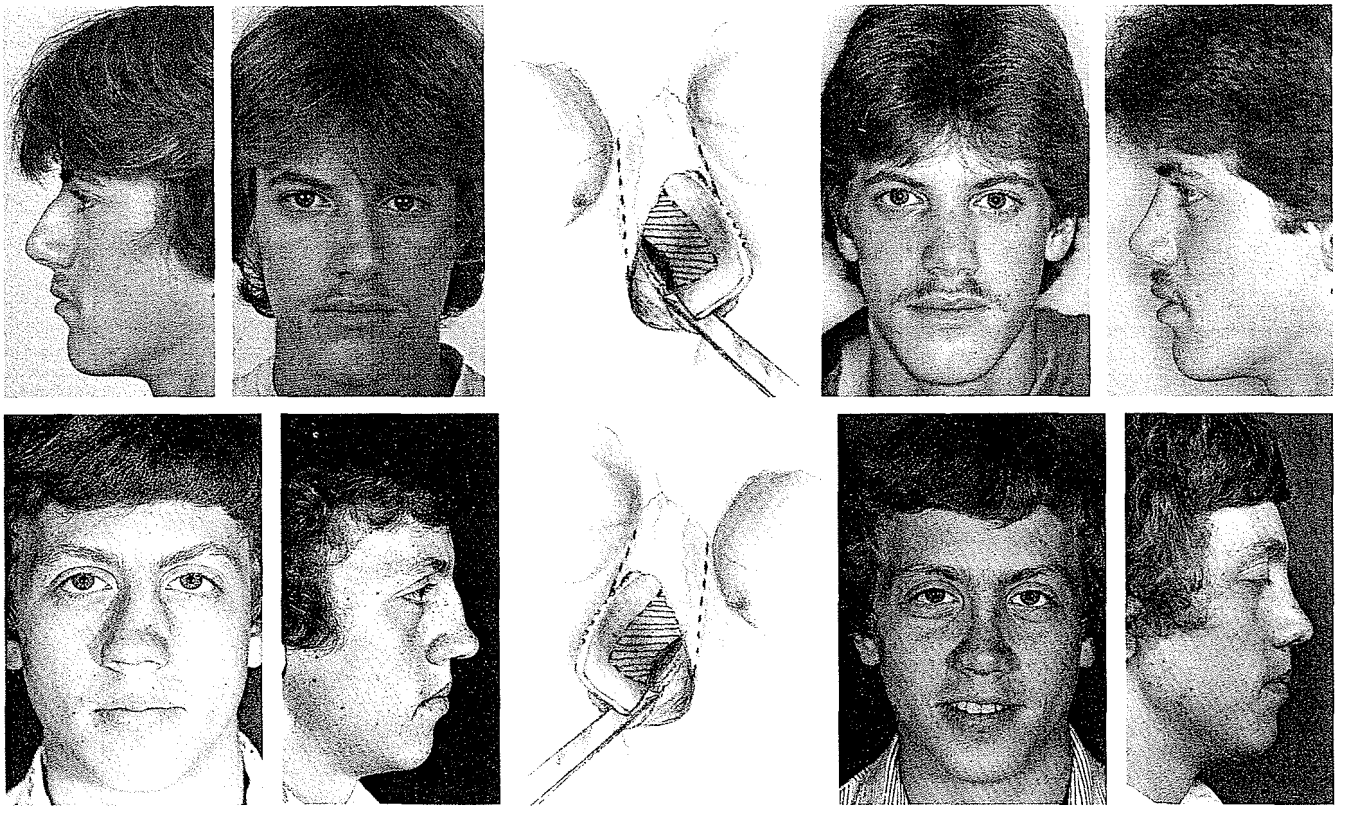
When the septal deformity is extensive and positioned more posteriorly, then the approach changes. An incision parallel to the anterior septal edge and 0.5 cm to 1 cm proximal to the edge is made through the mucoperichondrium enabling dissection of this covering layer of the septal cartilage with scalpel and elevators. In previously unoperated or non-traumatic cases the dissection is swift and easy with a few sweeping strokes. This frees the cartilage on one side. To accomplish the same on the opposite side I pass the scalpel through the septal cartilage parallel with the vertical mucoperichondrial incision leaving the anterior cartilage strut of 0.5 to 1 cm covered with mucoperichondrium. An elevator is eased through the cartilage cut gently dissecting the mucoperichondrial flap on the opposite side easing it from its attachments to that side of the cartilage. When there has been previous trauma in the septal area and there are scar adhesions of the mucosa to the cartilage then dissection is more difficult and mucosal tearing a possibility. As long as the mucosa is torn on only one side there should be no permanent septal perforation. Brad Garber, an ENT specialist who trained in plastic surgery at the University of Miami, taught me how to dissect around an adhesion isolating the area so that the scarred mucosa could be freed by sharp dissection from the cartilage.



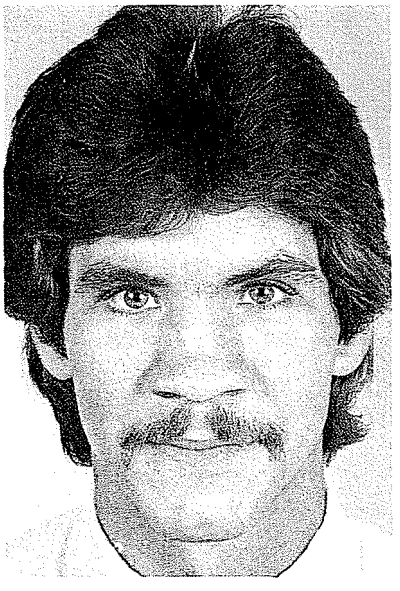


With the mucoperichondrium freed on both sides so that the deformed septal cartilage and bone is standing naked, the deformed parts can be resected. This is usually achieved by freeing the septum from its vomerian groove with a narrow chisel. Then defining the upper edge of the cartilage resection with a scissor cut parallel to the straightened bridge leaving at least 1 cm in bridge support. Then with a swivel knife passed through the scissor cut sweeping back, down and finally forward to join the chisel cut below allows removal of as large a piece of cartilage as desired. Excess bone obstructing the airway can be removed with chisel and rongeur. If the remaining L of cartilage still presents a deviation the cartilage

can be scored on the concave side to allow release and straightening. Here are a pair of deviated septums that have been corrected as described.



This septal resection approach is used in the normal septum when cartilage is being harvested for grafting the tip, bridge, ala or columella.



In a 1993 symposium in Miami J. Juri boldly dismissed the importance of septal cartilage advocating its entire removal without concern. He explained that the nasal bones and cartilages would hold a nose up without the cartilaginous septum. This scene is analagous to a kid on a bicycle soon after he has learned a few tricks crying out, "Look, no hands!" . . . Crash! Nature put the cartilage there for a good reason and principle demands we respect it. As the pride of the nose stands with the septum it is better for us mere mortals to preserve the L and correct the cartilage rather than discard it. I have had to correct too many noses that have suffered removal of too much septal cartilage. Often the deformities do not become apparent immediately but in time they shrink, regressing in the direc-

tion of the missing cartilage. To emphasize this point here is an example of a childhood injury followed by septal chondritis which destroyed the nasal septum. The flat result shows nasal growth without septal support. Its correction will be presented in secondary surgery.

Trimming the Lining

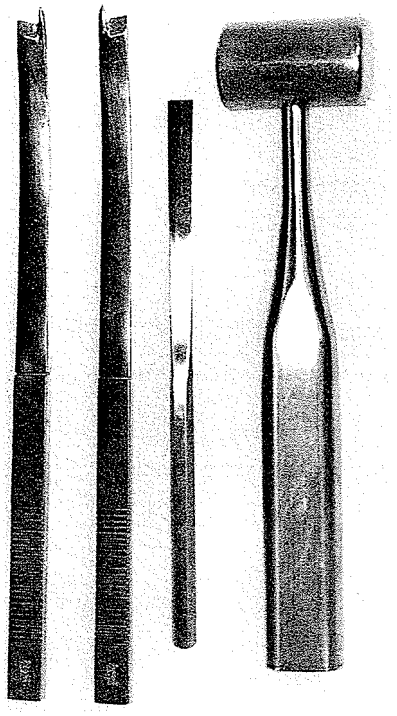


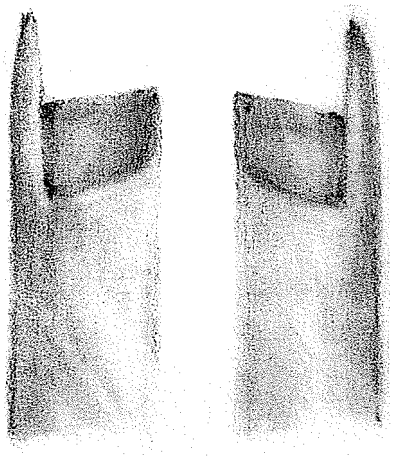
At this point the vestibular lining is tailored conservatively with right angled scissors. The amount removed should be definitely less than the amount of anterior septal resection. Freed vestibular mucosa will contract. When too much lining is excised and the mucosa sutured there may be obvious retraction of the ala with notching in severe cases but even when the pull is subtle it will be progressive and irreversible lifting the ala skirt off the columella knee presenting a skeletal look. Examples of these retracted alae can be seen everywhere including the section on secondary rhinoplasty. This is one of the telltale signs of rhinoplasty and may need release with skin grafts or chondromucosal flaps. Thus it is important to be conservative in the reduction of your vestibular mucosal lining and suture with great care to avoid tip distortion, vestibular webbing and alar rim retraction and notching.

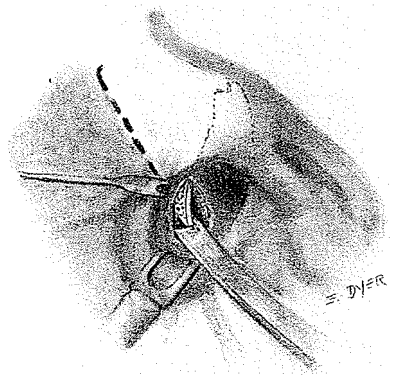
The next and final step in corrective rhinoplasty will be bilateral osteotomies. However, just before this step I prefer to carry out two adjuncts which may or may not be indicated in each case. One is insertion of a cartilage graft for nasal tip definition and the other is the marking and resection of excess alar base. Incidentally closure of these alar base resections are postponed to provide better access for the osteotomies. Rather than interrupt the order of the steps in rhinoplasty, the order of the execution of these adjuncts only are noted but will be discussed in detail subsequently.

BILATERAL OSTEOTOMIES

Subcutaneous hemorrhage after fracture of the nasal bony pyramid is greatly responsible for the excess ecchymosis and







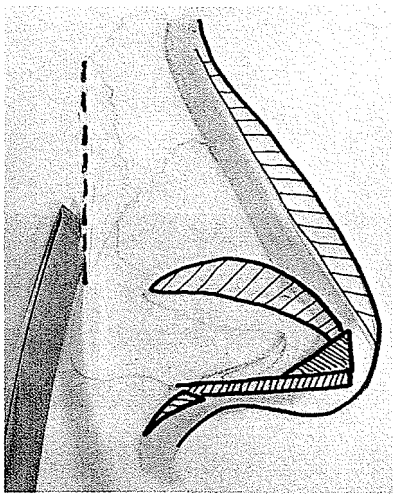
swelling of the eyelids following rhinoplasty. To minimize this reaction the osteotomies are postponed until the end so as to reduce the time lag between the fractures and the application of the nasal splint and eyelid pressure dressings. Under this regime "black eyes" are almost a rarity.

Method of Osteotomy

Although I was taught to cut the osteotomies through a vestibular stab incision and periosteal tunnel along the lateral side of the frontal process of the maxilla with a saw, this approach is mechanically difficult. Any amateur carpenter knows for efficient sawing the saw needs an edge into which to engage its teeth. No such edge is available as the saw works back and forth on the flat side of the frontal process of the maxilla. After hundreds of sawed osteotomies I changed to a chisel and then designed a chisel specially for this procedure. Previous chisels had a rounded projection on its lateral side which could be palpated through the skin and used to guide the chisel away from the eye area. A better chisel was designed with the round knob on the medial side next to the angled blade. Through a 1.5 cm stab in the lateral vestibule just anterior to the nasal bony pyramid the special chisel is inserted into the stab and then sunk into contact with the bone of the frontal process of the maxilla flush with the maxilla. The round knob is hooked around the medial edge of the bone to guide the chisel and prevent it from sliding laterally into the eyelid area.

As noted by R. S. Flowers and R. Anderson in 1968 the lacrimal sac is vulnerable during osteotomy. Although disruption of the sac was demonstrated, postoperative obstruction of the lacrimal system was observed to be functional, of short duration and without sequelae. It is, however, better technique to avoid this injury when possible. Thus the chisel, with its knob hooked around the inside of the bone, is guided safely along the maxilla toward but medial to the

inner canthus dividing the frontal process of the maxilla off the maxilla. Care is taken not to tear or divide the lining mucosa with the chisel. The nasal bones attached to the frontal processes are left intact as a combined unit. At the completion of the chisel cut I usually pry the freed bone and twist to greenstick fracture the remaining attachments to the maxilla. A 3/4 cm chisel may be used to release any resisting attachments. There are certain circumstances where the vestibular approach may be difficult and access to the bones can be achieved by an incision in the upper buccal sulcus. Use of a 3 mm chisel passed through the skin is used by some to free the bone in the upper portion. I find this seldom necessary.



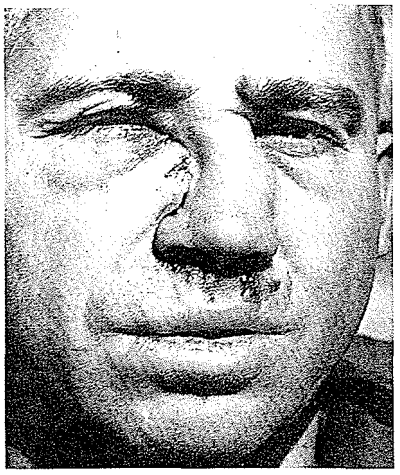
Once the bony components are free on each side then they are moved inward with thumb and finger pressure as a bilateral in-fracture.

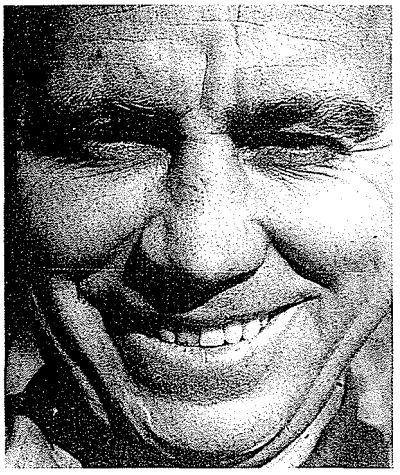
In-fracture Out-fracture Controversy

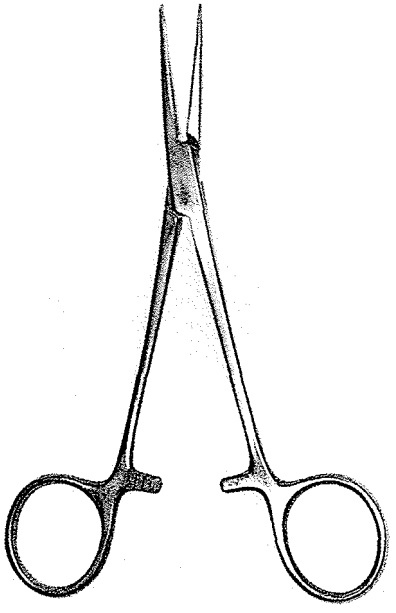
Some surgeons, rather than depend on simple in-fracture, prefer to get even more mobility by doing an out-fracture and then an in-fracture to position the bony elements after bilateral osteotomies. This controversy was started by two aesthetic plastic surgeons, Joseph Safian and Gustave Aufricht, in the middle of the twentieth century. Both trained with Jacques Joseph in Berlin and then came to New York City and each, it is estimated, completed at least 15,000 rhinoplasties. Safian advocated simple in-fracture after osteotomy, whereas Aufricht advocated out-fracture and in-fracture for more mobilization of the bone. They argued this controversy often as seen at a symposium organized at the University of Miami in 1974. Safian is standing and Aufricht is seated to the right with P. Natvig, Joseph's historian, just beyond Aufricht.



It is true Aufricht's noses were often more elegant but on the point of osteotomy I agree with Safian. Obvious clues to the advantage of simple in-fracture are seen in most nasal







fractures following fist fights where the right cross or left hook has in-fractured one nasal bony component.

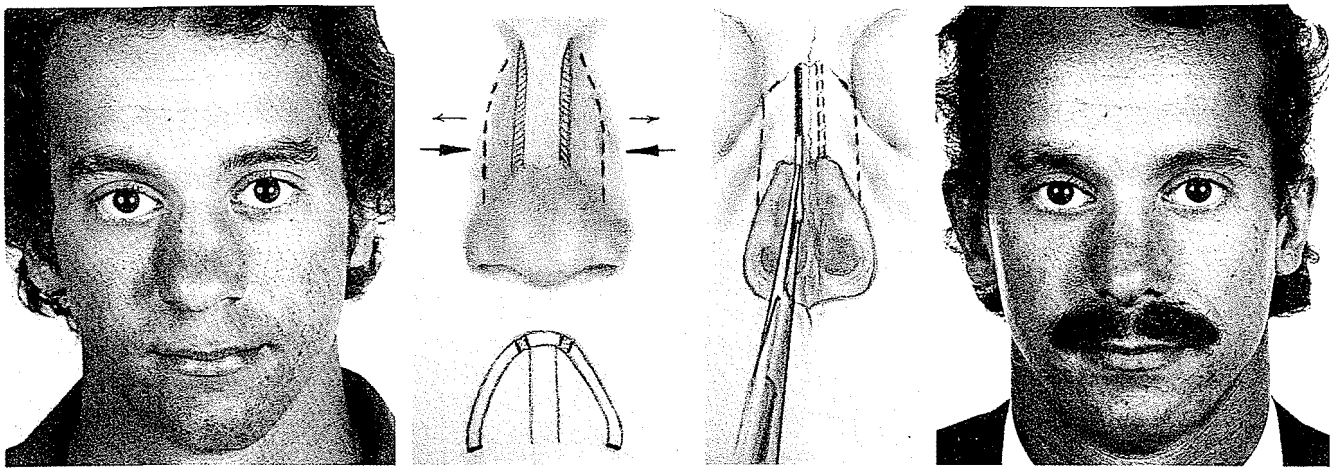
When seen after impact the in-fracture is so fixed in in-fracture position that it requires vigorous out-fracture maneuvering to reposition it normally. Here is an example of the in-fracture of a left hook which required out-fracture to align the nasal bones. As in-fracture can be so effective with less tendency to shift, out-fracture is not usually necessary.

Aufricht devoted much of his ingenuity to improving nasal splints with graduated pressure to keep his radically mobilized bones from spreading postoperatively. Safian was able to control his in-fractures with a simple splint as we do today. The splint is maintained one week.

There are rare occasions when it is not possible to obtain a good enough narrowing of the bony pyramid with simple in-fracture. In these cases a regular chisel can be passed along the side of the septum and driven between the septum and the nasal bone on each side to allow prying to obtain an out-fracture.

The bony bridge arching between the septum and the nasal bone on each side can be broken off with a straight clamp as advocated by Aufricht. Removal of this osseous chink allows the nasal bones to approximate the septum more snugly during the in-fracture. The out-fracture requires more prolonged nasal splinting for 10 days to 2 weeks.

In my experience I have not found it necessary to remove the bilateral bony bridge between the nasal bones and the septum or to out-fracture the osteotomies. Yet here is a case where I found both were necessary! This wide bridged nose was benefitted by removal of the high bony bridging chink between the nasal bones and the septum. This thin piece of bone was cracked off on each side with a straight clamp then bilateral osteotomies followed by both out and in-fractures achieved the correction desired. The splint was maintained for two weeks which is twice as long as usual.

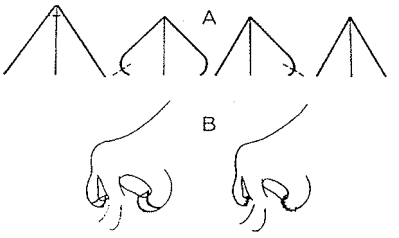


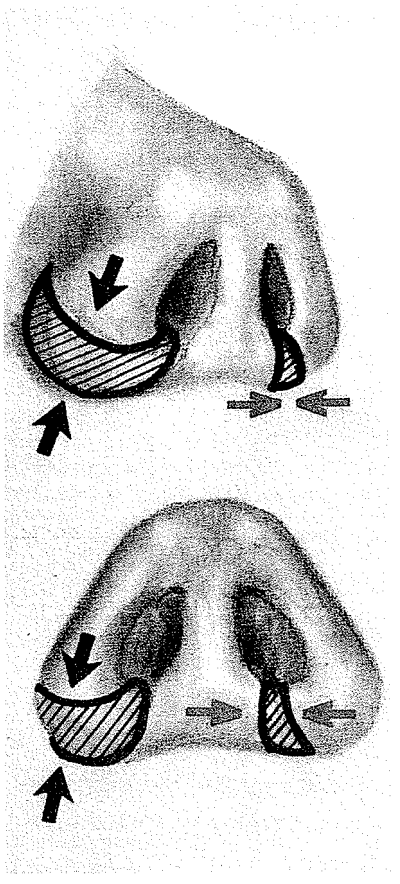
Sir Archibald McIndoe once said to me "You cannot do a proper rhinoplasty without doing osteotomies". He meant that unless you altered all aspects of the nose the correction would not be complete. It is true that when a large hump is leveled the bridge tends to present a flat top or even show the three ridges of the nasal bones with the septum running down the center. When lesser humps are removed the remaining base can sometimes be tailored by shaving the bony sides.

In my corrective rhinoplasty cases I would estimate doing osteotomies in 90%. Except in special cases the results of osteotomy and in-fracture will not be showcased except that almost all results of corrective rhinoplasty shown in this book reflect the effect of osteotomies and in-fracture.

ALAR WEDGE RESECTION

During routine reduction rhinoplasty the mere lowering of the bony pyramid and septal height results in flaring of the nasal sidewalls. It is like lowering the center pole of a tent and observing the inevitable sag and flare of the sidewalls. Preoperative nostrils which seem within normal limits or are gracefully long and slender suddenly become open, flared and even vulgar (A). This effect is exaggerated when the nose has been shortened and tilted giving the nostrils greater antero-posterior exposure. Correction of this flare with a bilateral tuck is achieved by a wedge resection of each alar base as it





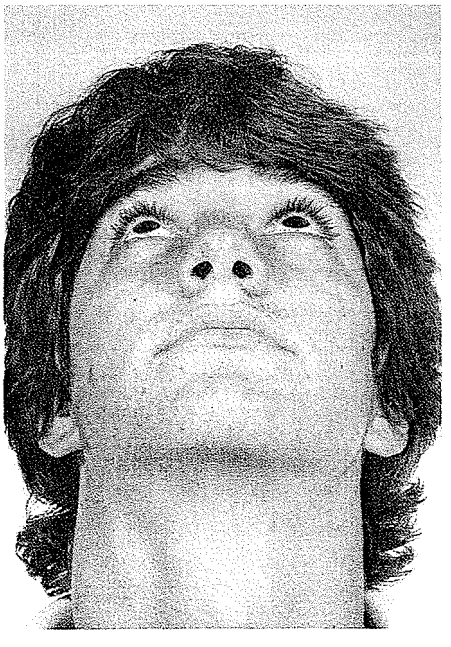


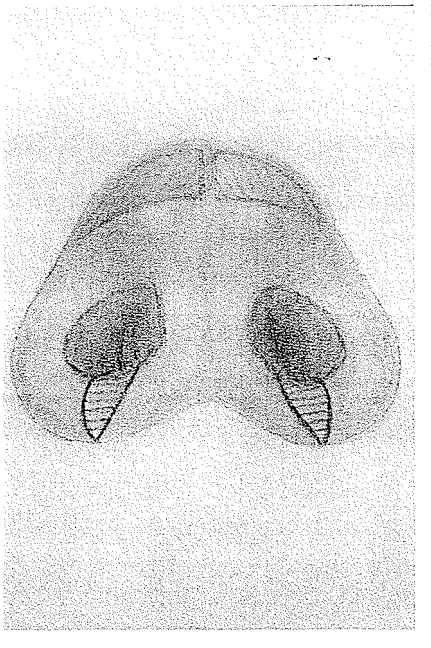
swings into the nostril sill (B). Alar base resection to correct alar flare was described by Joseph in 1931 and elaborated by Aufricht in 1943 but seldom used. In all my training I never saw any surgeon excise alar bases. In 1960 I noted that 65% of rhinoplasties deserved alar wedge resection and by 1975 my percentage had risen to 98%. Today I estimate that I use alar base resection in about 92% of reduction rhinoplasties and so has been used in over 90% of cases shown in corrective rhinoplasty.

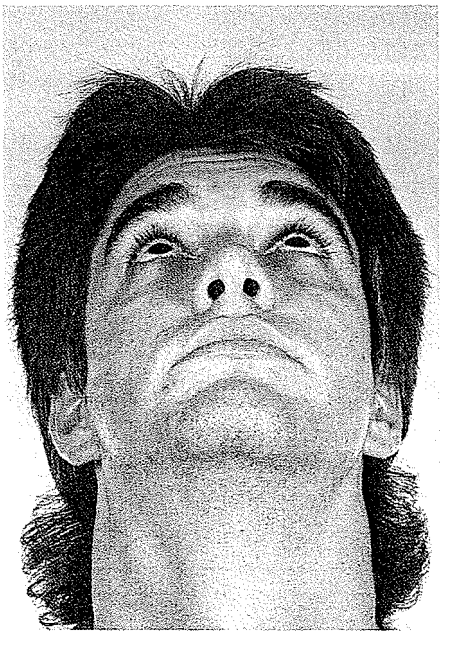
The position of the alar base resection depends on the case. It is important not to confuse this resection to that of Weir, 1892, which involves full thickness of the alae as it joins the cheek. This causes shortening of the entire alar sidewall rather than reduction of alar flare and, although of value in rare cases, is seldom indicated.

I postpone the alar base resections until the very end of the operation, for only after the supporting structures have been altered and the lining trimmed and sutured does the nose repose in its prospective shape. A glance under the nostrils will determine if wedge resections are indicated.

When the flaring alar base runs into a too long nostril sill the wedge resection is taken mainly out of the sill at its junction with the alar base. When the alar base runs directly into



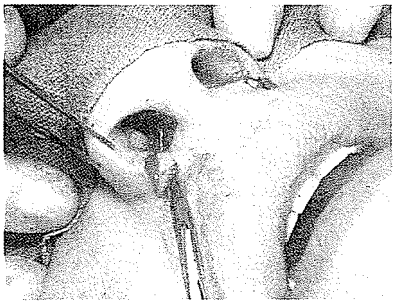


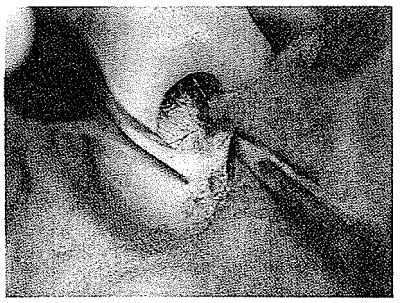


the cheek with minimal nostril sill the wedge resection is made at the medial junction of the alar base with what sill is present. In the flaring nose the wedge resection is taken from the wide nostril sill immediately adjacent to the alar base.



The scars hidden in this join are nearly invisible. I do not agree with Sheen that the resection should be made through the substance of the ala above its join with the sill. This violates an aesthetic unit and the scars in this area are more noticeable being seen as a nicking interruption of the flow of the ala.





The excess alar base to be resected is marked and one side of the wedge is stabbed through with a No. 11 P. P. blade leaving only an epithelial thread intact to maintain fixation while the opposite side is severed cleanly. The thread is then divided, its wedge removed and the wound eventually closed with one 5–0 chromic catgut suture inside the vestibule and 6–0 silk to the skin. During the execution of this aspect of rhinoplasty invariably I express to the resident that the most difficult part of this procedure is the achievement of absolute symmetry. Not only is it important to keep the nostrils equal but in many cases the wedge resections must be calibrated to adjust an original asymmetry in the nostrils.

It is good to note that lowering the bridge does not always cause unattractive sag and flare of the alae. In those noses with nostrils that are too narrow, the bridge lowering can flare the sidewalls just enough for aesthetic and functional improvement.

LONGITUDINAL TIP-COLUMELLA CARTILAGE GRAFTS

The adjunct of cartilage grafts to the tip has become popular, too popular in fact. It seems that almost every rhinoplasty surgeon feels free to insert cartilage into the tip of all his noses. Often this is not indicated and can occasionally lead to ill effects. There are many cases where the graft can be an asset but each case should be evaluated individually.

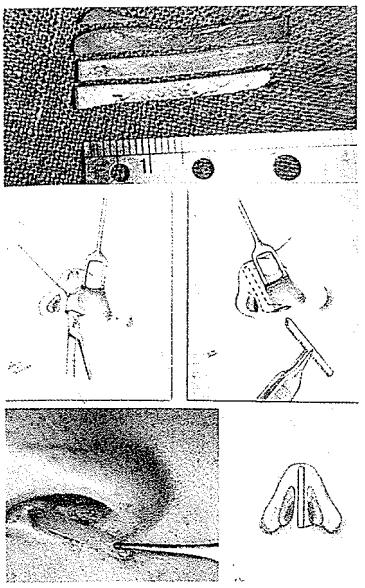
Although rarely acknowledged by the modern tip grafters I started this adjunct with a presentation in 1964 and published in 1965 in Plastic and Reconstructive Surgery when I wrote:

> Routine reduction rhinoplasty is limited in its potential for in principle it is all take and no give. Occasionally, the mere removal of tissue may produce an improvement but still fall short of ideal. A subtle addition in the right place along with the reduction can tip this gain into a full-fledged success.
>
> Autogenous septal cartilage taken by the usual submucous resection is by far the material of choice for the adjunct of columella strut. It is close at hand, usually available in sufficient amount, thin enough to avoid bulk but of a structure and strength suitable to render support as well as contour. In principle, the septal cartilage graft should be inserted into an intact compartment simultaneously with but independent of the regular rhinoplastic action. The actual incision should be as small as possible and placed out of the line of stress so that the cartilage thrust within the pocket at no time is exerted against the healing suture line. A stab with a #11 P. P. blade is made at the base of the columella on one side and within the vestibule. This allows the dissection with fine scissors of a pocket at a right angle just under the skin of the columella and then turned up progressing anterior to the medial crus of the alar cartilages.

Among the uses of this anterior columella strut, besides correction of mild columella retraction, was improvement in the broad, flat-tipped nose that had no potential stand-up quality.

Even after these flat tips are tailored by the usual rhinoplastic procedures, they still possess no tip definition. Here a strong septal cartilage strut thrust from a firm foundation at

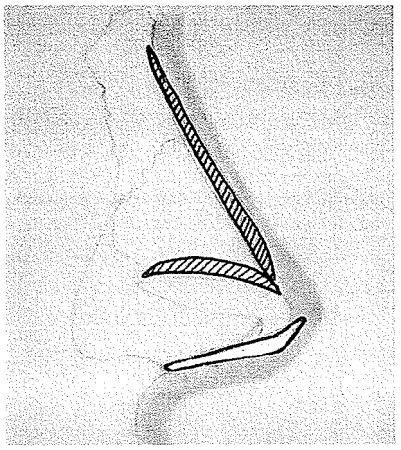
the columella base well into the tip can give an exciting point to a potentially dull nose. Such is seen in this 1963 result of a regular reduction rhinoplasty and chin implant embellished with this septal cartilage strut.



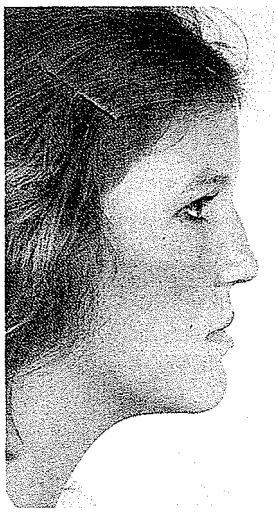


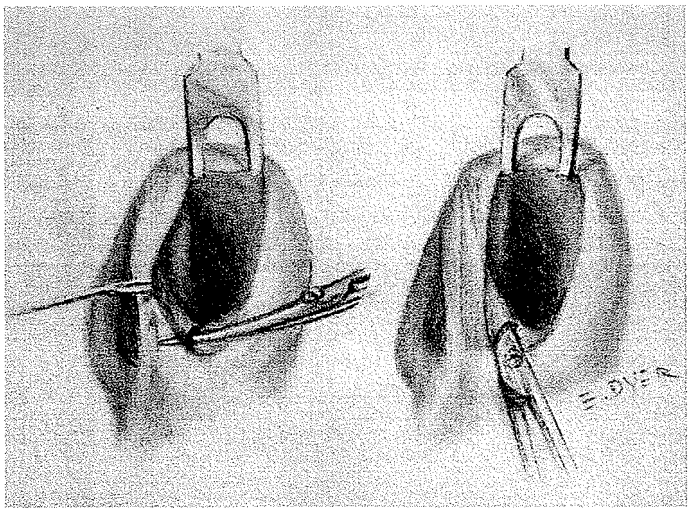


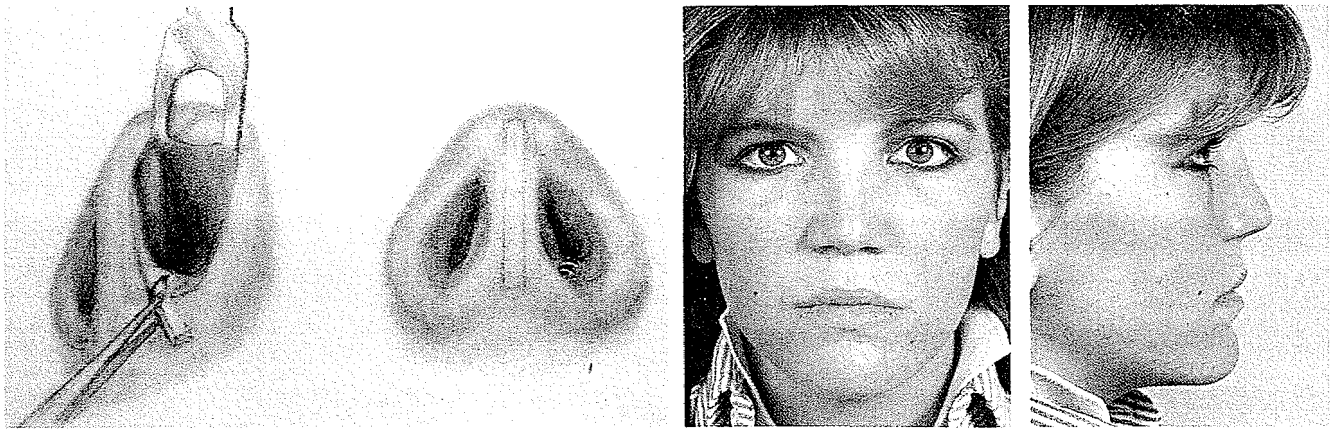
Then there are the flat-tipped noses in which the bridge height challenges the tip height. The bridge was lowered and the alar cartilages reduced. Then a long cartilage strut introduced at the base of the columella into a tunnel in front of the septum all the way to the nasal tip enhanced the profile with natural elevation of the tip. It is the same septal cartilage strut, 1963, that surgeons today find a necessity after open rhinoplasty to keep their dismantled noses from scarring down.







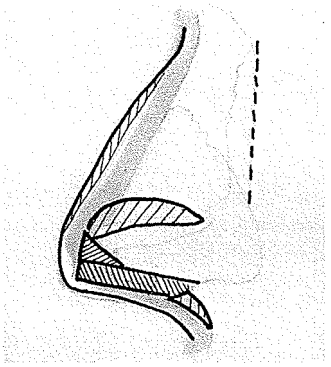


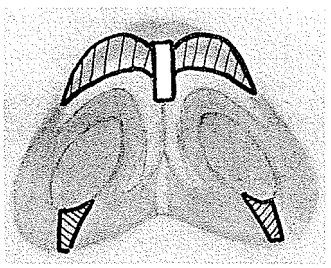


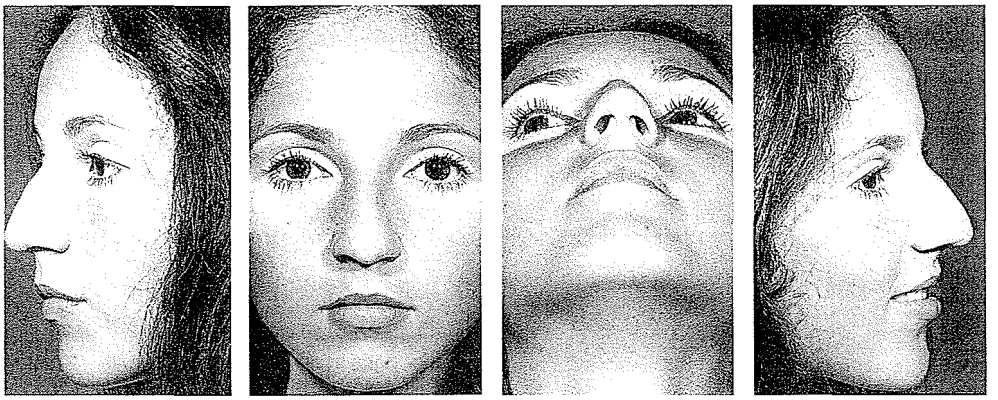
TIP GRAFTS

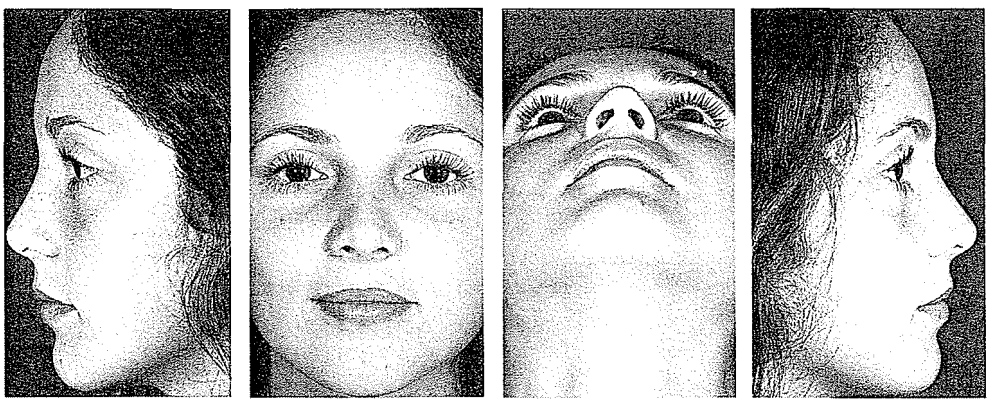
Use of these long columella grafts were confined to columellas with retraction. In 1968 in Plastic Surgery by Grabb and Smith I described fashioning smaller grafts for nasal tip definition. This is the approach that is popular today. A stab at the side of the upper columella just inside the vestibule provided access for dissecting the pocket in the anterior nasal tip. This facilitated insertion of small cartilage struts for tip definition. At this time they were shaped as rectangles.





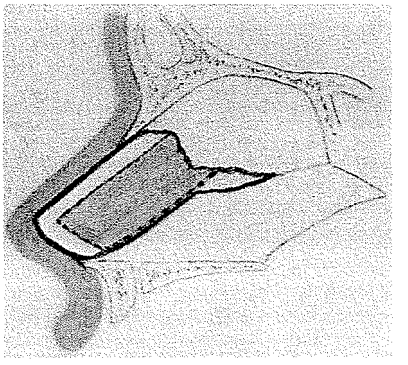






This was over 25 years ago. In his 1978 book Sheen described altering his tip grafts to rectangular shape as I had previously advocated and in his 1993 up-to-date conclusion he noted: "most commonly a combination of multiple grafts with different consistencies is used. Solid grafts are usually rectangular, without posterior notching. The bruised and crushed cartilage grafts are also rectangular although shape is less important than volume".

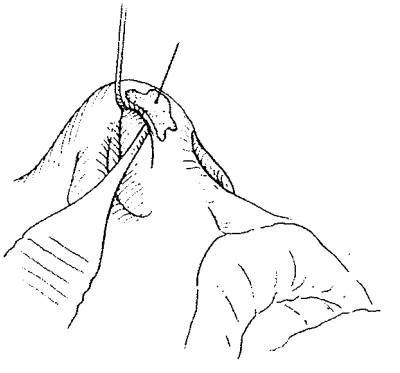
Over the years I have been altering the shape slightly using more often a diamond shape to elicit an attractive highlight. Insertion of this cartilage graft not only provides definition and tip projection but also helps accent the golden angle. It was first used in primary corrective rhinoplasty, then corrective rhinoplasty in the Oriental and Black race and finally it became an important adjunct in secondary rhinoplasty.



There are always a few pieces of septal cartilage lying around at the end of anterior septal shortening and bridge adjustment. If not, then a piece is easily harvested through a submucous septal resection. Whatever piece is chosen can be shaped appropriately and inserted after the nasal tip has been sculptured but before the osteotomies.

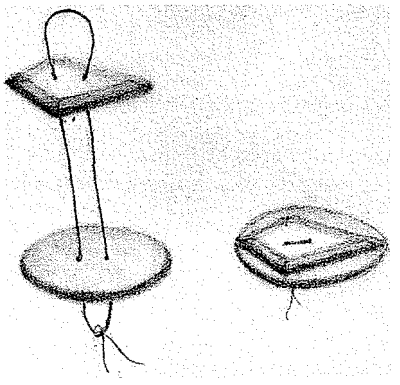
BONE GRAFTS

In 1975 J. Sheen advocated the use of small autogenous bone grafts from the vomer or perpendicular plate of the ethmoid be placed at the columella-lobule junction with a 35-degree angle. His grafts were shaped with two prongs on the upper edge and a notched lower edge. Anyone familiar with bone grafts could predict the unpredictability of survival of small vomer grafts in soft tissue. Sheen soon acknowledged mass loss of a good percentage of the bone grafts and so he converted to cartilage grafts. After 20 years experience Sheen estimated 95% survival of cartilage grafts in the nasal tip and I concur with this estimate after 30 years experience.



TIERED GRAFTS

Tiered grafts should be limited to two layers. When cartilage is stacked three tiers high sufficient nourishment can get to one side of the outer two layers but is probably blocked from nourishing the middle layer. Thus the center piece may gradually undergo partial necrosis which not only defeats the purpose of extra projection but also may make the transition from asepsis to chronic infection.



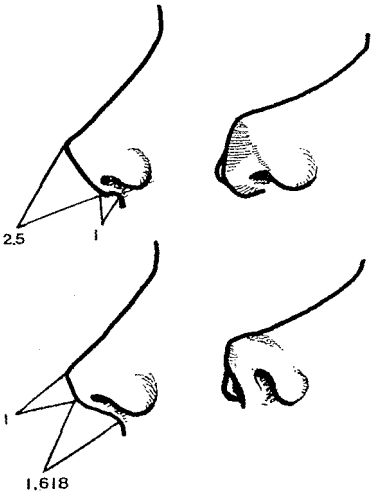
When anterior tip flatness requires slightly more projection than the thickness of septal cartilage I have used a two-tiered graft. This is constructed by shaping an alar cartilage as an oval and then suturing a septal cartilage lop-sided diamond on to this oval platform with one suture of 4–0 Prolene with the knot tied on the side of the alar cartilage. When the two-tiered graft is inserted into the tip area, with the diamond forward and the knot beneath, the flat graft holds the position and the diamond creates definition picking up a highlight.

As noted over 30 years ago mere reduction rhinoplasty presents aesthetic limitations but the addition of cartilage grafts to the tip can make the aesthetic difference. In 1993 Sheen noted "I now prefer to spare as much skeletal framework as possible in every patient, adding framework as necessary to improve contour." I tend to differ with Sheen here since reduction and reshaping by rhinoplasty should be basic and a better proportioned nose is achieved. When reduction is avoided in preference to tip and bridge augmentation the nose often tends to be omnipresent or just too big. I have had several patients who have undergone the routine of no reduction but excessive onlay of cartilage. The shape is reasonable but they complain of the size!

TOO MUCH

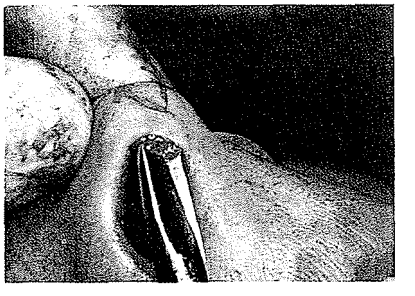
M. D. Constantian in 1984 expressed his preference for four nasal planes: one dorsal, two lateral, and one basal. Yet in his enthusiasm to lift the tip he exaggerated this area beyond aesthetic proportions. His more recent results seem improved. It

is true that planes and light reflexes are the illusional essence of beauty of face and body form but proportions and harmony such as height, length, and width of features and the angle or angles of planes are also important. When too much extra cartilage is introduced into the nasal tip to gain definition or force a rise in tip over bridge, be sure the distance from the height of the alar arch to the tip is not too long! Too much projection, especially associated with a long nose, can be comical, as Pinocchio sadly discovered. It is also well to remember that in the basal plane, which is the line running from lip to tip, the beautiful normal is not a straight line or even one angled 1 to 1; the ideal is a line sectioned at the golden proportion of 1.618 to 1.0. Too much auricular cartilage, in a valiant attempt to refine the tip, is seen in Constantian's figures where the basal plane angle is 1.0 to 2.5, with the height of the alar arch to tip too long.



Method of Insertion

It is important that the tip graft remain where it is placed. First the area of the tip that deserves the graft should be marked. Then the pocket to be dissected must be designed to enable insertion of the graft without allowing opportunity for shifting. Thus the small entrance incision is made 1/2 cm inside the columella at the exact height of the inferior extent of the planned pocket. This prevents downward slippage of the graft and avoids need for fancy but ineffectual notches on the inferior extremity of the graft. From the inferior stab incision a sharp pointed scissor is inserted horizontally into the stab to the center of the upper columella and then turned 90 degrees and advanced toward the tip spreading a pocket well under the tip skin just over the alar cartilages. This pocket must be tailored custom-made no larger than required. It must not enter the dissected areas created above during reduction of the alar cartilages. When the pocket is fashioned in this manner there is little chance of the cartilage slipping out of position. If for some reason the pocket has been created too large then a 4–0 catgut suture to the tip of the cartilage graft can be

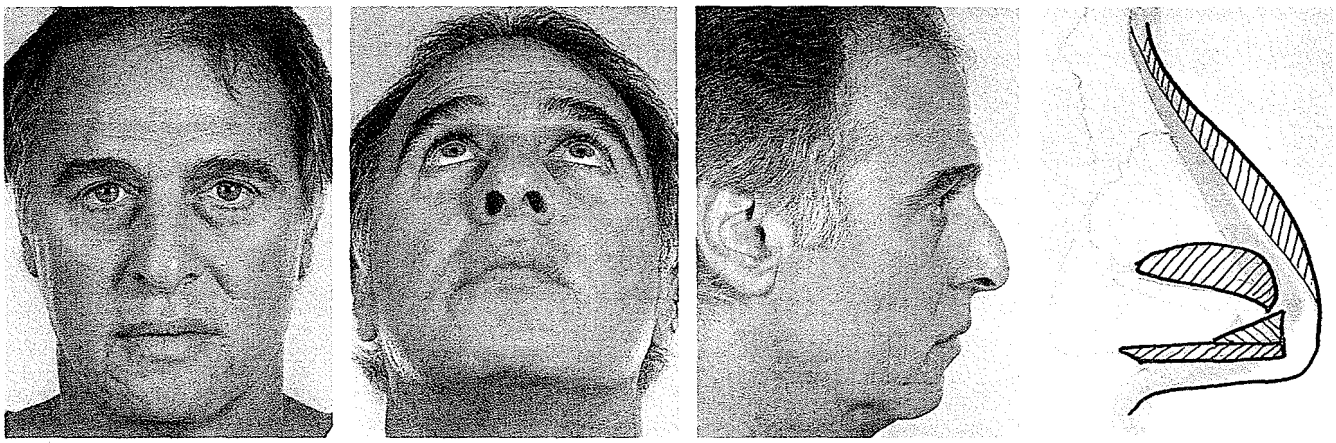




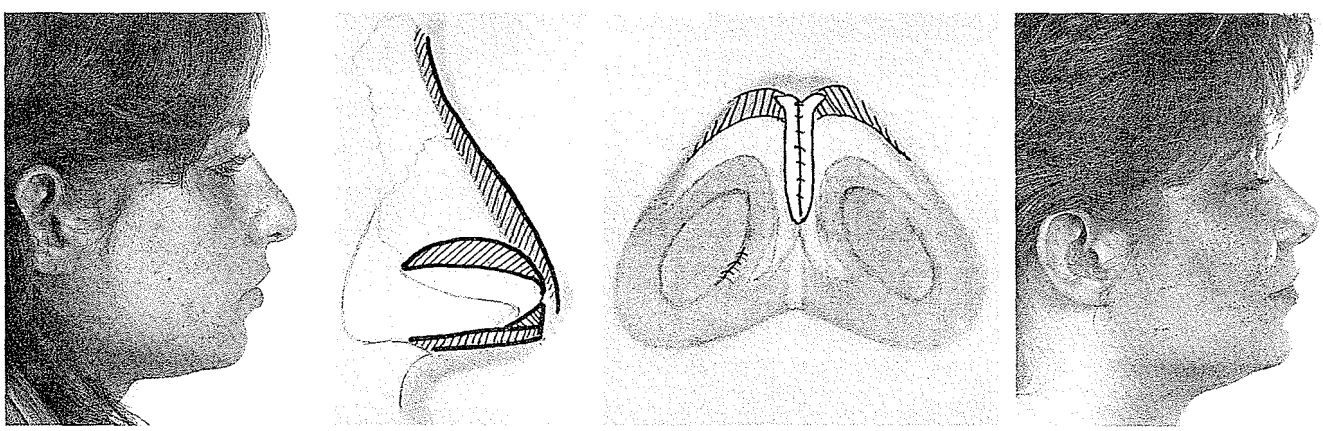


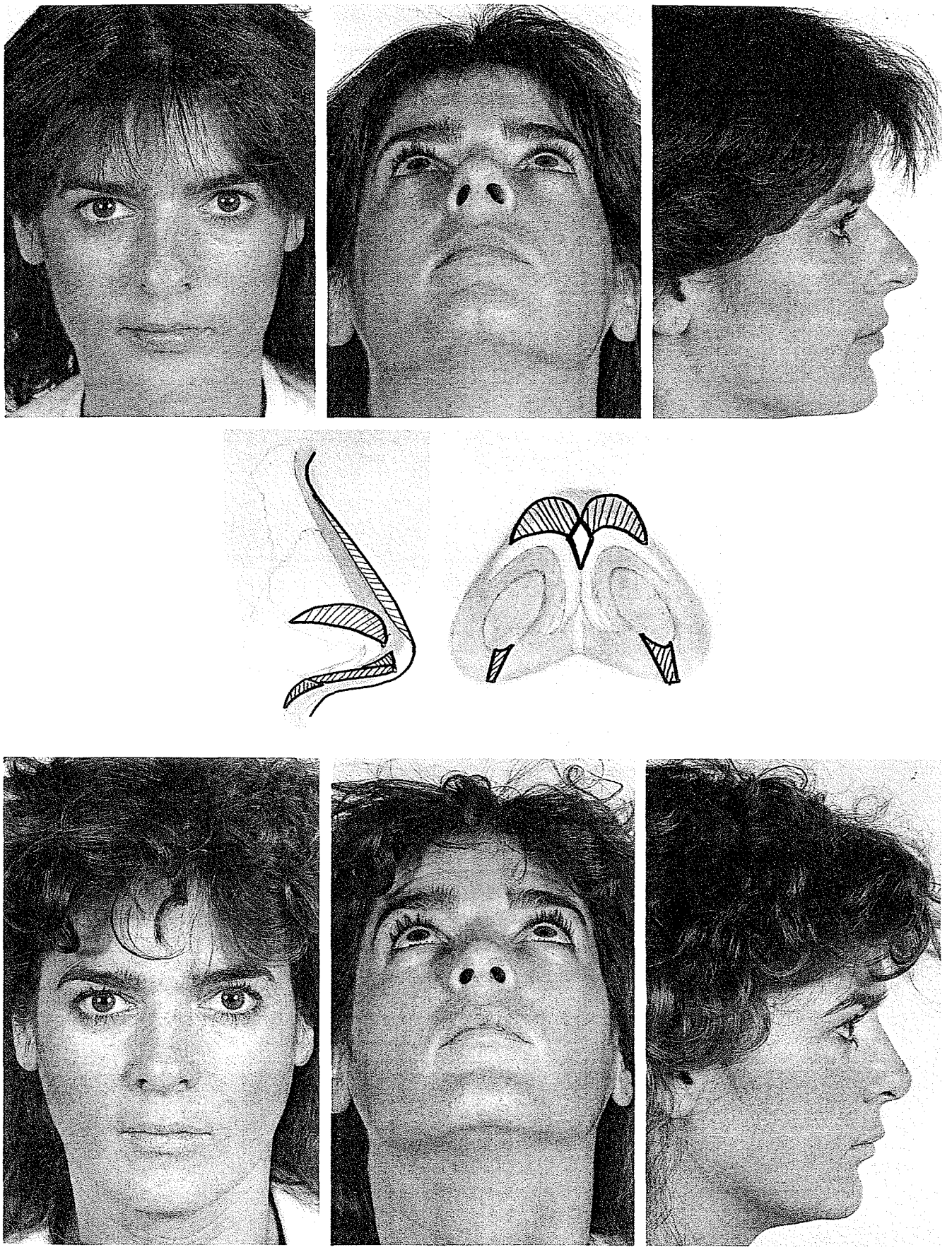
passed into the pocket and out through the appropriate area of the skin of the tip so that fixation of the graft can be controlled for a day or two until the pocket has contracted and sealed off the graft. Once the cartilage has been set in position the tiny entrance wound at the side of the columella is closed with a single suture of 6–0 silk which ties off the inferior pocket preventing cartilage slippage and exposure.

Over the years I have used the tip cartilage graft in probably 65 to 75% of corrective rhinoplasty cases. Here are a few examples but of course a high percentage of all cases receive the graft.

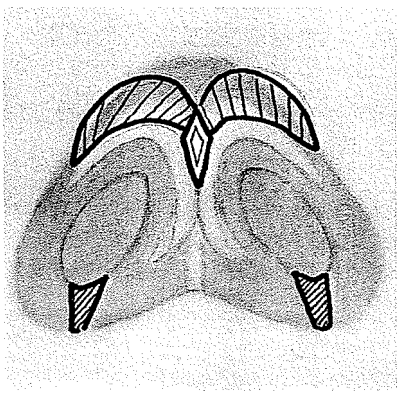


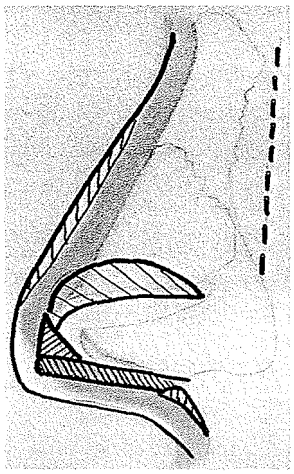




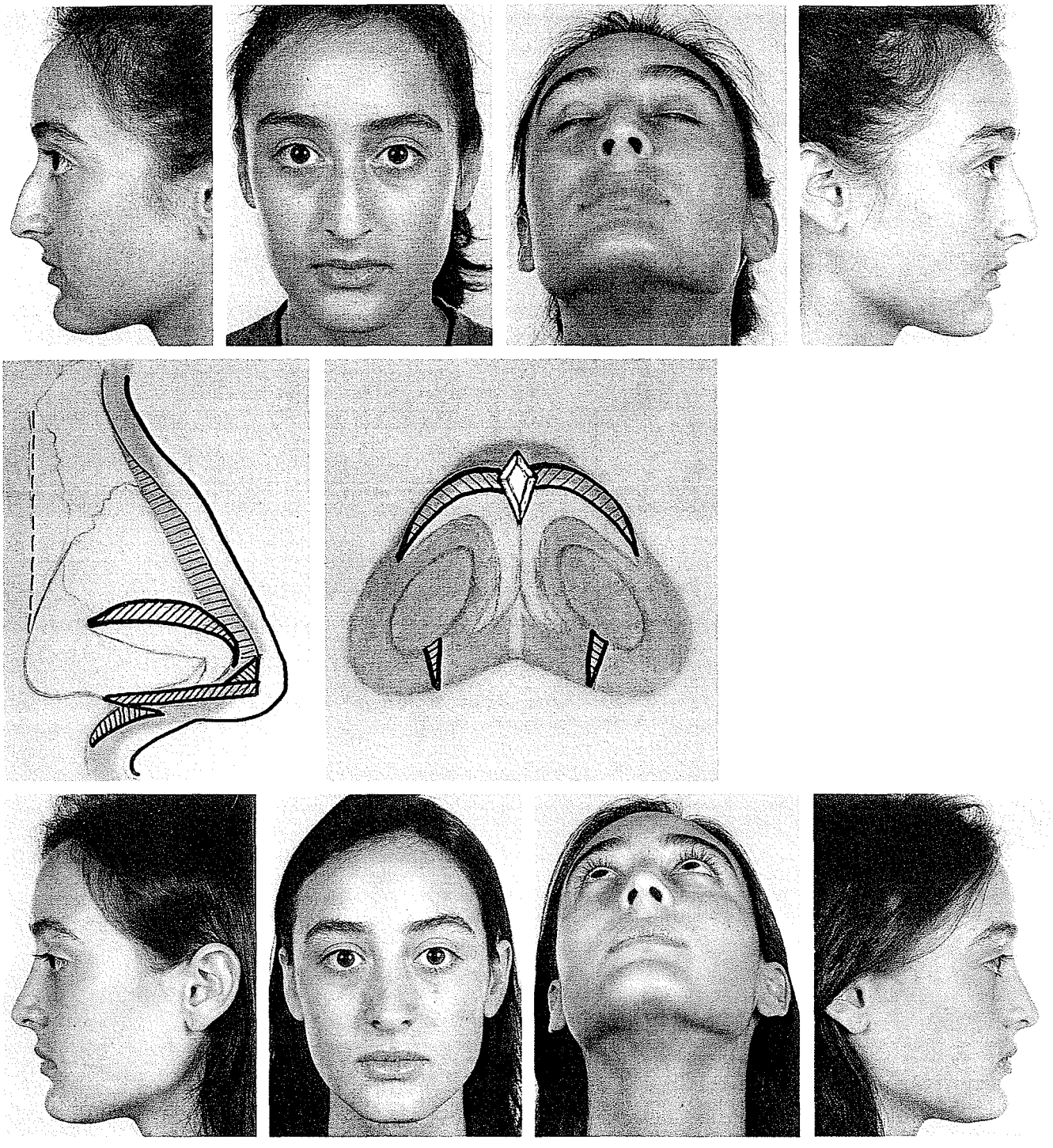












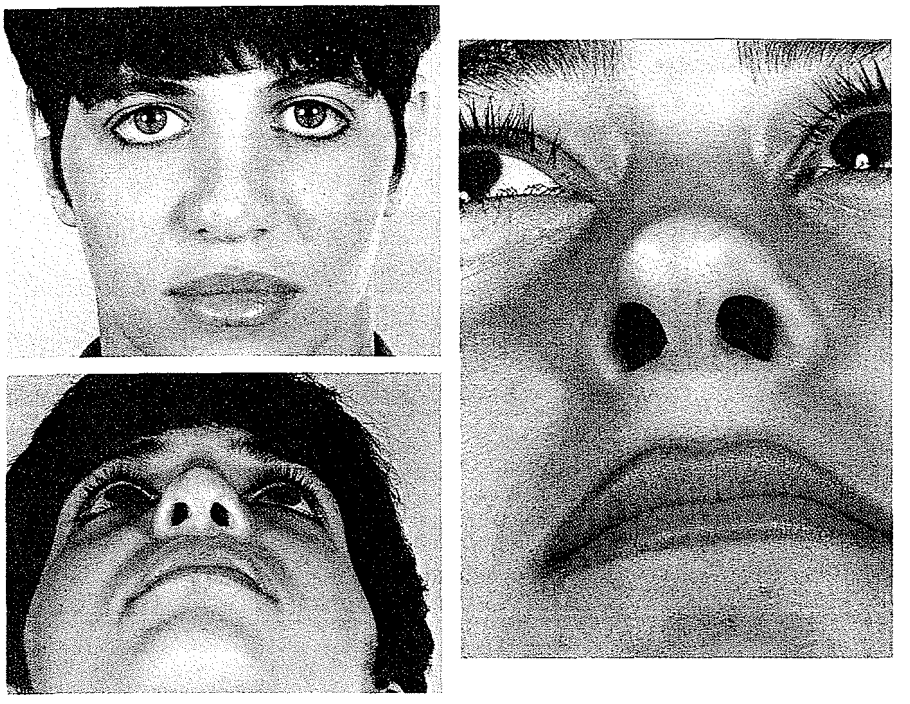
Complications

If slippage is avoided the only other danger is infection. Sheen, in his honest evaluation of his series of cartilage-to-tip technique, discussed infection in his early experience, suffering occurrence of three to five percent acute infection and 15 to 18 percent chronic infection. He blames it on technique

and by dipping his grafts in antibiotic solution and not allowing exposure of the graft at the entrance site he cut his incidence to ten percent. I have always placed these patients on systemic antibiotics postoperatively for three to five days and in 30 years cannot recall more than one or two infections in this area.

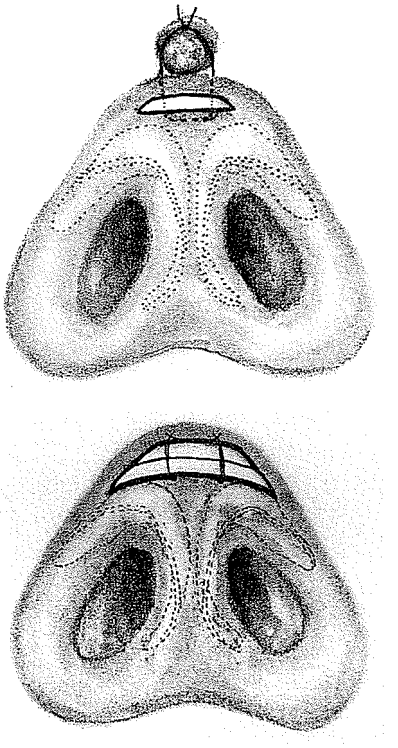
Sheen has devoted a lot of his career and time to tip grafting. He has contributed artistic talent, concentration and hard work toward perfecting this little but important adjunct of rhinoplasty. He is indeed adept with this graft but what works in his artistic and experienced hands is not working for all surgeons. Unfortunately, he and his disciples have been so enthusiastic in their papers and books that they have mesmerized enchanted followers so that small and not so small septal, auricular and costal cartilage grafts are being shoved into the tip of thousands of noses, many of which actually do not need them. In fact, one of the most infuriating tasks I face in secondary rhinoplasties is removing ill placed cartilage grafts in the tip stuck to the under surface of the dermis in asymmetric position. There can be the exaggerated tip lift, the bulbous hump, the three cornered tip, the off-center projection and variation of all of these.





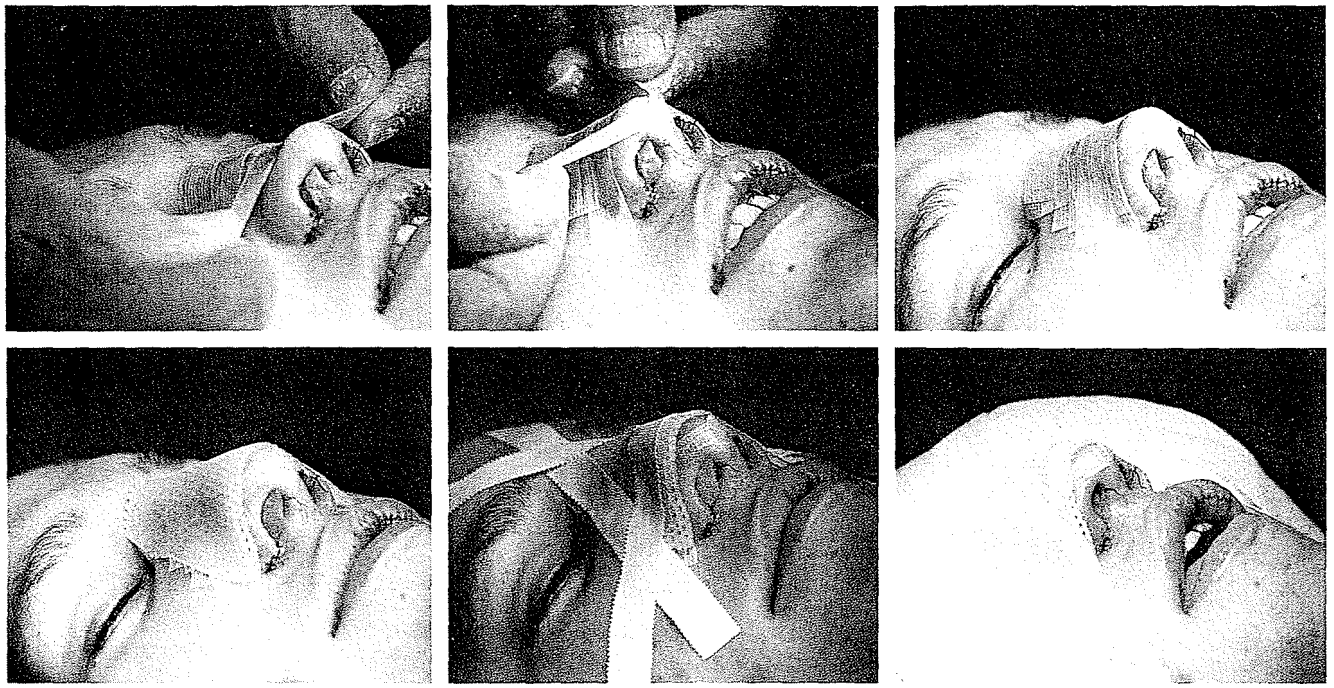
Grafts to the Dorsum of the Tip

I. B. Goldman in 1953 described a round cartilage graft onlay for the dorsum of the tip. As an improvement G. C. Peck in 1983 proposed primary and secondary use of a horizontal onlay cartilage graft which he inserts through a rim incision into a pocket over the alar cartilage dome in the tip. He prefers a conchal cartilage graft from the ear measuring about 4×9 mm with its convexity placed outward to imitate gentle curvature of the nasal tip. If double onlay grafts are needed, then two tiers are sutured together prior to insertion. If septal cartilage is used, it is scored on the outer surface. I do not find a great need for this type of projection in the primary rhinoplasty but if needed would use it. There are two potential hazards. First there is a tendency for horizontal onlay grafts to shift askew and if placed superficially they become too noticeable.



POSTOPERATIVE RHINOPLASTY DRESSING. The mucosal lining should be sutured carefully. Then Vaseline gauze packs are inserted snugly into each nostril to press the freed tissues gently back together again but not enough to spread the in-fractured

bones! Usually these packs are left for 6 to 12 hours. The skin of the nose is taped down with horizontal strips exerting gentle pressure especially in the supratip area where the excess skin has memory of the previous bulges of the alar cartilage. A narrow half split sling wraps around the tip.



An Aquaplast splint holds the bones together for one week. When osteotomies have been carried out, eye pads and a gentle pressure dressing over the head reduces the post-operative eyelid ecchymosis. This pressure dressing is left on a couple of hours. Sutures of the alar bases are removed in four days. The splint comes off in 1 week.

HEALING TIME. It takes at least six months for a nose to settle after surgery. Some surgeons claim that it may take as much as two years. Certainly long follow-up is ideal, and if the nose has not been done correctly this will become evident in time, as seen in the section on secondary rhinoplasty. Here is a special example where a corrective rhinoplasty with reduction of the alar cartilages, bridge trimming, septal shortening with the golden triangle, osteotomies with in-fracture and a double septal cartilage strut up the columella into the tip promised a good early result.





After 22 years the patient claimed her nose had improved and she sent the photgraphs to prove it!



SURGICAL ADJUNCTS IN PRIMARY CORRECTIVE RHINOPLASTY

There are noses that are within normal limits but in which mere routine primary corrective rhinoplasty procedures will not produce the improvements deserved. In those incidences there are certain adjuncts that can be added to increase the aesthetic potential. Several of these adjuncts such as alar base resection and cartilage tip grafts are so commonly incorporated into the standard rhinoplasty that they have already been inserted and described.

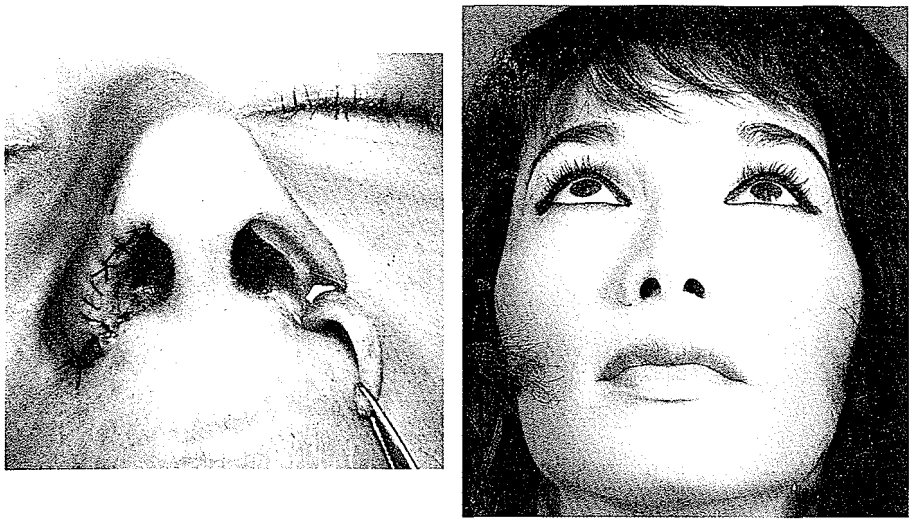
ALAR MARGIN SCULPTURING

It is becoming more and more apparent that direct sculpturing of the alar margins can be of inestimable value in primary and secondary reduction rhinoplasty. This maneuver empowers artistic shaping and thinning of the alar rim beyond the reach of the standard approach. In certain cases the need for alar margin excision does not become evident until the postoperative phase of the primary rhinoplasty. In some incidences its need is obvious at first sight. Then, too, it can be repeated merely removing the previous scar.

Joseph in 1931 diagrammed an alar margin excision. In 1960 in the *British Journal of Plastic Surgery,* I described a modification of the marginal excision as a secondary procedure to trim and thin overhanging nasal sidewalls.

In 1965 this excision was extended as a primary procedure to thin the bulky alar rim and base as seen in Asian and



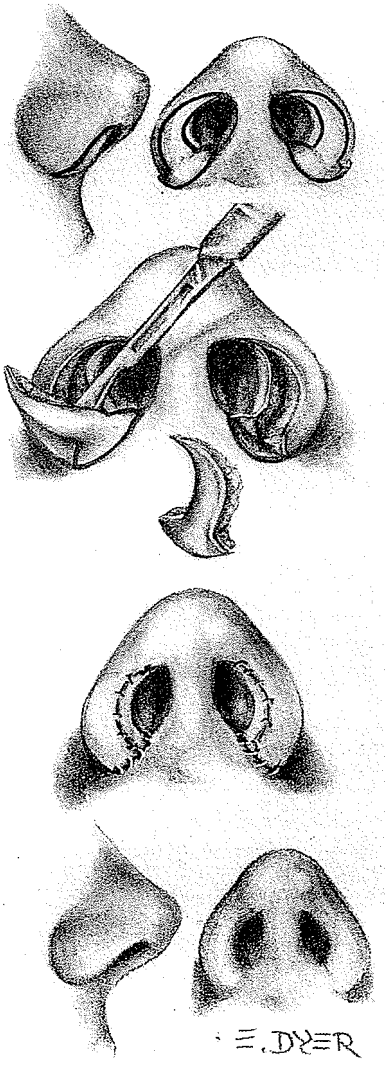


Black-type nose. This technique was endorsed by K. Boo-Chai for Asians and I. Spina for Blacks.

Fundamental Principle

There are two cardinal dividends to be gained from this procedure.

1. It thins directly thick bulky alar rims.
2. It carves a delicate flaring curve in an overhanging alar sidewall and exposes the columella in profile by lifting the ala skirt to reveal the columella knee. In modified form it can reduce merely a thick hub of the alar wing.



By extending the alar margin excision into the routine medial alar base wedge excision, a flaring ala is also corrected. If this is extended into a crescent excision of the entire alar base's join with the cheek (Weir) then the sidewall length from tip to cheek is reduced. Usually the combination of *shaping* and *thinning* the alar margin along with alar base excision is indicated but emphasis on a specific aspect depends on the individual nose and its alar margins.

Multiple Applications

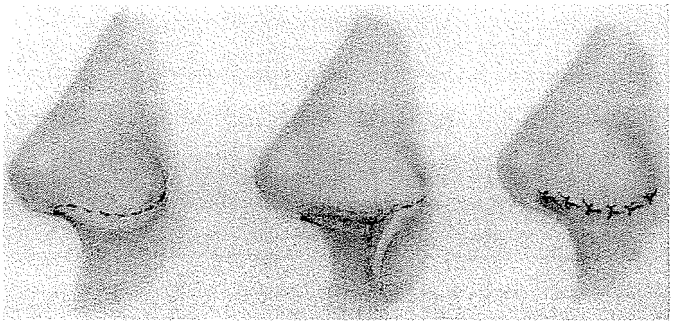
There are a variety of inelegant nasal traits which can be improved by alar marginal excisions.

1. In the double barrel shotgun or funnel nose the long sidewalls are flush with the columella. This unattractive and previously inaccessible condition inspired the procedure initially and continues to receive a greater share of its profits. It can be a primary problem but is most often seen secondarily.

In extremely long noses where adequate shortening calls for a severe anterior septal excision the mid-column moves back markedly. If this nose possesses rather thick skin with broad alar wings and long sidewalls then the columella will disappear as the sidewalls remain fixed and become flush with or even overhang the mid-column. This relationship is unsatisfactory as the classic profile of a nose must show the delicate strength of its columella as the alae curve back and away. This can be corrected by alar margin sculpturing with excision of the alar wedge along the sidewall.



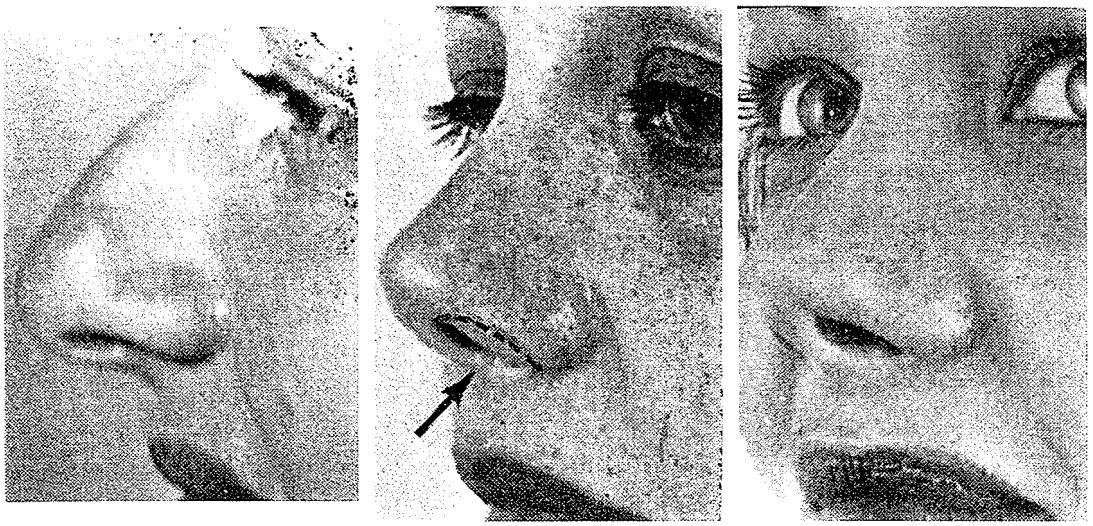




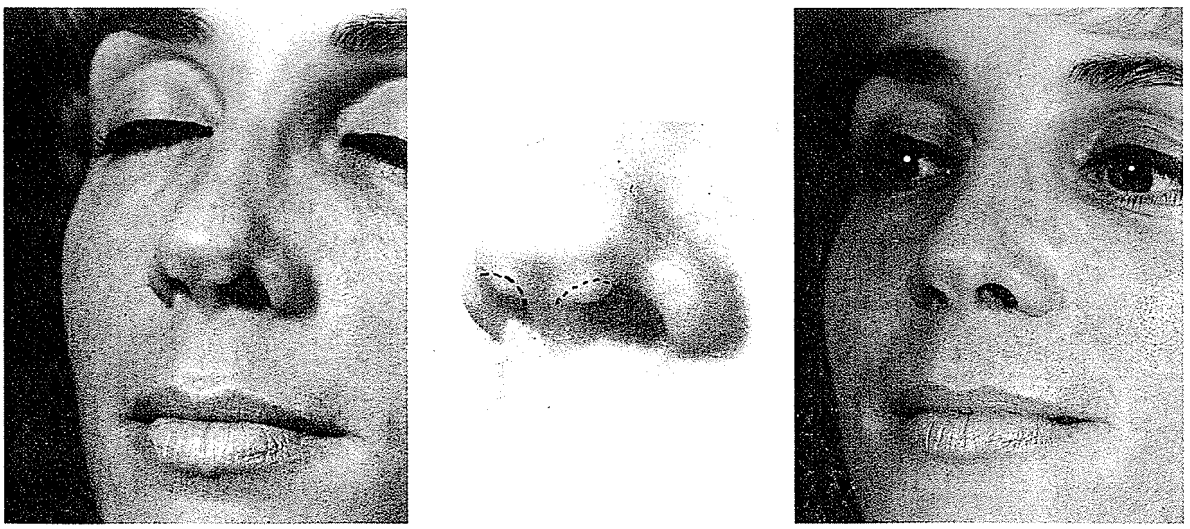




Even in less severe nasal length and thickness the relative length of the sidewall may become exaggerated after reduction rhinoplasty deserving alar margin sculpturing.



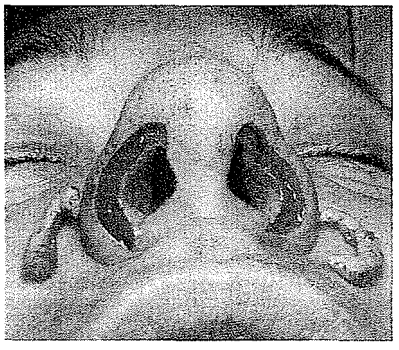
2. In corrective rhinoplasty skeletal structures and lining mucosa are reduced leaving only the covering skin without tailoring. In most cases the skin will adjust and in severe skeletal reductions wide skin undermining will allow redistribution of excess skin out into the cheeks without unattractive sequelae. Occasionally, however, the residual skin excess after cartilage reduction may be reflected in strange peripheral pile-up. Marginal sculpturing can be used to refine the discrepancies as the postoperative irregularities of the alar rims were symmetrized.



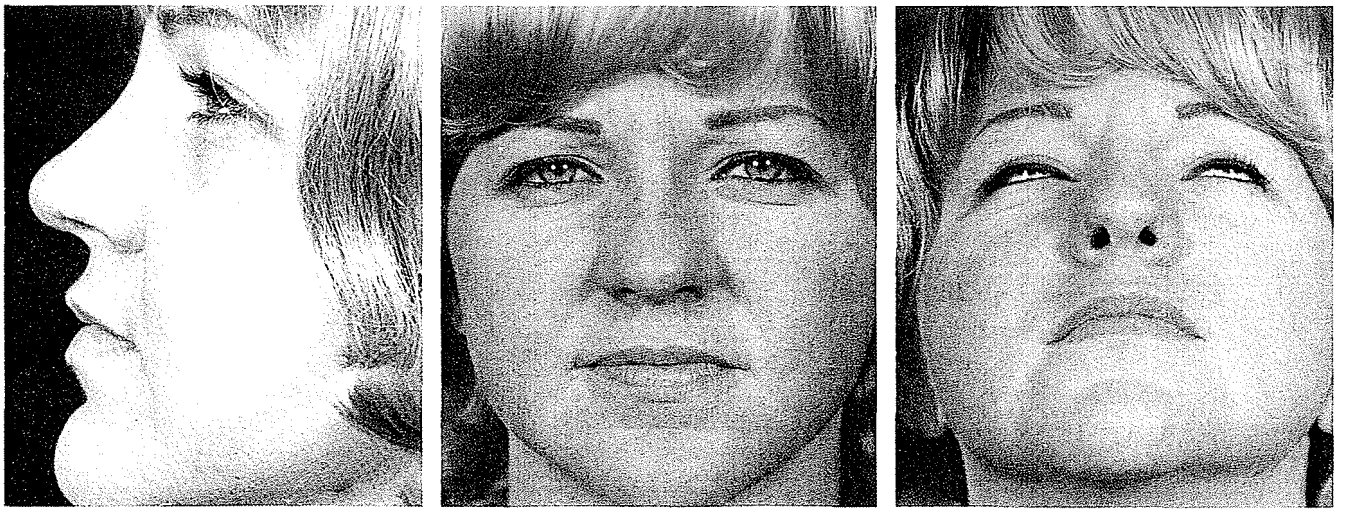
3. The thick potato type nose which so often ends with a disappointing result occasionally can be benefitted by marginal tailoring. The broad, thick nose in this 24-year-old woman required more than just routine rhinoplasty.



The alar cartilages were reduced markedly and a silastic strut was inserted on the bridge not only to heighten the profile but to produce a general narrowing effect. The most important adjunct, however, was excision of bilateral deep marginal wedges along the full length of the ala flowing into alar base wedge resections to narrow the flare. The margin incisions were closed with a gentle running suture of 6–0 silk.



Six months later a second pair of alar margin wedges were excised along the old scar to refine the effect. The final result revealed marked thinning and narrowing refinements otherwise unattainable.



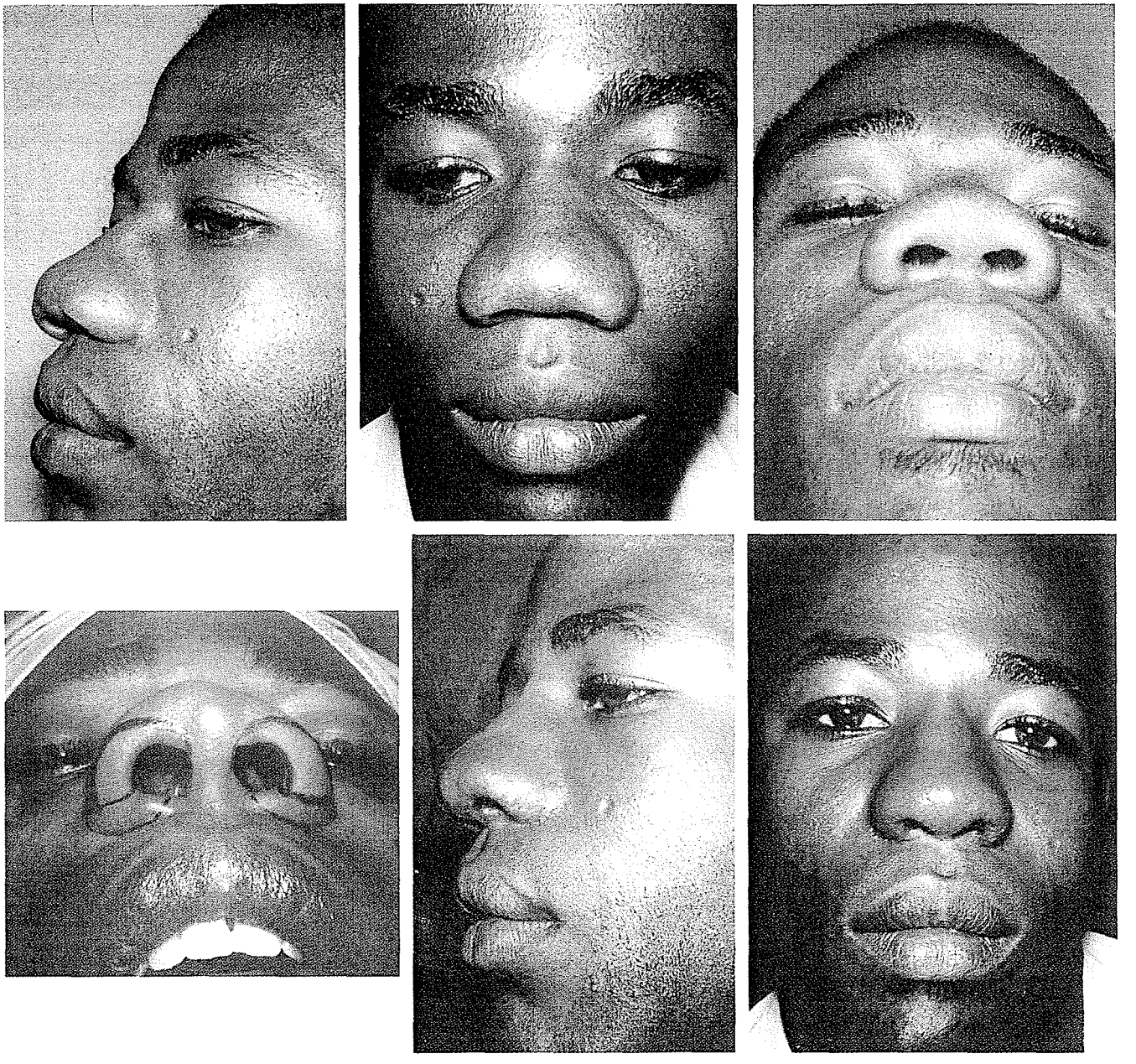
4. Its ability to change the shape of the nostril entrance serves an advantage in unilateral and bilateral cleft deformities. A direct crescent excision of the alar web taking skin and lining but usually not cartilage can aid in raising the alar arch.



5. Racial nasal characteristics can be altered. There is no universal canon of beauty as each ethnic group has its own special qualities. The blending of races has been accelerated by wars, post-hostility rehabilitation, slave trade, easy transcontinental travel, migration and immigration. This has indeed stirred the pot. American, British, and European movies and television have so brainwashed the general world public that, among other things, the fine Caucasian nose with its reasonably high, slender, straight bridge, slim sculptured slightly up-tilted tip and narrow graceful nostrils is most popular, the envy of others and cause of requests for surgical change. It is neither feasible, desirable or possible to transform totally an Asian into a Caucasian or vice versa, a Black into a Caucasian or vice versa or an Asian into a Black or vice versa. Nor is it advisable to transform a Black nose, especially when on a negro, into an acquiline nose better befitting the classic British butler. The same seems true of any Caucasian nose on an Asian. The result of such surgery can produce weird Jacksonitic hybrids. There are, however, reasonable exceptions where corrective surgery is indicated.

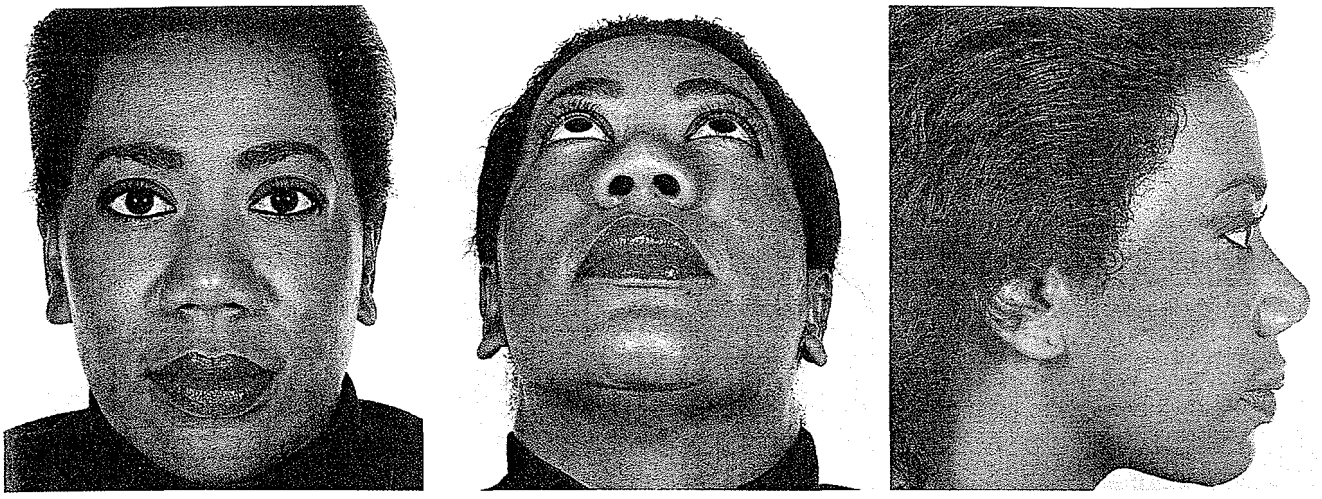
The Black Nose

When a certain racial characteristic is exaggerated to the point of ugliness in any race, corrective surgery seems justified. For instance, variation of the Black nose to an offensive extreme certainly merits modification to within the norm.

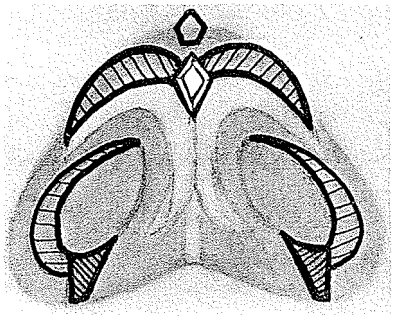


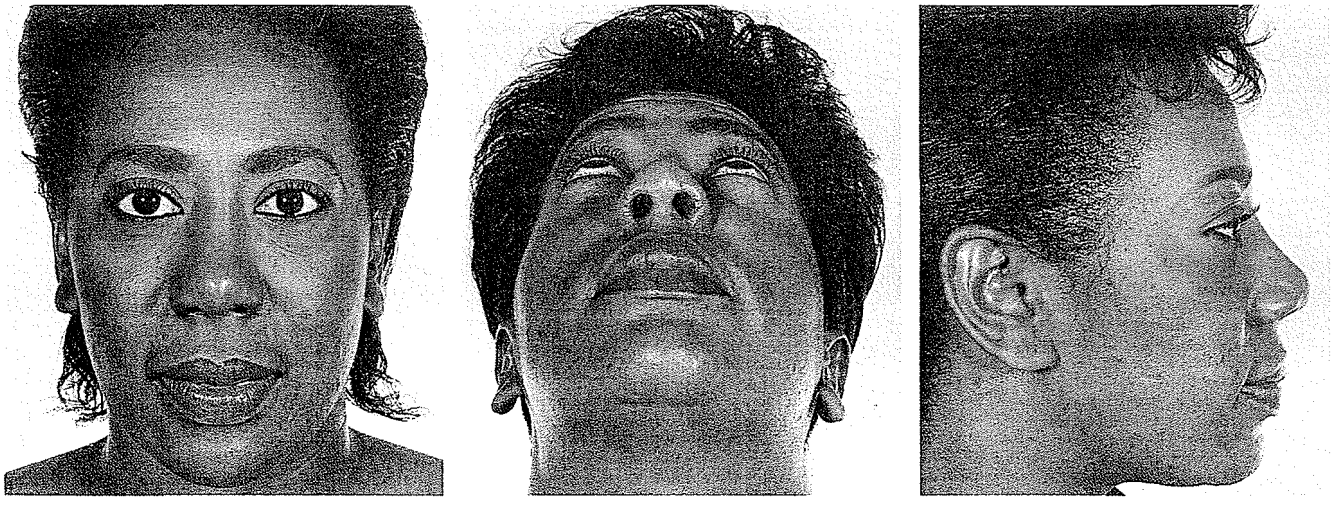
A SPECIAL CASE. This 32-year-old black woman with a low upper nasal bridge, flat, thick nasal tip, heavy, flaring alae pre-

senting bulky hanging sidewalls, requested a more Caucasian style nose.



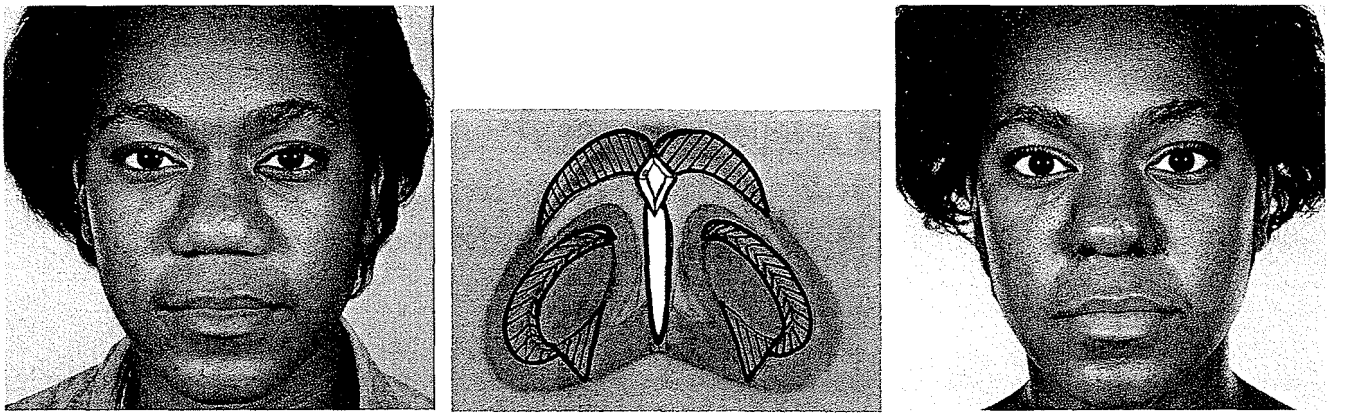
Two-thirds of her alar cartilages were resected. Through a submucous septal resection a cartilage strut was obtained and inserted up her columella into her tip for more definition. A silastic inplant was inserted onto her bridge. Then alar margin wedges extending into alar base wedges were resected bilaterally and the wounds gently closed with 6–0 silk. The alterations were subtle but effective. She asked how we liked her "white" nose. More important she seemed proud.



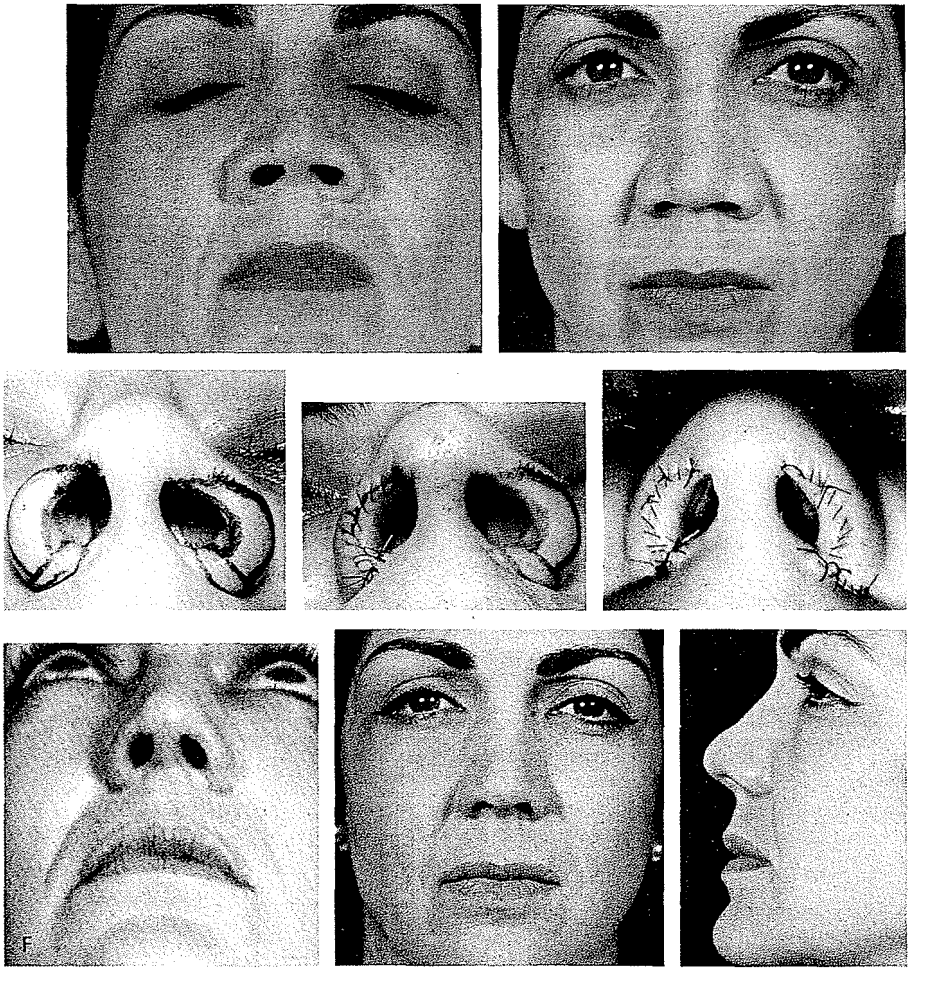


AND ANOTHER. This 19-year-old black female presented an extremely broad, thick nose with severely cystic skin in the tip that had been cauterized extensively by a dermatologist. The same general approach of alar cartilage reduction, alar margins, and alar base wedge resections was used; septal carti-

lage graft in columella to tip gave improvement after three months. Only improvement had been promised.



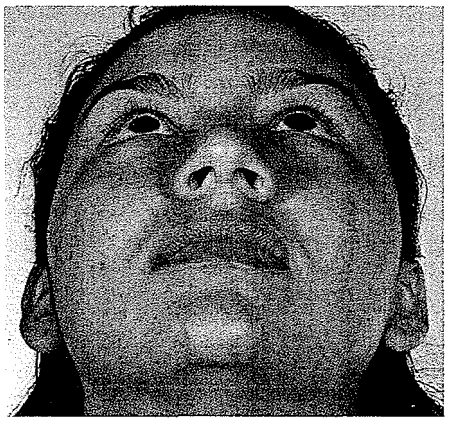
When a Negroid nose happens to be on a Caucasian, surgical modification is in order. Each patient has his or her own reasons and desires for change. These must be evaluated carefully and, if they are sane, sound and within reason, surgery should not be withheld.



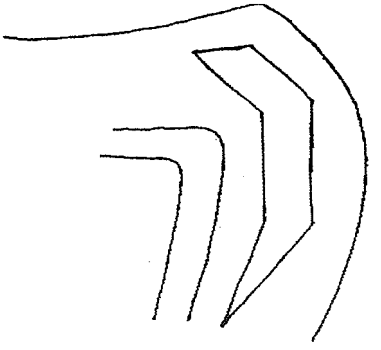
The Mestizo Nose

Blending of western Indian and the Spaniard may produce a thick tipped nose with heavy alae. Here is an example that was further complicated by a dermatologist cauterizing several cysts in the skin of her nasal tip resulting in moderate scarring.

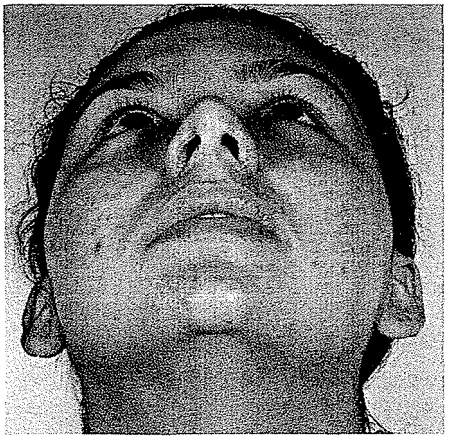


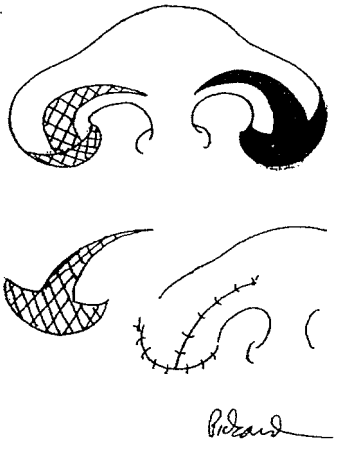


To improve the aesthetics of this nose much of the alar cartilages were excised along with the subcutaneous fat in the tip. The anterior septum was shortened but leaving as much membranous septum as available on the back side of the columella to provide more generous housing for the planned columella strut. A semi-glibbous shaped 3 cm cartilage strut with a special tip angle was obtained by submucous septal resection. Through a skin stab at the base of the columella a pocket was dissected up the columella into the tip and into this tunnel the cartilage strut was inserted to give form to the columella and to provide support and definition in the tip in spite of the thick skin. Alar margins and bases, after wedge resections, revealed a general refinement of the nasal entrance.





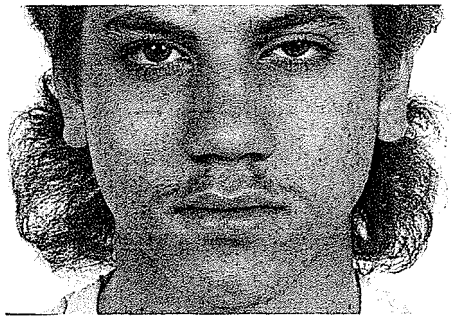
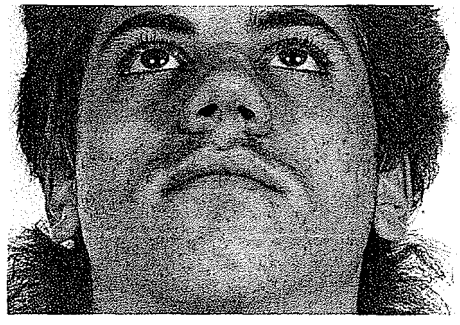


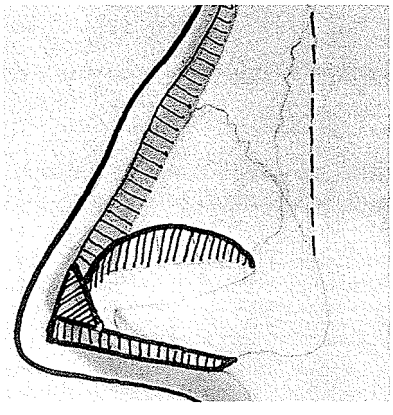


Non-Specific Noses

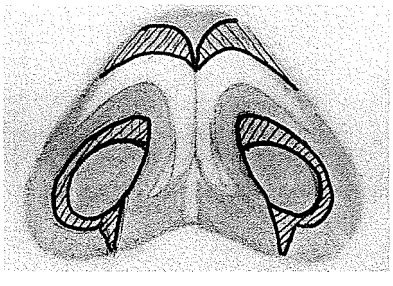
Alar margin revisions can be of aesthetic value in conjunction with reduction rhinoplasty in a variety of cases. The pertinent point is to be aware of the possibility and to be alert to the specific benefit.

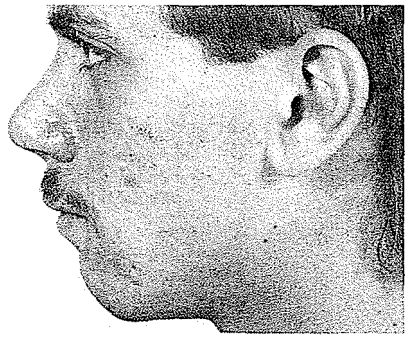
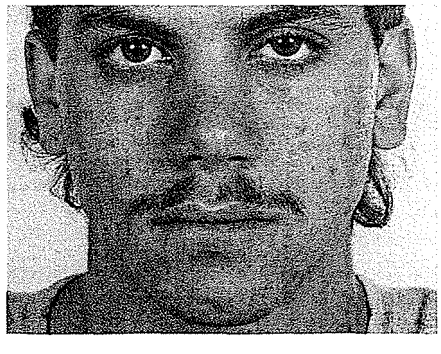
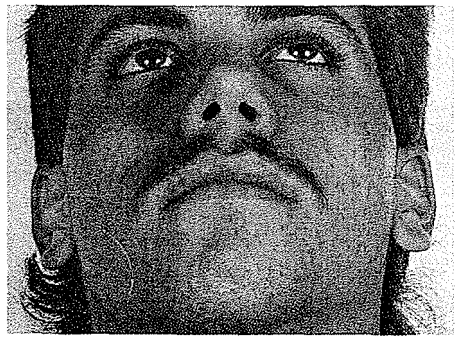
This 16-year-old male patient who had sustained a nasal fracture one year before requested nasal correction but refused a chin implant.

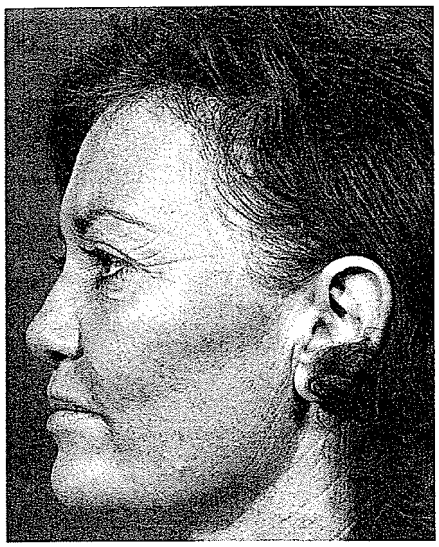


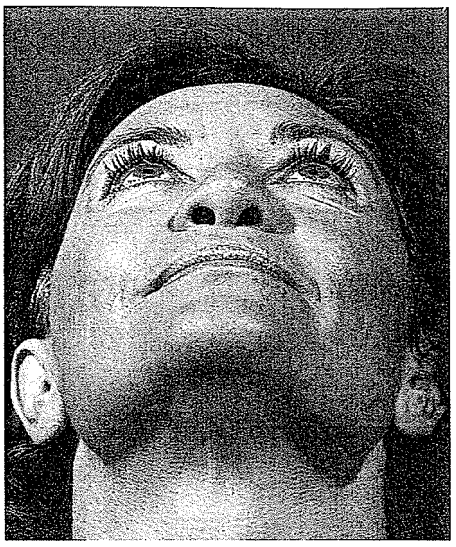
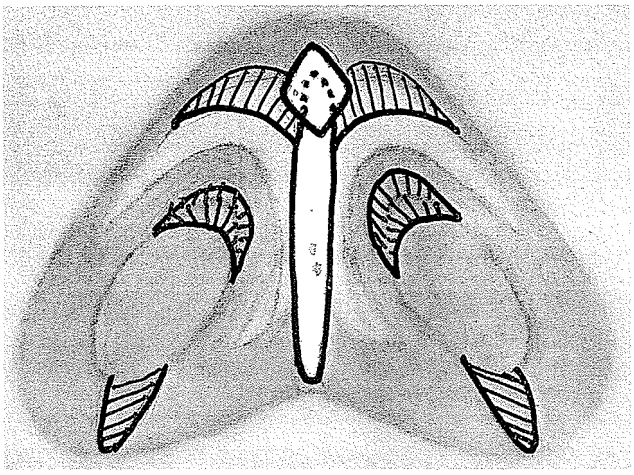
Through anterior vestibular incisions three-quarters of the alar cartilages were reduced. The dissection freeing the cartilage from the skin was achieved with right angled scissors which snipped excess fat off the under surface of the dermis along with the cartilage. The anterior septum was shortened with a rectangle resection and then tip tilted with a golden triangle excision. The bridge was levelled with chisel and scalpel. A submucous resection improved the airway. The lining was trimmed and closed. Alar margin and alar base wedge resections were marked, excised and closed with 6–0 silk. Bilateral osteotomies with in-fracture completed the nasal correction. The refinement of tip, bridge, hanging sidewalls and flaring alae is definite.

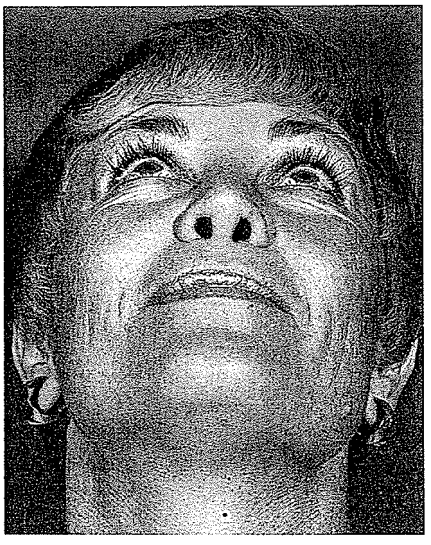


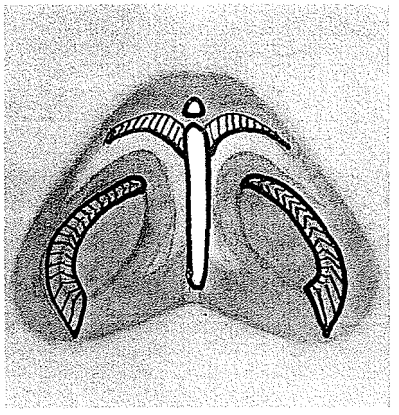
There are numerous conditions where alar margin sculpturing can be of benefit. This 41-year-old woman had an unattractively flat, flared nose with a thick tip and transverse nostrils.



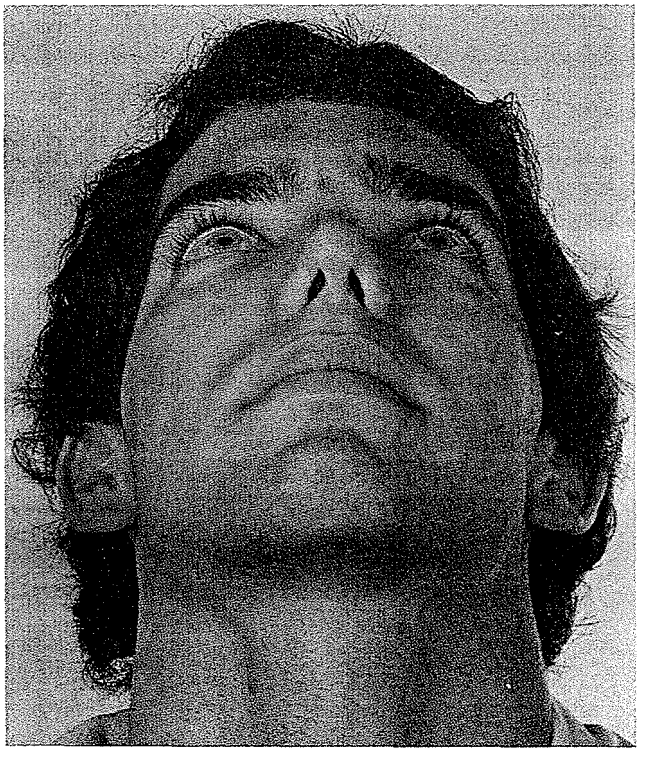



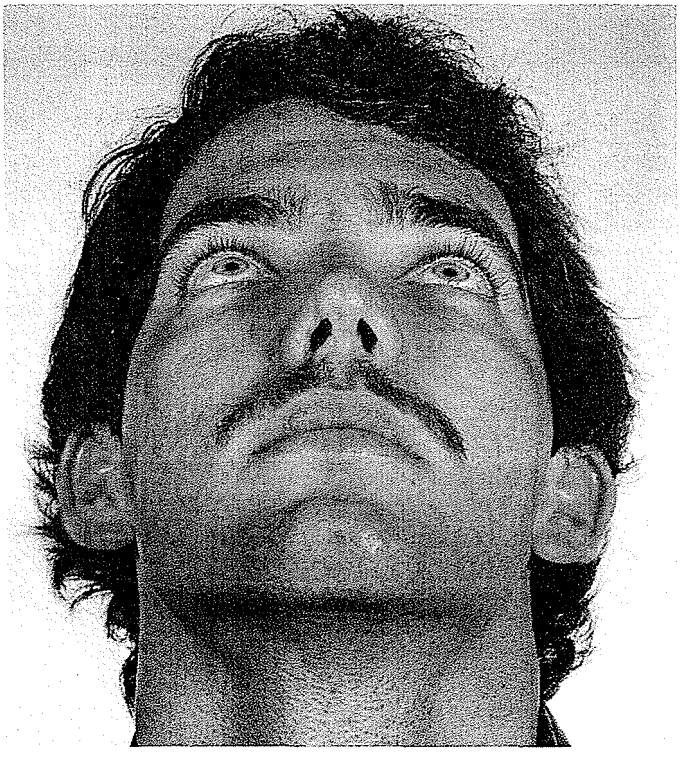



To enhance and refine her nose a submucous septal resection provided two cartilage struts, one for the bridge and one for the columella. The alar cartilages were reduced and one of these was trimmed and used to cap the septal strut in the tip. A bilateral sculpturing of the upper medial alar margins turned the transverse nostrils into a more vertical axis and alar base wedge resections reduced the abnormal flare.



An entirely different problem was solved in this 20-year-old male who had collapse of his alar margins with reduction of his airway. His nasal entrance was refined by inserting a septal cartilage strut up his columella to support his tip. His alar cartilages were reduced and a second septal cartilage strut was inserted along his bridge. The most effective maneuver was the alar margin excisions which refined his alae and opened his airway.

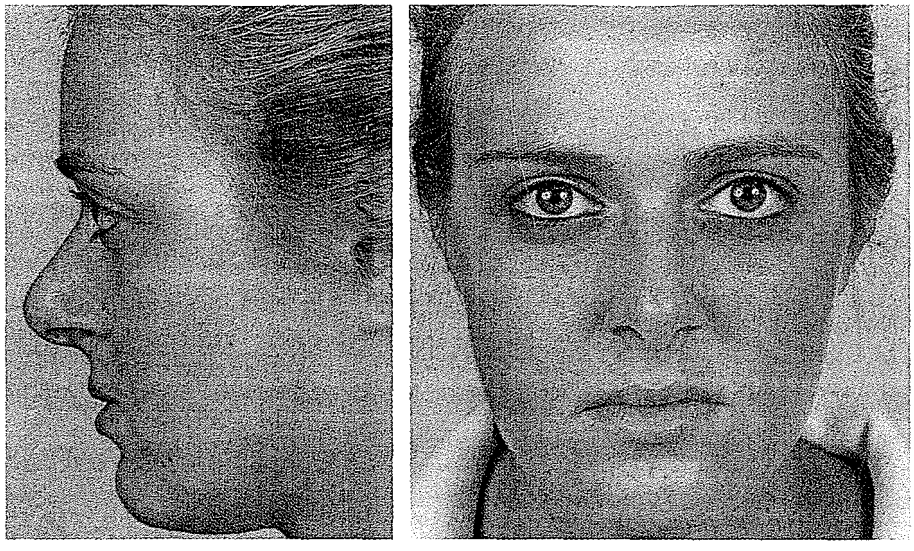


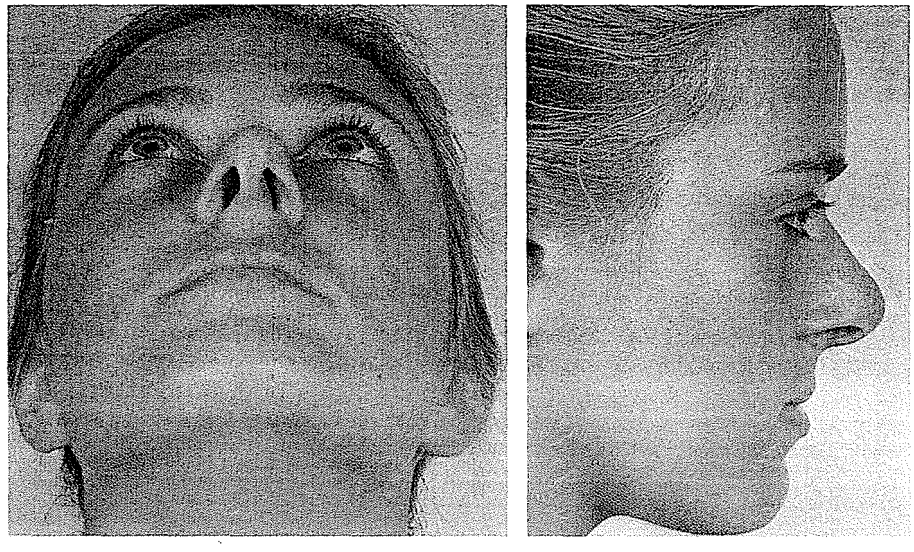


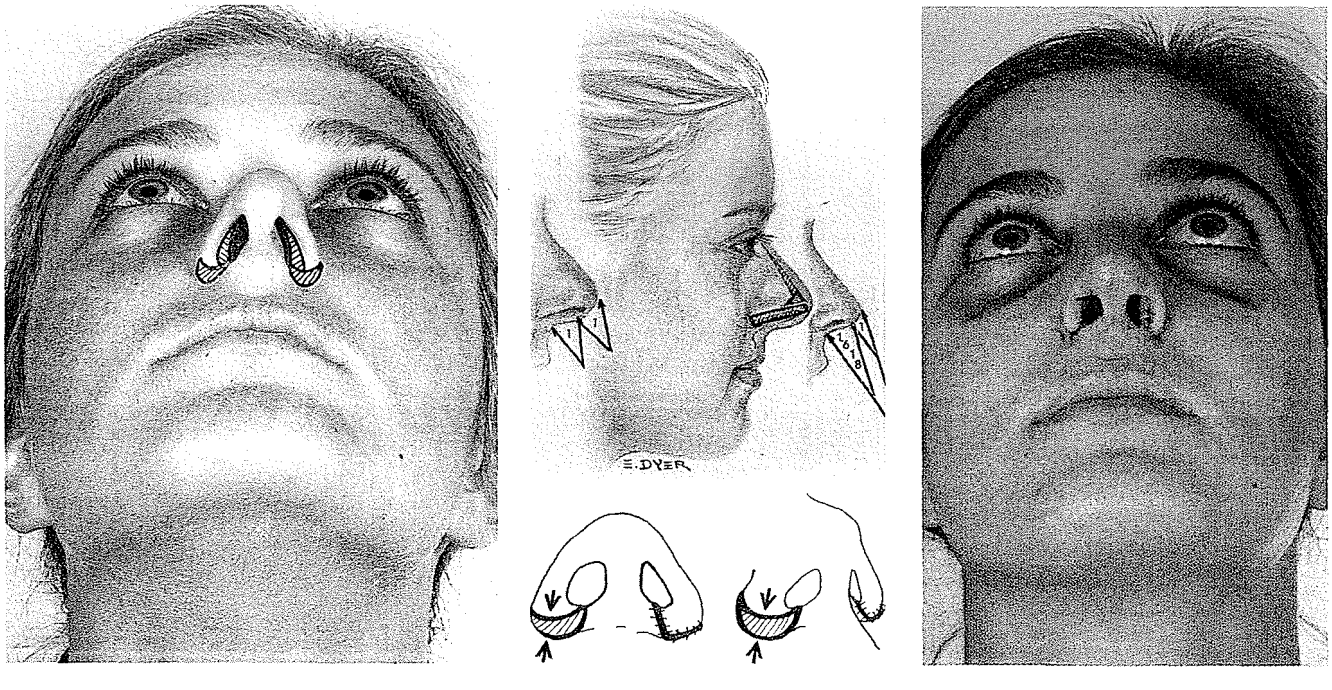
MARKING THE EXCISION

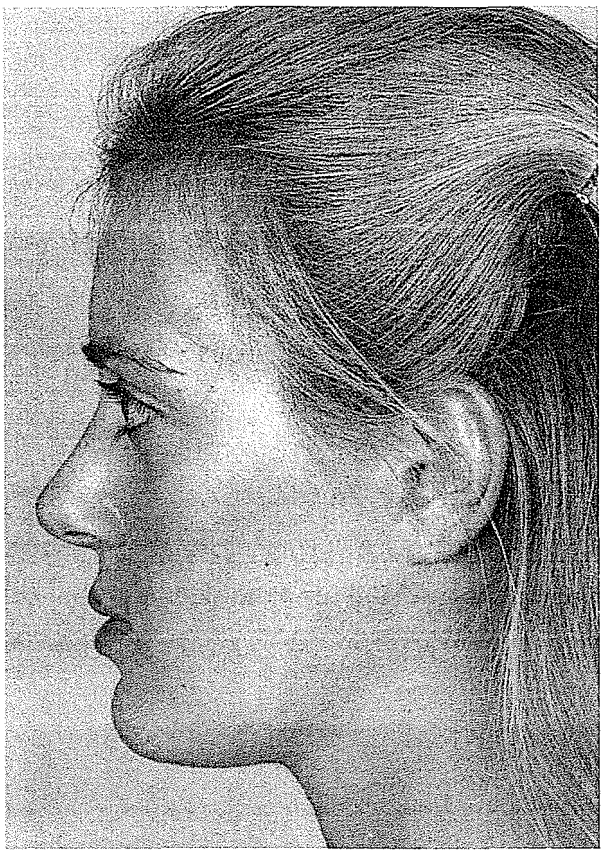
Determine the amount of alar rim cutback desired and mark with methylene blue the new alar profile along the skin outside and along the lining inside the vestibule. If the distance from the height of the alar rim to the top of the nasal tip is too long or the columella too short then the arch should be heightened by excision of the alar rims at the tip. If the nostrils are wide or the alae flared then medial alar base wedges should be marked in continuity with the marginal excisions. When the alar wing and base is long and bulky then it can be further reduced by alar margin excisions extended into a true Weir wedge.

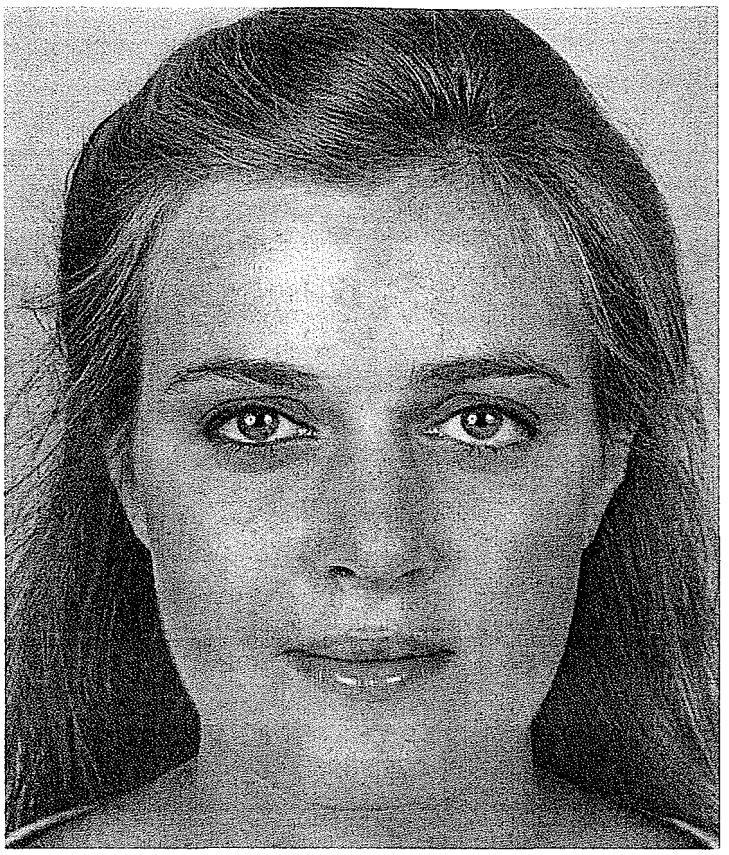
Here is a nose that required several of these adjuncts. The alar cartilages were reduced, the bridge lowered and the septum shortened and tailored to a golden angle. The alae had webs on the inside which gave a gross thickness and the alae were too long from nasal tip to alar base. These two features were refined by alar margin excisions continuous with Weir wedge resections which shortened the long nose from cheek to tip.

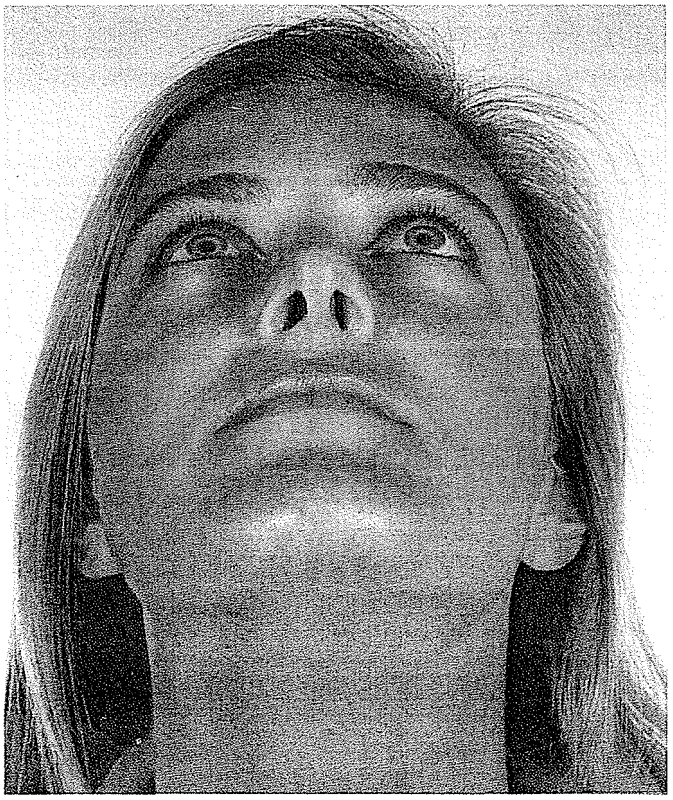


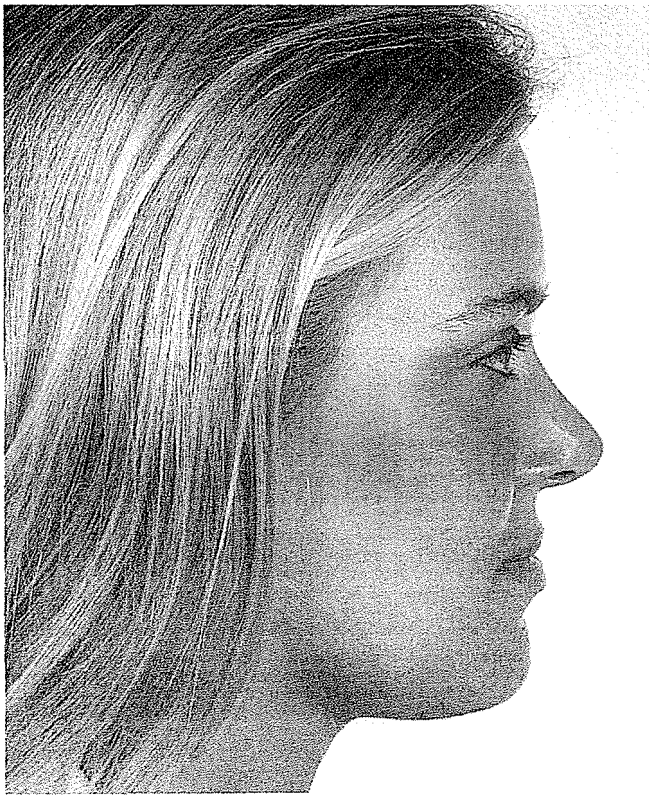



E. DYER









TECHNICAL DETAIL

With an eye on the marginal parallel blue marks, estimate the depth of thinning desired. Then with a hook in the height of the arch near the columella and a finger on the cheek near the alar base, tense the alar rim to a straight line and slice deeply on the bias the desired wedge from the margin. Needless to say, bilateral symmetry in this procedure is essential. This leaves a thinned fish-mouthed edge which will come together with a continuous No. 6–0 silk suture without the least tension.

A WARNING

It is important not to remove all of the devibrissized zone on the lining side of the vestibule so that hair does not grow too close to the alar edge.

In 1993 J. Planas and J. Planas, inspired by my 1960 description of external margins excision, presented excellent results following marginal excisions in the cleft-lip nose and in primary and secondary rhinoplasty.

A GUARDED REASSURANCE

This marginal scar has been quite unnoticeable as it lies along a natural line where light and shadow meet. It is important not to suture too tightly or leave the sutures more than 3 to 4 days. Occasionally there may be suture indentations but these usually smooth out in time and have not been a concern to the patient. There had been no record of keloid forming in this region of the nose in any race. It was particularly encouraging to have confirmation of our findings in the Caribbean and Florida by a 1962 report by Crockett from the Sudan of absence of keloids in members of the Black race.

Alas in 1994 Osman Mustafa, a plastic surgeon of Nairobi, Kenya, a member of the Flying Doctors, reported to me finding keloid in the noses of black patients of Uganda, Zaire, and Tasmania. Here is an example of keloid forming in the ala and columella of a cleft case which had had incisions in the alar base, alar margin and columella during attempts at corrective surgery. Although keloid in the nose is rare evidently it does occur in certain races in Africa.

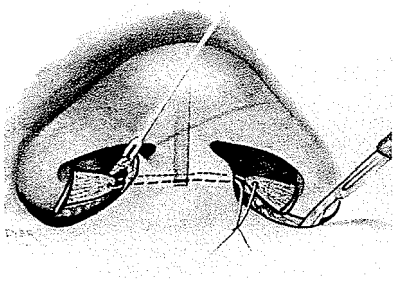


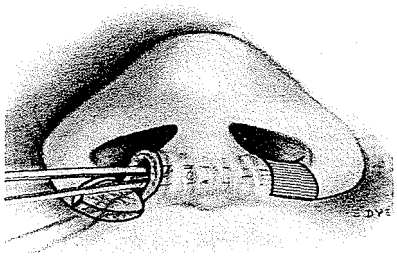
ALAR CINCH

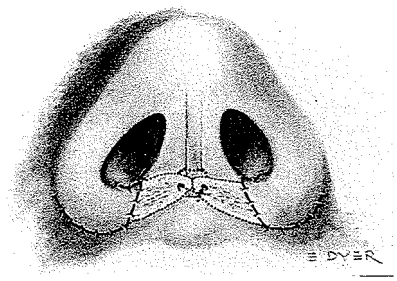
The alar cinch procedure was developed for the flaring ala of the cleft lip deformity and was first published in 1974. The principle involved the fashioning of a de-epithelialized tether on the freed, flaring alar base. This tether, like a string on a puppet, can be manipulated to advance the alar base into symmetry with its mate as it is fixed to the septum at the nasal spine with a permanent suture. This procedure has been used routinely in both unilateral and bilateral cleft lip nasal flaring.

The bilateral alar cinch operation was found to be effective in correction of certain wide noses as reported in 1980. When the nose is flat and spread all over the face with wide, flaring alar bases associated with a depressed nasal tip, then the alar cinch can be extremely effective.

Alar base flaps incorporating the abnormally wide nostril sills can be cut free, the incisions being camouflaged carefully in the junction shadow of the nose join with the lip. The medial ends of these flaps are denuded of epithelium, leaving strong dermal subcutaneous flaps that can control the position of the alar bases and nasal width at the entrance of the nose. A tunnel from donor area to donor area of the nostril sills, dissected across the upper lip, just in front of the base of the septum and nasal spine, provides a pocket into which the two denuded alar extensions can be advanced. These flaps are cinched to each other at the base of the septum with one or



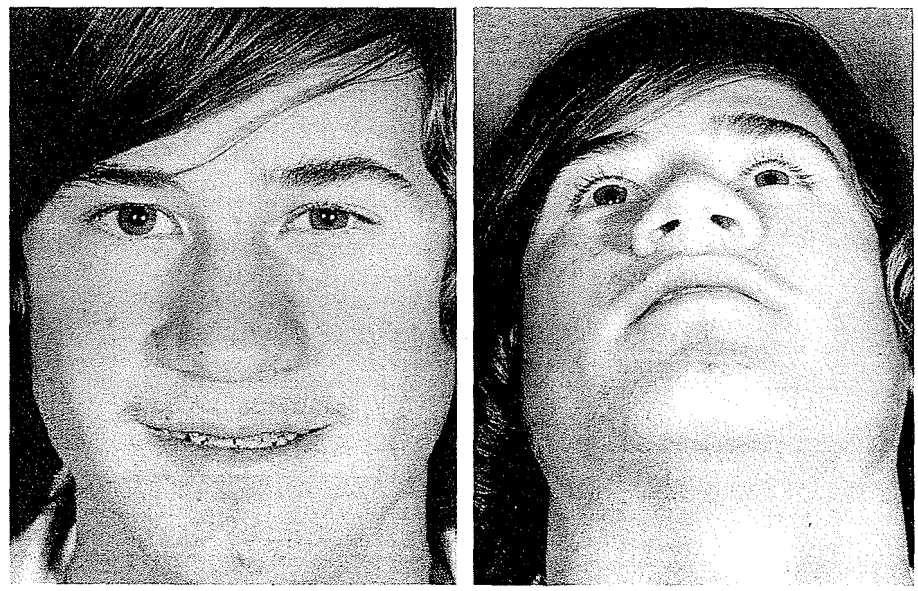




more permanent sutures, Ethicon's 4–0 Prolene. Although the buried tie is executed off center on one side of the columella, a symmetrical effect can be achieved with the hitching action much like straightening a saddle after one-sided cinching of the girth. As the suture is tied, the alar bases move in as the entire front of the nasal entrance is narrowed markedly and according to desire. The correction will be maintained as one tether is tied to the other tether in a self sustaining bond. The fringe benefits of this action raises the depressed nasal tip, advances the columella as the axis of the nostrils change from a flat, transverse to a more oblique, vertical aesthetic line.

When indicated the normal rhinoplasty procedures such as alar cartilage reduction, insertion of septal cartilage strut into the columella-tip area and osteotomies with in-fracture can be used in combination to improve the overall aesthetic result.

The first example of the use of this cinch procedure in a non-congenital deformity was in a 16-year-old male who had a flat, flaring nose that seemed to spread all over his face.

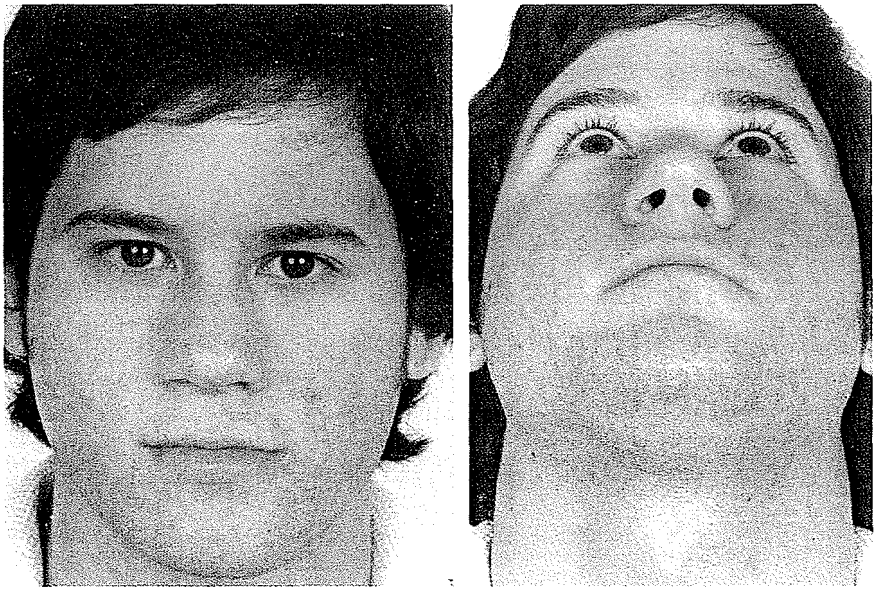


Corrective surgery involved marked reduction of the alar cartilages through anterior vestibular incisions. Two long narrow strips of septal cartilage, obtained during submucous septal resection, were sutured together and allowed to splay at

the tip. This double strut was inserted at the base of the columella and tunnelled up the columella into the tip for projection.

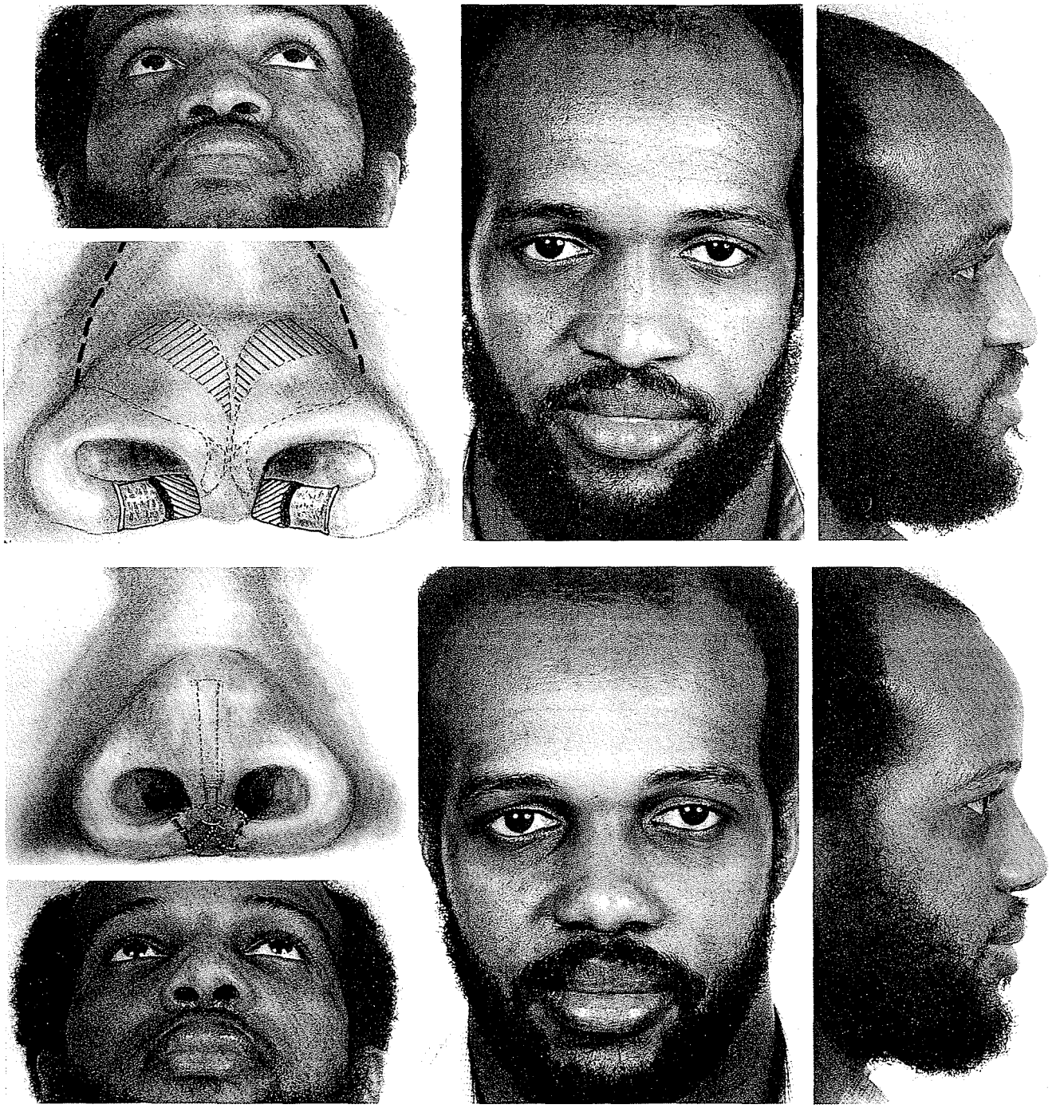
Then attention was directed toward correction of the grotesque nasal flaring and flatness. An alar cinch procedure was executed. Alar base flaps incorporating the abnormally wide nostril sills were cut free, the incisions being camouflaged carefully in the junction shadow of the nose and lip. The medial ends of these flaps were denuded of epithelium leaving strong dermal-subcutaneous flaps that controlled the alar bases and nasal width at the entrance. A tunnel from donor area to donor area of the nostril sills, dissected across the upper lip, just in front of the base of the septum and nasal spine, provided a pocket into which the alar flaps could be advanced. The denuded alar flaps were cinched to each other at the base of the septum with one permanent suture. As the suture was tied, the alar bases moved in and the entire front of the nose became more narrow. Also, the columella lengthened slightly and the axis of the nostrils changed from a flat, transverse to an obliquely vertical.

After two years the cinch procedure revealed permanent improvement in its narrowing effect.

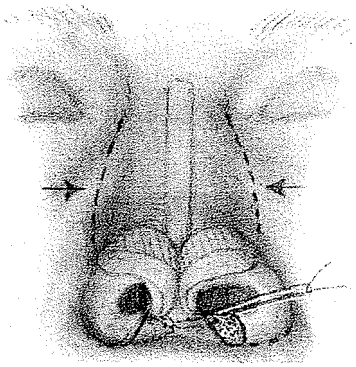


The alar cinch procedure has been effective in other races or blended races.

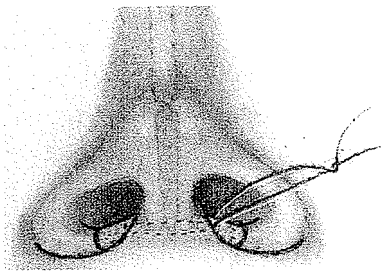
1. This 32-year-old black physician had a depressed nasal tip with a relatively broad, flat nose. Alar cartilage reduction, cartilage graft to the nasal tip and bilateral osteotomies with in-fracture set the stage for a bilateral alar cinch.



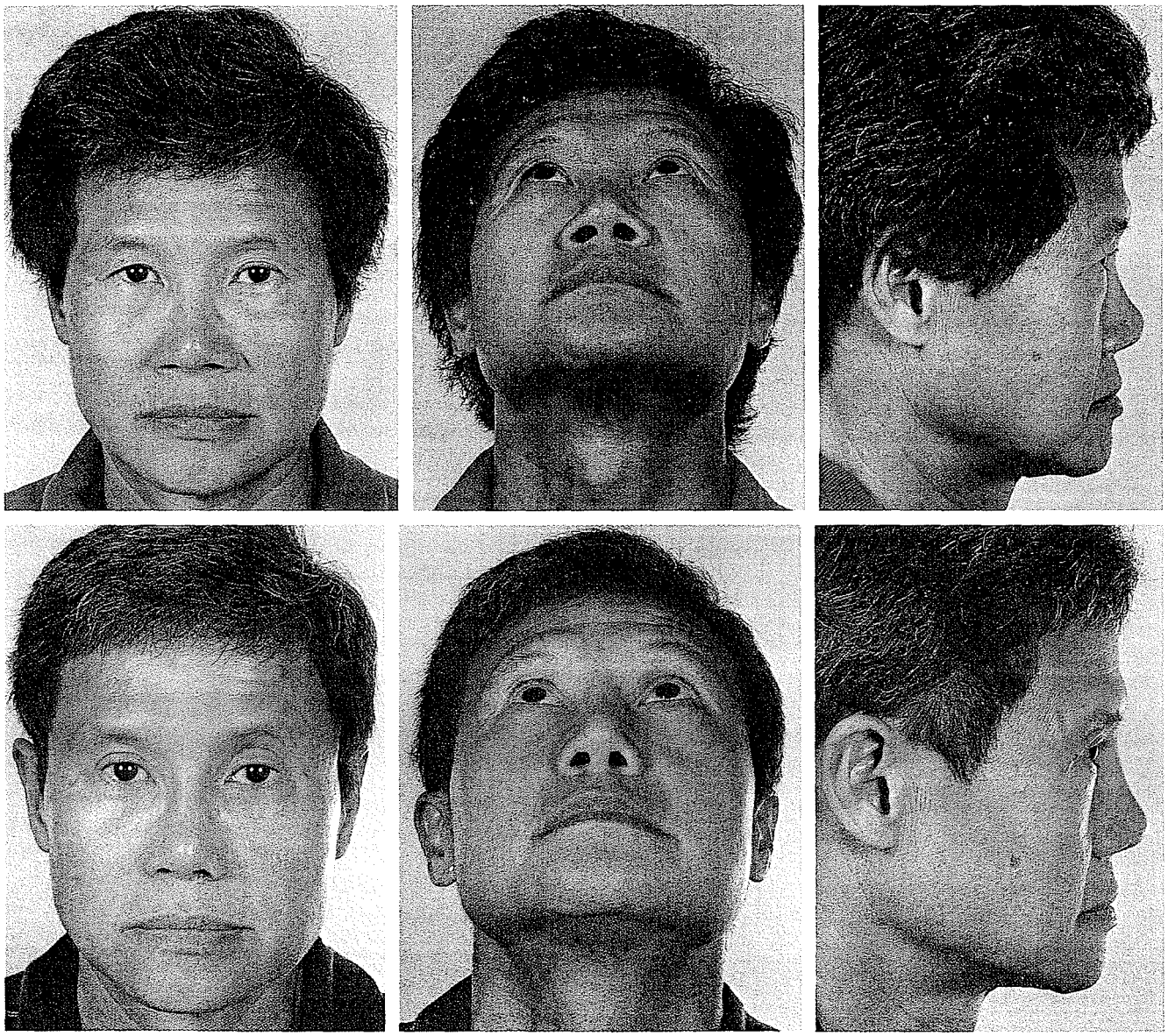
2. This 37-year-old black woman requested nasal refinement expressing her dislike of the typical broad, flat flaring nose. Her alar cartilages were reduced and a diamond shaped cartilage graft was inserted into her tip. Her alar margins were sculptured. Bilateral osteotomies followed by in-fracture narrowed her bony base. Then she had a bilateral alar cinch which narrowed the front entrance of her nose. A silicone implant to her bridge refined her profile and a silicone implant to her mentum improved the chin and nose relations.







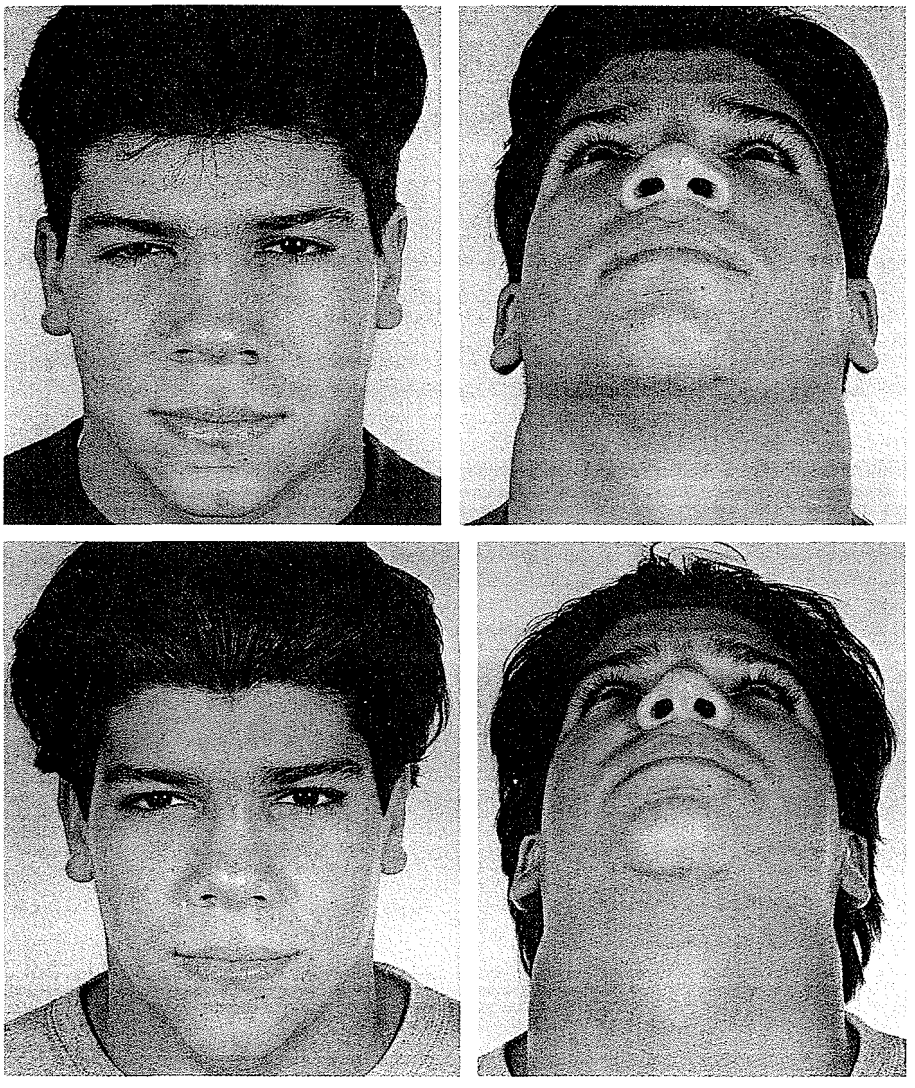
3. A successful 57-year-old Asian business man from Jamaica expressed his desire to be Occidentalized. An operation I described in 1955 to release the mongoloid folds and to create a double fold to the upper eyelids was carried out. The nasal profile was enhanced by a silicone implant. A submucous septal resection provided a cartilage strut which was inserted up his columella into his tip. Then a bilateral alar cinch procedure reduced flaring of the entrance of his nose.



4. The New World crossbreeding of the Western Indian and the Spaniard often produces a broad, thick nose (a "mestizo" nose). Here is an example.

This 20-year-old male patient with a receding chin and a wide flaring nose came in requesting a narrower nose.

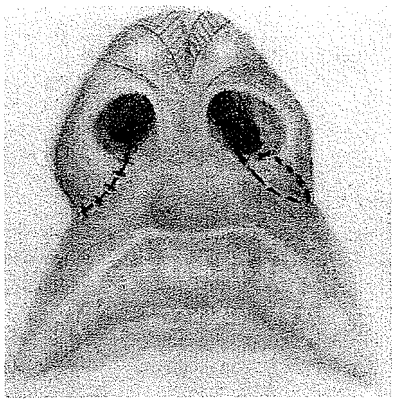
A chin implant was inserted through a lower labial sulcus incision, alar cartilages were reduced, standard alar cinch procedure was marked, and nostril sills were developed as flaps and denuded of epithelium. Through these alar base incisions a chisel was passed through on each side to achieve osteotomy of the frontal process of the maxilla. Bilateral infraction was accomplished. Then the denuded nostril sill flaps were cinched to each other with a 4–0 Prolene suture through a tunnel at the base of the columella in the area of the nasal spine.



The position of the cinch scars camouflaged along the margin of the alar bases and the join of the nostril sill with the columella rendered them totally unnoticeable after one year.

THE CINCH IN WIDE TIP-TILTED NOSE

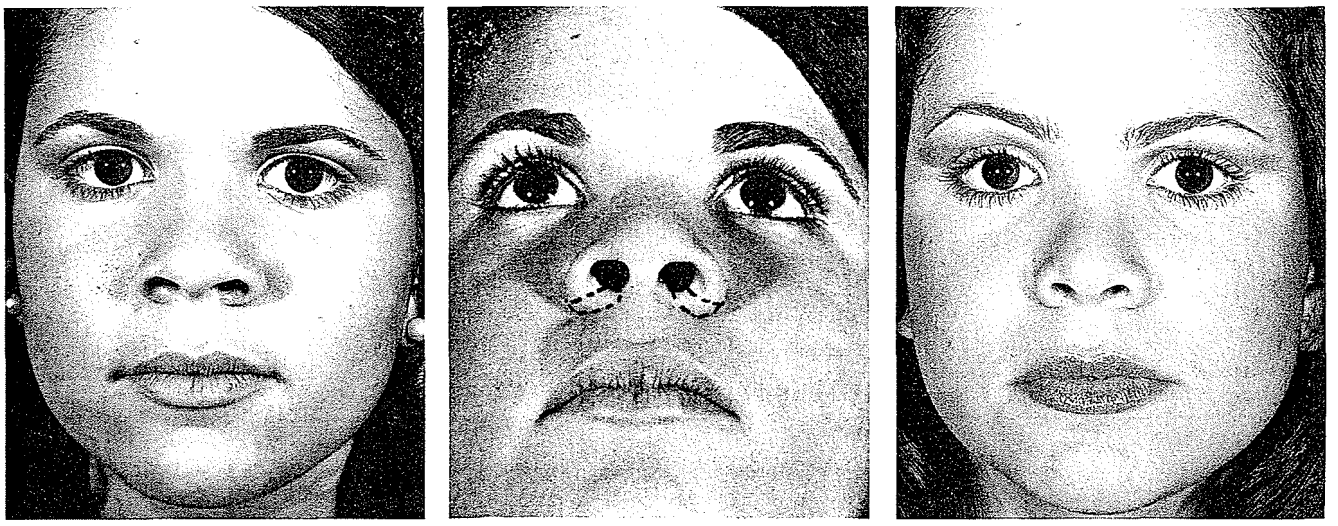
This 16-year-old female patient had a flaring nose and long nostril sills but her nasolabial angle was already acute.



The alar cartilages were reduced. Then the nostril sills were cut as flaps and denuded of epithelium. They were pulled to each other through a tunnel across the columella base with a suture in the cinch procedure. In this case the uptilt of the nasal tip was exaggerated too much. Thus the suture was removed and the denuded alar bases were excised as wedges and simply sutured in the usual fashion. This reduced the flare without turning the nasal tip up too much.





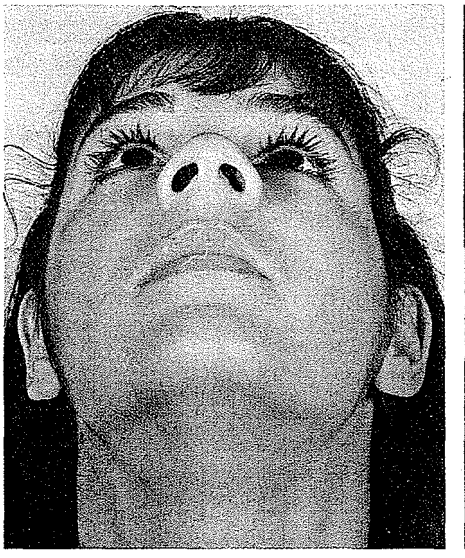


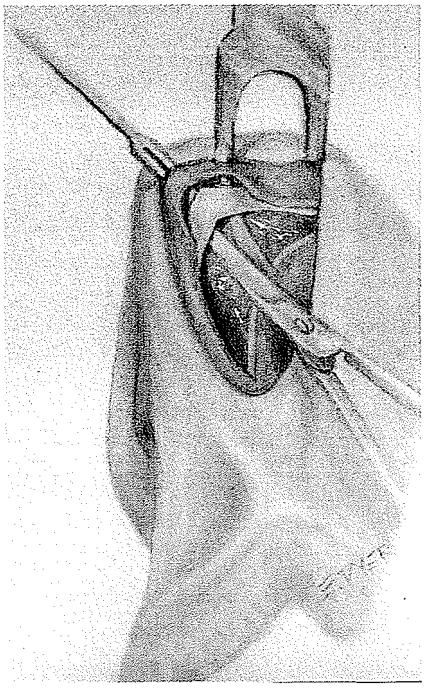
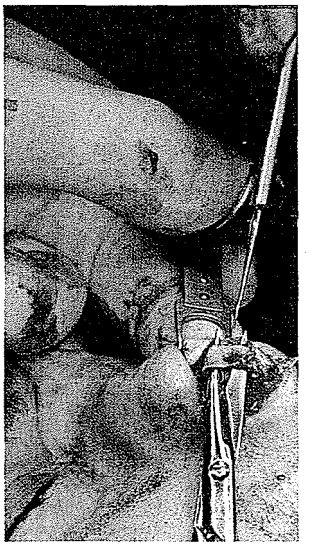
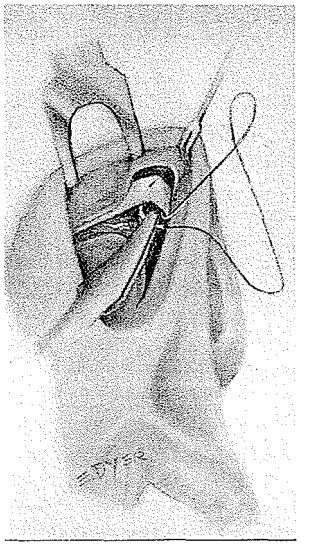
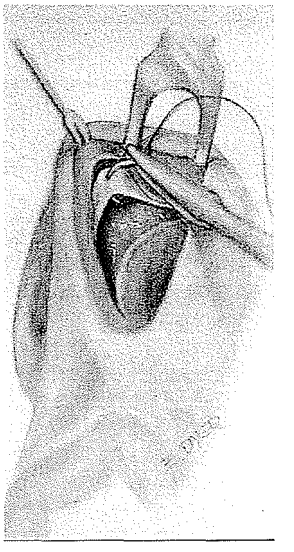
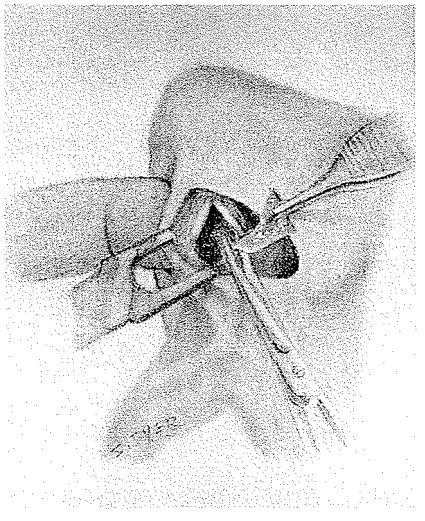
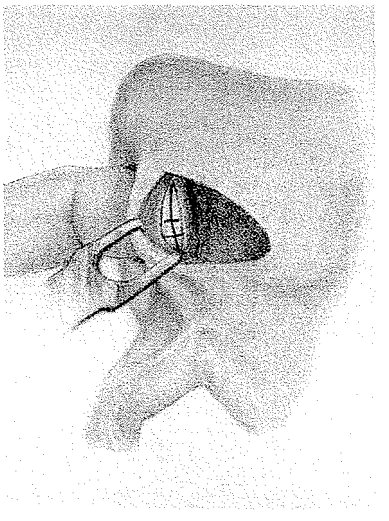
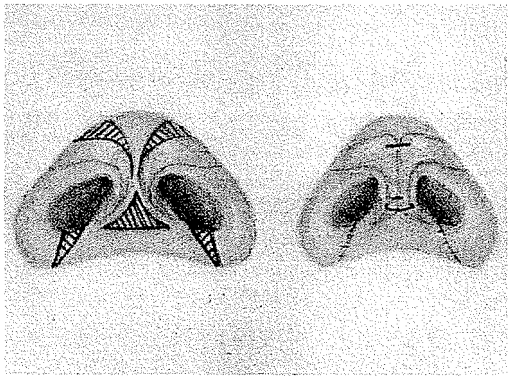
Here is another example where simple alar base wedge resections served well without the need for an alar cinch.

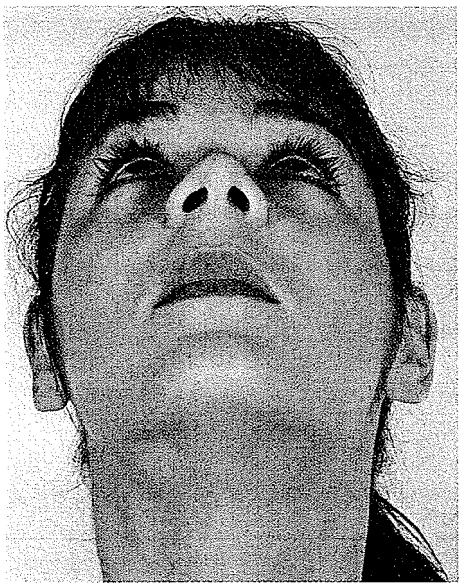
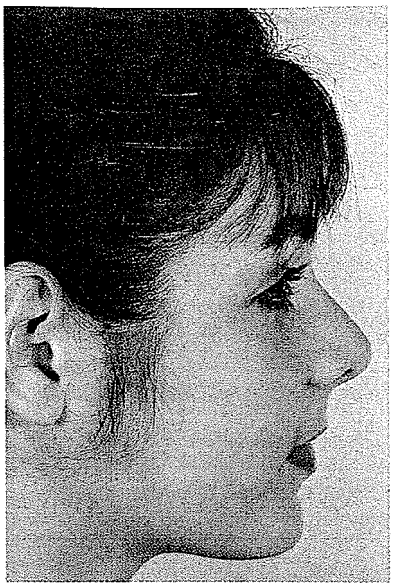
OTHER ADJUNCTS FOR SUBTLE BROADNESS

This 20-year-old female with a good profile and nasolabial angle requested aesthetic correction of her nose. When her nasal broadness was analyzed focus was placed on her alar cartilages, broad columella and moderate alar flaring.

This nose was best treated without open rhinoplasty. Through routine anterior vestibular incisions the alar cartilages were reduced to intact 3 mm strips which were easily dissected free from overlying skin and underlying vestibular mucosa. Once these strips of each medial crura were freed they were sutured to each other in the tip with one 4–0 Prolene suture. This narrowed the tip and improved its projection. A diamond shaped alar cartilage graft was inserted in the anterior tip in the usual separate incision to fill out this contour. Through the membranous septal incision the columella was everted to expose the backside. A triangle of excess subcutaneous tissue was excised and the feet of the medial crura were sutured together with a 4–0 Prolene stitch to narrow the columella base. Small alar base wedge resection refined, by narrowing, the alar flare.

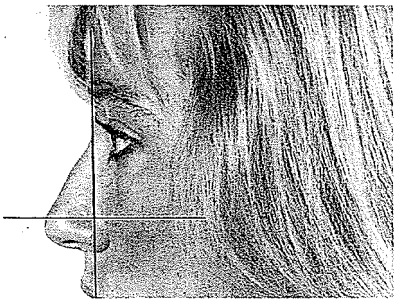
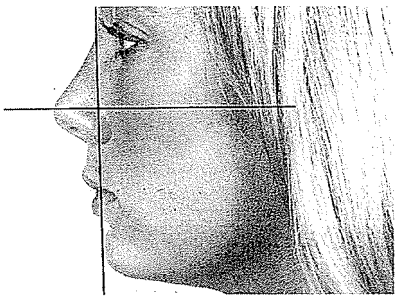








AUGMENTATION MENTOPLASTY

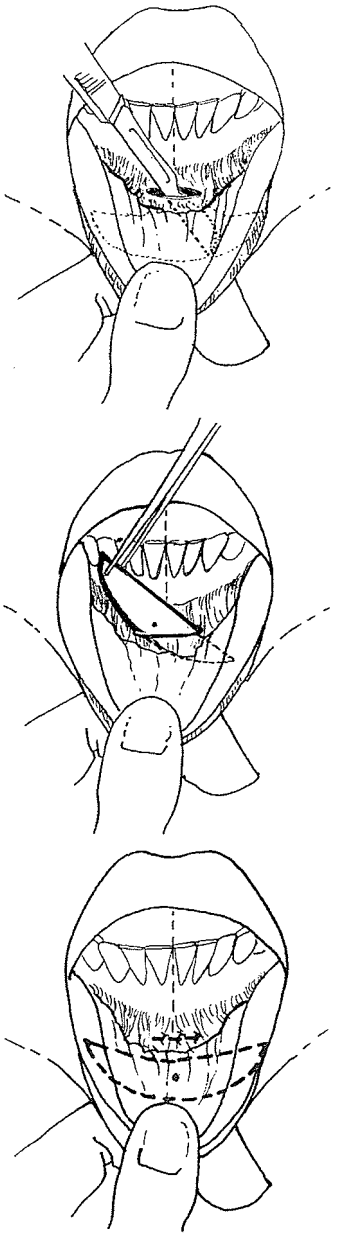
When patients consult about nasal correction, it is justifiable to bring their attention to a receding chin, particularly when, without its correction, the overall effect will fall short of the potential. The surgeon's purpose is not to produce platoons of perfect noses all shaped from the same pattern, but rather to refashion faces by adjusting one or more features so they blend in *natural* attractive harmony.

When the vertical plane from the nasion crosses the Frankfort plane at 90 degrees, if there is daylight showing at the mandibular mentum, this can be used as a guide to chin augmentation. For minor to modest discrepancy a chin implant at the time of rhinoplasty will suffice.

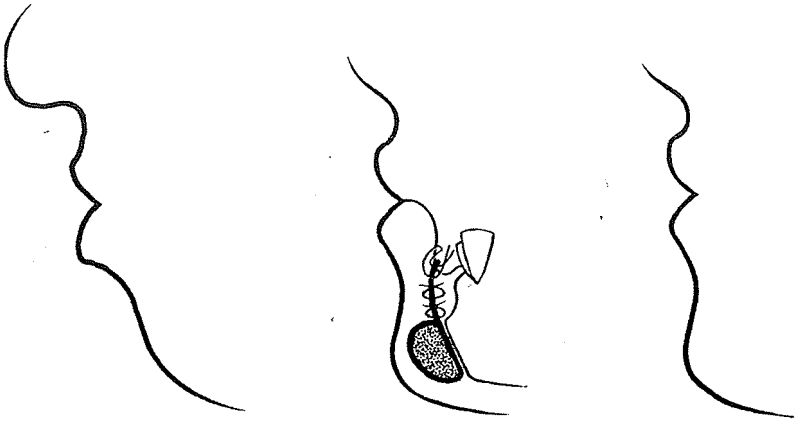




When the deformity is more extreme along with malocclusion, Xray studies and dental models are necessary for exact planning of osteotomies and mandibular advancement. When the chin is receding and the mentum extends vertically too long then a sliding genioplasty can solve both problems as Gillies and Millard described in 1957.

Chin implants are inserted at the time of rhinoplasty in about 15% of my patients. At least 75% of these patients were not directly conscious of the chin discrepancy before consultation, but close to 100% are pleased with the final chin improvement. Few operations match these statistics, and the reasons for the success of this procedure, besides the permanent increase in chin contour, can be found in its simplicity, speed of execution, absence of scars, and lack of complications. There is also the extra dividend of its complimentary effect not only on the nose but on a relatively protuberant hanging lower lip and excessively protrusive teeth. Either or both of these unattractive characteristics are partially camouflaged by increased chin prominence.



It is important not to make the chin projection too much especially in the female.

SPECIAL PREPARATION FOR OPERATION

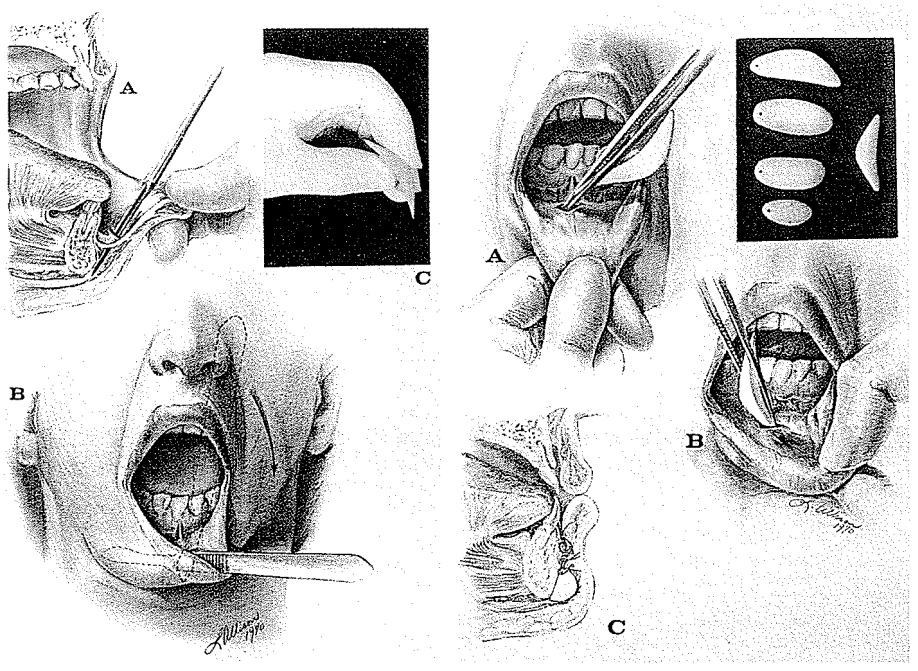
Four routine color photographs of the face (front, profile, and a view under the nostrils) are taken and mounted in the oper-

ating room as a standard guide to prevent deception from the various transient distortions of local anesthesia, edema, and progressive operative changes. When draping the patient, it is important to leave the forehead, nose and chin unobstructed. To expose only the feature destined for surgery reduces the chances of gaining a harmonious relationship. The chin implant is inserted first and thus sets the scale for shaping the nose.

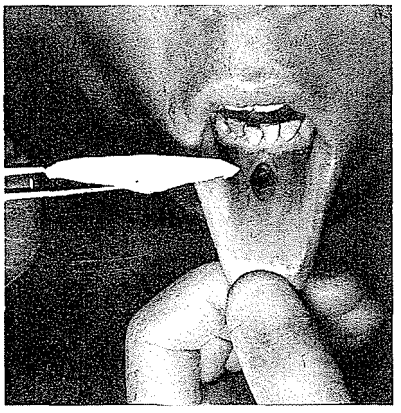
Technique of Insertion of a Chin Implant

In order not to distort the chin contour, a total of 3 cc of 2% Xylocaine (Lidocaine) with Adrenalin (Epinephrine) 1:100,000 is injected through the lower labial sulcus to block both the mental foramen region and the area of the future implant pocket. A 1 cm stab is made in the midline of the lower labial sulcus 1.0 cm out from the mucous membrane attachment to the mandibular alveolus. This stab is carried to the point of the mentum, but a pad of subcutaneous tissues 1.0 cm thick should be kept over the mandible until the destined site for the implant has been reached. A pocket from 4 to 6 cm in length is dissected just in front of the mandibular periosteum.

It was noted in 1969 by M. Robinson and R. Shuken that solid silastic implants placed on the mentum caused bone re-

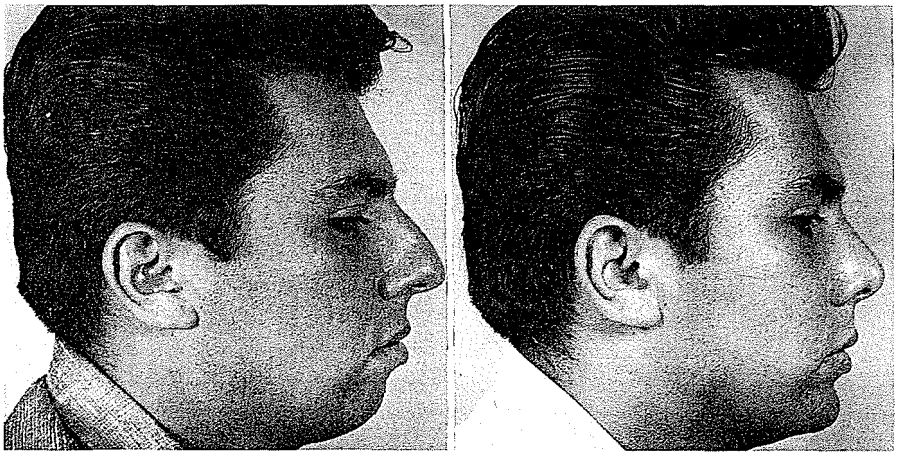


sorption which could be demonstrated by a lateral radiograph. In 1973 R. Jobe, R. Iverson and L. Vistnes confirmed these findings in human and rabbit studies. The authors did not present this as a contraindication for chin implants. As the resorption is more likely when the implant is placed subperiosteally I prefer to place the implant on top of the periosteum and have not found resorption to be a problem.



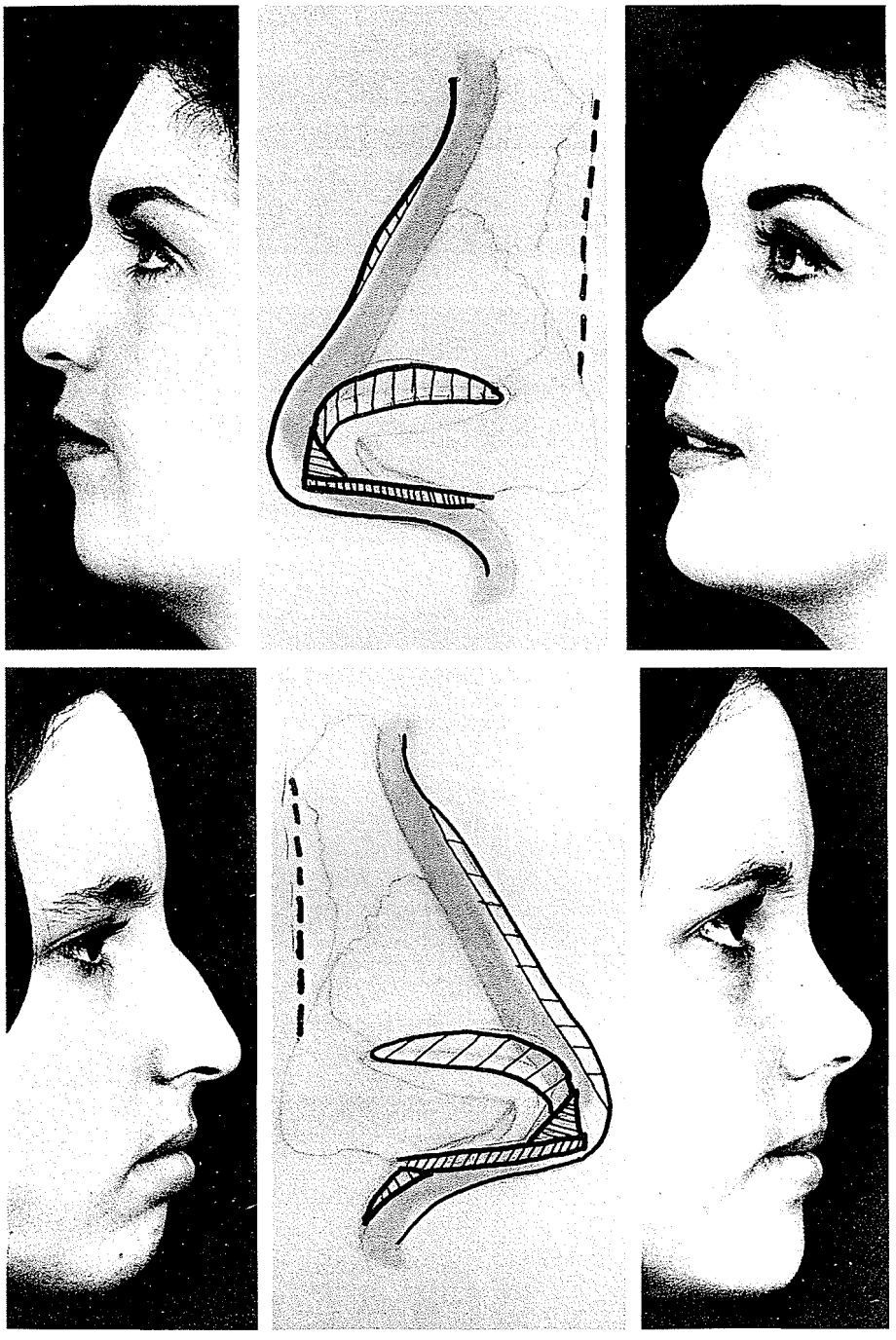
Care is taken not to extend the pocket dissection over the edge of the mandible, so as to avoid an overhang of the implant. A temporary gauze pack soaked in Adrenalin is inserted into the pocket to aid hemostasis. A McGhan silicone solid chin implant 1–6 is chosen. One end is then inserted to the depth of the chin pocket to the right, and the other end to the depth of the pocket on the left. A blue mark on the center of the chin skin is lined up with a blue X mark on the center of the implant sighted through the mucosal buttonhole. There is no need for fixation. The pocket should be a perfect fit for the implant reducing the chances of slippage. If the implant needs reshaping for the specific case, this is quite possible.

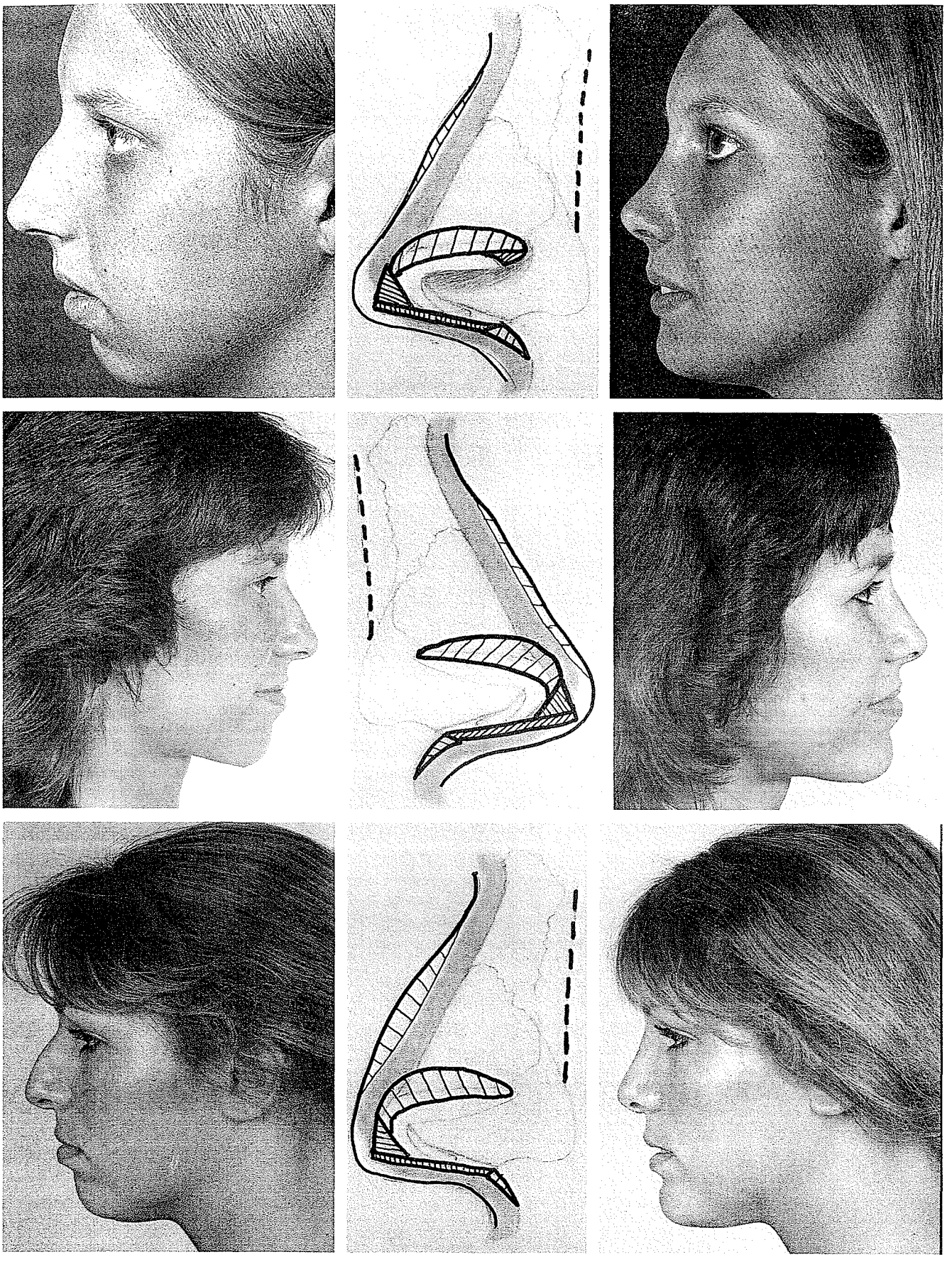
The wound is closed by two layers of 4–0 chromic catgut sutures to the subcutaneous tissues, absolutely sealing off the pocket. A final layer of mattress sutures closes the labial mucous membrane. An elastoplast pressure dressing is applied at the end of the operation and is maintained five days to press the entrance tunnel closed, immobilize the lip and discourage chin swelling. Antibiotics are administered for five days.

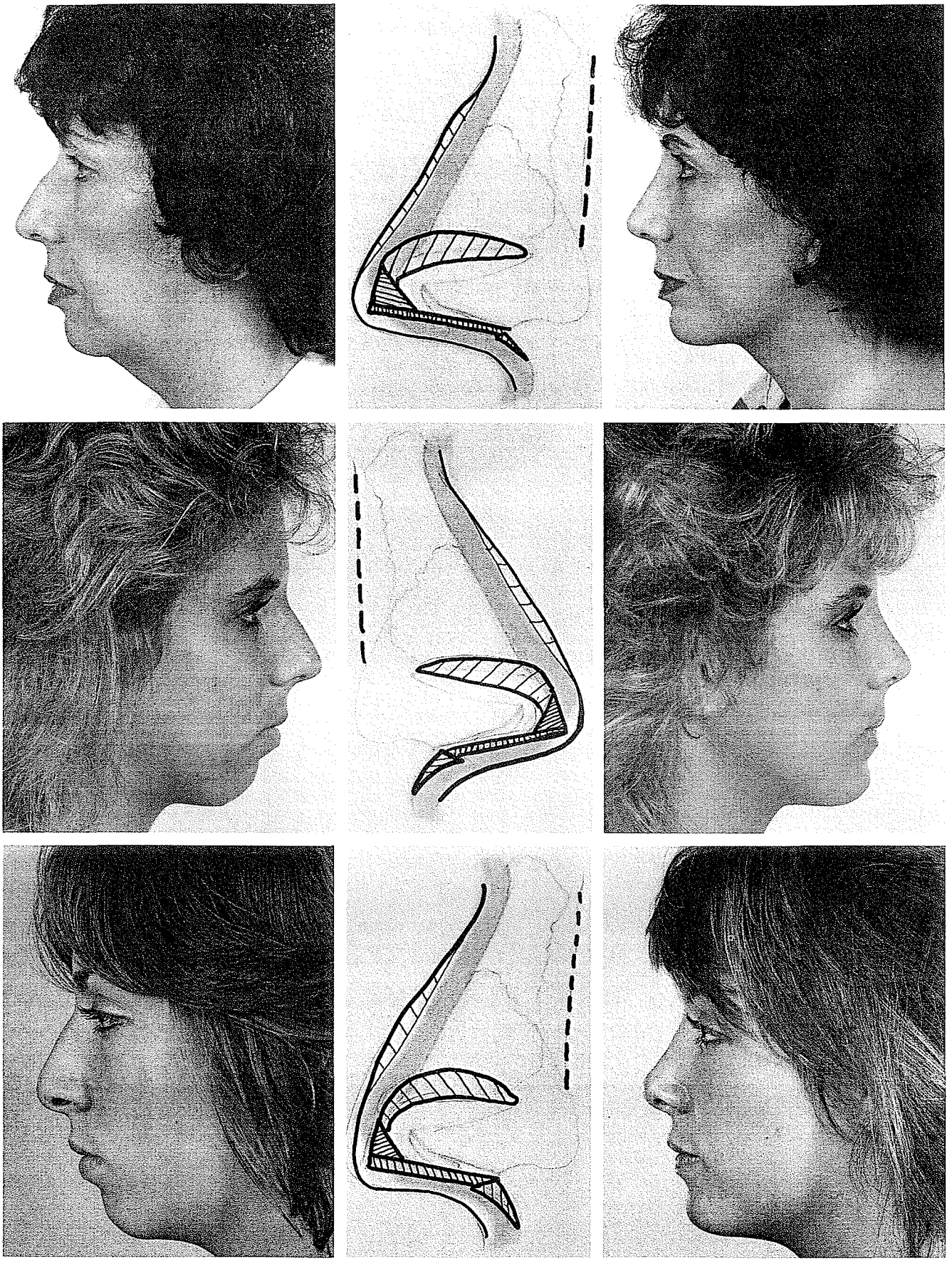


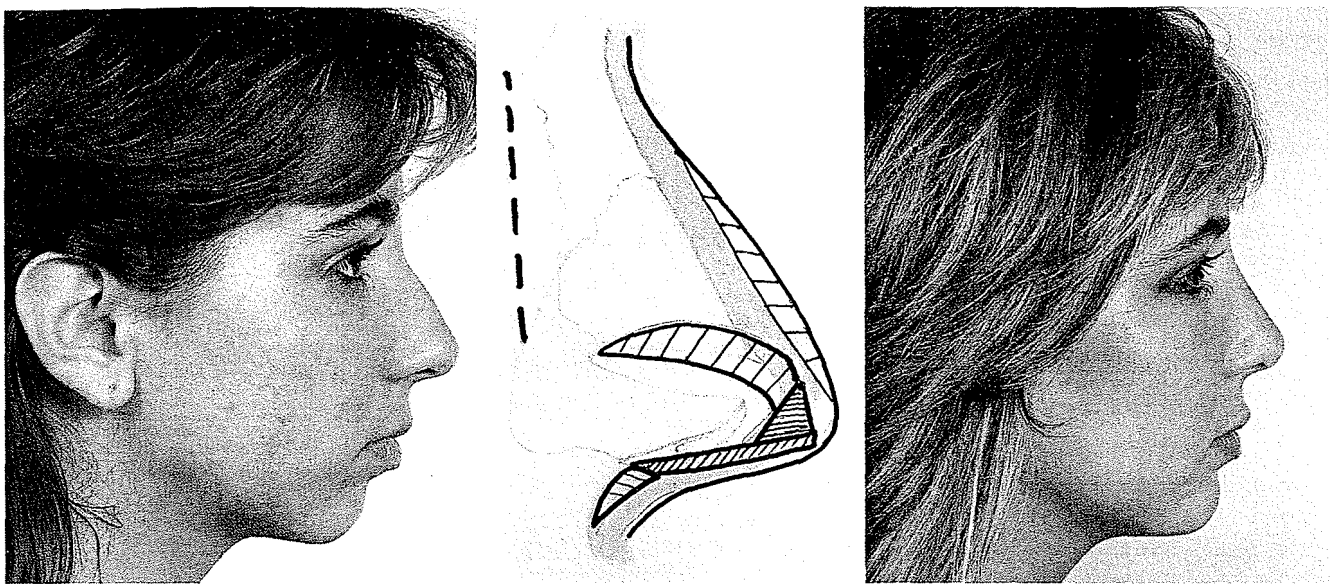
This simple procedure requires only an additional 15 minutes. There are no external scars and no telltale puckered submental dimple. In 1950 Converse described an intraoral approach for the introduction of autogenous bone grafts to the chin. I was the first to insert foreign body implants through the intraoral approach and have done so for 45 years.

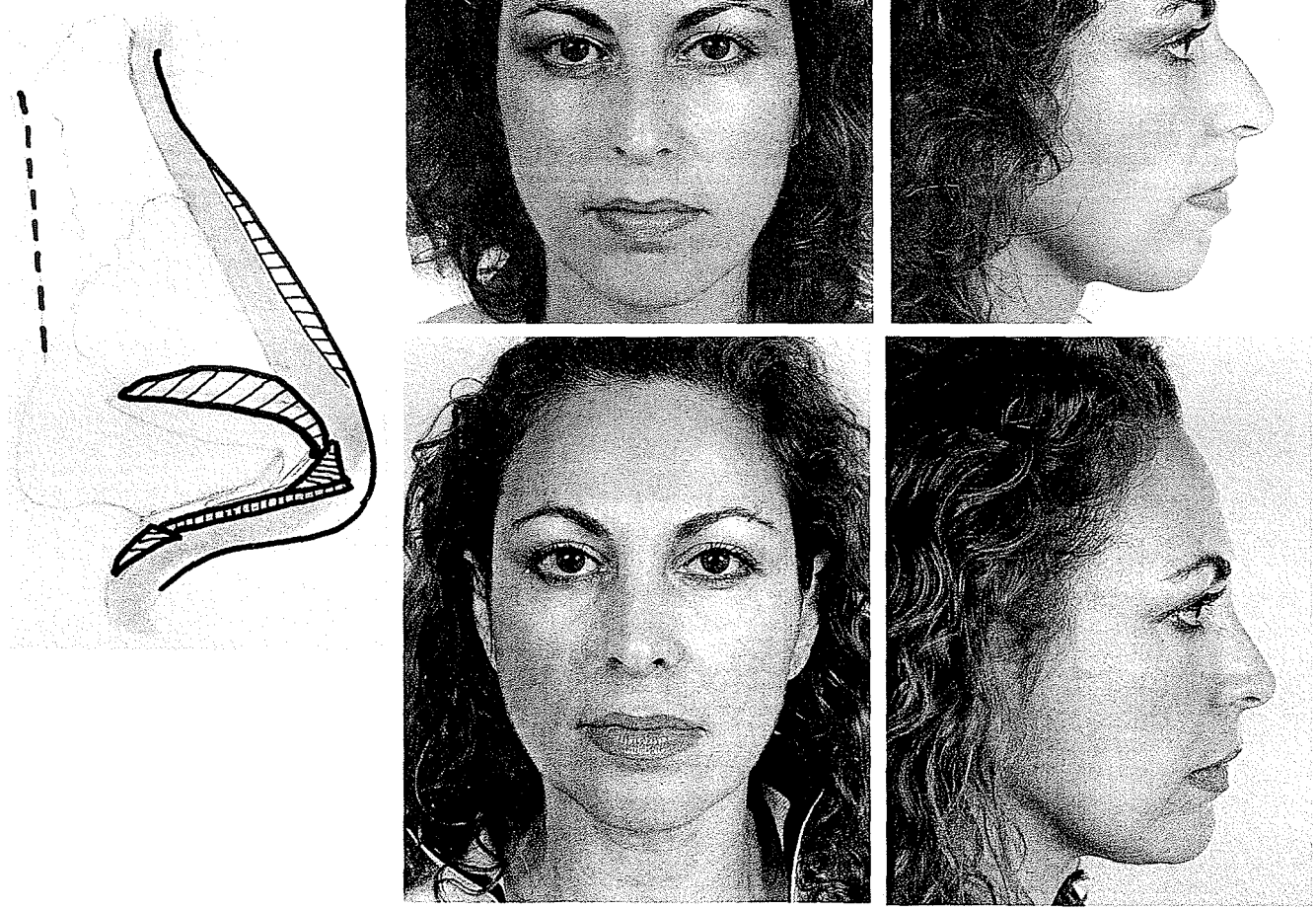
Here are a series of cases showing the combined improvement of corrective rhinoplasty and chin augmentation.

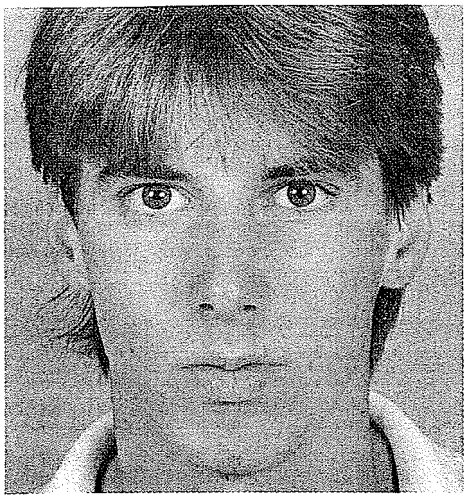


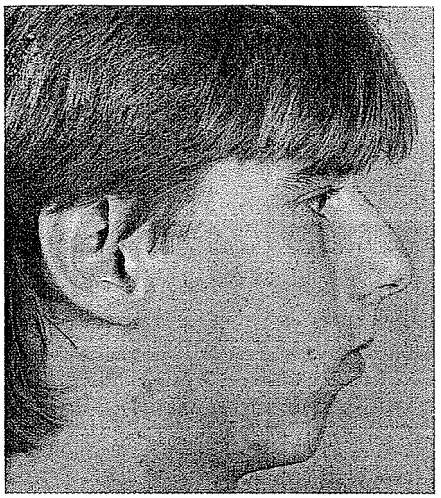


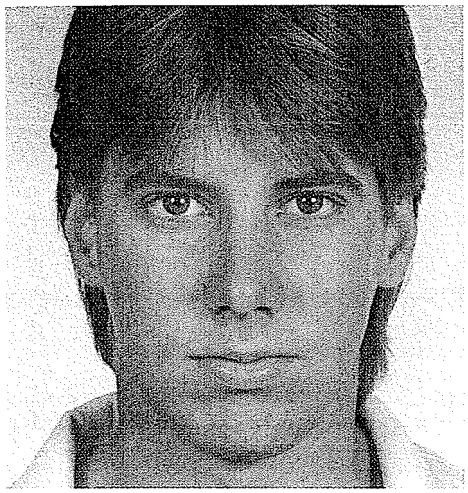


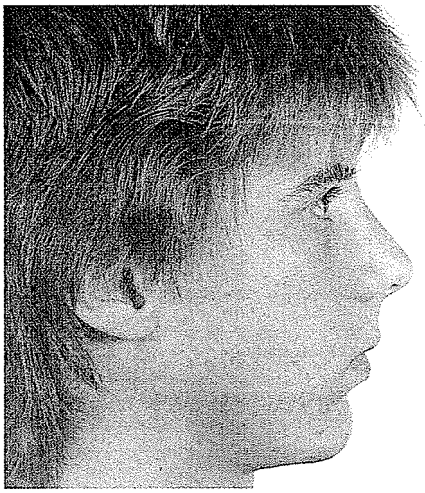


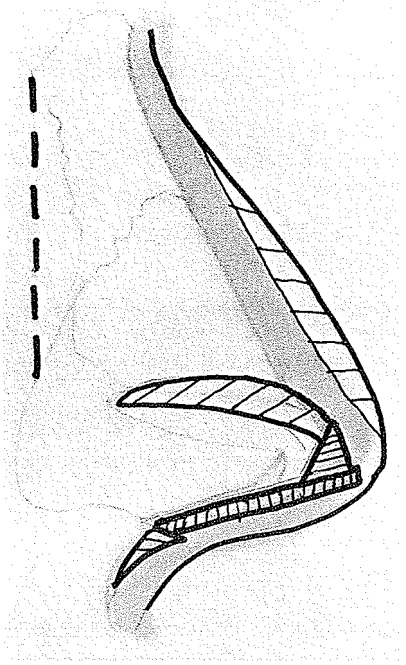


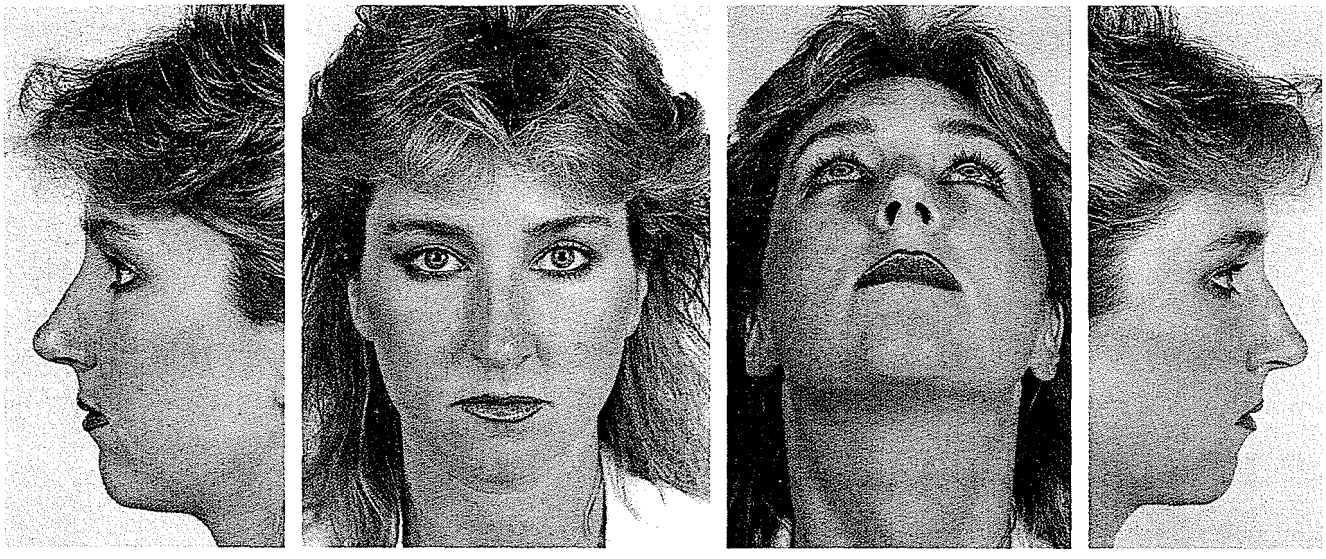


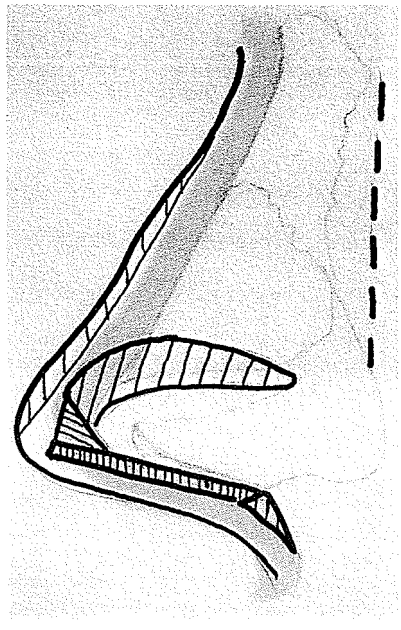


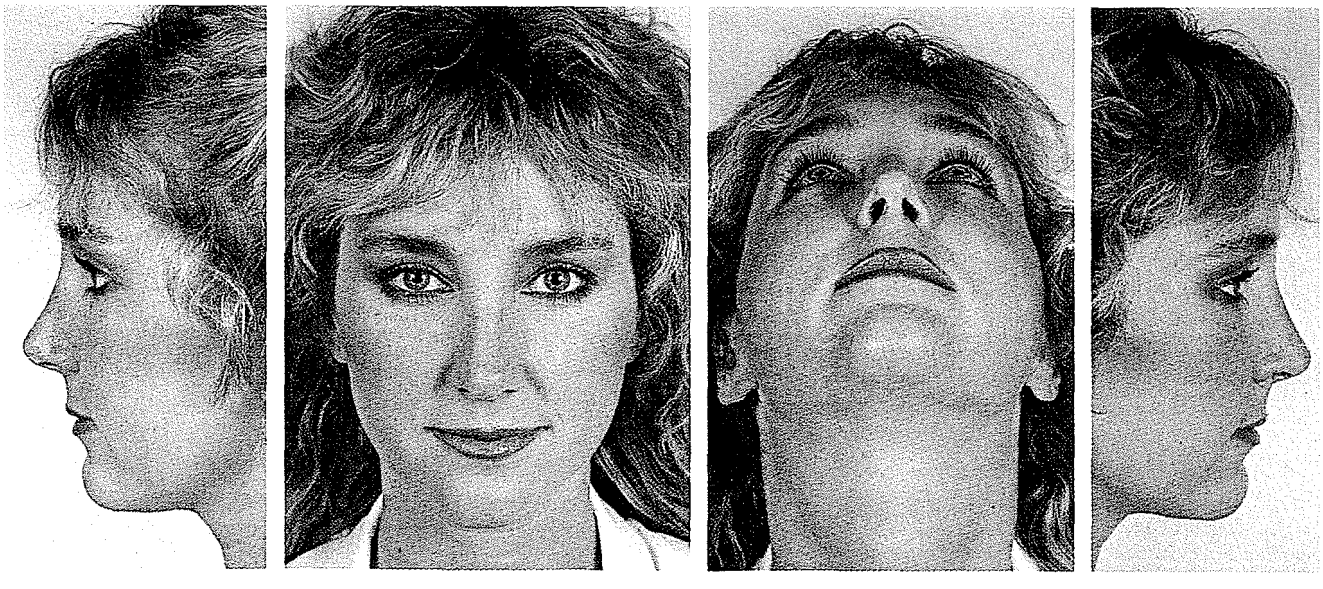


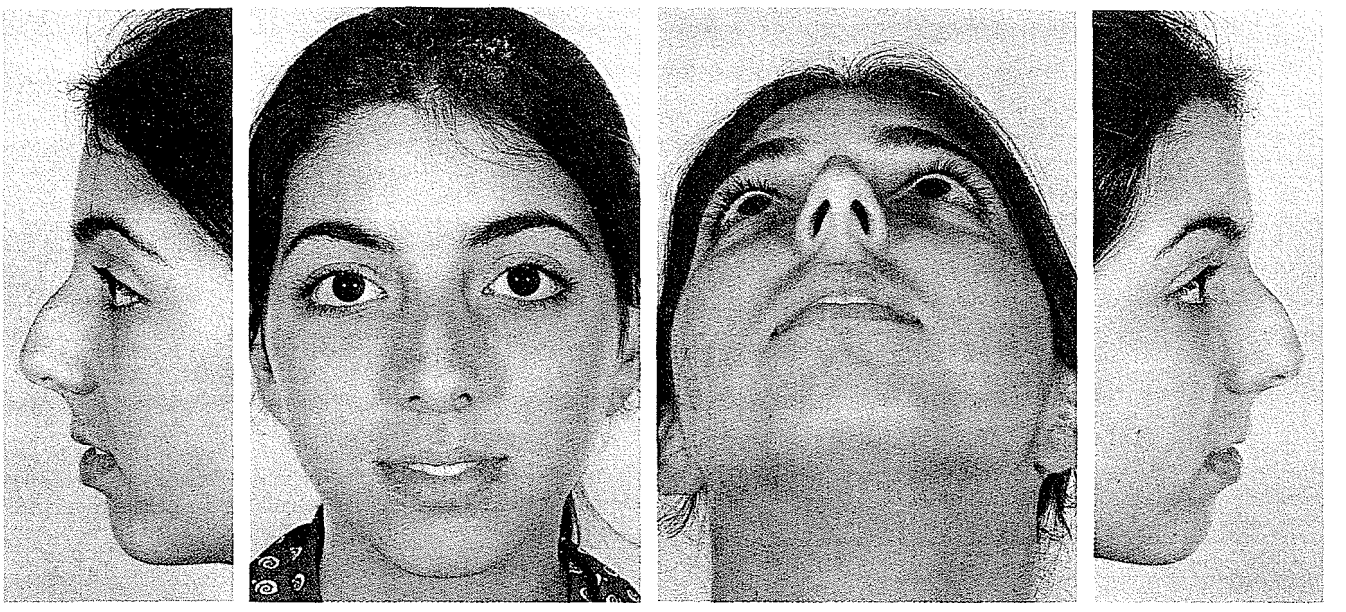


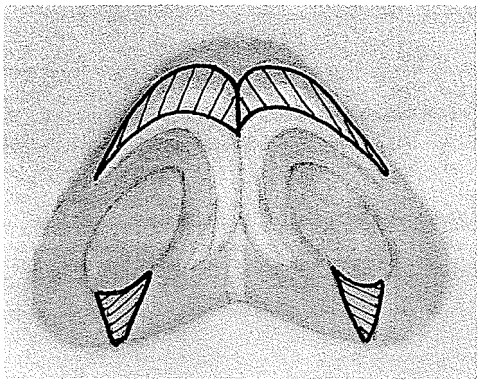


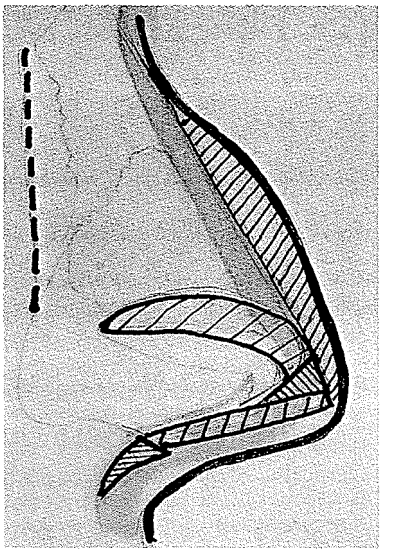


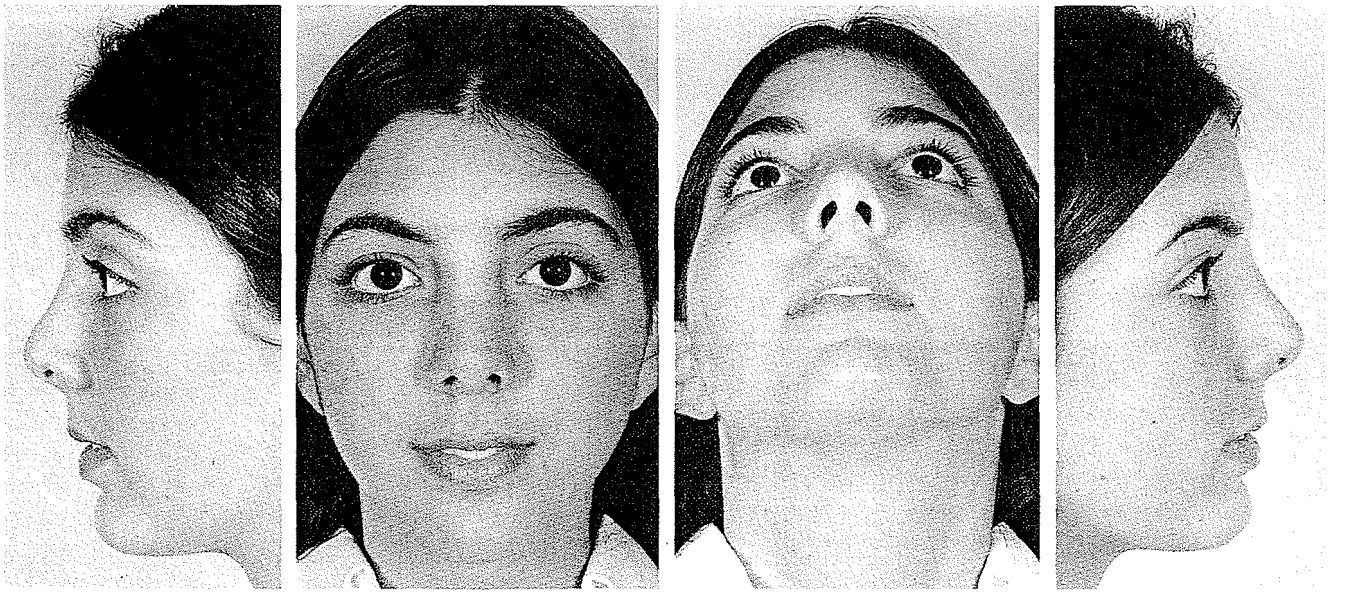












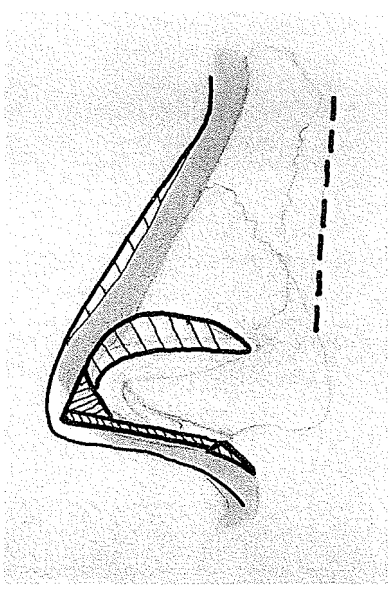
It is impressive how effective a chin implant can be on a receding chin especially in the profile view. It is also important that the nose be reduced and shaped to fit the new chin so that there is a harmony of features. Here is a 39-year-old female who wanted her nose reshaped but refused a chin augmentation. It is remarkable how the nasal reduction harmonized with her receding chin but an implant would have been even better.

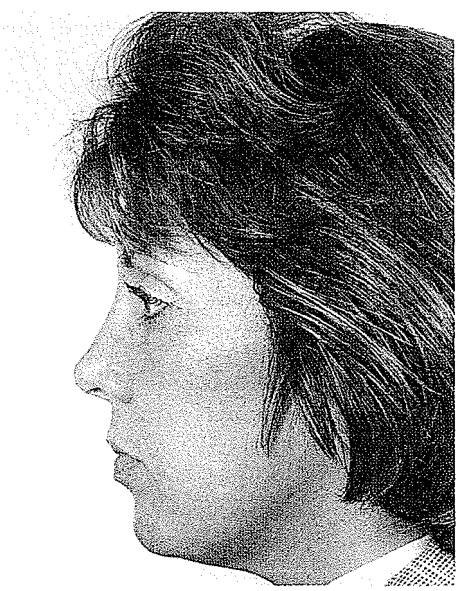




The same was true of this 20-year-old female who had a rhinoplasty but refused a chin implant. Reduction of her nose and nasal spine improved her facial relations but not as much as a chin implant would have done.







It is not too late for a chin augmentation after the nose has been operated especially when a parrot's beak has formed. Secondary revision of the nose and a chin implant improved the balance of features.

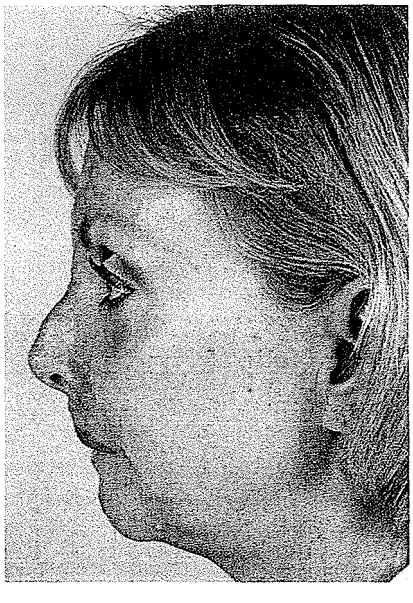


THE INTERFACE OF AESTHETIC AND RECONSTRUCTION IN PLASTIC SURGERY

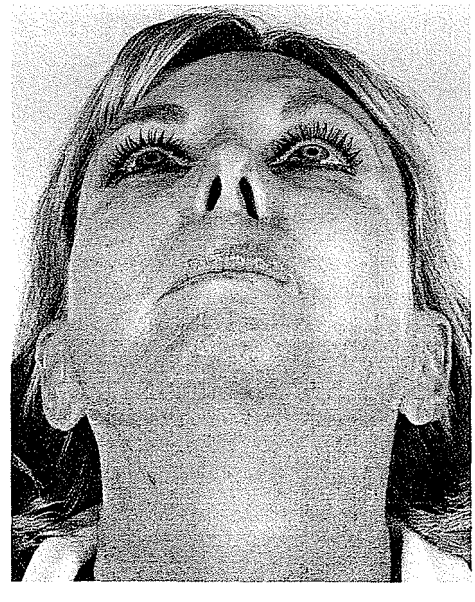
In 1983, at the specific invitation of President B. Williams of the International Federation of Plastic Surgeons, I presented the opening address at the Montreal meeting devoted to the increasing interface of cosmetic and reconstruction in plastic surgery. It was noted, in general, cosmetic surgery is a routine discipline demanding perfection while reconstruction is less routine but dependent upon principles and imagination. A true plastic surgeon should be adept in both. Thus plastic surgeons can no longer be content to act as O-Fillers merely plugging tissue into holes. The sophistication of our great specialty has elevated us to the state where failures in aesthetic surgery must be reconstructed and reconstructions must be aesthetic.



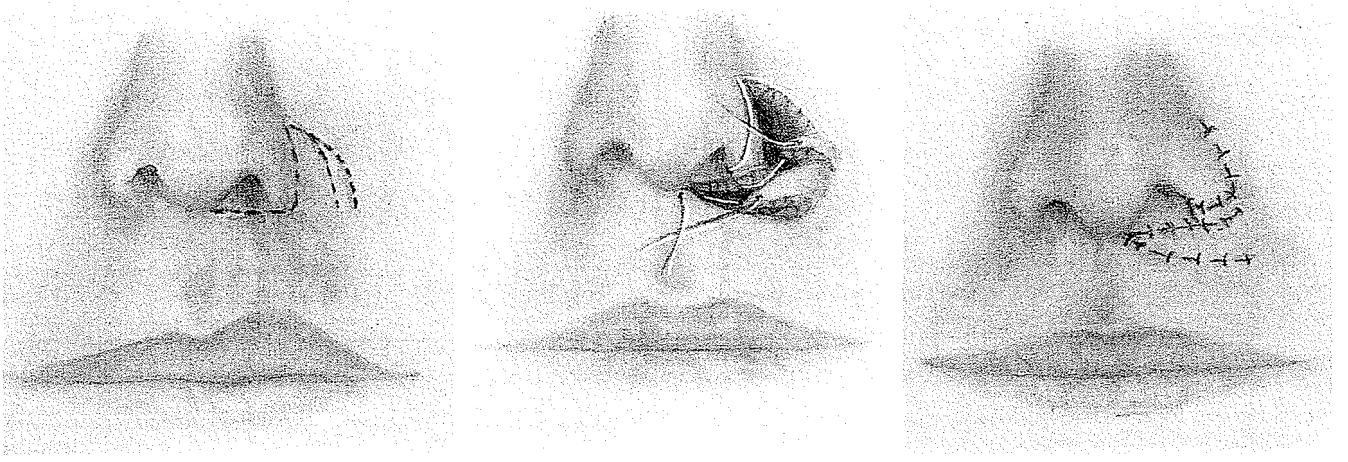
In this same spirit the final result of selected trauma cases may be improved if the reconstruction is augmented by any indicated aesthetic surgery. The epitomy of this philosophy is seen in the treatment of a 45-year-old female pedestrian struck by a car from behind and catapulted to the cement sidewalk. She avulsed a portion of her left eyebrow, lacerated her forehead, avulsed a portion of her left alar base and the upper lip in this area. She was seen soon after the injury revealing early contractures. These wounds were allowed to heal and soften for a year.



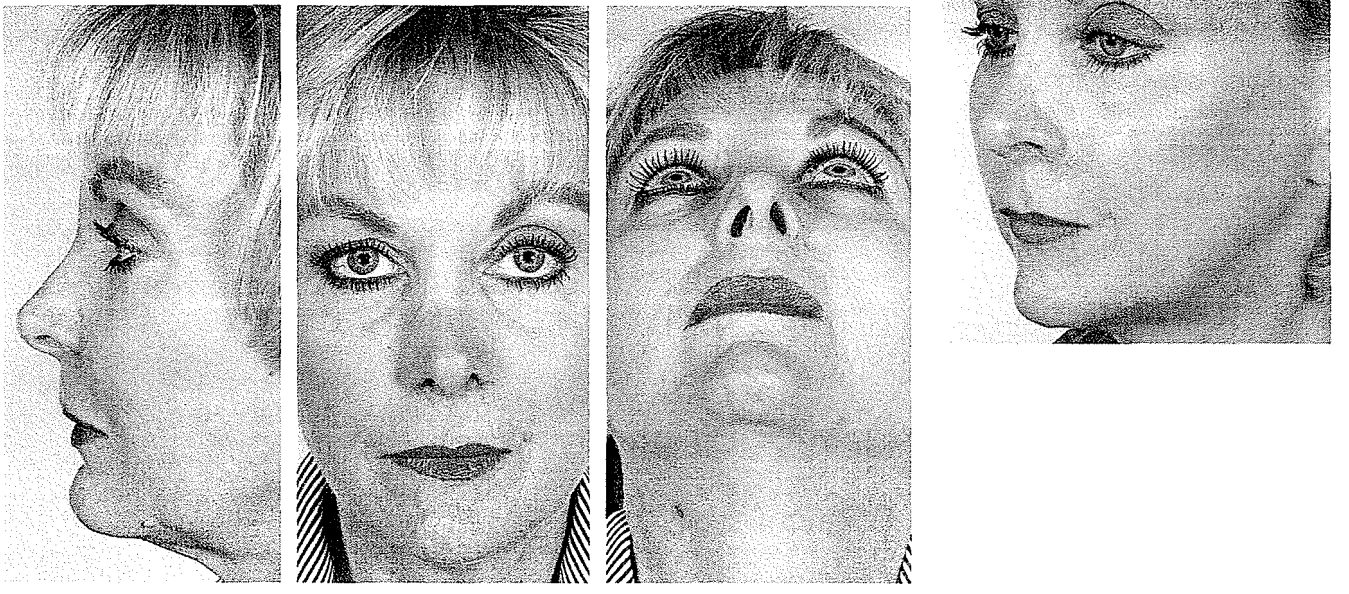




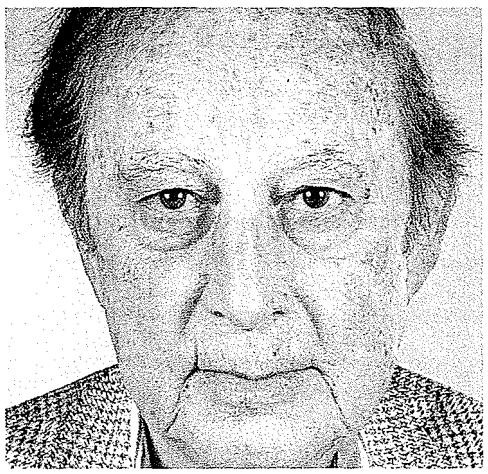
The retracted slightly shortened ala and the markedly contracted left upper lip were relieved by a two-pronged nasolabial flap, one minor prong to the ala and the major prong to the upper lip.



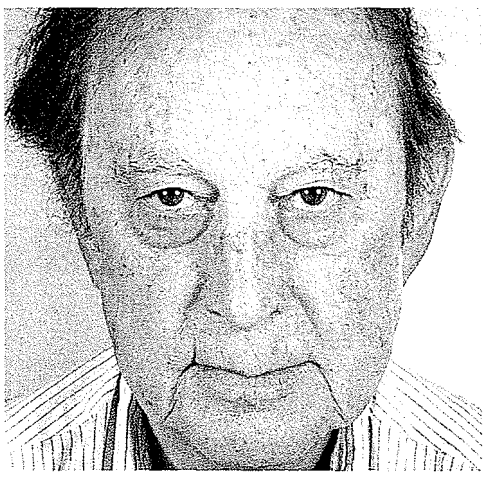
At the same time a corrective rhinoplasty and a chin implant improved her aesthetics. As our fees were not exorbitant her Prudential insurance went along with us on all of this preventing the tragic accident from being a total negative.



Another example of the subtle interface of aesthetic and reconstructive surgery is seen in this 73-year-old male who developed basal cell carcinoma of the right side of his upper nasal bridge. The lesion was excised down to bone and cartilage and the margins were reported clear by frozen sections. A transverse 1.5 × 2.5 cm forehead flap was taken from the glabella area based on the right supratrochlear vessels. A tunnel was developed from the forehead donor area to the nasal defect and the island flap was threaded beneath the skin bridge and sutured into the defect. The donor closure provided a mini brow lift. The flap healed to near invisibility.







2.
Secondary Rhinoplasty

IN a 1994 Gillies memorial oration to the Association of Plastic Surgeons of India, N. Pandya noted that 60 million Americans do not like their nose and 40 million Americans do not like their chin. I wonder how many Americans do not like their *operated* nose.

Simultaneous with its rise in status, corrective rhinoplasty has achieved great public popularity and is in increasing demand. Unfortunately, not all who do this work are adequately trained. As a result, more and more postoperative deformities are being produced. The opportunity for discrepancy is threefold and three-dimensional, for its surgery has but a slim allowable margin of error: artistic judgment is an intangible, postoperative healing unpredictable. No matter how well trained, experienced, careful, artistic, or lucky a surgeon may be, however, he or she will have some secondary deformities.

PROGNOSIS

The prognosis of a corrective rhinoplasty operation is influenced by several factors: (1) The condition and degree of

the original nasal deformity, (2) the training and skill of the operating surgeon, (3) the postoperative course and healing of the patient, and (4) unexpected or unknown circumstances labeled "luck." The latter factor may be a late unexpected hematoma, a low-grade infection, necrosis of tissue in invisible positions, and other subtle and unusual reactions secondary to the surgery that result in unexpected deformities.

Secondary rhinoplasty by definition means some degree of failure. It may be inability to interpret or fulfill the patient's desires. It may be miscalculation or inadequate execution by the surgeon. This can occur in a minor or major degree involving one or multiple layers influencing a portion of the nose or the entire nose.

DIAGNOSIS

Aesthetic Surgery

Before treatment can be considered a diagnosis of the deformity must be determined. If the problem is simply inadequate execution of the standard corrective rhinoplasty procedure, which has left too much or unequal alar cartilages, or a residual hump, too much length of anterior septum, the nasal bones still spread or asymmetrically positioned or too much flare to the nostrils, then by secondary rhinoplasty the surgeon can return through the old scars to revise any or all discrepancies. He must simply *redo* the rhinoplasty. This is within the realm of the aesthetic surgeon.

Although I personally prefer to gain exposure through the previous endorhinoplasty incisions, this is a condition where I can sympathize with those who feel more confident when using an open rhinoplasty approach for increased exposure.

Reconstructive Surgery

When the cause of the secondary deformity is due not to too little reduction but to too much or there has been an unexpected complication of necrosis or infection or both, which compounds the error in one or more layers, then it falls into

the realm of the reconstructive surgeon or the aesthetic surgeon with reconstructive training.

Treatment involves determining what is displaced, distorted or actually missing and what is in excess. This is necessary before adequate action can be planned. The Robin Hood principle is invariably useful taking what is not needed to make up what is missing. Replacement of the missing portions with similar tissue in kind is essential.

The nose is composed of skin and subcutaneous tissue of varying degrees of thickness as cover, an elongated tripod of bone and cartilaginous support, and two cavities of mucosal lining. Any occurring secondary deformity that is of concern will be reflected in the cover, support, or lining. It may involve only one, a combination of two, or it could include all three. Diagnosis of which of the three is involved deserves first priority. Once this decision has been made, then the standard techniques of reconstruction must be employed to achieve the correction.

Secondary problems range from difficult to insurmountable and usually present limited potential. If the secondary deformity is our own, we have already done the very best we could; if it is another surgeon's result, then often he has discarded what we would leave and has retained what we must take. This is particularly true if the primary surgeon's main focus has been on the airway and his radical submucous resection has removed all cartilage, which can be a trump card in a secondary reconstruction.

COMPLICATIONS

Once the nose goes wrong, too often an irreversible chain reaction is set in motion as the surgeon frantically operates again and again. The first operation offers the best chance for success. In certain cases, one secondary procedure may be required or even predicted preoperatively. The third attempt carries with it a more gloomy prognosis; if this fails to achieve improvement, then a halt should be called or the baton passed on.

The indomitable spirit portrayed in "If at first you don't succeed try, try again" can be disastrous in an untrained surgeon. Too often when a complication occurs the inexperienced surgeon may panic and, in his frantic effort to recover, multiply the damage. Secondary deformities occurring regularly after the primary procedure are *cause* for *pause.* There is an established 6-month minimal waiting period (and preferably one year) required for healing before re-operation is justified. It has been expressed in the procrastination "Never do today what can be put off until tomorrow." To ignore this safety rule is dangerous. In 1969 B. O. Rogers emphasized the importance of "delay" in timing secondary and tertiary correction of post-rhinoplastic deformities. In 1983 H. Kleinert re-emphasized the importance of this waiting period in the hand which is applicable also to the nose.

Scar tissue (fibroplasia) is not mature for 6 months. When scar does form, avoid additional secondary operative procedures whenever possible at the same wound location for at least 6 months, thus permitting scar to mature. Early operation (under 6 months) in the presence of immature scar does stimulate marked fibrous tissue proliferation at the wound site and is to be avoided.



When the surgeon persistently goes back again and again, a catastrophe may be in the making. Here hope is triumphant over *experience,* to the repeated detriment of the injured. It is imperative to know when to stop. I remember one otolaryngologist who was turning out deformed noses, and several by chance found their circuitous way to my office. A history divulged that they had had one primary and as many as six secondary procedures. One of the patients came in with a necrotic columella which her surgeon had assured her would eventually "granulate and fill in." I took a forceps and removed the mummified center of her columella. Closer scrutiny revealed two scars, one at the tip join of the columella and the other at the columella base. Obviously the surgeon forgot or ignored his first scar of open rhinoplasty when he made the second cut and shoved in a silastic strut for

tip support that sloughed the entire intervening unit. This patient's reconstruction will be described later in the reconstruction section under columella.

Subsequently I phoned the surgeon responsible for this columella problem and informed him of this patient's progress, ending with this warning:

> If you feel driven to do rhinoplasties without proper training (he had had a 2-week course) and you get secondary deformities, which I might add we all get occasionally, I suggest you limit your secondary corrections to no more than two. After that refer them to someone more qualified to handle them. If another case comes to me in distress from you with a history of seven operations, I am coming after you.

He must have taken me seriously for good or bad, I never saw another of his cases . . .

PAINTED INTO A CORNER

When H. D. Gillies and C. Straith had little interest in secondary rhinoplasty I was honored to accept the challenge and got some invaluable experience during my early training. Part of the challenge is sparked by the fact that there has been previous partial failure. Primary corrective rhinoplasty demands *consistent* aesthetic technique but secondary rhinoplasty requires imaginative use of principle with indepth diagnosis of the defect being essential before any chance of obtaining an aesthetic solution.

Once it is known you are willing to take on these problems patients will seek you out and if you continue to accept them and even express pleasure in the joust, the trickle will become a flood. My operative schedule probably carries more secondary rhinoplasties than any other single problem, which, plus time, explains why I have faced so many secondary nasal deformities. Lest this be misconstrued as evidence of superior skill let me note that I charge less for secondary procedures than for the primary operation. Of course, the fee should reflect the severity of the deformity and the time required to correct it and thus may vary somewhat. The reduction in fee

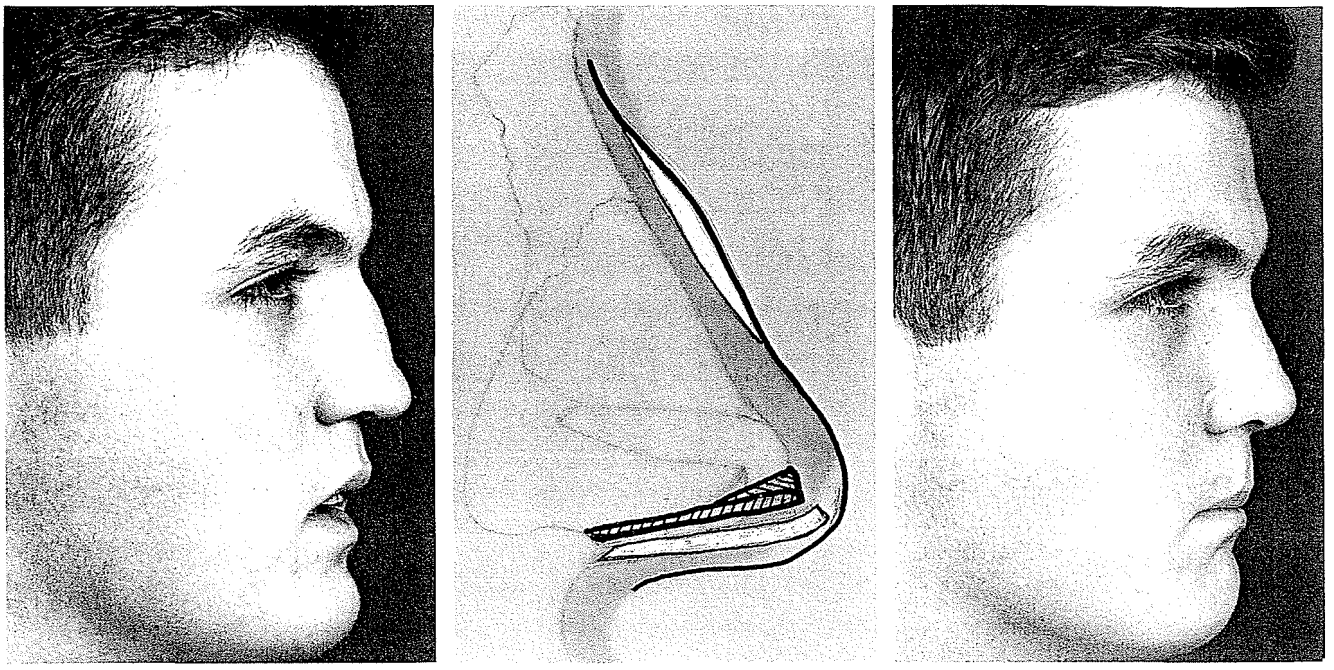
is not to attract more patients which it undoubtedly does. The spirit of this approach is based rather on the fact that the patient already has paid a good fee to someone for what they expected to be a success. I feel the specialty owes it to the patient to help in the climb back.

When seeing a patient with a secondary nasal deformity in consultation for the first time, be kind to the patient and the previous surgeon. You do not know for certain the preoperative conditions so do not be too critical of the work. First it keeps your relationship on a higher level and gracefully gives the previous surgeon the benefit of the doubt. Remember also that he may very well be seeing one of your postoperative cases at the same time that you are seeing his! It happens!

MINOR DISCREPANCIES

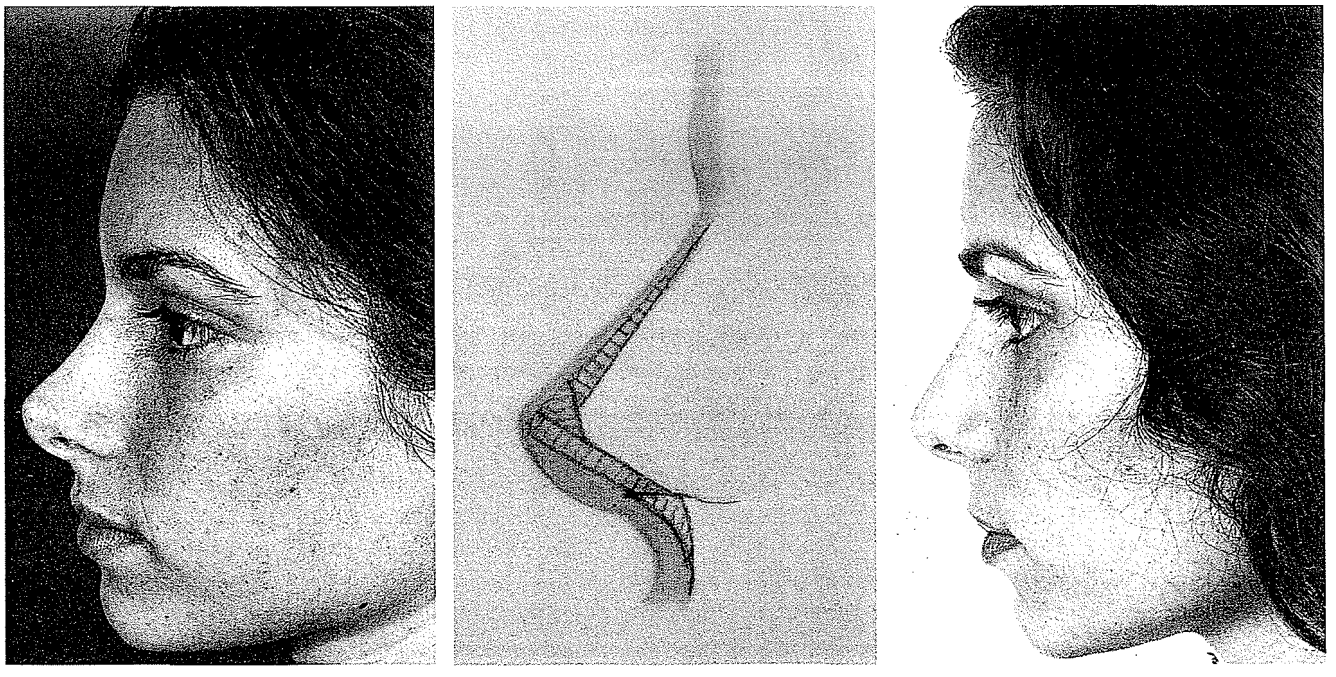
Remember that this work is done by hand and eye. No matter how careful the surgeon may be when shaping three layers of living, bleeding tissue along three planes, it is inevitable that minor discrepancies will occur. A difference in skin cover thickness may give a slight depression of contour. Residual loose pieces of cartilage or bone can give a visible interruption in profile or a roughness to the touch. Shortness of lining, misplaced interruption of cartilage integrity, or the pull of one stitch can cause kinking along the alar rim. The lowering of the bridge without reduction of the alar bases can give a relative widening of the nostrils. Reduction of the nostrils can produce slight asymmetries. The mere process of narrowing a nose with an adequate airway can encroach just enough on the passages to become bothersome even in the absence of a deviated septum or enlarged turbinates. Depending on the degree of these minor discrepancies, the amount of overall improvement already achieved, and the contentment and stability of the patient, action is determined. Under suitable conditions, whatever is not perfect deserves improvement, provided there is a maximum chance of correction, with minimal chance of compounding the problem. For instance, a slight hump can be used to support the tip and fill out the

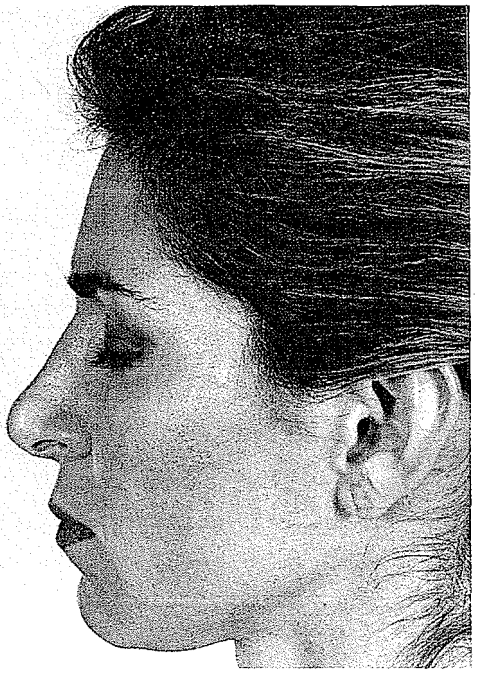
moderately retracted columella following removal of too much anterior septum. Here is an example of this Robin Hood trade off:

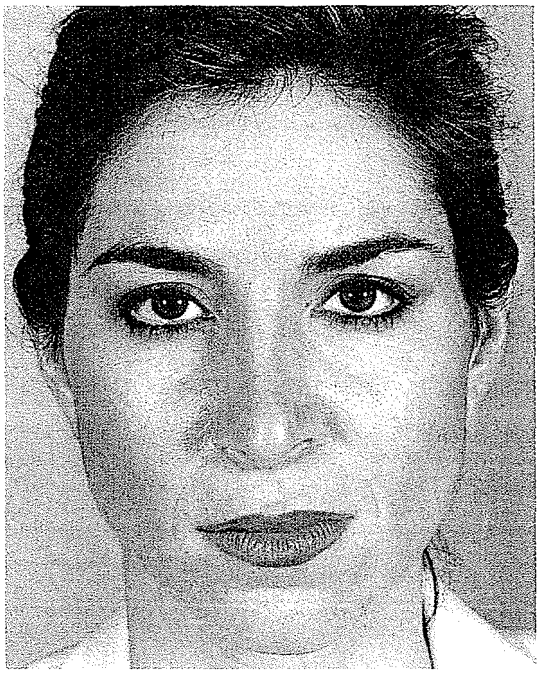


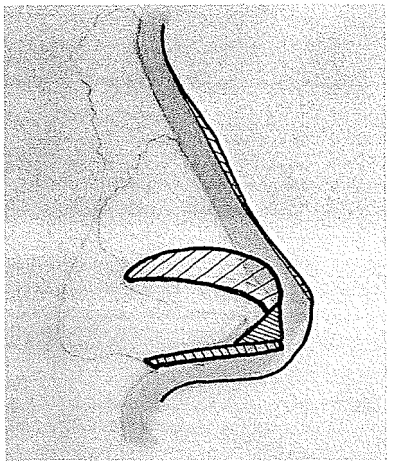
Inadequate Reductions

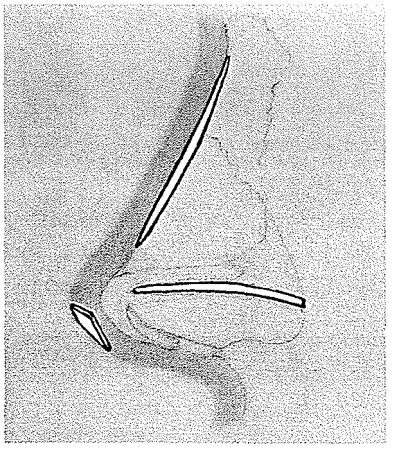
1. Four years after rhinoplasty, a patient requested secondary correction. The excess profile was improved by lowering the bridge and reducing the anterior septum and nasal spine.

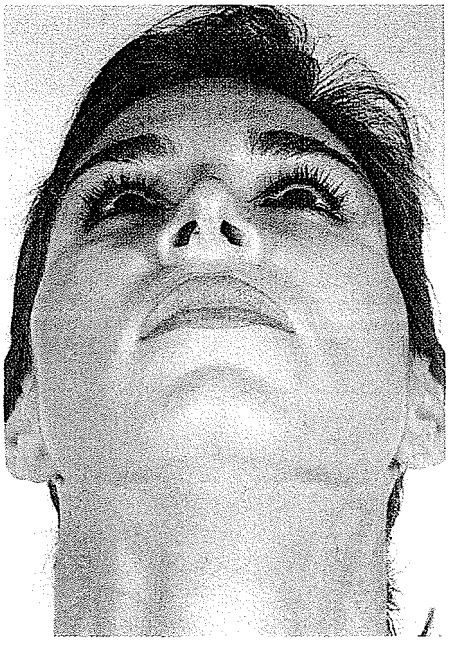


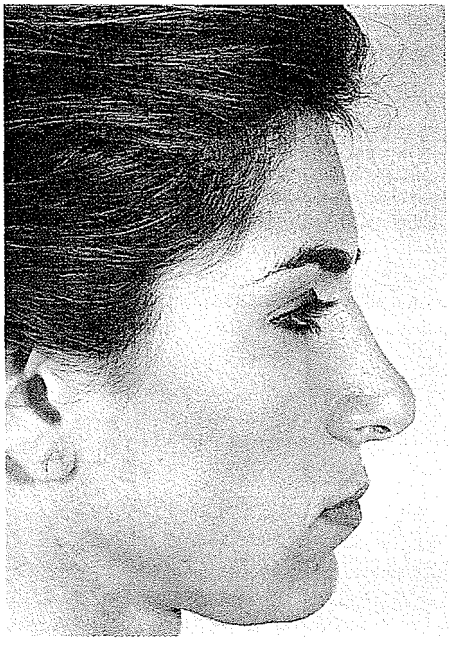




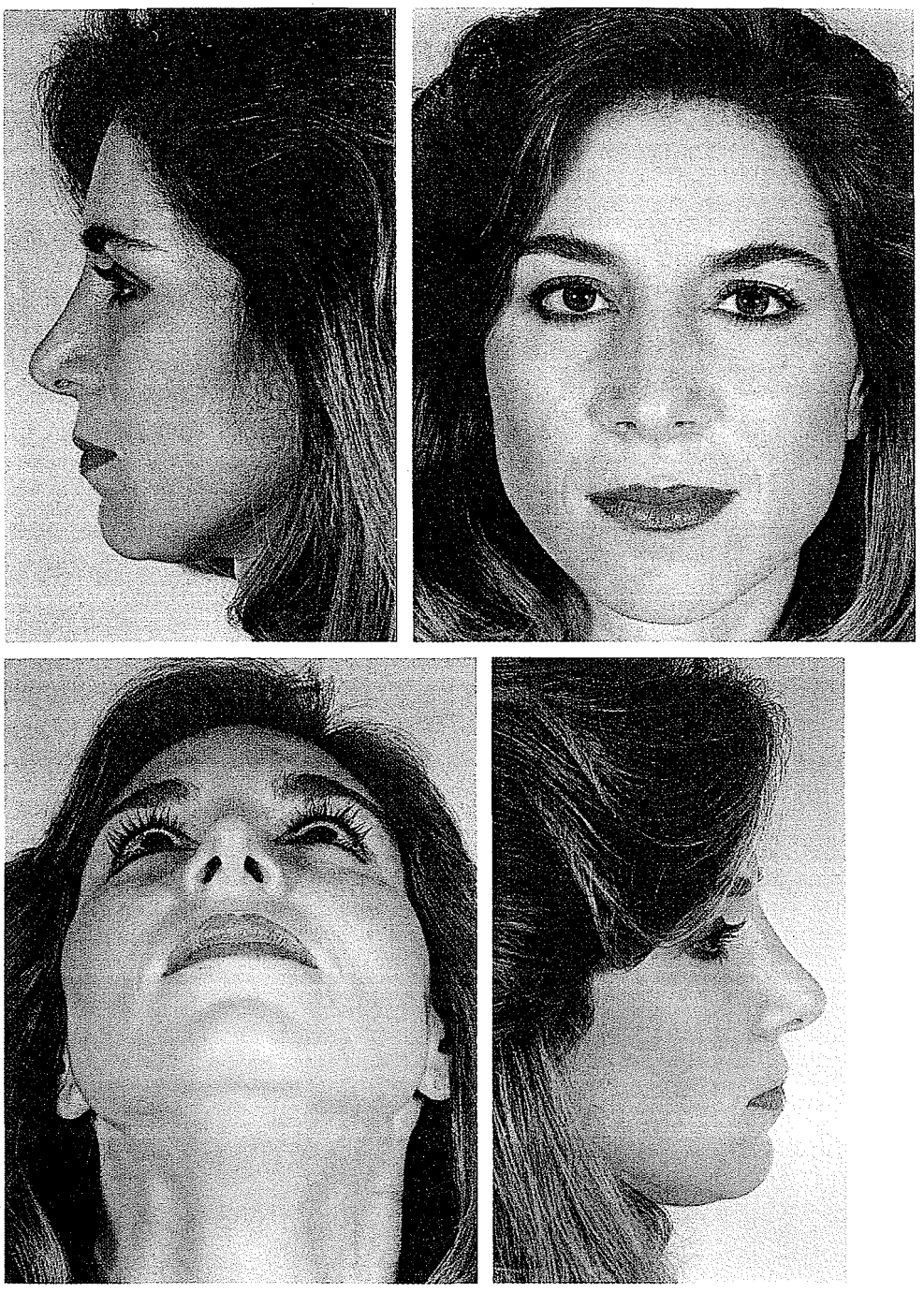








Two-thirds of the remaining alar cartilages were resected. The bridge was lowered with a chisel and scalpel. A thin rectangle was resected along the anterior septum including a golden triangle at the tip. Alar base wedge resections reduced the flare. Through a submucous septal resection enough cartilage was harvested to insert one piece along the concavity of the left bridge, another in the crease of the left ala to support the valve collapse and finally a diamond shaped graft was inserted for tip definition.



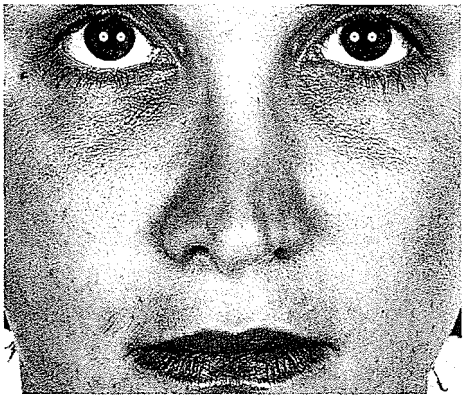
Maintenance of some intact alar cartilage to support the alar rims is as sacrosanct as maintenance of an L-shaped cartilage frame to preserve the nasal profile. Peck has emphasized the importance of an intact alar cartilage. There are two circumstances where this rule need not be rigid. One is in a case where the alar cartilages are so deformed or deficient that it is better to scrap what is inadequate and replace it with a more normal cartilage graft. The second circumstance is in the sec-

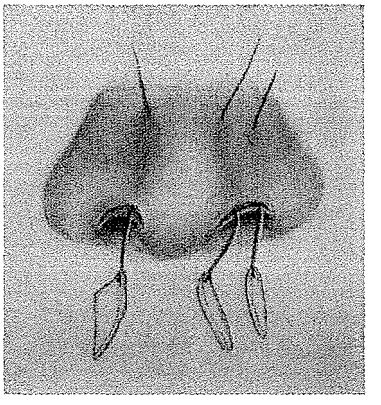
ondary nose when the alar cartilages of the tip and alae have been previously dissected and resected so that they are locked in scar. The secondary surgery can be more radical in resection of these cartilages with some impunity because of the buffer of the scar.

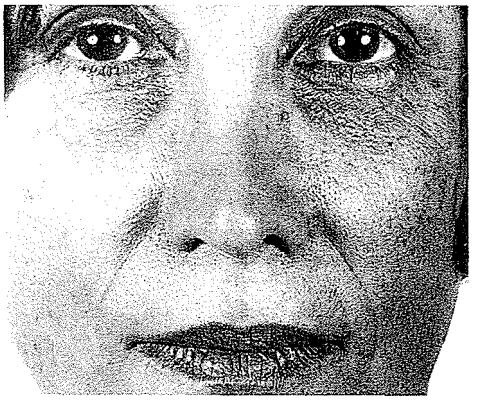
When there is no respect for intact alar cartilages, lack of skill with skin dissection and arrogant disrespect for the 6 month healing phase, real trouble is brewing.

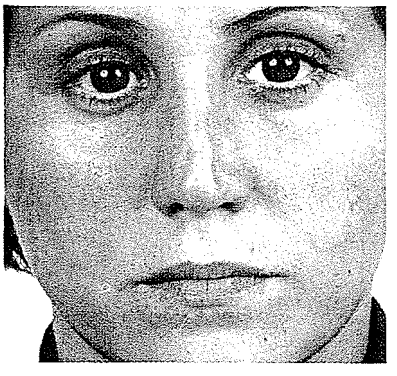
Postoperative Furrowed Nasal Skin

This patient had a rhinoplasty and 4 years later a secondary rhinoplasty. Three years later she presented nasal skin grooves, a short wide one on the right and a longer one on the left. Other minor discrepancies were corrected such as shaving the bridge and narrowing the bones with infractures before treating the furrows. Then through alar marginal stab incisions the skin of the furrows was undermined with a scalpel and custom shaped strips of auricular cartilage were threaded into the pockets to smooth the external contour. Result seen after a year.







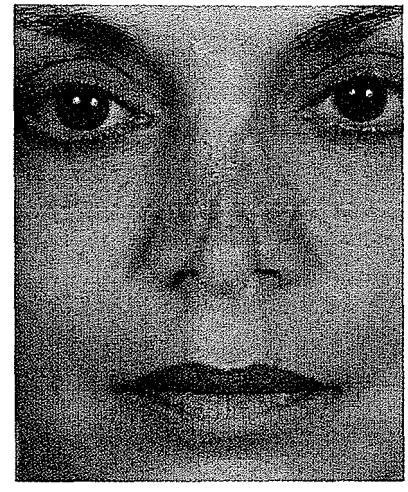


A similar procedure was used in this irregularly grooved tip.

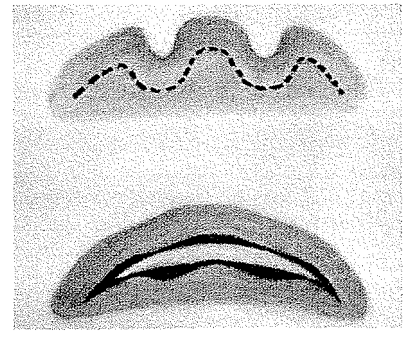
An unfortunate 50-year-old woman underwent a reduction rhinoplasty in January. A suprahump that developed in her bridge shortly after the operation stimulated the same surgeon to operate again in March of the same year. Then he operated again in April in a frantic attempt to correct the recurring irregularities, depressions, creases, and collapse

with loss of the airway patency. *In time of a complication, the embarrassment of the surgeon's ego, the disappointment of the patient, and the impatience of both precipitate too much secondary surgery too soon, and insult is added to injury.* In this specific case it is difficult to guess what created such a catastrophe. The radical excisions of ala cartilaginous framework provided slack skin cover which if dissected irregularly with repeated violations of the dermis could account for skin depressions, rucking and grooving without external skin scars. Too early surgery into unhealed tissue exaggerated by inevitable low grade infection had matted the mass. There was collapse of the bridge, septal perforation, nasal tip grooves, and bilateral notching of the alae with collapse of the airways.

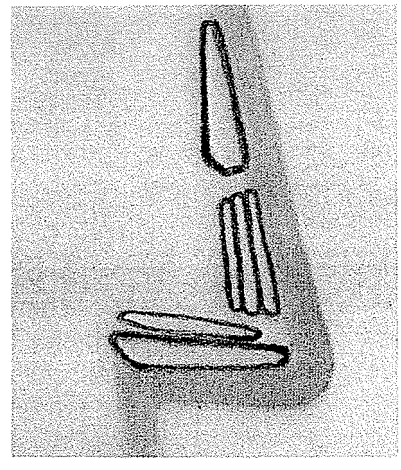




When seen in consultation I explained to the patient the difficulty of her correction and that more than one procedure probably would be necessary admitting there was some doubt in my mind how much I could help her. I explained, evidently effectively, why she needed at least six months' rest. She returned after one year.



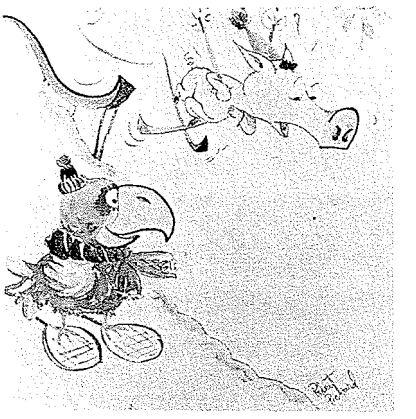
The key to correcting this deformity seemed to be primarily in smoothing out the irregular grooved skin surface and secondarily supporting the bridge and alae. It was tempting simply to try to insert cartilage into the grooves and had there been but one or two short ones this might have been attempted as is shown in the previous cases. Merely freeing by undermining the furrowed skin and adding supporting framework would have been of some benefit but logic pointed to an approach which might tax a Swiss watchmaker's patience but offered slightly better potential. The best plan seemed to be first to develop a skin cover of near equal thickness and then beneath it fill out the cartilaginous deficiencies with cartilage. Thus through alar margin incisions the skin was carefully elevated out of the various depressions, dipping deeper in the furrows to carve the skin and scar thicker in its thinned areas thus equalizing the general thickness of the entire dorsal skin covering. Autogenous conchal cartilage was



harvested and cut into specific pieces. One was placed along each alar margin to splint the notched rims. The remaining pieces were used strategically to correct the depressions in the dorsal tip. Bilateral osteotomy with infracture improved the nasal base. The patient was allowed to heal for 6 months and then a costal cartilage strut was inserted on the bridge and another smaller piece into the columella. The patient was reasonably satisfied and returned only once with a minor request.



THE BIG THREE



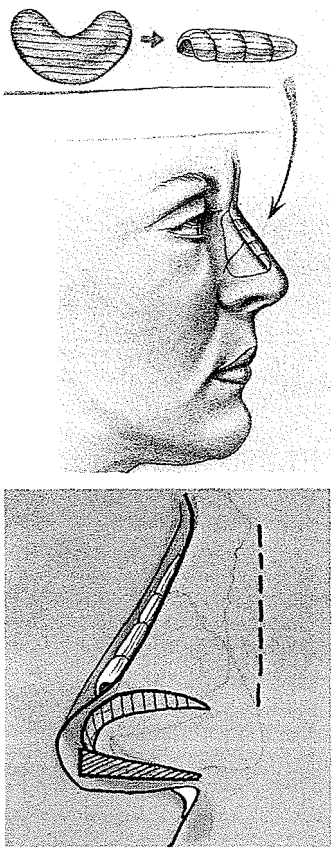
There are three post-rhinoplasty secondary deformities that occur commonly enough to have been awarded comical nicknames. They are the ski jump, the parrot's beak, and the pig's snout, all characterized here and all out in the cold. These common three may appear separately or in varying combinations with each other. They may be accompanied by other secondary deformities that further complicate the problem.

SKI JUMP

The character of a face and the pride of a nose depend in great part on the graceful height and relative straightness of the nasal bridge. Minor degrees of scooping the bridge to make it retrousee are sought by some and can be attractive in certain women. When carried beyond ideal, the bridge lowering becomes a deformity requiring elevation and straightening. Regardless of whether the deformity has been caused by traumatic or surgical removal of the bridge itself or is indirectly the result of loss by trauma, surgery, or infection of the septal support, the bridge will require additional onlays. Minor to moderate bridge correction can be achieved with an autogenous septal strut or tiered struts. If the discrepancy is minimal to moderate with no septal cartilage available and if the skin cover is in good condition, then an auricular conchal or costal cartilage graft may be indicated. Since the nasal bridge

is an area where the implant can lie quietly without need of a work load, a suitable strut of shaped hard silastic will often achieve the correct effect and lie in place silently without serious reaction or threat of absorption.

Conchal Cages



Supplemental contouring of the nasal bridge when the fundamental support is sound can be achieved with auricular cartilage grafts as described by J. H. Sheen and later by M. Constantian. Here the basic nasal skeletal structure is nearly adequate and only increased contour is desired. As designed by Sheen, large conchal grafts with the natural curve already built in are curled by scoring and fixed with 6-0 nylon sutures into conchal cages, and the hollow is filled with free pieces of extra cartilage. These bridge grafts have enjoyed some popularity and have shown early apparent success. What will happen over the years with the aseptic necrosis of the loose cartilage pieces and partial uncurling of the cages is left to be seen.

Here is a secondary deformity of the bridge that I treated with an auricular conchal cartilage cage. The alar cartilages were reduced and the septum shortened. A septal cartilage graft was inserted at the retracted base of the columella to improve the re-entrant nasolabial angle. An auricular conchal



cartilage was made into a cage and inserted on the bridge to correct the profile line.

Saddle Nose

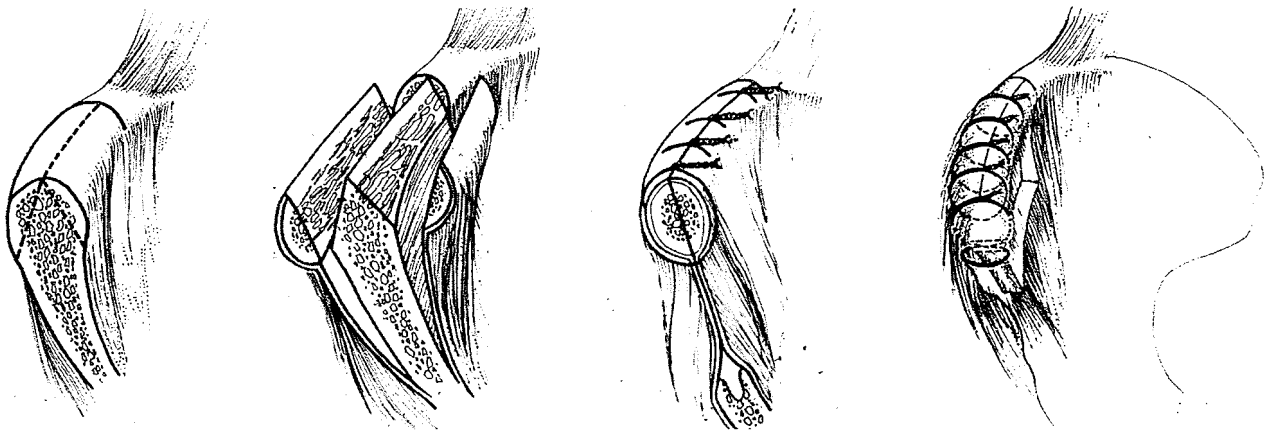
A severe degree of ski jump is the saddle nose. This may be the result of trauma, disease, excessive surgery, or any of the above followed by severe chondritis. Adequate treatment of this deformity calls for serious nasal skeletal replacement.

Tissue used for skeletal support of the nose should follow the principle of lost tissue being replaced by similar tissue in kind—bone for bone, cartilage for cartilage. This may not always be possible but when it is, the rule should be respected. A nose with mainly the bony nasal bridge flat, as seen after severe crushing injuries, can best be treated first by bilateral osteotomies and infracture. Since there has been partial pulverization of the bone with little hope for return to normal bridge height, an onlay bone graft is ideal as it replaces bone for bone on bone.

There are aesthetic aspects to nasal bone grafting. It is not enough just to shove a large piece or pieces of bone under the skin and fix them to what remains of the nasal bones. Ideally the nose should be supported so that the effect is graceful and natural. It is important to prepare the nasal bridge platform to receive the bone graft and avoid a slanted, hooked, Roman, or unaesthetic nose.

CHOICE OF BONE

There are several excellent choices for nasal bone grafting. Full thickness or split thickness costal bone is easily obtained, provides good bulk and strength, and the remaining periosteal tunnel of the donor area will regenerate new rib bone. For a thick block of cancellus bone the iliac crest is an excellent donor site provided the surgeon understands how to lift the crest, take the required bone, and then wire the crest back in place to reduce notching defects and postoperative disability and discomfort. This technique has been described in de-



tail by S. A. Wolfe. The most popular bone graft for nasal support at this time is cranial bone.

Cranial Bone Grafts

In 1892 Ollier first used cranial bone in rhinoplasty when he included a piece of frontal bone attached by periosteum to a forehead flap to reconstruct a nose. In 1982 P. Tessier began popularizing cranial bone grafting. It is true that cranial bone grafts have much to commend them. The donor area is hidden and the donor scar is usually unnoticeable. Membranous cranial bone seems to show less resorption, especially when stabilized by miniplate or screw fixation. Most bone grafts, when placed in a vascular bed and securely fixed, will survive especially in the area attached to bone.

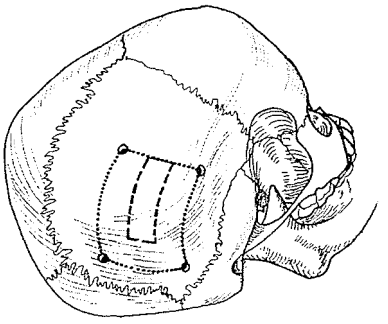
In craniofacial surgery when a coronal incision and nasal root exposure are already present cranial bone for nasal as well as other facial bone grafting is expedient and logical. Although exposure for inserting miniplates is facilitated by the coronal approach, dissection of a pocket over the nasal bridge all the way to the tip can be slightly awkward, leading to the possibility of the graft slanting off center.

All bone grafts to the nose do not deserve a coronal incision. The bone can be inserted into a subperiosteal pocket through an internal vestibular incision or a columella splitting incision which heals to invisibility. Fixation of the bone with screws, when necessary, can be accomplished through a 1/2 cm incision in the skin at the root of the nose.

Long bone grafts on the nasal bridge do not follow the principle of replacing lost tissue with similar tissue in kind. The only bone in a normal nose is in the upper third, and the rest of the profile is maintained by septal cartilage along with alar cartilages in the tip. Introducing a rigid piece of bone from nasal root to tip does not recreate a natural effect. In fact, it looks like a bone grafted nose, it feels like one, it breaks like one, and in time the portion extending into the soft tissue may resorb like one.

In cases where loss of bone is the primary cause of the deformity then cranial bone is the replacement material of choice.

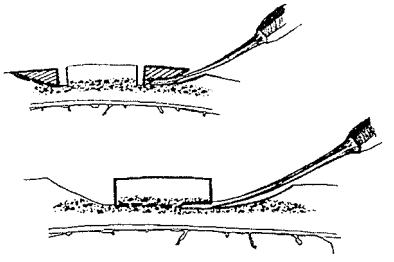
As S. A. Wolfe is an expert in cranial bone grafting, I requested that he describe how he harvests the bone:



"The usual donor area, most people being right-handed, is on the right parietal occipital region (this being the non-dominant hemisphere) behind the posterior attachment of the temporalis muscle. The bone is generally thickest in this area and there is usually a good diploic space which is important to harvesting an outer table graft. One, two, or three segments can be removed, as required.

The procedure can easily be done under local anesthesia. Patients have no sensation in the skull itself after the periosteum is anesthetized.

The approach is through a zig-zag incision without shaving any hair. The area to be removed is scored with the oscillating saw in the bleeding bone (carefully!) and the bone around the periphery of this area is taken off with an osteotome and saved.



Once the diploic space has been entered and clearly identified and the peripheral bone removed enough to permit an almost completely tangential placement of a thin curved osteotome, then the outer table segment is carefully removed. Once the first segment is removed, it is usually easier to remove the second and third if necessary. If the inner portion of the inner table is inadvertently removed and the dura ex-

posed, this is not a problem and several little fragments of bone are placed over the dura.

If there is any possibility that the dura was injured, the defect should be enlarged with a Kerasin rongeur and the dural defect inspected and repaired.

The peripheral fragments of bone that were removed are placed back into the donor area to help minimize the contour deformity. A piece of gel foam is applied over this and the wound closed with a drain which is taken out the next morning.

The bone that is removed has the perfect curvature for a nasal bone graft. If two or three tiers are going to be used, they are fixed together with several micro-screws into a counter sunk hole. The titanium screws, if any of them become palpable, can be burred down since titanium is a soft metal.

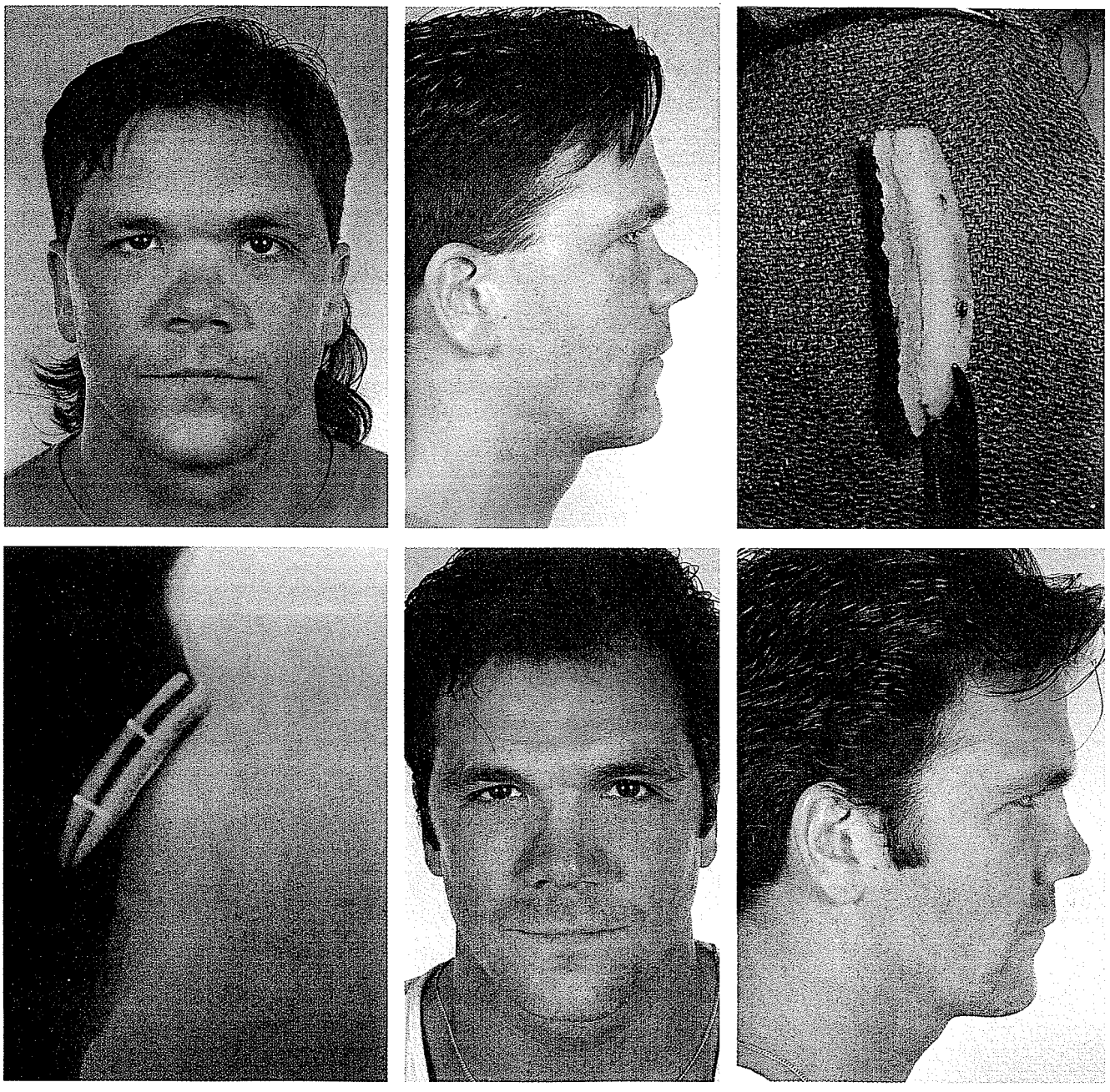
The recipient area for the bone graft is usually freshened with a rasp or burr. It is important to be sure that the undersurface of the bone graft to be inserted is flat so that it does not tilt. The lateral contouring of the graft is important because if there are sharp edges they can be seen through the skin. If the nasal bones are substantially narrow and a bone graft is supplied to the dorsum, it is necessary to place several layers of this diploic bone over the nasal bones themselves to give an adequate broadness to the upper portion of the nose.

It is usually not necessary to fix the bone grafts to underlying nasal bones with a screw or K-wire unless the nose is originally crooked.

The bone graft is thinned and tapered as it goes into the area of the upper lateral cartilages and probably acts as a spreader graft to a certain extent since patients usually experience improvement in their breathing. We try not to run the bone graft into the nasal tip since it is hard and is going to either resorb or come through the skin."

This case by Wolfe has an ideal defect for cranial bone. A 27-year-old male with the history of a childhood infection of the nose presented a dorsal bridge collapse. Two attempts at

conchal cartilage grafting of the dorsal defect had failed. Under local anesthesia Wolfe harvested two segments of cranial bone from the right parietal region. These two struts were held together with a microscrew and the edges burred for appropriate contour. Bilateral transvestibular incisions provided access to the nasal dorsum allowing insertion of the two-layered cranial bone graft. The incisions were closed carefully and healed excellently with replacement of like tissue with similar tissue in kind.



It should be noted that the scalp scar, if straight, will show as a parting in the short-haired male. Even with a zig-zag incision which partially confuses the hair, in the short-haired patient the scar may be apparent.

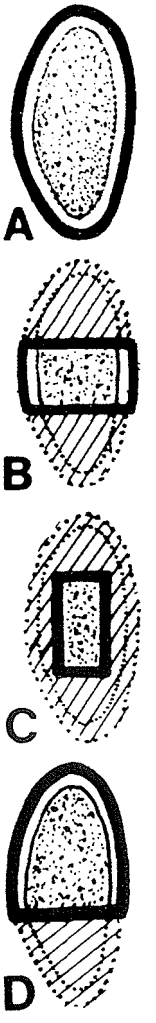
For serious total nasal bridge and tip support I prefer costal cartilage and have been using it for 40 years. It is essential, however, to understand the nature of this material.

HOW TO CARVE CARTILAGE FOR NASAL GRAFTS

Living autogenous cartilage does not absorb, but it earned a bad reputation by warping after implantation. A number of surgeons experienced postoperative curvature of their cartilage grafts. This prompted T. Gibson and W. B. Davis to perform in vitro experiments to determine the cause of autogenous cartilage warping. The cartilage used for study was obtained during operations or from young, fresh cadavers. (Cartilage cells have been found still viable 72 hours after somatic death.) Gibson and Davis reported some interesting findings in 1958. It was noted that an immediate curvature occurred when a thin slice is pared from the surface of an intact rib segment, the curve being concave toward the perichondrium. If the perichondrium is first scraped from the surface, then slices bend in precisely the same way. If serial slices are cut, only the most superficial one bends, the underlying pieces remaining flat. If a series of incisions is made across the concave surface, all tendency to bend is abolished and the slice becomes flaccid. Similar incisions on the convex surface merely accentuate the curve. It was deduced from this that it is not perichondrium that is responsible for the bowing of the cartilage, rather it is due to a difference in tension between the outermost layers of cartilage and the inner zone. They likened a cartilaginous rib segment to a tight-skinned sausage, the skin representing the outer cartilage layer. Microscopic examination of a cross-section of rib cartilage shows that the peripheral chondrocytes are flattened in a plane par-

allel to the surface, and this may well indicate lateral stresses in this situation. Rib cartilage grows by proliferation of peripheral cells in a centripetal direction and also by cell division in the central zone itself. There is therefore a tendency toward increased tension in the central zone, and this is restrained by the tautness of the outer layer. An intact rib segment has these forces nicely balanced and its shape is stable. When cut or carved the matrix tends to expand while the outer stretched layer contracts; thus warping occurs.

In their search for a method of obtaining stable grafts, Gibson and Davis found four basic balanced cross-sections.



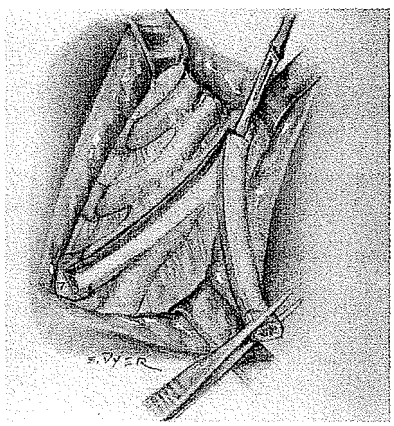
A. An intact surface layer surrounds the cartilage.
B. The surface layers are removed from two opposite sides, leaving the remaining cartilage balanced.
C. The surface layers are removed from all four sides of the graft. Although it is not advised that a complete rod should be cut in this way, this is a useful cross-section for certain parts of the graft, particularly the ends.
D. Cartilage is removed from one side only of the rib segment, leaving a deep D. At least one-half may be removed before bending occurs, but the amount varies with the cross-sectional shape; more may be excised from a flat rib than from a rounder section. Taking a similar mass from the flat surfaces of a rib segment invariably results in the distortion of the remainder. To retain stability it is essential that every cross-section of a cartilage graft should conform to one or another of these basic patterns.

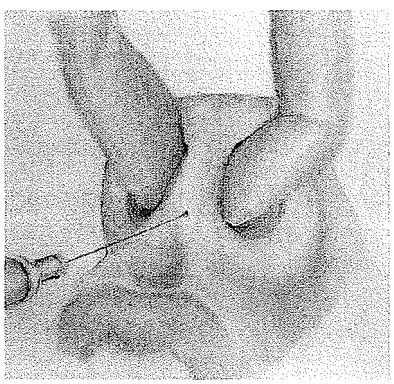
Gibson and Davis reported on 46 grafts carved in accordance with their rules and inserted as support for whole nasal bridges. Over a period of up to 3 years no graft twisted or absorbed.

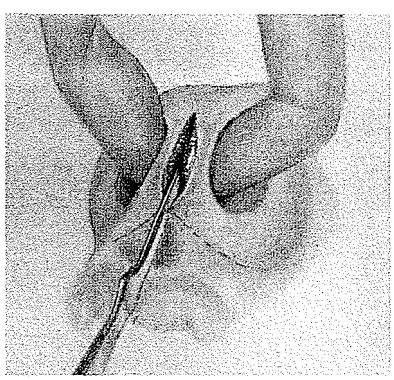
These findings established the basic truth that cartilage will curl away from any area where its surface tension has been released. In 1968 H. J. H. Fry adopted the same scoring

procedure to septal cartilage with correction of deviations and shaping of grafts. Many surgeons have adopted this same principle in otoplasty, the first being A. M. Cloutier in 1961 and V. Chongchit in 1963. Furthermore, when using septal or auricular cartilage in rhinoplasty this same principle should be constantly in mind and use. Of course the morsellizer is the great equalizer of cartilage surface tension and may explain its popularity when preparing amorphous auricular cartilage grafts for the nasal tip.

Hinge Graft

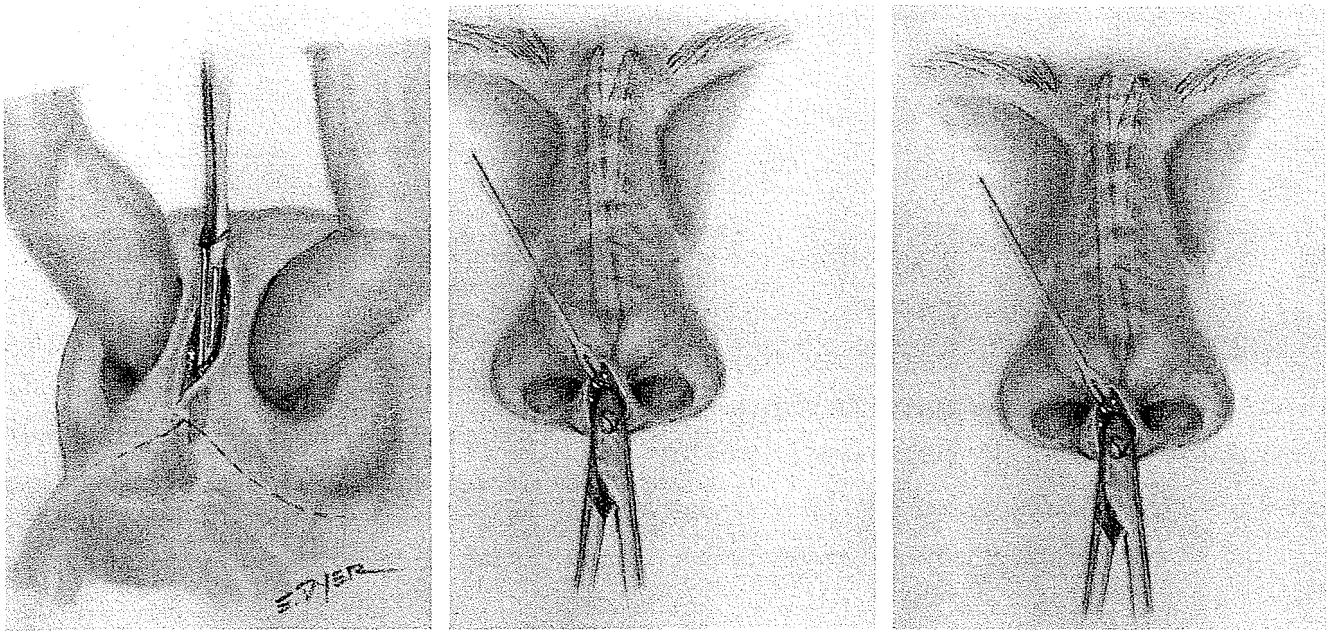




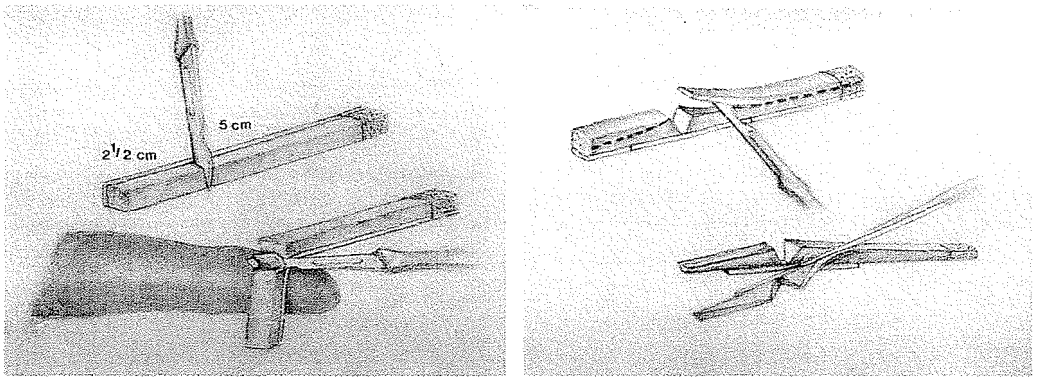


When the entire nose requires overall skeletal support and the lining and covering are sufficient and elastic enough to rise to the occasion, then my preference is a costal osteochondral perichondrial hinge graft. The principle of the hinge graft was conceived by H. D. Gillies and described by him and me in 1957. I have added a bony portion to complete the principle of "like tissue" and have found the technique an asset in several types of skeletal deformity where the bridge is flat and the total nasal profile deficient. This graft is true to the principle providing bone to approximate the nasal bones but also extends the rest of the way as a flexible cartilage cantilever ending with a perichondrial hinge at the tip providing a distal propped cartilage strut for the columella, enforcing a graceful lift in the nasal tip.

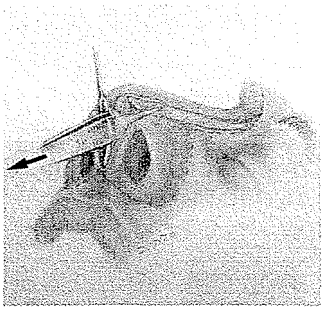
This hinge graft is best introduced through a columella splitting incision. First the columella is expanded with local injection and then is taken between thumb and index finger. A vertical incision can be used to split the columella, taking great care not to perforate either side. Once the pocket in the columella is deep enough to house the distal strut and allow it to rest upon the nasal spine, then the dissection is carried along the bridge to the nasal bones. Here a periosteal elevator is used to expose fresh bone for a bed for the bony part of the bridge graft. The pocket dissection is extended up on to the glabella for practical reasons.



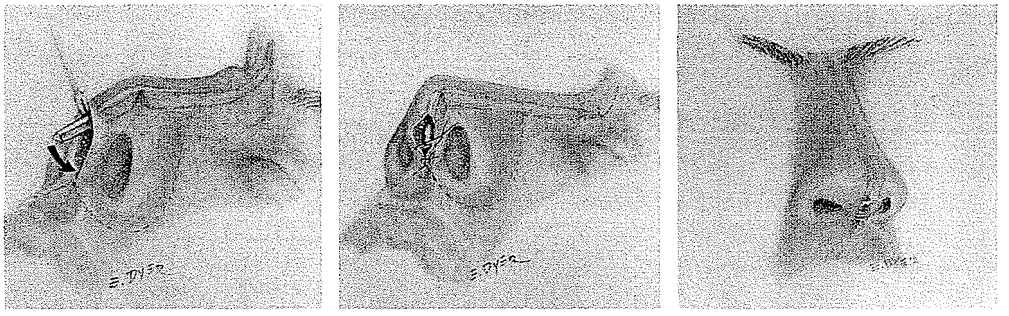
Ideally the costal graft should be taken one-third bone and two-thirds cartilage. The perichondrium is preserved over the last 5 cm of cartilage so that when a wedge is cut from the under surface of the cartilage the hinge joint is maintained by the tough perichondrium. Once the graft has been carved to



specifications of length and cartilage shape of Gibson's D to balance surface tension, its introduction takes a little care in technique. With the bony part first the graft is inserted into the split columella and guided into the pocket prepared on the bridge. The graft is pushed beyond its final destination up into the glabella area so that the 4 cm or less distal hinged strut in an open angle can be eased through the split columella and down to the nasal spine. Then with Adson forceps

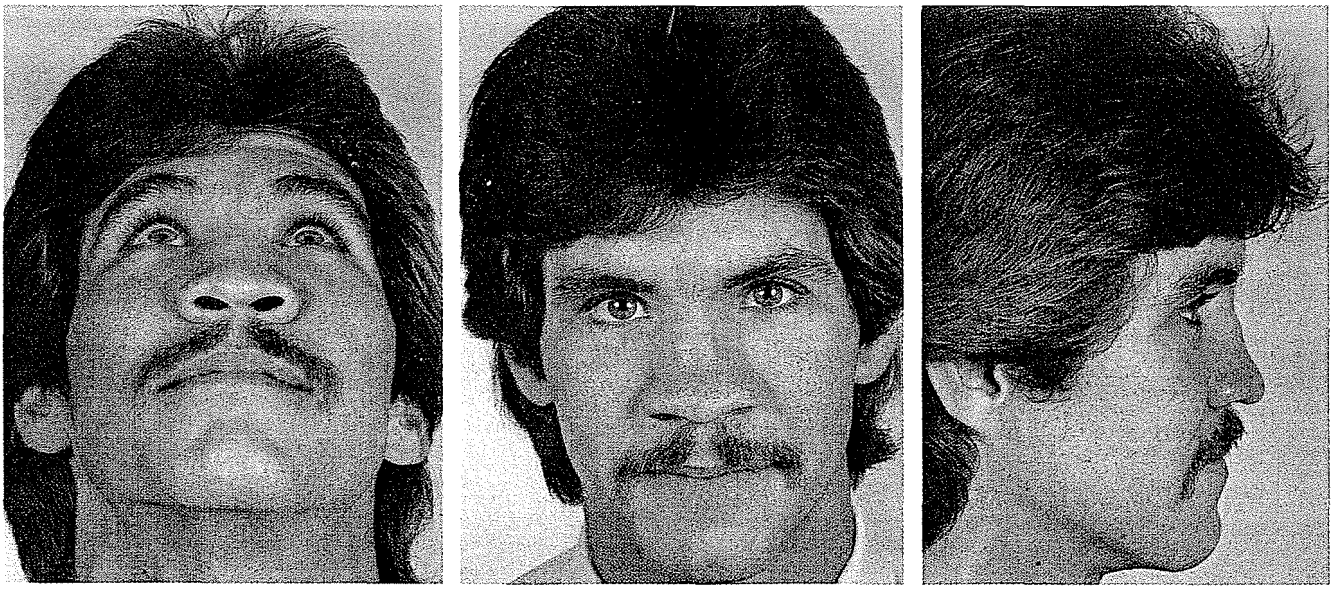


carefully catching the sides of the graft just proximal to the hinge, the graft is slid down into a normal position with the hinged joint in the tip and at 90 degrees. The upper bony part of the bridge graft can be fixed with an external pin or through a 1/2-cm incision with a screw to the underlying nasal bone or it can be left to rest on the bone. This osteochondral perichondral hinge graft as a propped cantilever is efficient in both bridge and tip support. The bone will attach to bone and the remainder of the cartilage graft will retain normal flexibility in the distal bridge and tip.

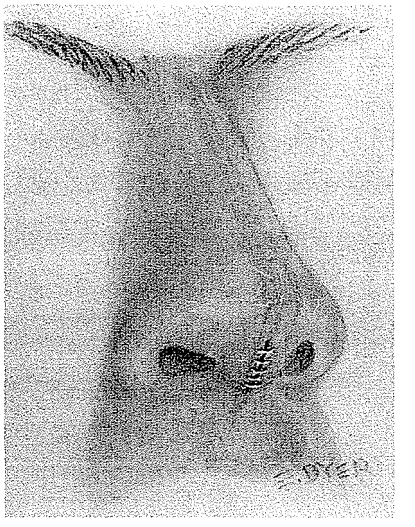


As a child this patient stuck a pencil in his nose and broke it off. The imbedded lead evidently resulted in a chondritis that dissolved his total septal cartilage. This not only caused failure of normal projectile growth but allowed gradual flattening and spreading of the entire nose.

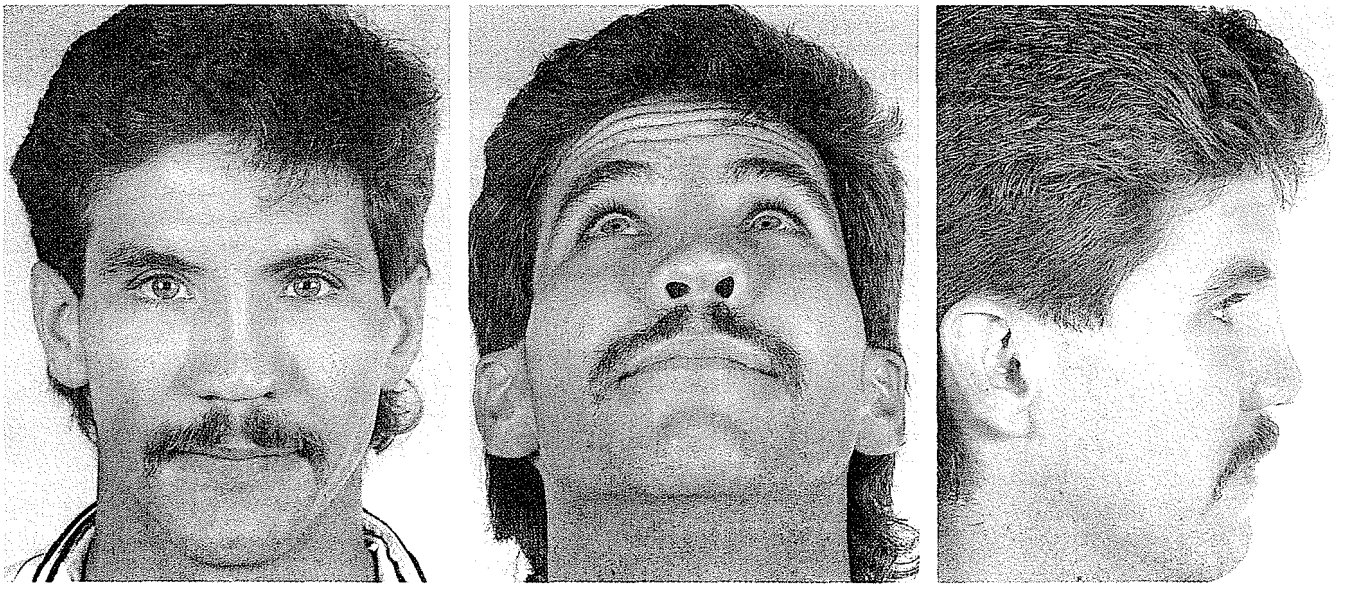
The patient had a bone graft placed on his bridge at age 18 years without great benefit.



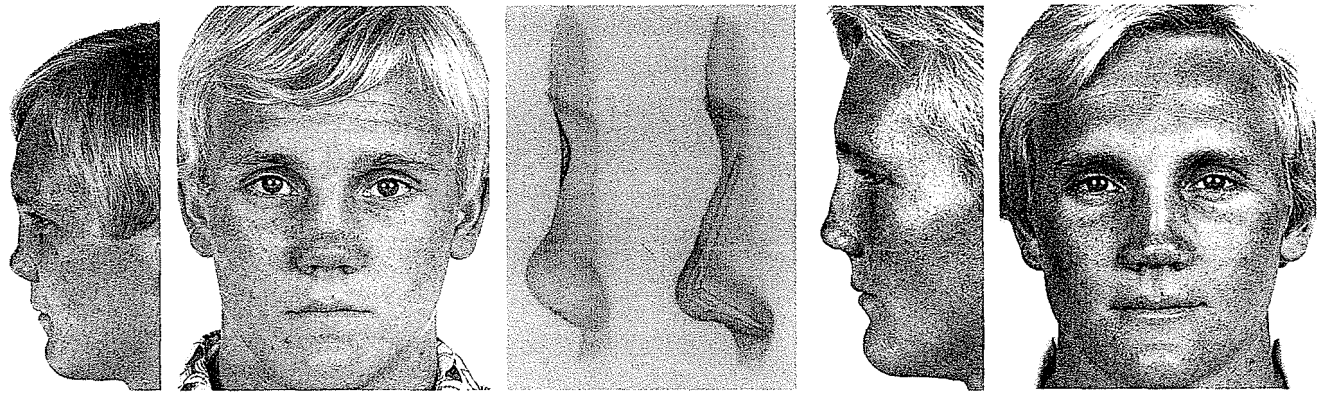
When seen at age 36 years he had a flat, wide nose. Through a columella splitting incision a pocket was developed along the bridge and down the columella to the nasal spine. The pocket was over-extended up to the glabella area to allow insertion of a hinge graft. The old bone graft was removed.



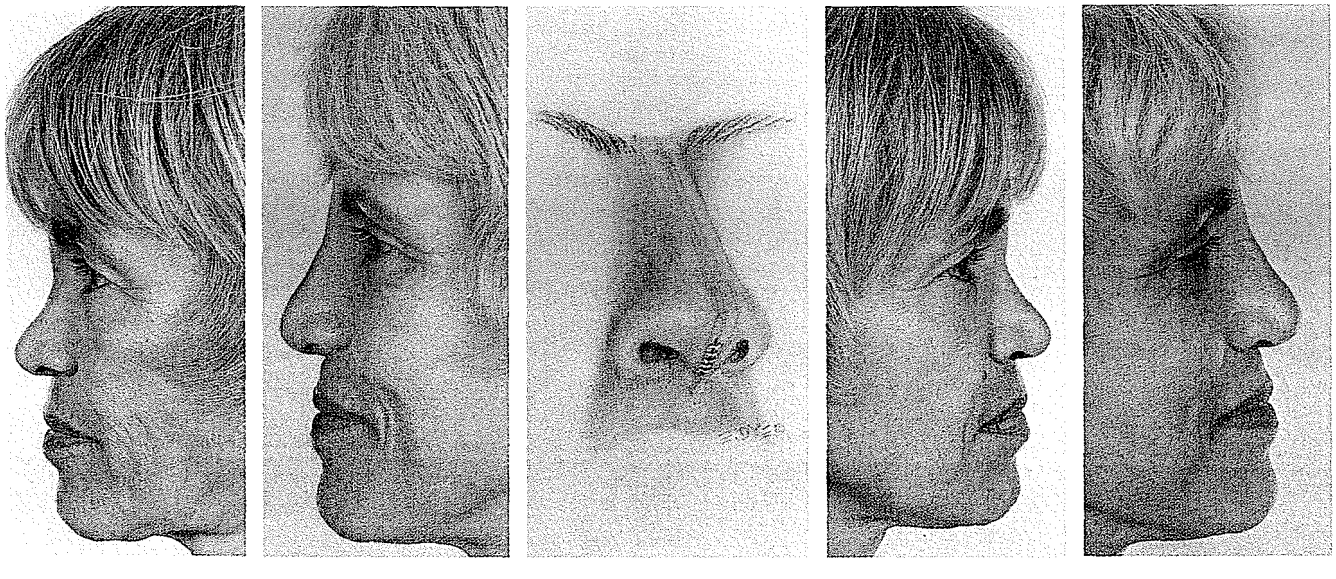
From the patient's seventh left rib an osteochondral perichondral hinge graft was carved to specific shape, 5 cm bridge, 3 cm columella. The graft was inserted along the bridge up to the glabella to allow the columella strut portion to be eased down the columella to the nasal spine. Then the graft was grasped just proximal to the hinge and pulled down so that the point of the hinge joint was projecting in the tip as a propped cantilever. The columella split was closed with subcutaneous sutures of 4-0 catgut and 6-0 silk to skin. The excessive alar flares were reduced by alar base wedge resection.



This case shows that when the injury occurs early in life and retards normal growth then the surrounding structures such as skin and lining are never stretched sufficiently. Thus the result of adding only support has some limitations as seen in this male who suffered a crushing injury in early childhood. By shaving down the upper bony root of the nose a hinge graft could sit reasonably well and improve the profile.



This 52-year-old woman had had a rhinoplasty 30 years before with loss of an important part of her nasal bridge. An osteochondral hinge graft inserted through a columella splitting incision brought back the integrity of her nasal profile.

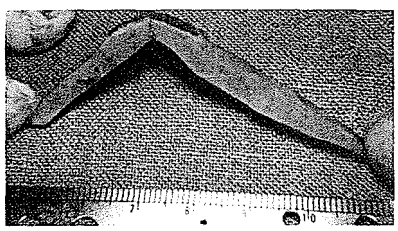


This 57-year-old woman had a small lesion of the skin near her right medial canthus. She requested the surgeon shorten her nose at the same time he removed the lesion. Excision of the basal cell carcinoma was reported inadequate and her nose healed with asymmetries. Three months later the lesion was completely excised and the nose reoperated, including a submucous septal resection and anterior septal resection. As this still did not correct the problem a silastic implant was inserted. Infection, septal chondritis, and cartilage dissolution ensued, resulting in nasal collapse with multiple furrowing of the skin covering.

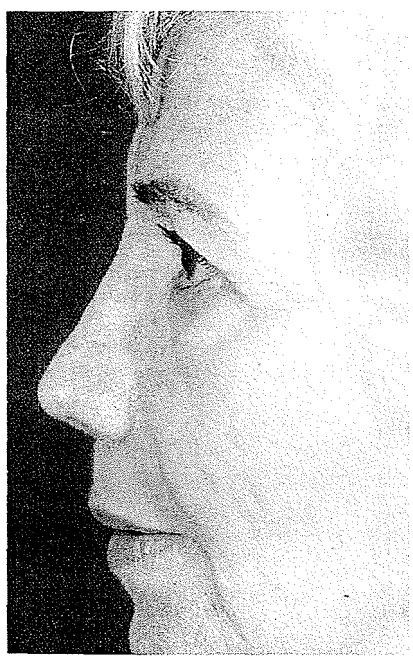
In principle, in the presence of a possible malignancy, it is better not to combine tumor excision with a cosmetic correction—unless the reduction facilitates an otherwise difficult to impossible defect closure. As it turned out here both the primary excision and the corrective rhinoplasty were unsuccessful and both required repetition. The secondary rhinoplasty, three months after the initial procedure, was too early for radical work; the insertion of a foreign body as a "last ditch" effort is often done, but rarely successful. The infection that followed was unfortunate and devastating, but almost predictable. The patient was forced to wait a full six months for healing.

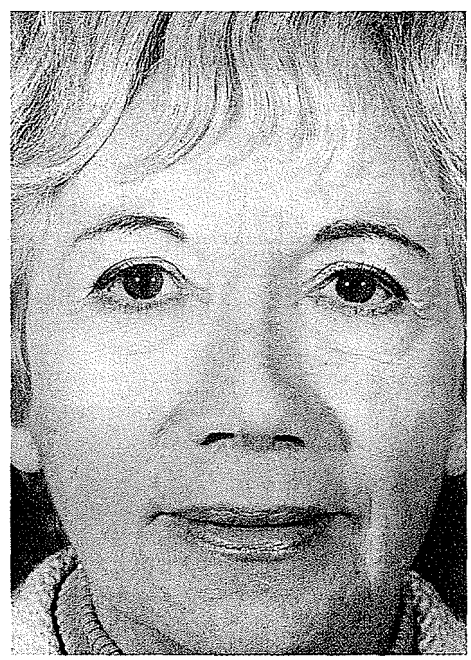


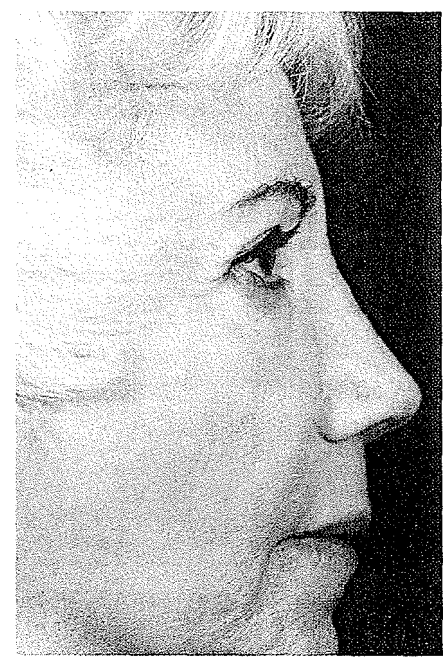
It was obvious that more than one operation would be necessary. The first procedure was designed to set the stage for the repair. Through anterior vestibular incisions, the alar cartilages were reduced and the irregular skin covering was freed from its scar adhesion taking a bit of deep tissue with the skin in the areas of furrowing as previously described. A large nasal lining defect had to be replaced with an upper labial sulcus mucosal flap brought up into the nose to replace the missing lining. This smoothed the skin moderately but one severe anterior skin furrow required direct excision. Osteotomies with in-fractures narrowed the nasal base.



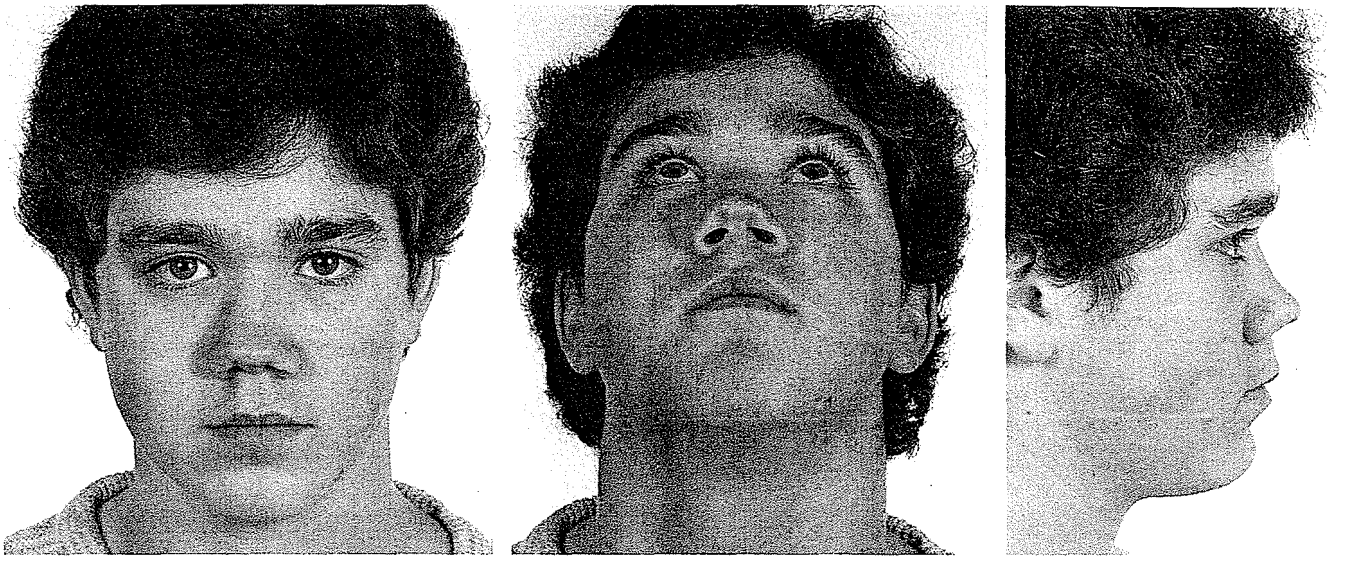
Eight months later, through a columella splitting incision, a costal osteochondral hinge graft was inserted. This reconstituted the classical L support and opened the airways. Several minor alar margin and base excisions completed the secondary reconstruction.



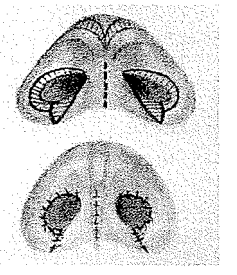


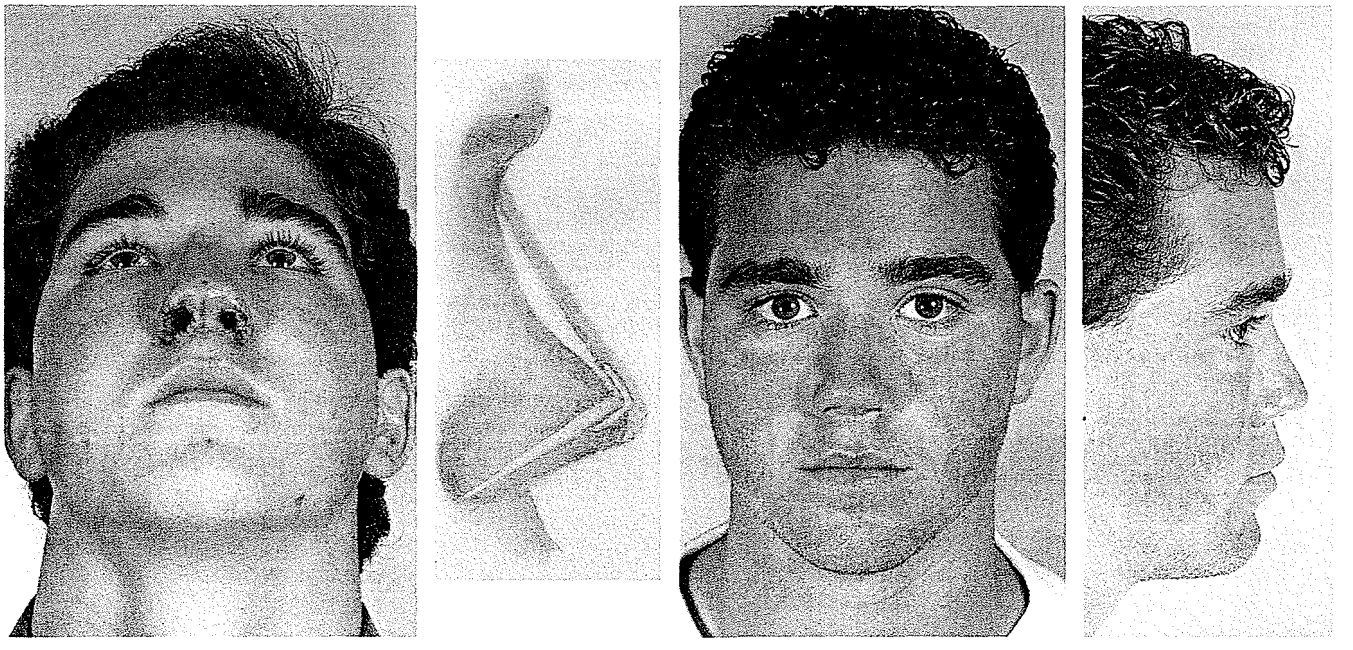


This 16-year-old male patient suffered a severe injury to his nose complicated by infection at the age of nine. The failure in nasal growth left the tip asymmetric, the alae flared and the bridge flat.

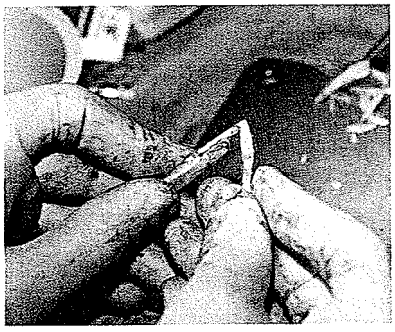


First stage reconstruction involved alar cartilage reductions, submucous septal resection of obstructions, and bilateral osteotomy with in-fracture. One year later a costal osteochondral hinge graft was inserted through a columella splitting incision to correct the bridge and tip. Alar margin sculpturing along with alar base reduction of the flare improved the result.

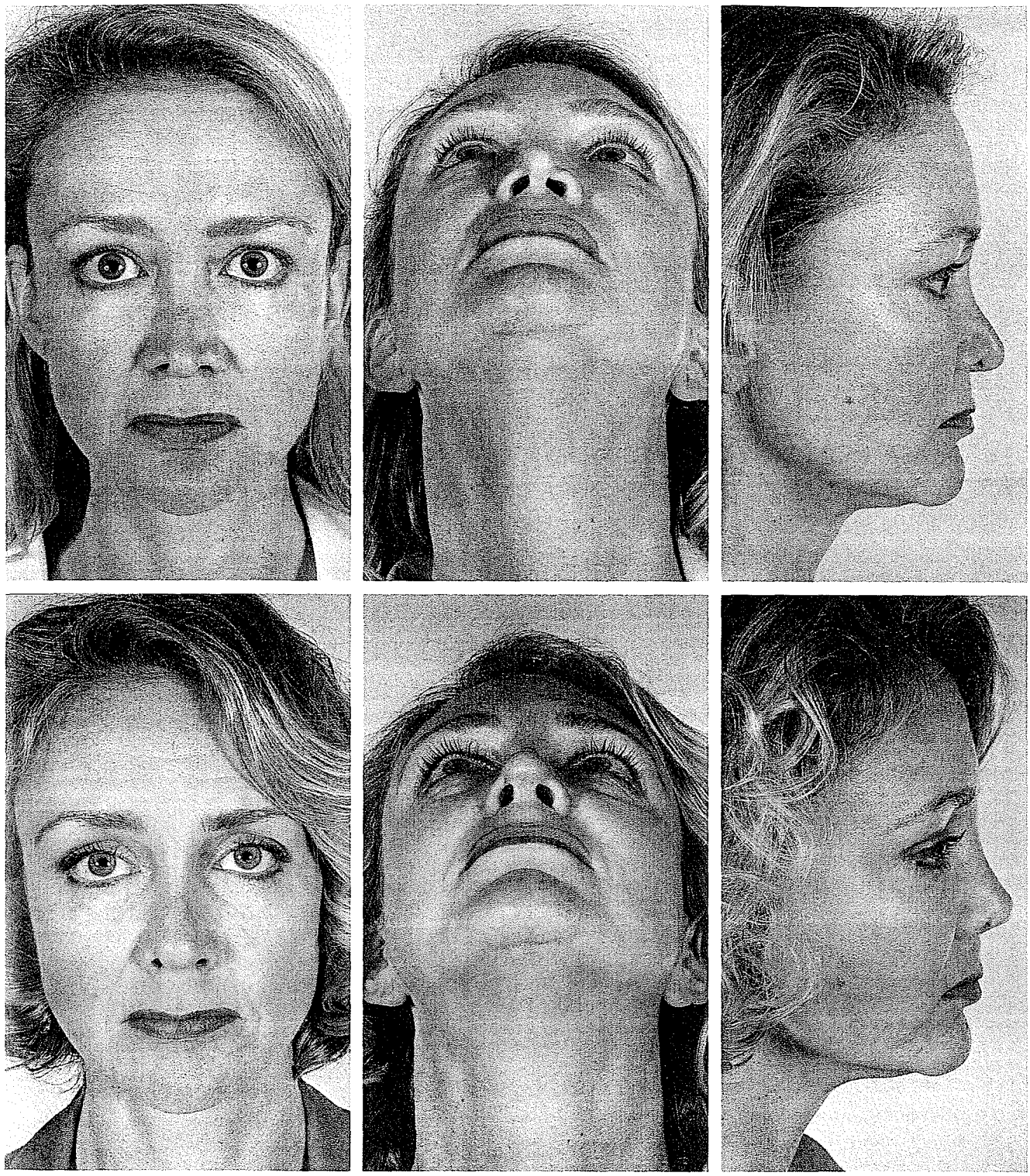




This 32-year-old female suffered blunt trauma to her nose with nasal fractures and injury to her septum. She underwent two rhinoplasties, including radical submucous resection of the deformed septal cartilage. The result of these multiple traumas was a partially collapsed nose with a depressed bridge, pinched tip, retracted columella, and difficulty with breathing.



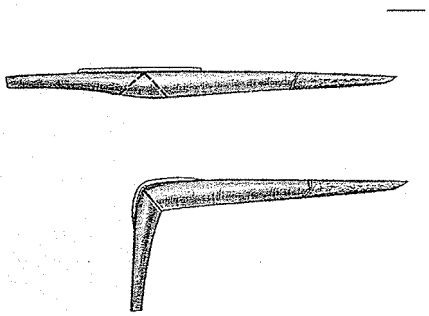
The general sag of this nose is the result of loss of skeletal support; the proverbial L is insufficient in its peripheral dimension. Thus the best overall solution seemed to be a costal osteochondral hinge graft 5 cm for bridge and 3 cm for columella introduced through a columella splitting incision. This supplied the extra lift to the entire nose through the L-shaped propped cantilever. The profile was elevated, the columella and tip supported, and the breathing improved. Note the invisibility of the columella splitting incision, a far better scar than the popular transverse scar across the columella.

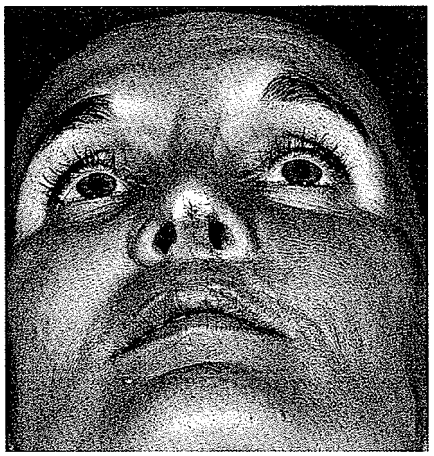


A hinge graft can be used to camouflage a severe nasal deformity in a cleft patient. This 41-year-old female who had a LeMesurier lip closure in infancy presented such a severe nasal distortion that the usual procedures were by-passed.



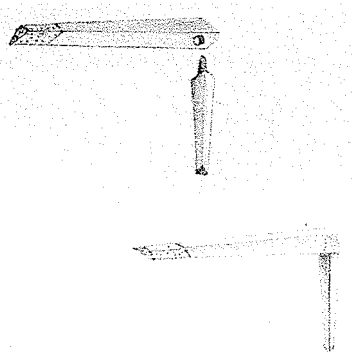
The septum was partially straightened to improve breathing. Then through a columella splitting incision a costal osteochondral hinge graft was inserted on the bridge and down the columella to camouflage the deviations beneath by onlay contour.







Of course there are occasions where simple cartilage grafts will suffice. A distal bridge support or a columella strut or the combination of both may be required. In these cases septal cartilage may be adequate, and, if not, then costal cartilage is available. An even more maneuverable propped cantilever can be constructed with a 5 cm costal cartilage bridge piece with a hole drilled under the distal surface. This will accept and interlock with a 3½-cm pointed costal cartilage strut in the columella.

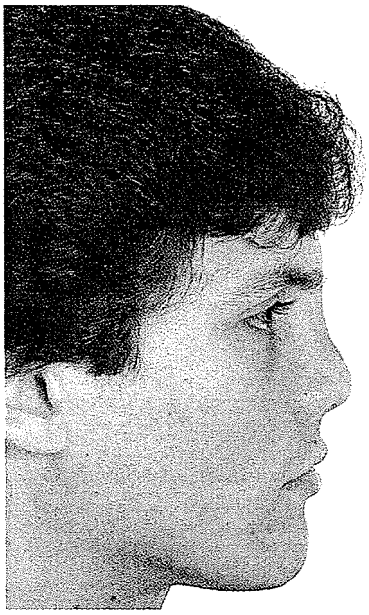


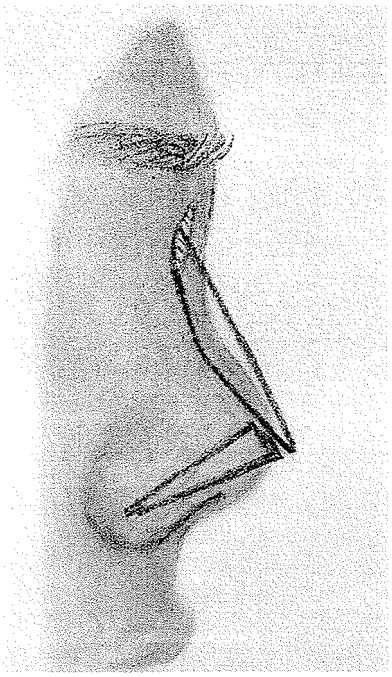
This 25-year-old Cuban male had a history of nasal trauma. The septum was deviated and the bridge was high, coming off the forehead in the Roman style. I planned a submucous septal resection and conservative correction of his bridge line.



The next time I saw him was after an ENT surgeon had radically removed his septum and lowered his bridge. In time with the loss of support the nose had settled and shrunk with gradual contracture of the skin and lining, rendering it resistant to correction.

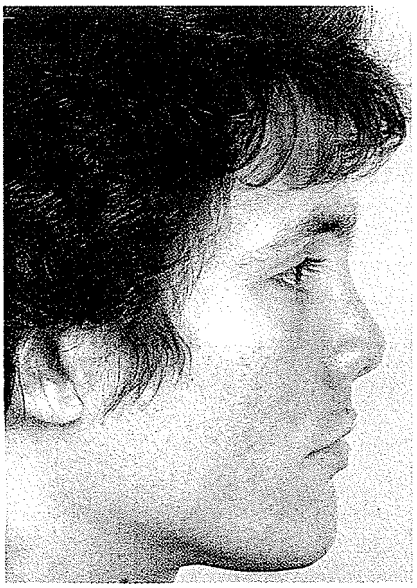






After one year of healing, a two-piece costal cartilage graft was used to improve his skeletal support. Through a stab at the base of the columella a pocket was dissected up the membranous septum to the nasal tip. Into this tunnel a costal cartilage strut, which was wider at the top to force the nasal tip to tilt down slightly, was inserted. Through an anterior vestibular incision a pocket was dissected under the skin of the bridge. The excess bone of the nasal root was reduced with a chisel. Then a specifically shaped costal cartilage strut was inserted as an onlay for the bridge, resting on the flat top of the columella strut.





It is interesting that in 1994 R. K. Daniel advocated for secondary rhinoplasty a two-piece costal cartilage graft, one in the columella and one on the bridge. He suggested that where the two ends meet in the tip that they either not make contact or they be locked to each other in a tongue-in-groove. Neither is as effective in tip lift as the hinge graft. He executes this procedure through open rhinoplasty. It is far better to introduce these cartilage struts through a columella splitting incision as it is safer and more efficient. When the skin surface tension from lip through columella to the tip is kept intact, the tissues are better able to respond normally to the upward stretch of the columella strut.

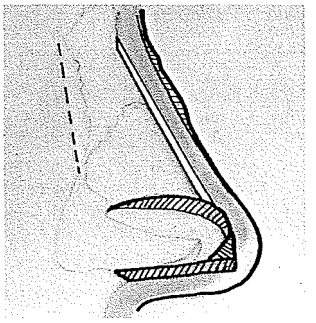
SEPTAL CARTILAGE TO BRIDGE

Septal cartilage for nasal bridge augmentation is excellent when the depression is not too great. It is effective as an onlay to disguise multiple irregularities and produce a clean profile line.

This 34-year-old man had severe trauma to his nose with bone fractures and septal crushing. This was followed by a rhinoplasty which resulted in irregularities of the tip cartilage, deviation of the septum, and an irregular bridge line. The nose was also too long.

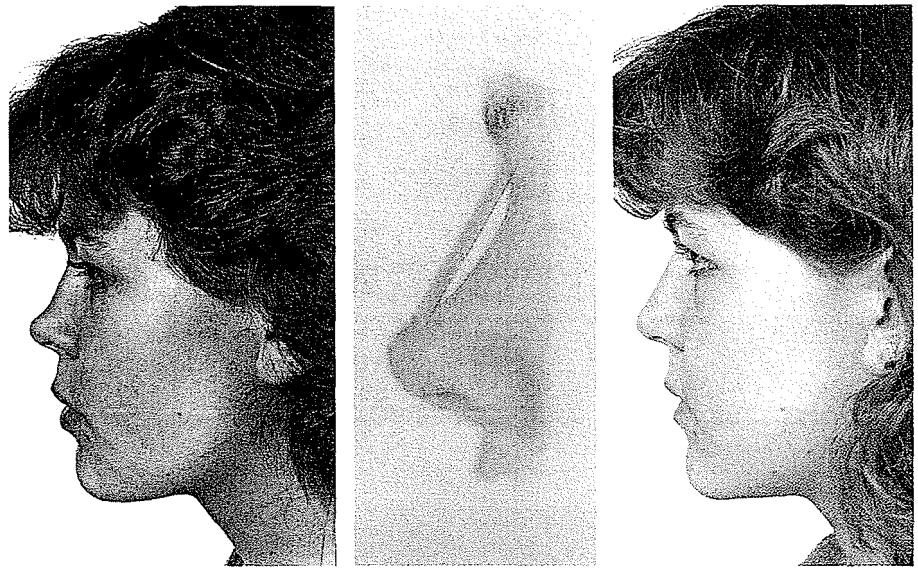


The alar cartilages were equalized by specific resections. The anterior septum was shortened by resection of a rectangle and then a golden triangle. The bridge was smoothed to level the playing field. A submucous septal resection supplied cartilage for a long bridge strut which when sutured in position improved the height and straightness of the profile line.

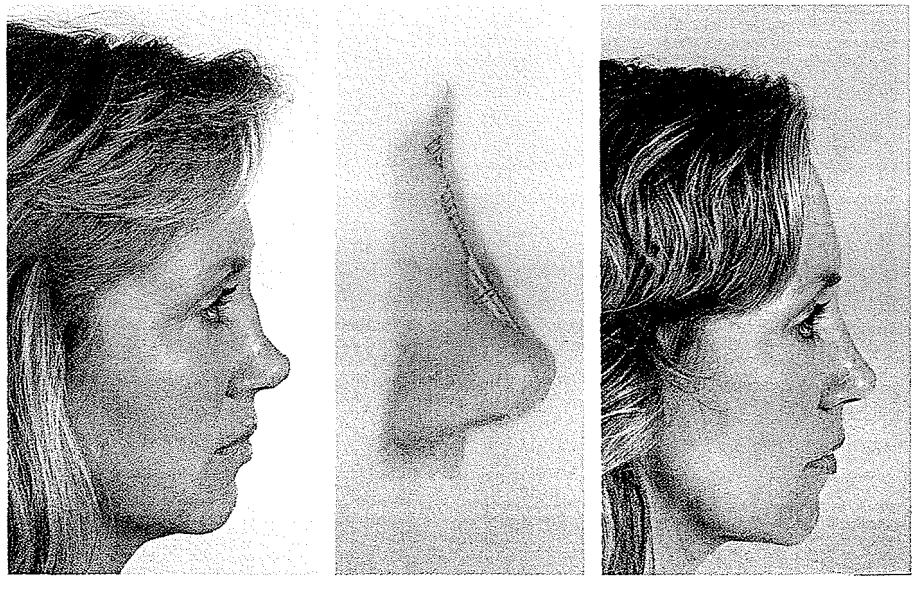




This secondary bridge deformity revealed too much resection of the septal bridge and too little bony resection. The correction required shaving the bony excess and augmenting the septal ski jump with a septal cartilage strut.



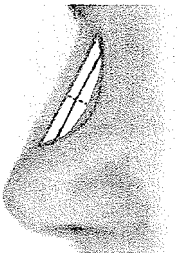
This 44-year-old female is seen after reduction rhinoplasty with excessive bridge reduction. A two-tiered septal cartilage graft was inserted on the bridge with definite improvement.



This is the typical supratip exaggerated by over-excision of the bony hump. First the tip deserves more alar cartilage



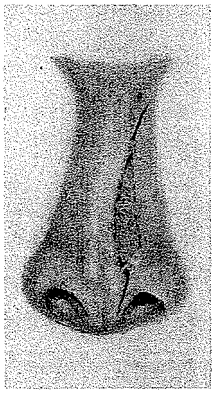
reduction and the distal bridge deserves lowering. Then following a submucous septal resection a two-tiered cartilage graft along the bridge brings some harmony back to this nose.



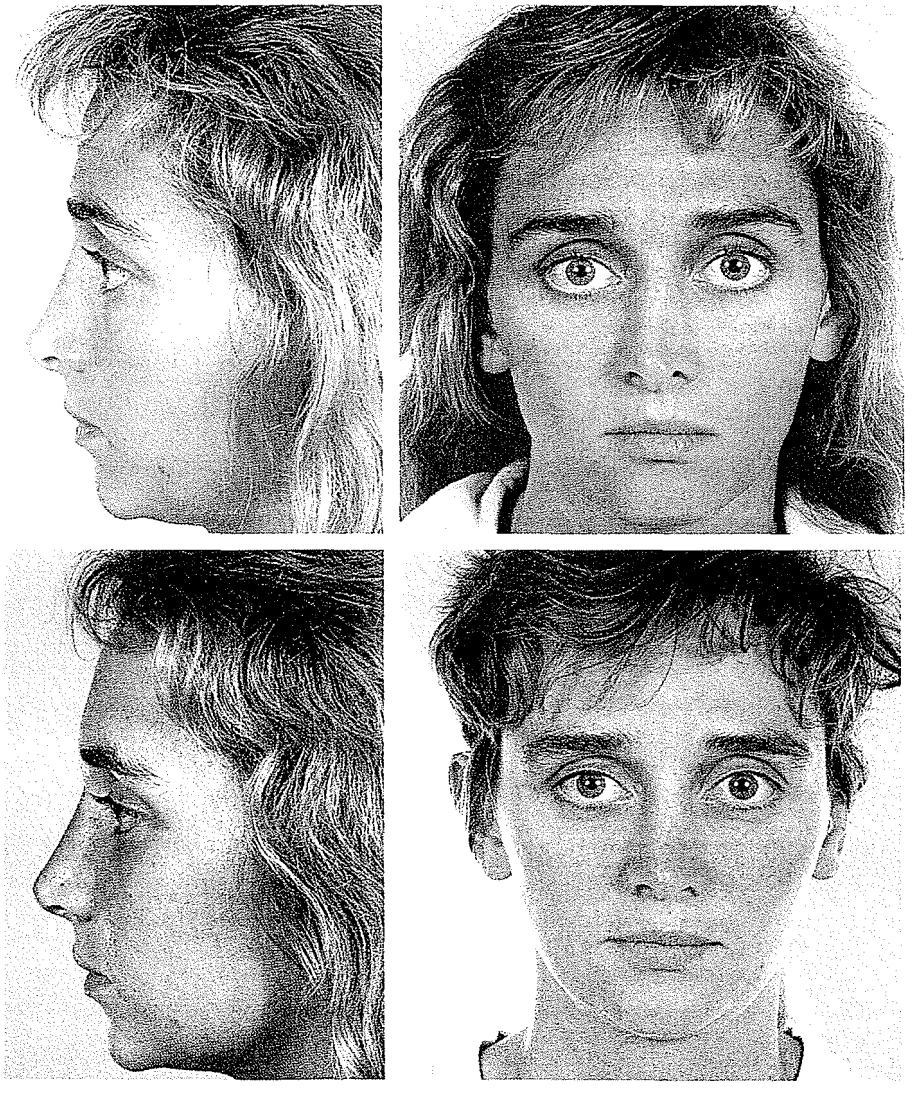


Asymmetric Grafts for Symmetry

This 28-year-old female had an injury to her nose which several months later was treated with a rhinoplasty and submucous resection. Twelve hours postoperative she was struck from the left side with the resultant asymmetric deformity.

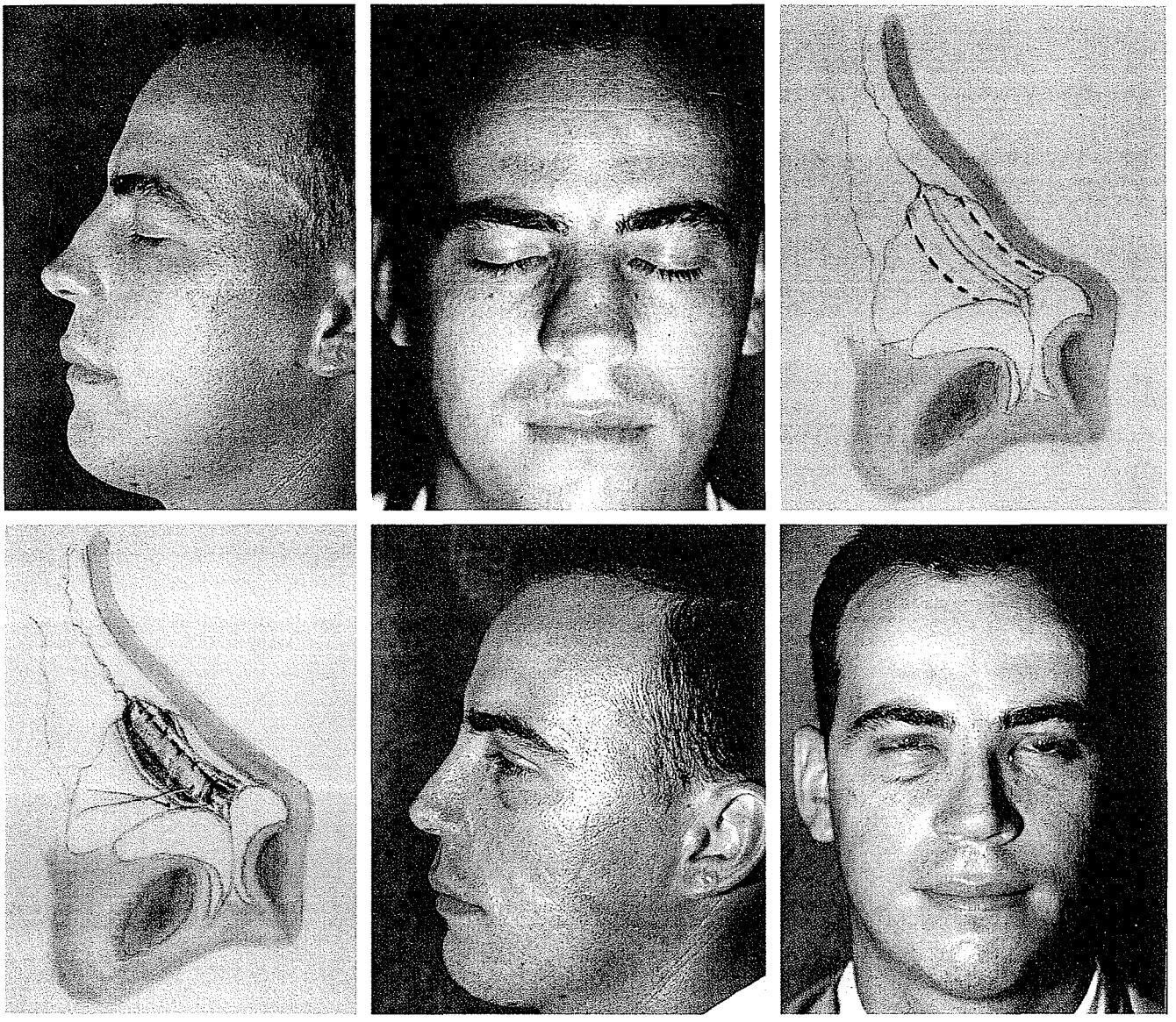


A submucous septal resection obtained cartilage and reduced the obstruction but the septum was too scarred to allow perfect straightening of the nose. A septal cartilage graft was inserted along the left side of the bridge. A right septal chondromucosal flap based superiorly and denuded of epithelium for 0.5 cm was threaded across the septum and into a left lateral anterior vestibular incision to bolster this flatness. Bilateral osteotomies with infracture improved the overall effect.



Using Local Tissue for Bridge Enhancement

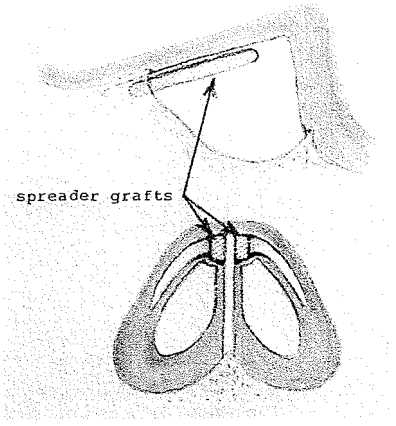
In a rare case the turn-up of sidewalls may give bridge enhancement. This young male had a flat bridge in the supratip area. The mucosa and upper lateral cartilages were divided, turned up and sutured to each other and the lateral walls allowed to advance medially. The early result was good but I



never saw the patient again and he was operated 44 years ago. Could he be that pleased?!

Spreader Graft

There is an inverted V deformity associated with middle vault collapse occurring when its roof has been over-resected. In

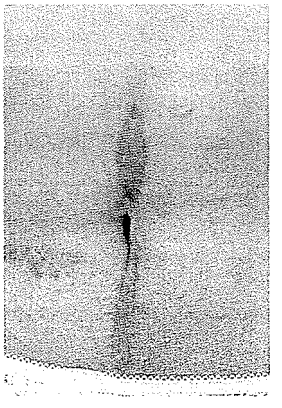


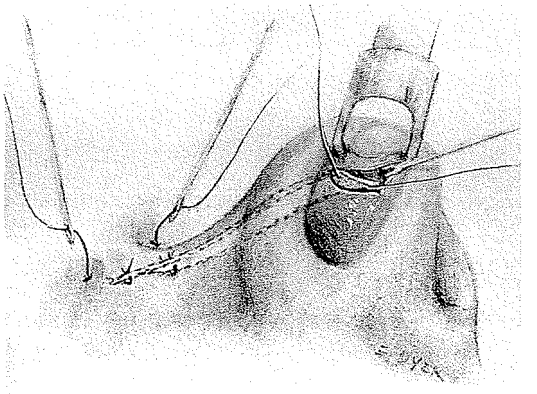
1987 J. H. Sheen proposed the spreader cartilage graft to counter the effects of an excessive dorsal resection. Although Skeen presented this method originally for primary rhinoplasty he soon found it also useful in secondary rhinoplasty. He warned that the bridge should have sufficient height and there should be adequate tissue along the anterior septal edge to allow dissection of an appropriate pocket and enough autogenous material for the grafts. I have not had occasion to use this graft more than a couple of times but it certainly has merit. There is a chance that these grafts may cause the bridge to be a little too broad. The inverted V deformity can usually be effectively treated by adjusting the bridge and moving the bony sidewalls medially into better position with in-fractures.

A Dermal Overlay

This 26-year-old female is seen after several rhinoplasty procedures. The keel effect of the bridge was too acute and skeletal looking. The patient had an abdominal scar so a dermal scar strip 6 cm × 2 cm was fashioned and inserted with external fixation sutures to cloak the keel bridge. The dermal graft cushioned the sharp bridge ridge as seen after two months







and again at one year. This is a procedure to cover a sharp skeletal line when the skeletal structure is adequate to make



further contouring unwise. This dermal graft could *cloak the sharp edge* that often is seen after *cranial bone* grafting.

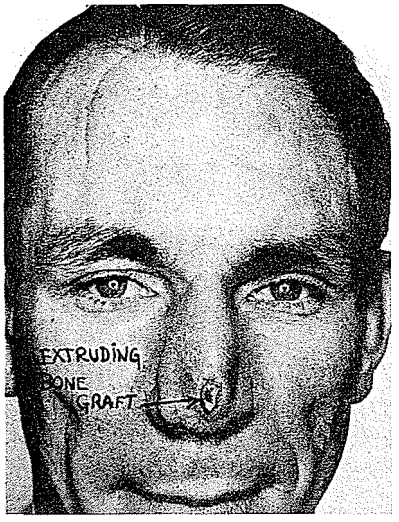
SILASTIC NASAL BRIDGE IMPLANTS

Although I favor autogenous grafts over foreign body implants to the nose there are certain circumstances where silastic may be first choice. I probably use one silastic for every 20 autogenous grafts.

The advantages of the inert silastic implant are its dependable straightness after carving, absolute lack of absorption, absence of reaction, easy obtainability, and avoidance of secondary donor morbidity, deformity, and scars. Its use bypasses guy wires, aseptic necrosis, and conchal deformities. Yet the rules governing the use of silastic foreign body implants must be rigidly followed.

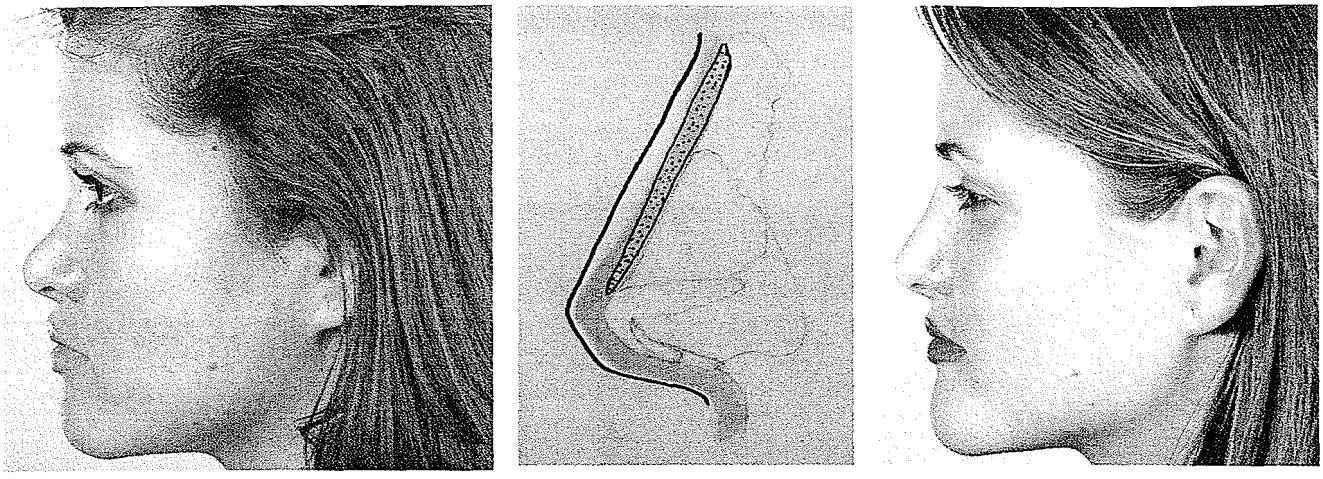
This implant should be used only as an impassive contour provider. The platform onto which it is placed should be level or corrected so to accept the implant. This ensures that the implant will lie quietly on its bed without chance for see-sawing motion. The cover should be normal skin and subcutaneous tissues. The pocket for the prosthesis should

be dissected straight with tailored accuracy for a snug fit and not haphazardly undermined to allow shifting. The external entrance of the pocket for the silastic implant should be at least 1 cm and preferably 2 cm distal to the implant itself to allow soft tissue closure of the entrance to the prosthetic pocket. This prevents later extrusion or exposure and infection. Yet this necessary extra longitudinal length of the pocket does make it possible for the implant to slide up or down. Thus it is wise to fix it with one suture of 4-0 Prolene.



The silastic implant should not be asked to do any work such as active tip support! Any rigid strut in the columella to lift the nasal tip is treacherous and even when autogenous cartilage is being used the surgeon must be on the lookout for the danger signal of a persistent white (avascular) pin point in the tip skin caused by too much thrust pressure. Here is an example of a rigid bone graft inserted in the columella to lift the flat nasal tip in a World War I case. The bone had penetrated the nasal skin. This undoubtedly has happened many times since 1918, and certainly modern silastic can be a silent enemy here that eventually will appear through a skin tip perforation. The thin tissues of the columella and the usual scarring which is partly responsible for the tip depression in the first place do not provide a happy bed for a silastic implant and therefore in my opinion should *not* be attempted. To avoid this I have used a combination of silastic to the bridge and autogenous cartilage to the columella-tip area.

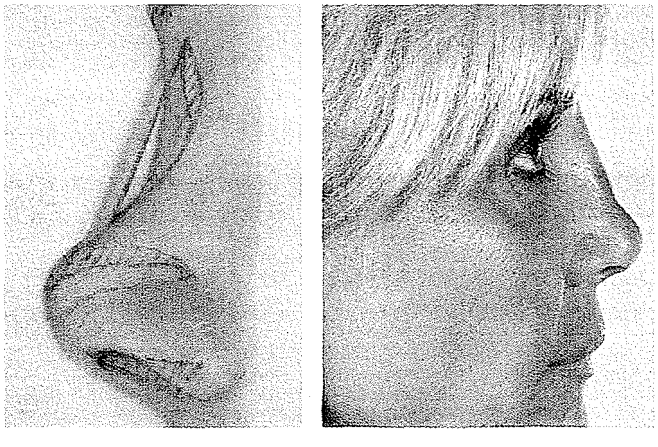
This 24-year-old female two years after corrective rhinoplasty including submucous septal resection revealed excessive loss of bridge. The over-zealous hump reduction destroyed the character of this nose. It was corrected with a specifically shaped 3.2-cm silastic implant inserted through a small vestibular incision just anterior to the point of the septum.



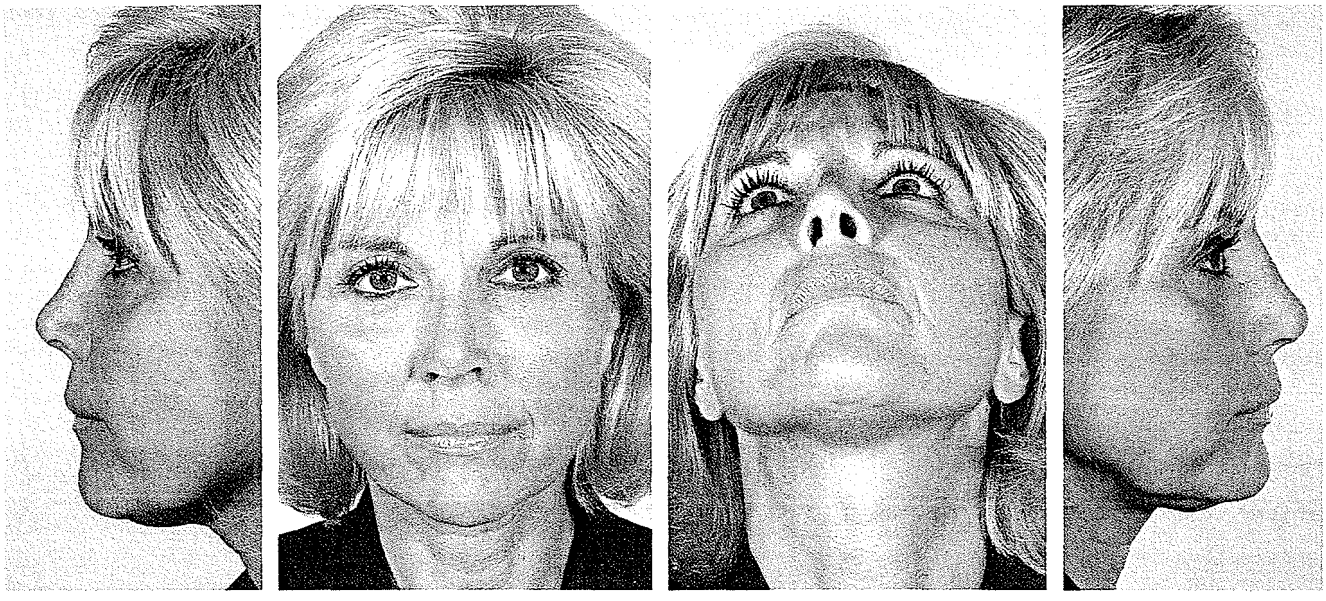
This 44-year-old female following rhinoplasty revealed a ski jump bridge with moderate pig snout tip tilt. Reduction of the excess alar cartilages tailored the tip and alar base



wedge resections narrowed the nostril flare. First insertion of a silastic strut was squeezed by constricting scar out of ideal position. Removal of silastic implant, reshaping and reinser-



tion with fixation to the septum with a Prolene suture corrected the deformity.



Thus, first it is important to pick the place for silastic implants and in my opinion, as already explained, only the bridge should be considered. Then it is advantageous to consider those cases I have found to be most adaptable to this approach. Those races often showing some flatness to the nasal bridge are the Oriental and the Black. Here there is usually no scarring, a good platform, and normal covering tissue. The simple insertion of a silastic implant to the bridge is effective and safe. Flat noses offer less septal cartilage anyway and the use of silastic costs only the price of the implant without the need to disturb a distant donor area.

Foreign Body Implants 40 Years Apart

In 1954 as chief plastic surgeon to the First U. S. Marine Division in Korea, I had the opportunity to carry out rehabilitation surgery on the natives. Among my patients was the wife of an international businessman who wished his wife to be Occidentalized, which he hoped would help in his trade relations. I created the upper eyelid double fold and inserted a homologous costal cartilage graft I carried in a bottle of Merthiolate to her nasal bridge.



In time I found that it took about ten years for the body to absorb homologous cartilage and so I turned to silastic implants. In 1994 an outstanding Japanese Fellow in plastic surgery training with us requested nasal bridge augmentation. A silastic implant was inserted on to her bridge and mentum.



Currently, there are several silastic implants available. I prefer the R. Straith implant but usually amputate the extended prong. For improvement in contour of the racially flat nose Korean plastic surgeon Ki-Il Uhm has an excellent model with a tip lift. Odd bridge problems can be treated with specially tailored silastic in rare cases.

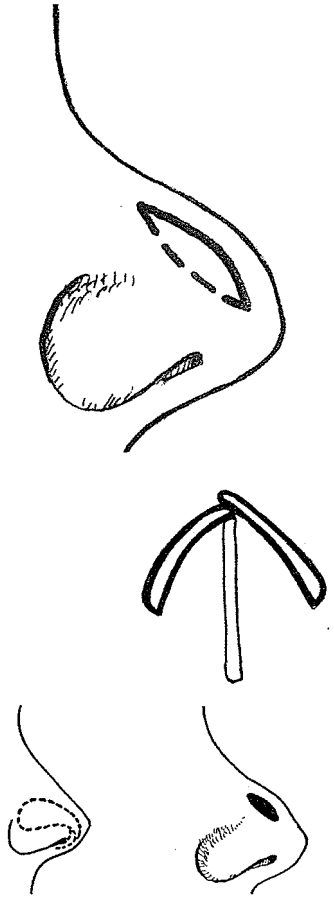


Silastic implants placed on the nasal bridge in selected cases have served well. I recall several that slipped or drifted off center and had to be repositioned. This occurred because the rules outlined here had not been followed. I do not recall more than one or two of my silastic implants getting infected, but I have removed several placed by other surgeons that had become exposed in the vestibule.

I usually prefer to avoid silastic to the nasal bridge of the young patient, especially males involved in sports, for purely practical reasons. Here the activity over a long term may be more demanding, increasing the chance of injury with complications. In the older patient or those with a more sedentary life-style the odds for a continued happy result are improved.

Further examples of silastic implants inserted on the nasal bridge will be presented in the specific conditions where they have served well.

PARROT'S BEAK



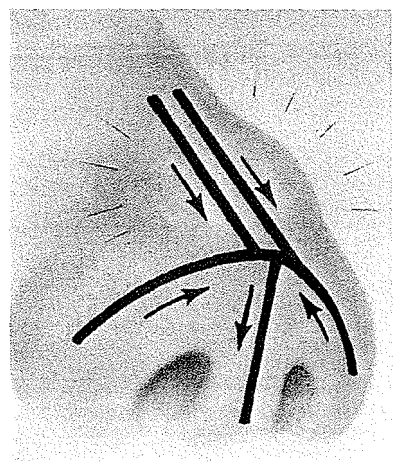
The convex curve of the bridge and tip hooking like a parrot's beak is a rather common sequela of corrective rhinoplasty. Numerous causes of this deformity, each with its champion, have been conjectured and any or all can and do play a part. The most obvious cause is the failure to carve the septal bridge correctly, leaving a curved distal hump. Another cause is the piling up in this area as the thick skin of the nasal tip telescopes on itself when the nose is shortened. Aufricht suggested extra scooping of the cartilaginous bridge in this area to accommodate the inevitable excess skin humping.

Safian blamed the overlap of the freed chondromucosal sidewalls on top of the septal bridge.

Peck has emphasized the importance of maintaining at least some intact rim of the lower lateral alar cartilages to ensure tip prominence over the septal bridge line.

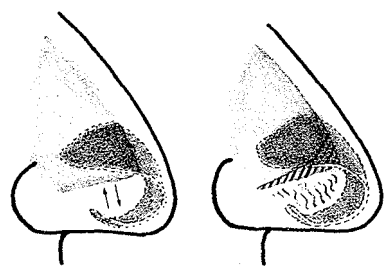
Rees accused the piling up of granulation and the following fibrosis in the supratip area. As the free edge of the septum can bleed severely, a postoperative hematoma with subsequent fibrosis is also a possibility.

It is important to note that this supratip deformity rises near the point of convergence of five incisions, and this indeed may offer further clarification. First, there is the vertical membranous septal incision which diverges bilaterally as vestibular incisions, either anterior vestibular or intercartilaginous. The dorsal skin undermining is a proximal extension of the vestibular incisions. Then when the sidewall lining is divided on either side of the septum two further incisions are made. If, instead of two anterior vestibular incisions, the surgeon used intercartilaginous and marginal incisions, he adds an extra two for a total of seven converging scars.



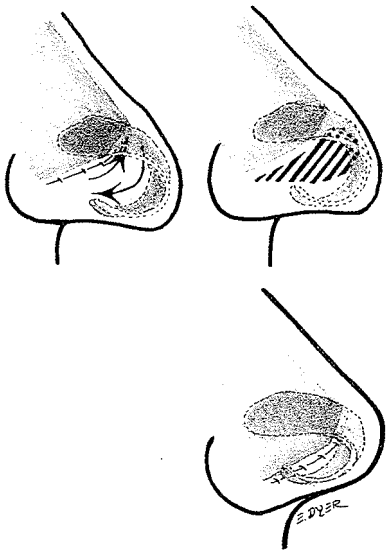
Whenever even three incisions meet at one point the scarring is usually exaggerated. In endorhinoplasty the hidden incisions are at different angles, converging to a central point, and, with contracture of each incision, a humping at the center could be expected. The membranous septal incision contracts, pulling the tip down, the lateral incisions contract, pulling the sidewalls toward the septum, and the sidewall incisions with the usual haphazard approximation add greater areas of humping granulation and subsequent fibrosis.

Our present modification of the maintenance of the "French Connection" (Eitner and Anderson) preserves the lateral mucosal attachments to the septum, while the septal cartilage of the bridge and upper lateral cartilages are shaved and tailored. This avoids two scars and the granulation and contracture associated with them. Under this regime the early postoperative tip swelling is definitely less and the amount of supratip swelling and humping has been impressively reduced.



An Added Factor

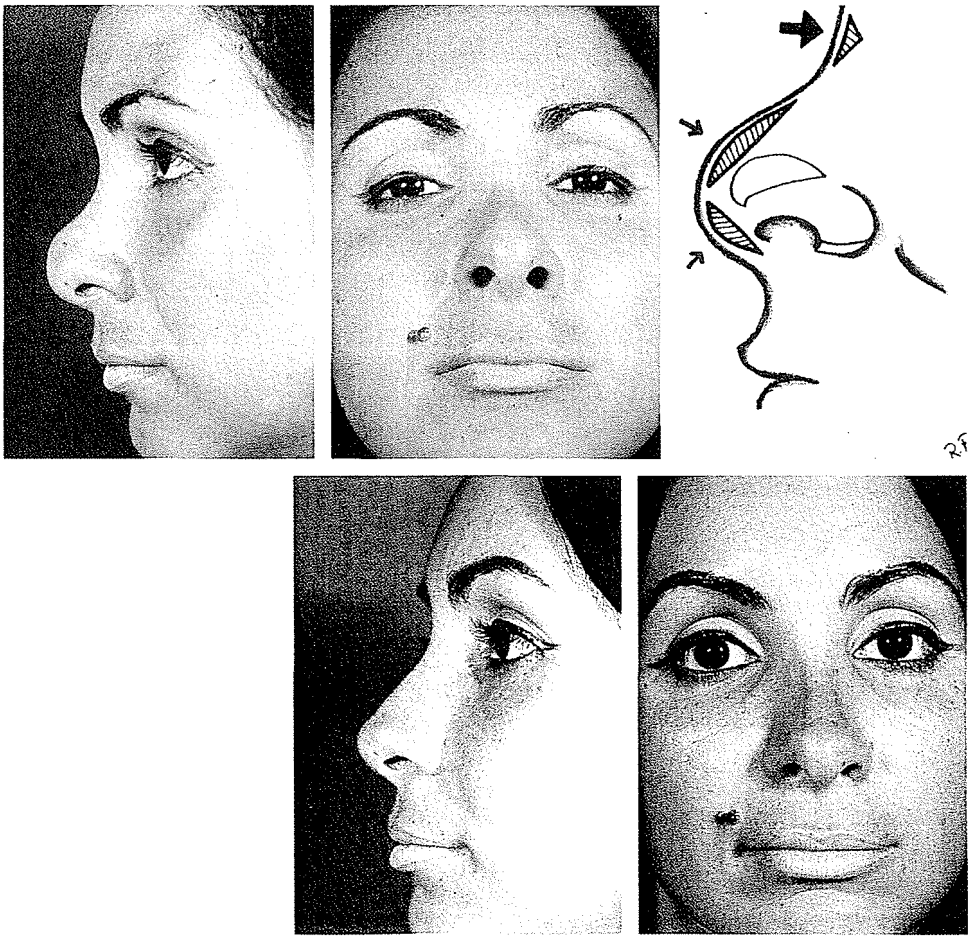
There is a greater tendency of hooked noses to "re-droop" postoperatively even after septal shortening. One reason is the preservation of too much membranous septum, which allows soft tissue play during laughing and crying with pull-



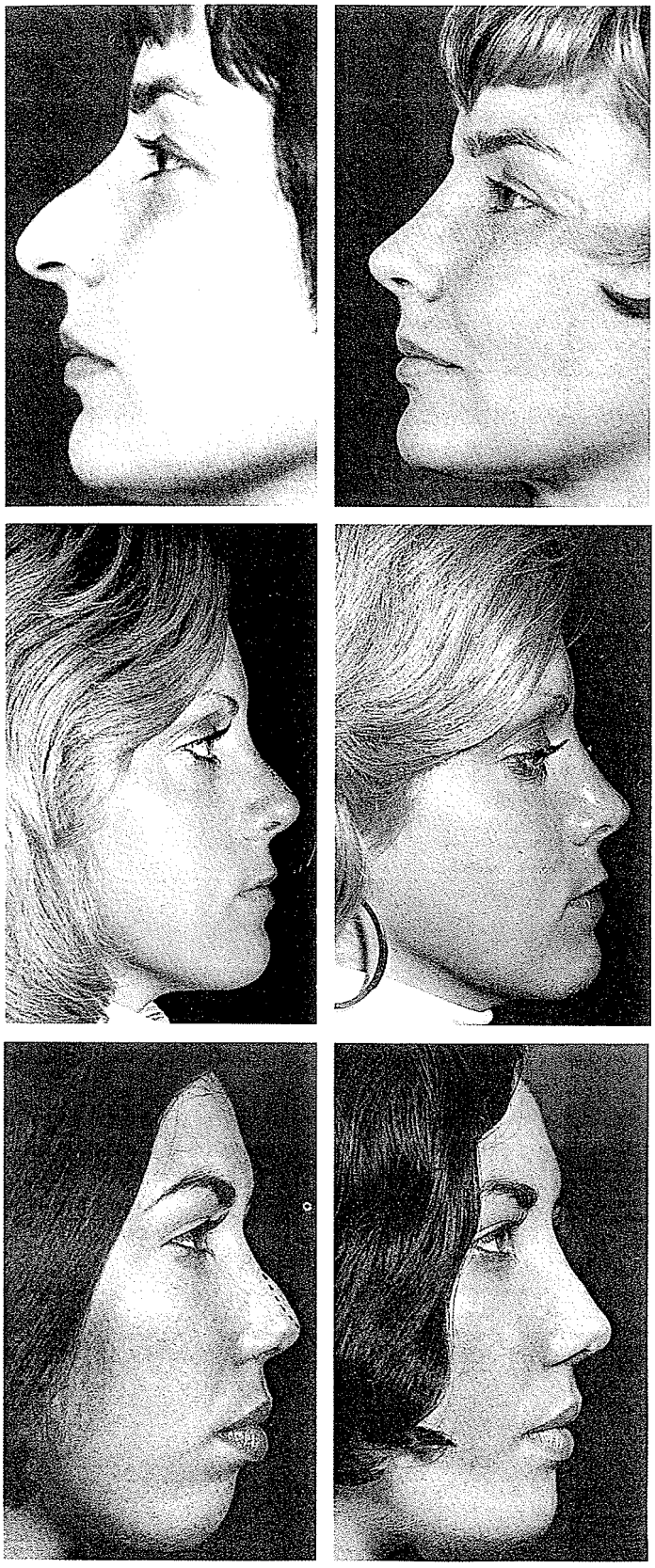
down of the tip as the upper end of the distal septum presents in the supratip area. By resecting a reasonable portion of membranous septum along with what septal cartilage is indicated, one leaves only a modest play between the caudal end of the septal cartilage and the medial crura of the lower lateral cartilages. When the membranous septal excision heals, the tip will maintain its corrected position. Too often orthopedic through-and-through stitches from columella to septum are used in an almost frantic attempt to over-correct tip depression, but of course, when the sutures are removed, if there is too much membranous septal play, the tip will droop again.

Most of the parrot's beak secondary deformities I have treated can be corrected satisfactorily by tailoring the remaining excess of septal and alar cartilage.

This parrot's beak of comic proportions was improved by further bridge and septal resection.



Again bridge and septal revision corrected these parrot's beaks.



Here, a series in which the primary rhinoplasty left a suggestive parrot's beak (arrow) that was improved by shaving the





slight convexity. So often the primary rhinoplasty may show a residual supratip excess which deserves secondary shaving.

Sheen has long advocated that excessive removal of the upper nasal bridge is often responsible for the supratip. He advocates auricular conchal cages to augment the depressed upper bridge rather than scooping the supratip. He has presented some fine results, but for me many of these bridges are too high.

Here is a case where I found the combination of tailoring the septum and augmentation of the upper bridge beneficial. This 57-year-old female had two rhinoplastic procedures, ending with a classical parrot's beak deformity. Through a membranous septal incision extended as anterior vestibular incisions the nasal skin was freed from the supratip area so that the excess cartilage could be excised. A triangle of anterior septum was also resected. A spare piece of this discarded cartilage was grafted in the pinched tip on the left to produce better symmetry. A pocket was dissected over the depressed nasal bridge and into this pocket was inserted a specially





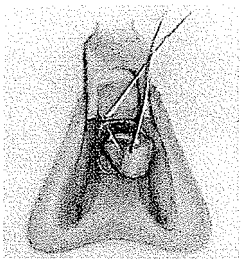
carved silastic implant. The nose healed well and the silastic implant has served admirably.

Parakeet's Beak Following Open Rhinoplasty

This 37-year-old female had an open rhinoplasty by a competent ENT surgeon who somehow managed to collapse the col-



umella join with the tip. Either the scar was too close to the tip or there was resultant necrosis of tissue in the area. This resulted in loss of tip projection with hooking associated with a crinkling retraction of the distal columella. Excision of the transverse columella open rhinoplasty scar released the depressed tip. Into this defect a composite auricular graft was inserted and sutured. The improvement was dramatic with





correction of the unusual parrot's beak. Minor revisions were necessary over a year later.



PIG'S SNOUT

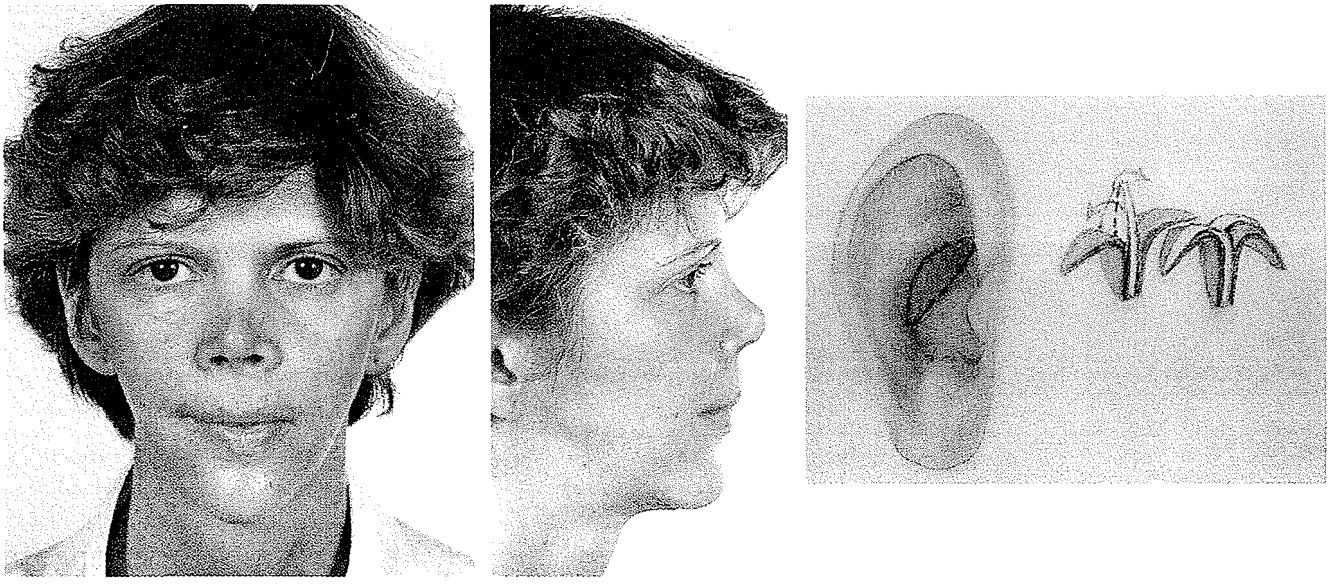
This is a secondary deformity that terrorizes the layman and is not particularly easy for the secondary surgeon to correct. It is usually caused during over-enthusiastic anterior septal resection accompanied by too generous sidewall reduction of lining and cartilage: chomp! chomp! chomp! This action not only shortens the nose but also tilts it upward, exposing the nostrils. Since septal shortening has the most direct effect on

the nasal entrance, usually there is also a quality of columella retraction in the deformity. Regardless of whether the sidewalls are long and thick in the original nose or have become relatively long after septal shortening, the effect is a flat, double-barrel nasal entrance not unlike a pig's snout.

Here, as always, diagnosis must direct the method of correction.

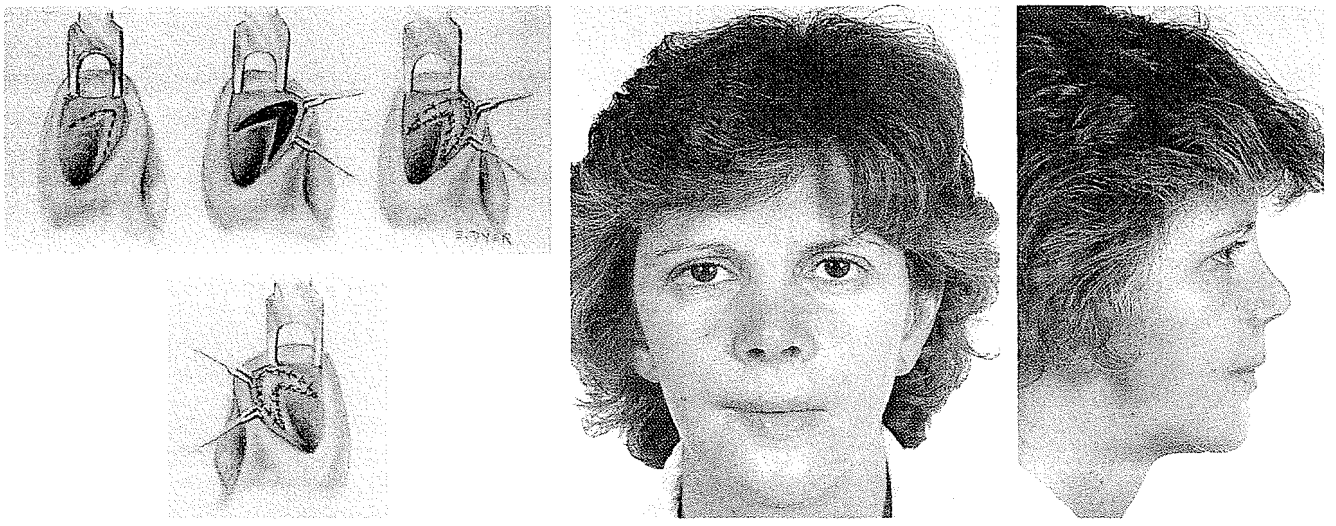
If the entire nose is snubbed, then there is shortness of the septocolumellar component as well as the sidewalls; relief of this condition requires release of all three with the insertion of a free graft. It can be split skin or full thickness skin for the sidewall release but it will require a composite graft for the membranous septal defect. Dingman's auricular banana-split chondrocutaneous graft seems to be one way of satisfying the entire three axis of the defect.

An example of this composite graft is seen in this 39-year-old female who, after a rhinoplasty and an attempt at bone graft to her nose revealed a snubbed, pinched, retracted nasal tip.



Through a releasing membranous septal incision carried bilaterally as anterior vestibular incisions leaving an intact cartilage rim anteriorly, it was possible to free the nasal skin over the dorsum to bring the nose down and forward moder-

ately. A composite auricular graft 3/4 cm wide by 3 cm long was taken from full thickness left concha as described by R. Dingman. It was bisected like a banana split for half its length. This was achieved by dividing the cartilage down the center, but, when peeling the skin on each side, half of the cartilage was left attached to the skin so two composite wings were created. The intact half of the composite graft was inserted into the membranous septal defect and the split half pieces were inserted into the lateral releasing incisions. The graft was sutured into position carefully with chromic catgut stitches. The early result of this procedure was encouraging, but one problem with the graft is the possible contracture over time. The patient never returned from her home in another country.



Unfortunately I do not have great faith in the long-term benefit of a complicated composite graft inserted into a scarred area of membranous septum. It is probably safer to use a simple composite graft to the septum and separate free skin grafts to the lateral lining. The following case is an example.

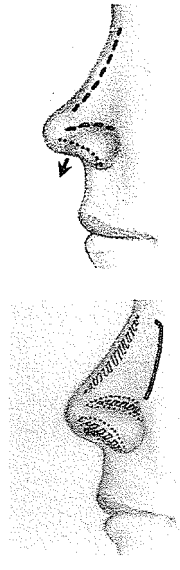
There are cases with in-depth discrepancies that cannot be cured with onlay cartilage grafts only. Often it is the subtle and out-of-sight absence of lining that is compounding the distortion. Diagnose before treating!

This 22-year-old female had had a submucous resection and rhinoplasty which was complicated by a staphylococcus

infection. A secondary procedure resulted in spread of the nasal bones, depressed nasal bridge, retracted columella, notching of the alar margins and a pinched tip. It was indeed a "banged up" nose.



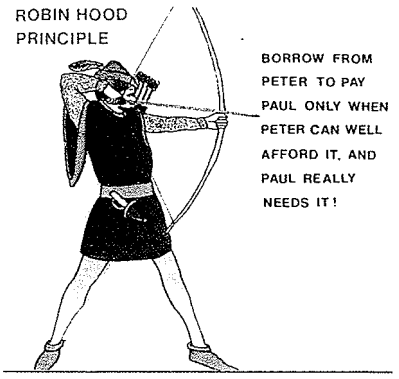
The actual key to the correction of the deformity was diagnosis of lining shortness. A membranous septal incision extended bilaterally as anterior vestibular incisions allowed the skin to be freed from the bridge with release of the alae and the columella. Bilateral osteotomies with in-fracture narrowed the nasal base. A chondrocutaneous graft from the concha of the ear with skin on both sides and cartilage in the center was grafted into the anterior membranous septal defect. Separate full thickness auricular skin grafts filled the lateral vestibular defects. The small alar margin webs were corrected by marginal excisions. A 1.5 × 4.0 cm auricular cartilage strip was grafted on the bridge but, as so often happens with extensive undermining, some of the bridge graft was absorbed. A year later a second auricular cartilage was inserted into a separate pocket all its own on the bridge to complete the contouring.





NASAL CHONDROMUCOSAL FLAPS

The nasal chondromucosal flap was first described by me in 1963, using it as bilateral vestibular flaps to release several retracted columellas and to line a nasolabial flap for reconstruction of a total columella. The versatility of a chondromucosal flap in the nasal vestibule was presented in 1973 with several interesting cases. Since then it has been found valuable in secondary problems.

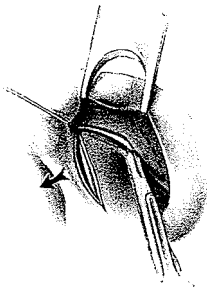


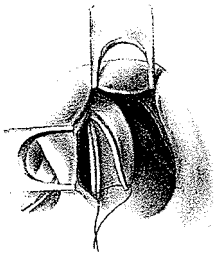
The use of these flaps epitomizes the Robin Hood principle in a double plus where the donor area needs to give up what the recipient area craves to receive. It also represents the extremes of the principle. In some cases the contribution of the flap from a (rich) hanging sidewall to release a (poor) snubbed nose and retracted columella is advantageous to both parties. In other cases where there is no true excess but the required flap is specifically essential for columella reconstruction or retraction correction, the lateral vestibular sidewall can be asked to give up the flap. Under these circumstances these defects should not be closed directly but rather aided by the insertion of a thick split skin graft.

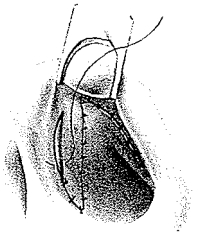
The chondromucosal flap is "on the spot" for repairs in this part of the nose, available immediately for a "one-shot" reconstruction, and it has acrobatic maneuverability. It enjoys vascular dependability far beyond any predictions based on its width-to-length ratio—and in spite of scars which may be near or in it. Best of all, it brings nasal lining with adherent cartilage to the area without too much increase in bulk.

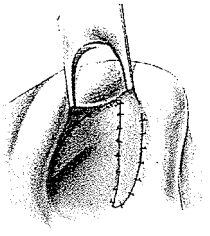
The use of these flaps does not interfere with the usual rhinoplasty maneuvers. In fact, the flaps can be developed at the beginning of a rhinoplasty and give better exposure—or, if the future position of the flaps is noted, the actual cutting of them can be delayed until near the end of the rhinoplasty.

The standard flap is a relatively narrow 1/2- to 3/4-cm strip of mucosa of the lateral nasal vestibule, together with a corresponding adherent strip of alar cartilage. It is usually four times longer than it is wide. Its pedicle base is superiorly









and anteriorly placed high up under the nasal tip above the front point of the septum.

To cut the flap, one extends the membranous septal incision laterally in the usual manner along the intercartilaginous line as far as the length of the flap. The tip of the flap is developed and then the incision comes back parallel to the first incision along the anterior vestibular line. The flap is freed from the overlying skin with right-angled scissors.

As the columella is released and advanced anteriorly, these bilateral flaps will ride forward with the tip and can be swung medially into a releasing gap between the columella and septum. As the "wings fold in," the cartilages of the flaps come together with the lining on the outside. As the sidewalls of the nose are longer than the central septum, these flaps will reach and easily correct a retraction extending as far down as the nasal spine.

Good Vascularity

The vascular dependability of these flaps is remarkable, considering the hazardous width-to-length ratio. The near 100% success in 100 flaps is probably due to the flap being backed by cartilage, which acts as a splint to prevent collapse or kinking of the vessels in the attached mucosa.

An ordinary skin flap of near dangerous width-to-length proportions and without a specific vessel, when cut and allowed to shrink, may turn bluish on its end due to collapse of its vascular channels. If left like this for a time, even though it is restretched later and sutured, the distal portion may have been lost from thrombosis. With cartilage backing, however, this collapse is prevented and the tendency to thrombose is bypassed. Scars near, in, or across the flap do not seem to prevent its use if sufficient time for revascularization has elapsed.

Economical

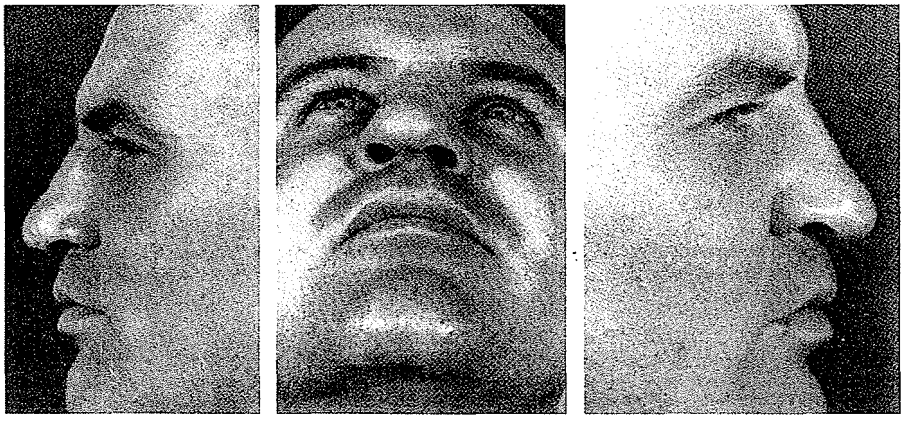
It is an economical flap, composed of tissue that is often discarded during a standard reduction rhinoplasty. Even after a reduction rhinoplasty, this flap is often still available. When taking the flap it is important to leave behind an anterior thin

strip of alar cartilage intact. Both the donor area and the recipient site of the flap are out of sight within the nasal vestibule: only the effect of its transposition is visible. There are multiple uses of this flap.

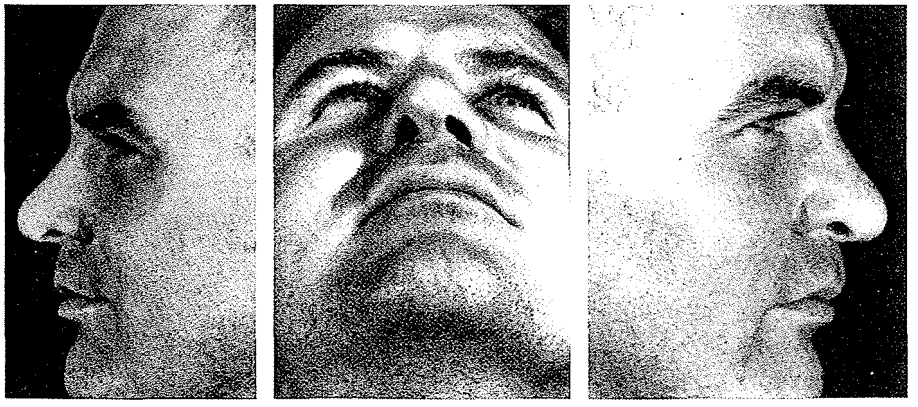
Bilateral

The chondromucosal flap is most commonly used as a bilateral procedure. The typical indication is a retracted columella with relatively long and overhanging sidewalls. The twin transposition of these chondromucosal flaps has a double effect. The columella is released as the sidewalls are lifted.

This 39-year-old man had a long, bulbous nose with severely retracted columella from previous football injuries and submucous septal resection.



The columella was freed from retraction by a membranous septal incision. Bilateral alar chondromucosal flaps swung down and in, coming together in the membranous septal gap with maintenance of the correction as well as reduction of the tip length and bulk.



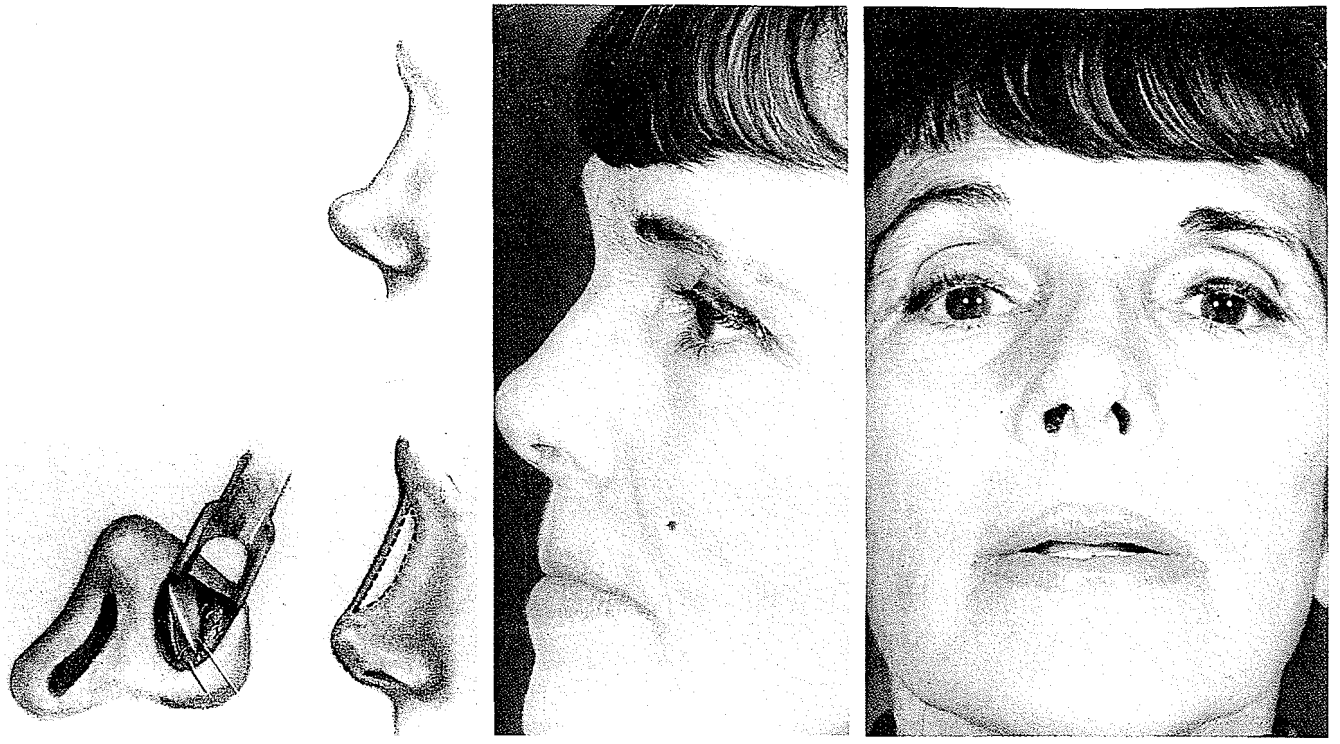
Here is an example in which a reduction rhinoplasty left the tip too long and caused the surgeon to resect too much anterior septum in his second operation. Bilateral vestibular chondromucosal flaps corrected the columella retraction, hanging sidewalls, and depressed nasal tip.



This 49-year-old woman had been operated on by a famous plastic surgeon who was not particularly skilled in rhinoplasty. She had a bulbous tip, retracted columella, depressed nasal bridge, and asymmetrically collapsed alae in knock-kneed position obstructing her airway. She had lived with this deformity for 20 years.

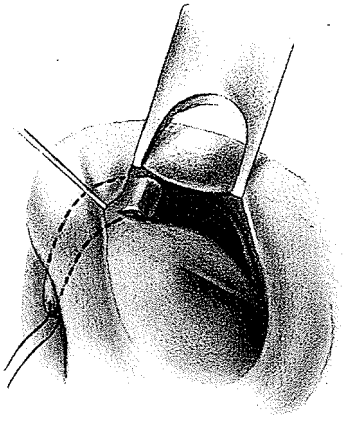


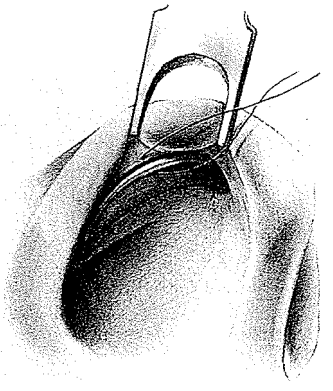
Lateral vestibular chondromucosal flaps were transposed into a releasing membranous septal incision which achieved simultaneous reduction of the tip, shortening of the sidewalls, and correction of the retracted columella. A silastic implant was inserted into a special pocket over the bridge to improve the profile.



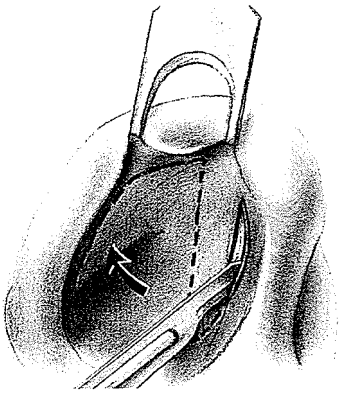
Unilateral

The flap can be used unilaterally when there is a difference in the length of the sidewalls, taking it from the long side. The septum is bypassed by slipping the flap over it at the tip. The flap is then inserted into a gap produced by a relaxing incision on the opposite side. The epithelium on the flap's base, which crosses the septum, maintains a small fistula. When the flap has become well vascularized in its new site, the base is simply excised. To bypass this second stage 1 cm of the base can be denuded of epithelium.

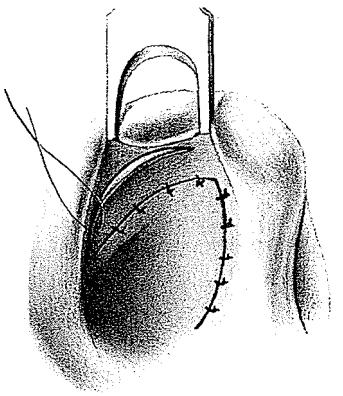




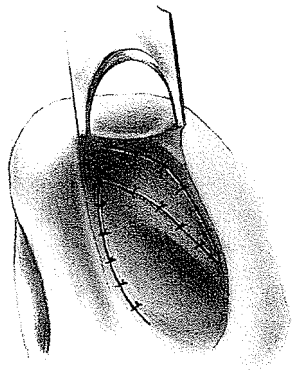
Flap in Reverse



The similar procedure can be done in reverse. The same general area for the base of the flaps is used. The chondromucosal flaps are taken from the area of the membranous septum including the posterior portion of the medial crus of the alar cartilage. If necessary, an anterior portion of the septal cartilage can be incorporated in one of the flaps. The key is to get some cartilage in each flap.



BILATERAL. The reversed application of this method is usually a bilateral procedure. It is most effective in cases where the combination of deformities includes (1) a hanging columella or a projecting septum and (2) ugly retraction of the lateral sidewalls with (3) collapse of the alar margins and obstruction of the nasal airway.



By taking the excess chondromucosal tissue from between and including various portions of the columella and the septum, this part of the deformity is corrected. It is important not to take more than can be spared in this membranous septal area because the new secondary deformity could be worse than the old one. Transposition of these flaps in a "wing spreading" maneuver places both support and additional lining into the area produced by lateral releasing incisions inside the vestibule and parallel to the alar margins. Not only does this let the retracted rims down, but the added support to the flail sidewalls opens the airway and maintains the improved apertures.

Here is a patient who, unfortunately, had a rhinoplasty by a surgeon trained in another specialty. The operation resulted in a comical bridge line, retracted sidewalls, and a hanging columella. There was also an asymmetry of the nostrils with varying degrees of collapse intermittently obstructing her air-



ways. Correction was performed by use of chondromucosal flaps taken from the general area of the membranous septum. Each included either a portion of the medial crus of the alar cartilage, or a piece of septal cartilage. They were transposed bilaterally into releasing incisions in the lateral walls of the vestibule. This lifted the columella, released the alar rims, and splinted the sidewalls to correct the collapse and prevent airway obstruction.



This secondary deformity with the typical hanging columella and retracted sidewalls occurs more commonly than would be expected and is difficult to correct by standard procedures. Again the bilateral chondromucosal flaps transposed bilaterally solved the problem.



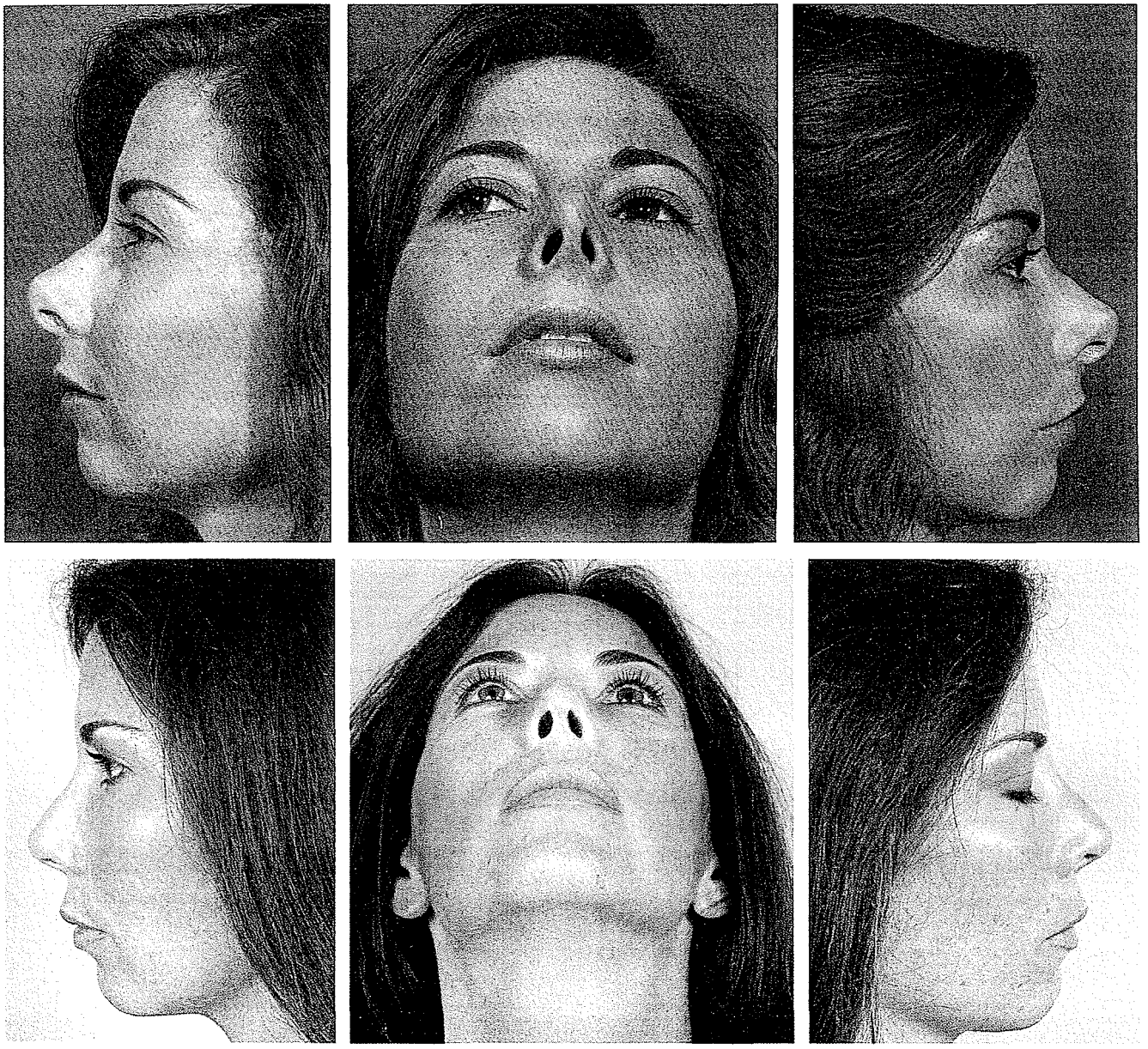
This 28-year-old woman after rhinoplasty and one secondary procedure revealed moderate hanging columella and retracted alae. Bilateral chondromucosal flaps from the anterior septal area were transposed into releasing incision in the lateral vestibular lining of the alae. Alar base wedges and cartilage graft to the tip completed the correction.



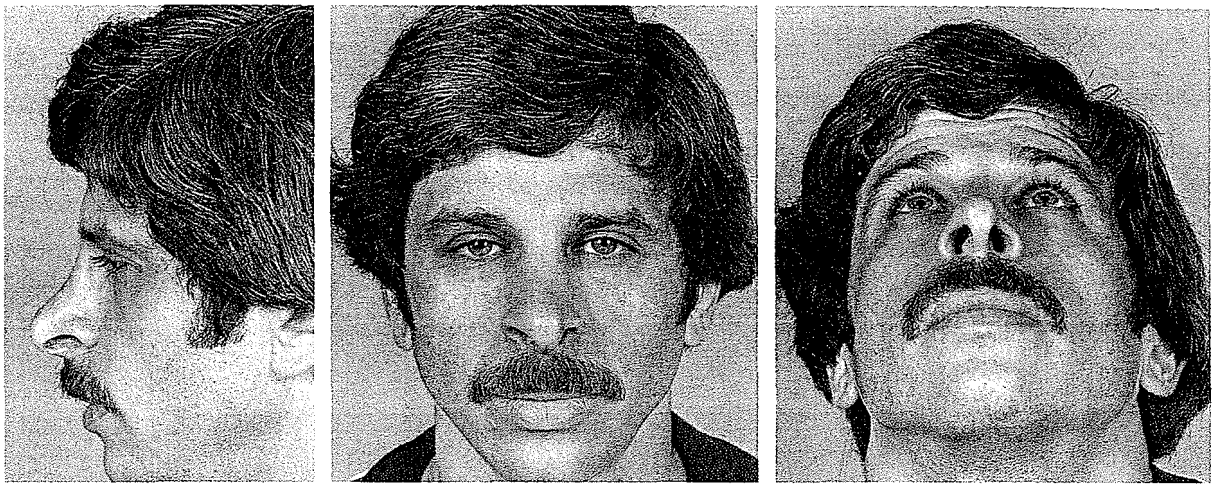
Here is a more subtle example of this deformity with a pinched tip effect. Conservative bilateral chondromucosal flaps relieved the lateral retraction and was further benefitted by tip and bridge revisions.

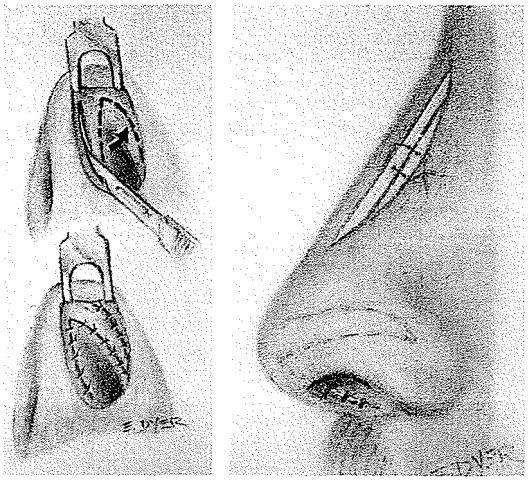


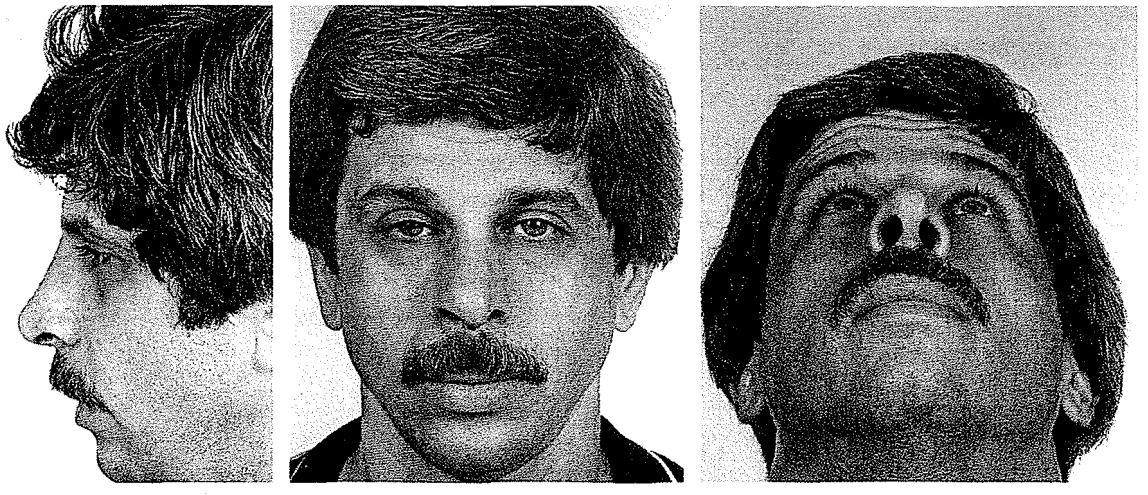
This strange nasal deformity seen at age 25 is the result of a rhinoplasty at age 15. The snubbed tip, retracted alae, and hanging columella were corrected by first lowering the distal bridge. Then the transposition of two membranous septal chondromucosal flaps (the left one carrying medial alar crus and the right one carrying a sliver of septal cartilage) were inserted into lateral vestibular releasing incisions.



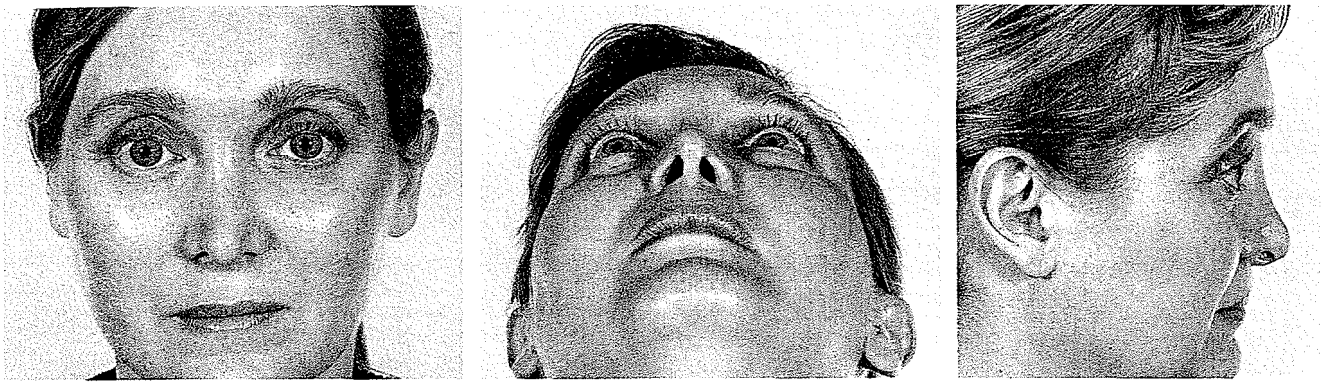
The first rhinoplasty surgeon took too much from the bridge and the lateral lining and not enough from the anterior septum. Improvement was achieved with a two-tiered septal cartilage graft to the bridge and the transposition of bilateral chondromucosal flaps from the anterior septal area to releasing incisions in the lining of the retracted alae.



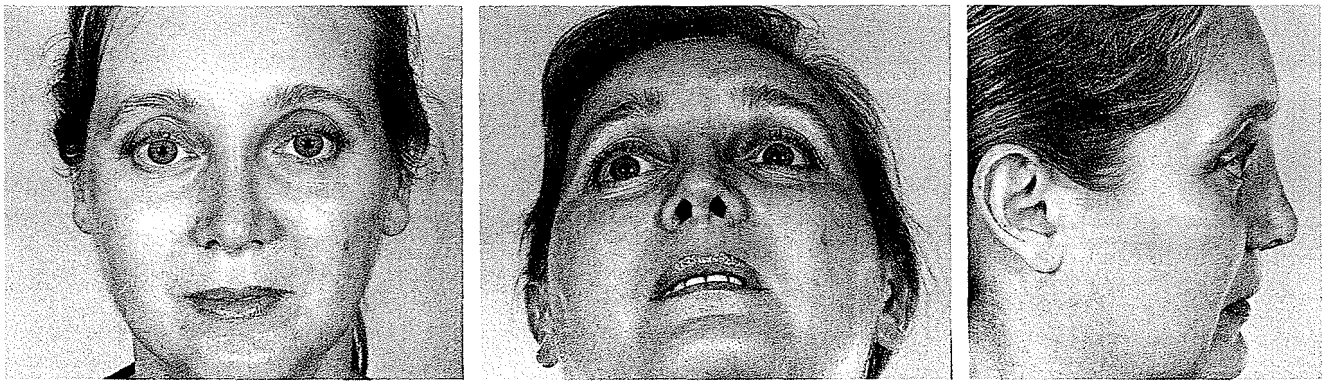




This 45-year-old female had had several rhinoplasty procedures and at least one open rhinoplasty which had resulted in a scooped bridge with a supratip curve, pinched tip with retracted alae, and a hanging columella.



Bilateral chondromucosal flaps were taken carefully and with some difficulty because of the scars of open rhinoplasty in this area. It is likely that the opening scars did delay the flaps with that slight advantage. These flaps, taken from the membranous septal area incorporating thin slivers of cartilage, were transposed into releasing incisions in the lateral alar lining to correct the retraction and excess creasing. This shifting of tissues also corrected the hanging columella. The distal bridge was straightened and the depressed middle bridge was augmented with auricular cartilage.



Airway Collapse

This secondary deformity is classic. It had the parrot's beak, the hanging columella and irregular retracted alae. On inspiration the flail right alar and sidewall collapsed, completely obstructing her airway.

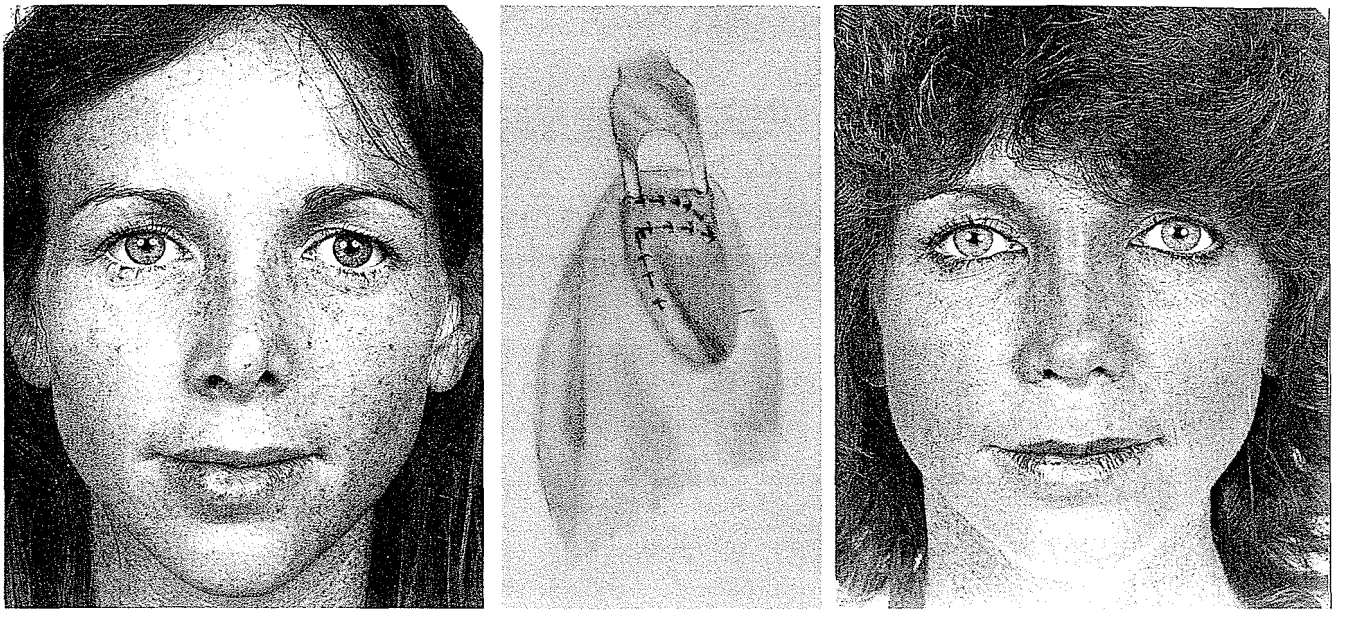


The bridge was straightened by shaving down the excess septum in the supratip area. Bilateral chondromucosal flaps, taking bits of cartilage from the medial crura and the septum, were transposed into releasing incisions in the lateral vestibule which not only lifted the columella and lowered the alae but put some support in the sidewalls to prevent collapse. She is inhaling in the postoperative nostril view.



Unilateral Flap

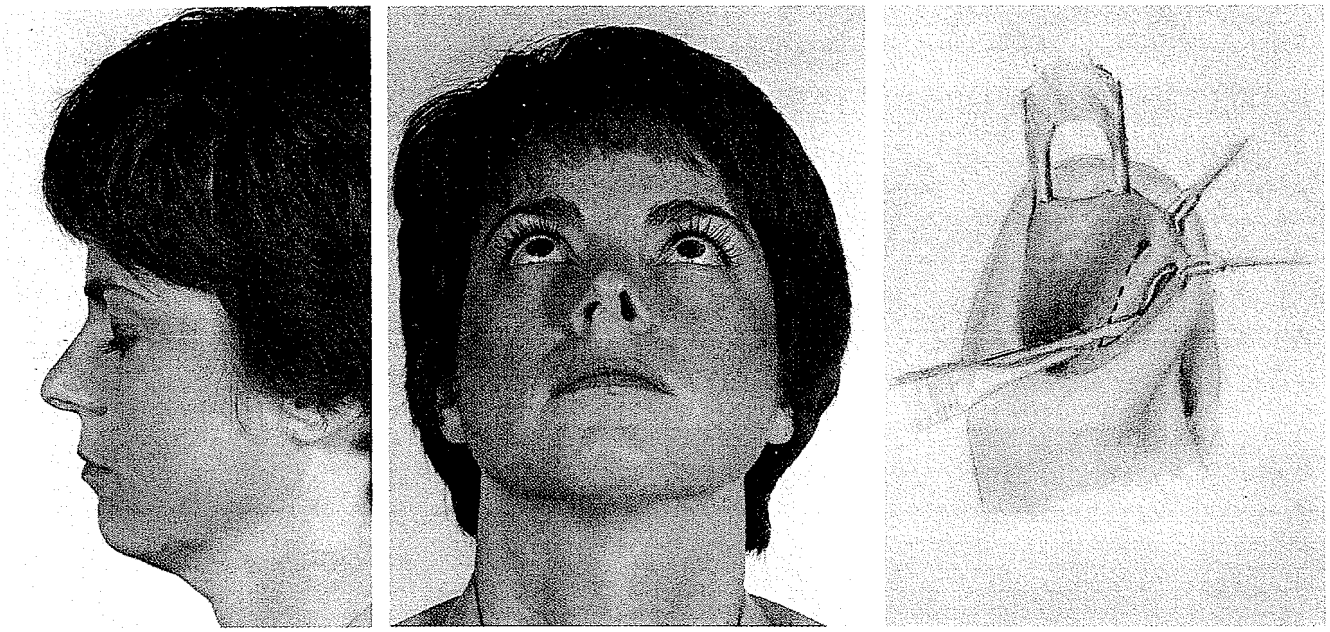
This 25-year-old female revealed a retraction of the left ala following rhinoplasty. A left chondromucosal flap taking medial crus of the alar cartilage along with mucosa of the membranous septum was transferred into a vestibular releasing incision parallel with the alar margin. A cartilage tip graft added definition to the alar balance.



The use of nasal vestibular chondromucosal flaps can also be as useful in alar reconstruction, as they are in reconstruction of secondary deformities following rhinoplasty.

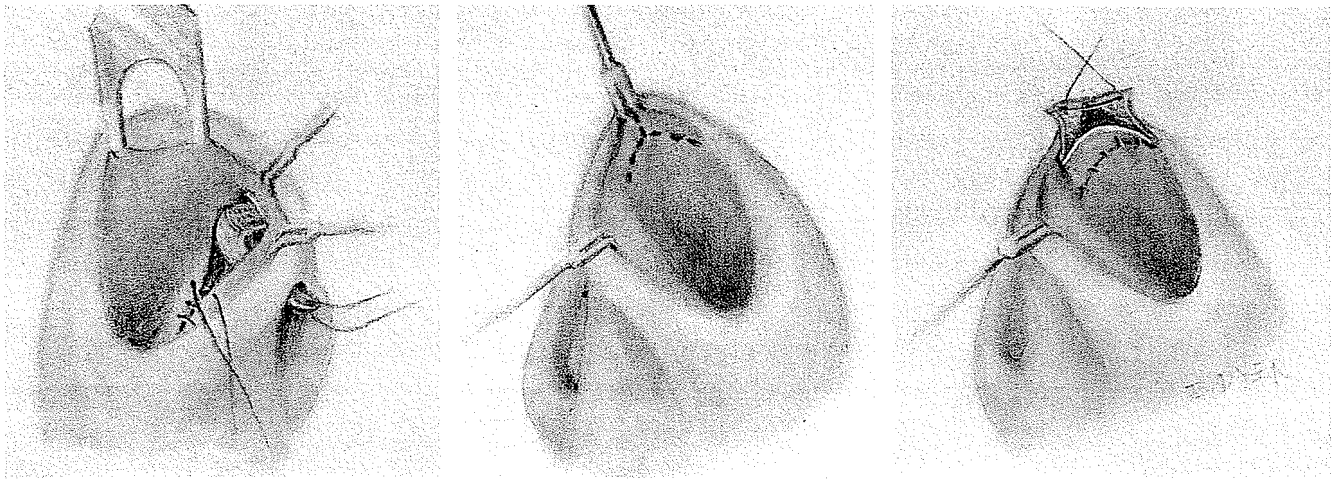
Alar Notch

This 36-year-old female had a rhinoplasty with complications that resulted in loss of the normal ala-columella web, resulting in a rather odd and startling notched effect. The septum was deviated to the right.

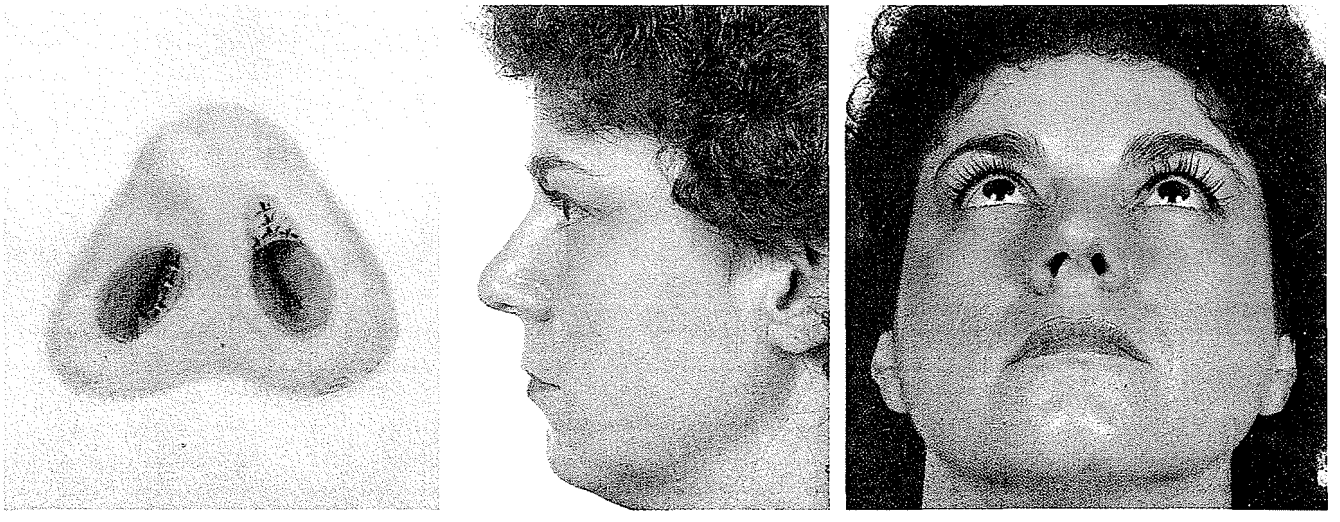


A membranous septal chondromucosal flap taking a portion of the prominent medial alar crus on the right was elevated with its base anterior on the upper columella. This

provided exposure for septal cartilage freeing, scoring, and better midline positioning. The skin hugging the upper left columella was turned out as a flap as was the skin lining the ala in the notched area. These two flaps were sutured together to reform the skin web arching the upper extremity of the nostril. Then the chondromucosal flap denuded carefully of epithelium for 1 cm of its base was passed behind the upper columella and brought out into the left upper nostril to line

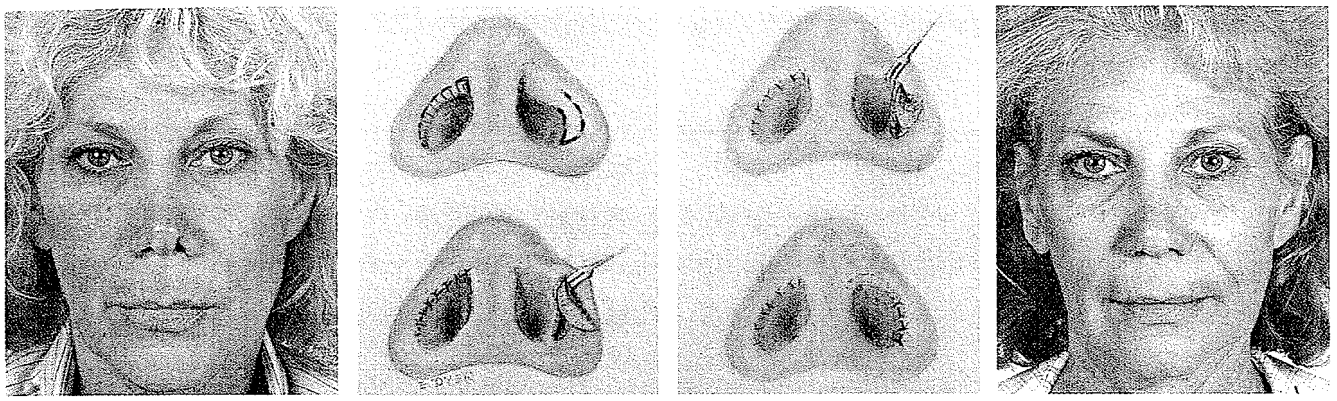


and support the out-turned skin flaps. Minor marginal revisions completed the reconstruction as seen after one year.

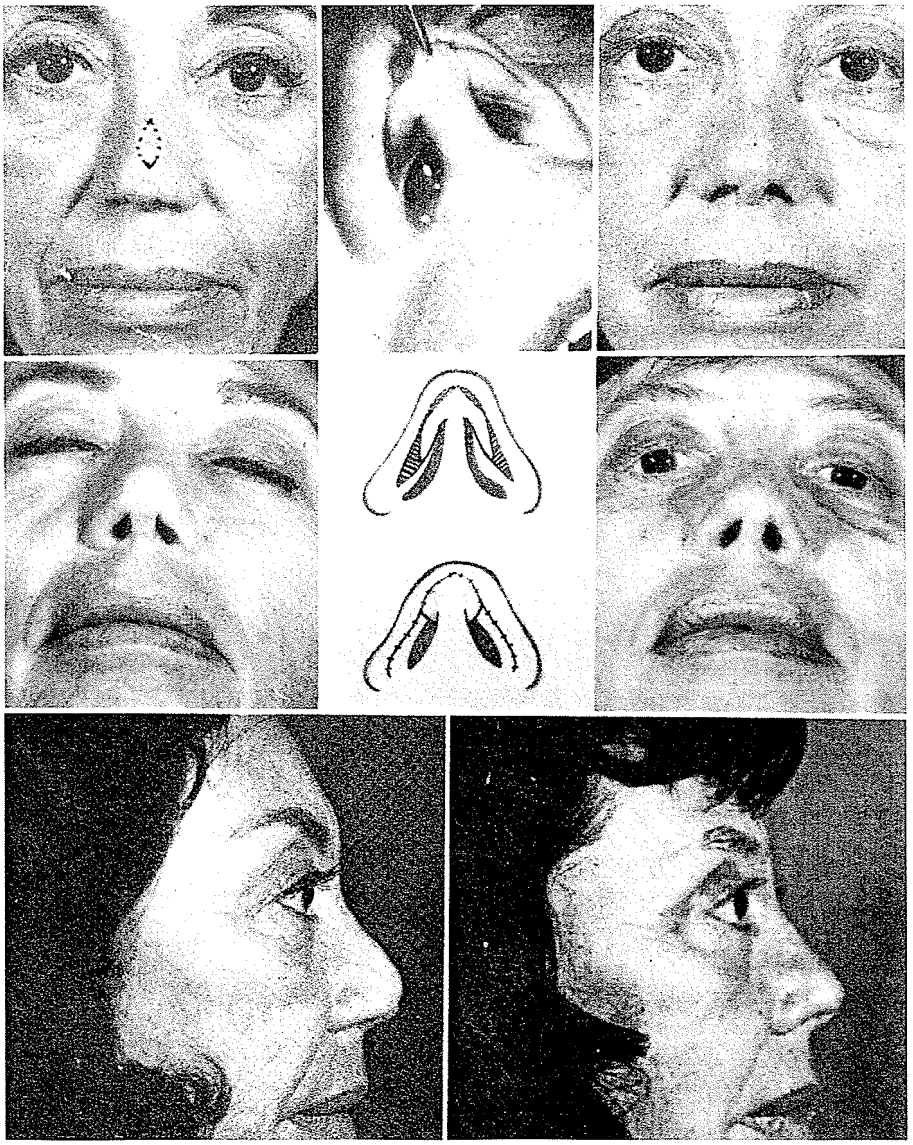


Take Whatever is Offered

Here is a strange combination of notching of the left ala with excess left alar base. In a Robin Hood switch the excess alar margin was taken as a flap, denuded of epithelium and inserted under the skin of the notched area to correct both deformities.



When the soft triangle is violated various secondary deformities occur. When the nostril arch has collapsed to an acute angle bilateral alar margin flaps can be transposed from above to round out the nostril curve.

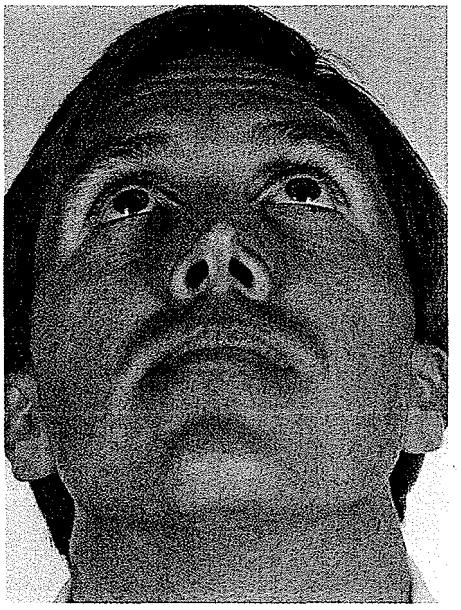


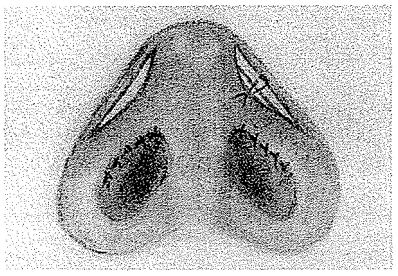
PINCHED TIP

The pinched nasal tip is an eyecatching deformity because it is so up front. It is usually caused by the enthusiastic excision of alar cartilage along with too much vestibular lining. Often there has been interruption of the integrity of the alar cartilage arch. The combination of all of these excesses destroys the natural flow of the tip into the ala and columella, often leaving the tip too full or too isolated from the ala by cartilage notching. The alar creases extend too far forward into the tip, and the alae often show asymmetric retraction due to lack of lining and insufficient alar cartilage support. The multiple and varied deficiencies create a mirage that makes specific diagnosis difficult. Yet even partial replacement of lost tissue with similar tissue can be beneficial.

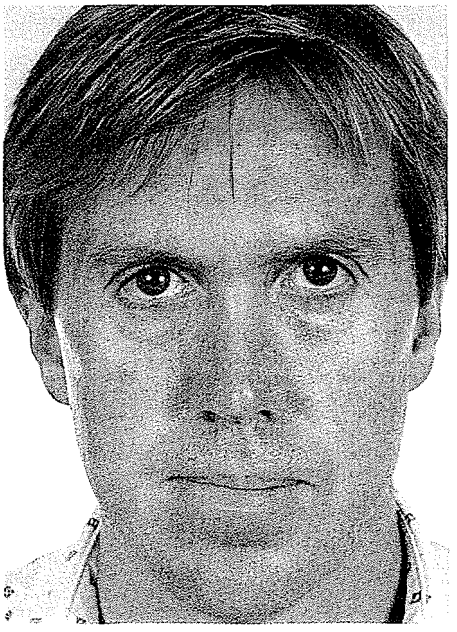
This 34-year-old male had a reduction rhinoplasty that evidently removed too much alar cartilage and interrupted the integrity of the alar arch. The pinched tip caused moderate alar collapse with reduction in the airway. Septal cartilage

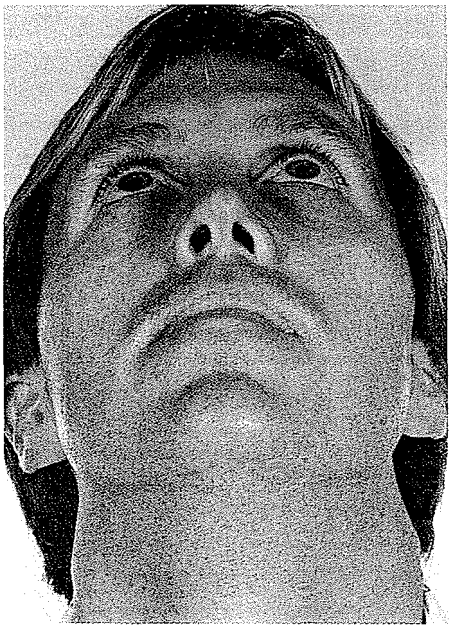




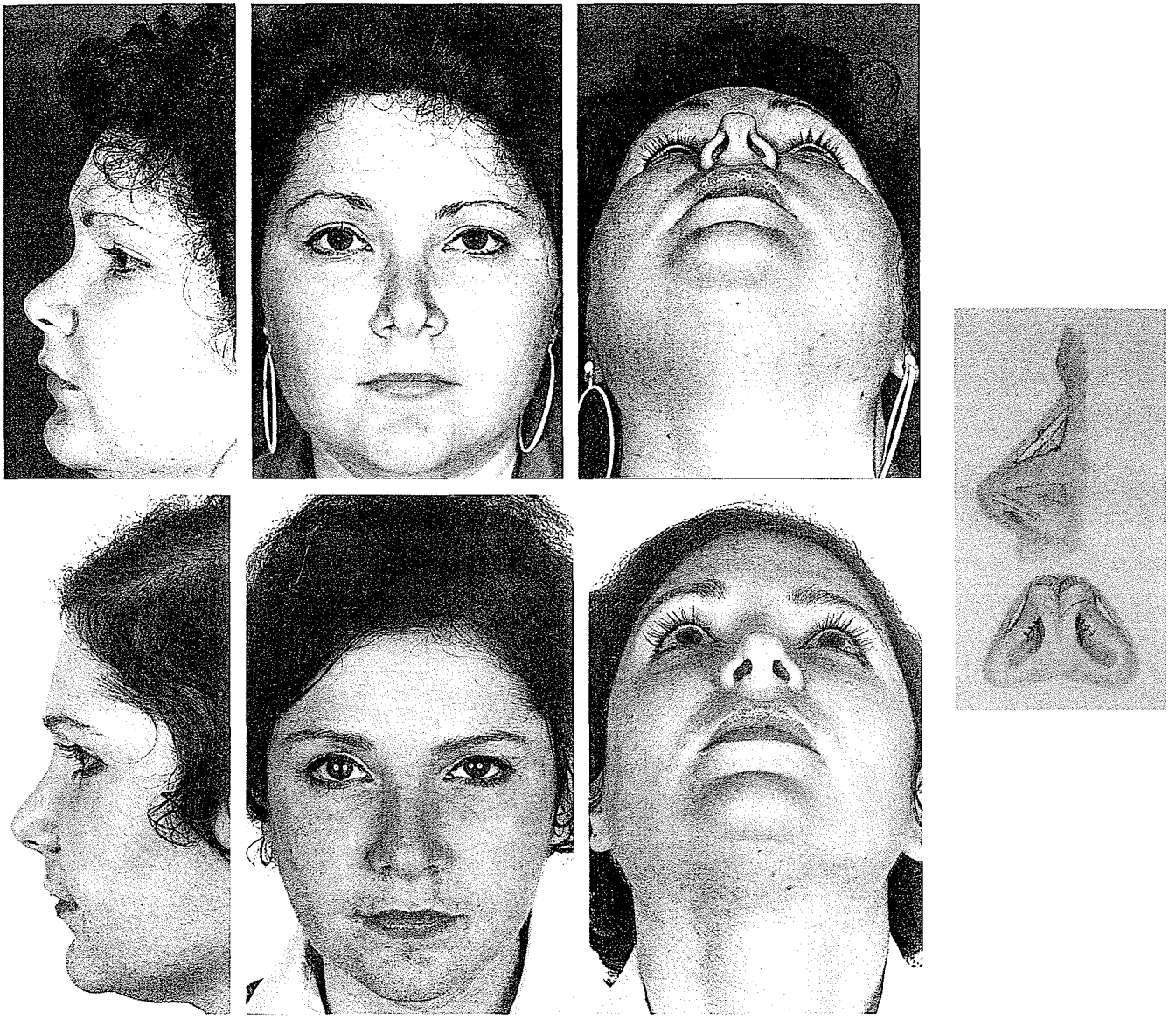


struts taken during a submucous septal resection were shaped to fill out the depressions on either side of the tip. A two-tiered graft was used on the left. These cartilage struts were inserted through marginal incisions to bridge the hollows. A bilateral osteotomy with infractures improved the width of the nasal base, and alar base wedges reduced the flare.

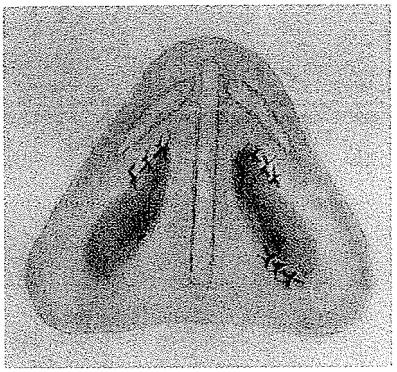


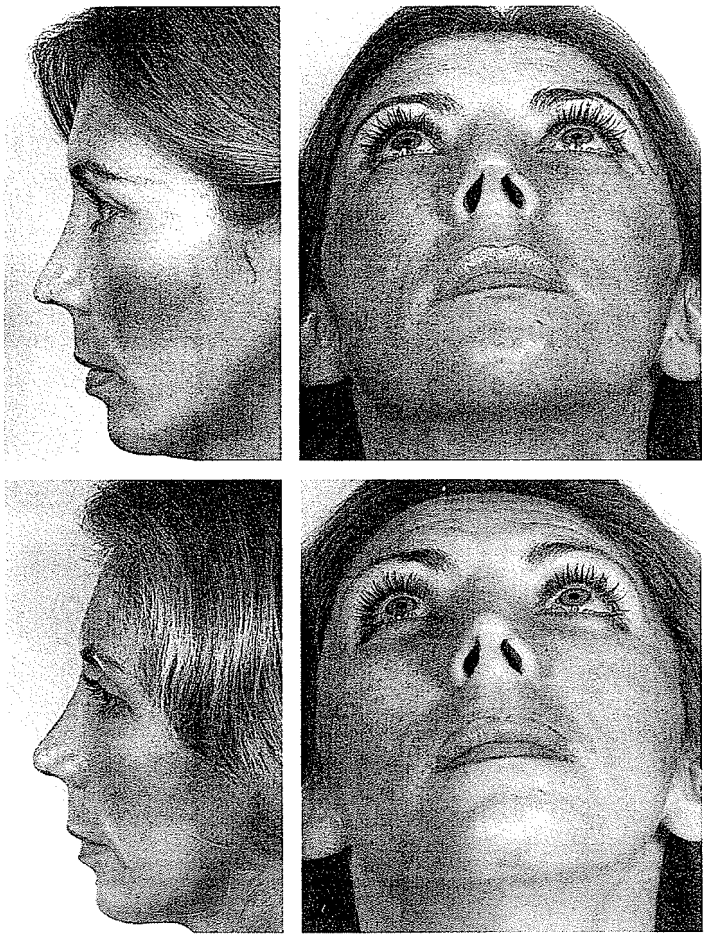


This patient had suffered interruption of her alar cartilages, resulting in collapse of the alar arch. Her bridge had been lowered too much. Thus, replacement of what is missing required a two-tiered septal cartilage graft to the bridge. Reduction of the remaining excess alar cartilage, plus splinting of the collapsed sides with septal cartilage struts, brought back some of the naturalness to her nose.



Here is an asymmetric pinching of the tip that required septal cartilage strutting of the columella into the tip and splinting of the collapsed alae with onlay cartilage struts.



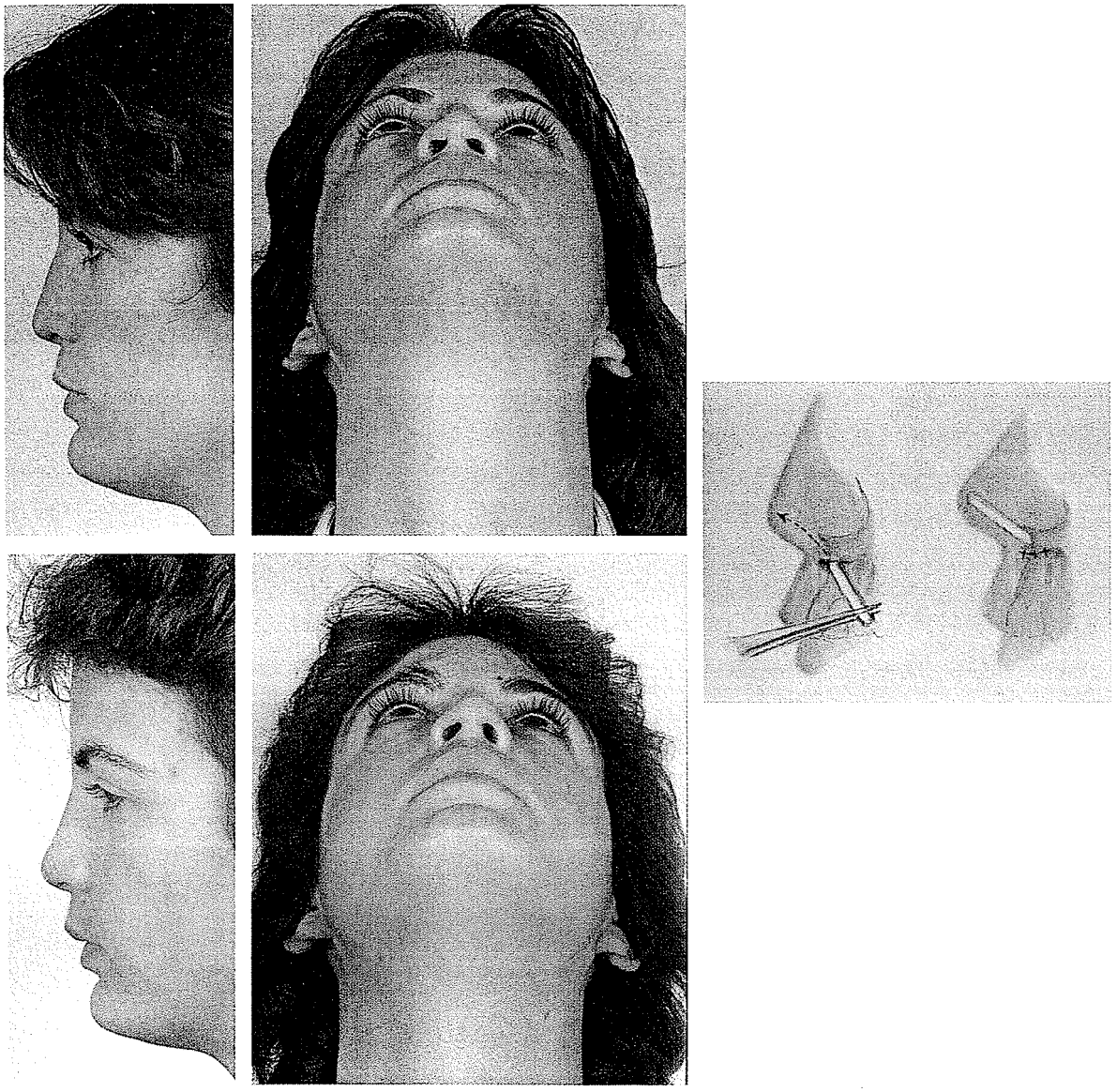


This unusual pinching beneath a bulbous tip was improved by reduction of the alar cartilage bulge and defining the tip with a cartilage strut up the columella and into the tip.



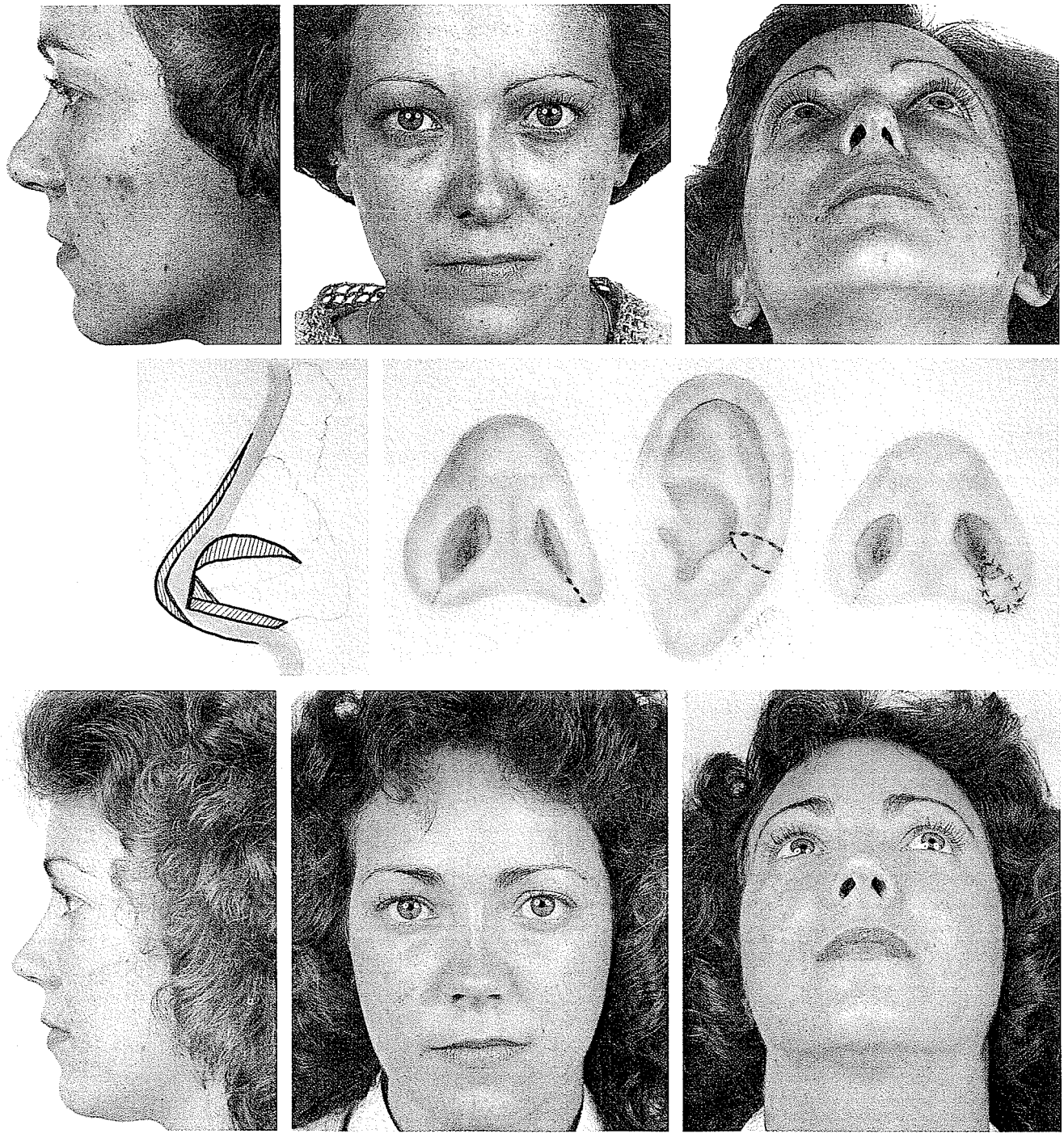
Depressed Tip

There are rare incidences of postoperative depressed tip that can be improved with a septal cartilage strut inserted through the upper buccal sulcus the length of the columella and into the tip. This strut corrects columella retraction and gives projectile authority to the nasal tip.



Other Asymmetries

This 25-year-old female had undergone an amateurish rhinoplasty in which much had been left that should have been taken and too much removed during the left alar base resection. This required a redo of the rhinoplasty which included bridge, anterior septal, and alar cartilage re-reduction. Then a composite ear graft released the collapsed left ala.



A SECONDARY QUINELLA

A Black nose, which is known for the difficulties it presents against refinement, was treated by all the latest rhinoplasty fads including open rhinoplasty and cartilage grafts to the tip.

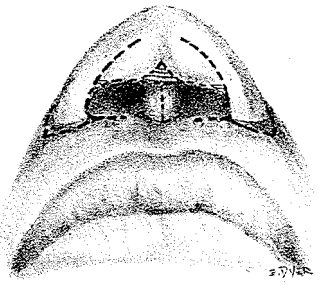
This intelligent black female reminisced that she once had a reasonable nose which was not as refined as her siblings. She sought plastic surgery and received several operations. The patient recalls at least eleven operations with slight improvement only after the first two. A second surgeon started using the open rhinoplasty approach and she marked this point as the beginning of trouble. She recalled several cartilage grafts. The patient was referred to several surgeons including G. Burget, who described her case as one of the worst he had seen in his practice.

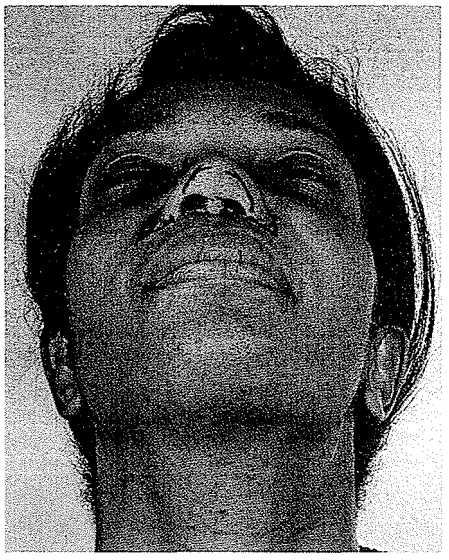
The patient was first seen by me in 1992. She was 40 years of age and had a nose that seemed to have been lengthened and flattened into a Picasso masterpiece. The short retracted columella had two transverse scars, one at the base and one at the tip. Both alae had been shortened—the left more than the right—and there was absence of alar bases and nostril sills, obviously from the injudicious use of alar base excisions. There was severe reduction in nostril skin and asymmetric distortion of the nostril apertures. There was a vertical midline scar in the tip and absolutely no definition in the tip or alae. The nasal bones were wide, but the profile line was not grotesque. As usual, the scars of the nose had healed well but this is to be expected even in the Black race.

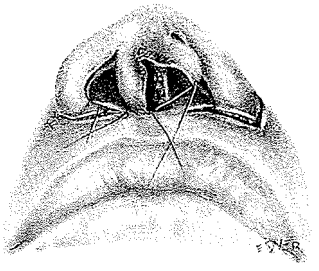


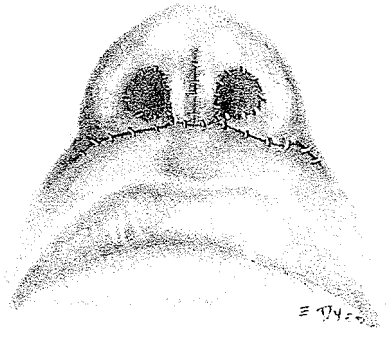
The corrective design used the Robin Hood principle to its fullest. The overhanging alar margins were marked as flaps based medially at the tip to be transposed to each other to onlay the retracted and scarred columella. This opened and reshaped the nostrils, effecting a shortening of the nose. The alae, in spite of their associated scars at the bases, were lengthened by a V-Y extension along the upper nasolabial line. These alar extensions were transposed at a 90-degree angle to the nostril sill position. In one procedure the transformation was encouraging. All nasal scars healed well. Unfortunately, the patient developed hypertrophic scars in the nasolabial area. These were excised and treated with Interferon by dermatologist Brian Birman.

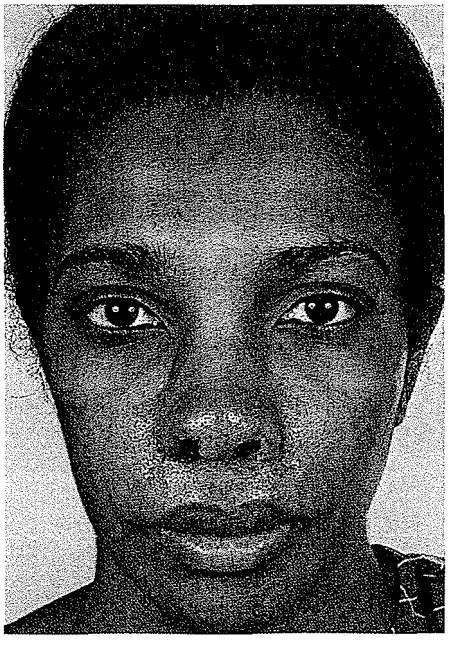




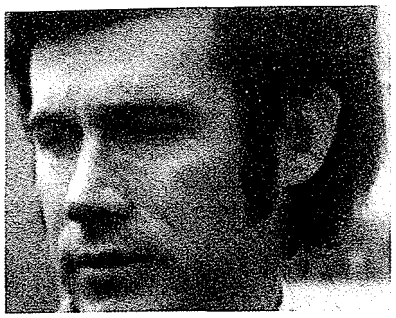








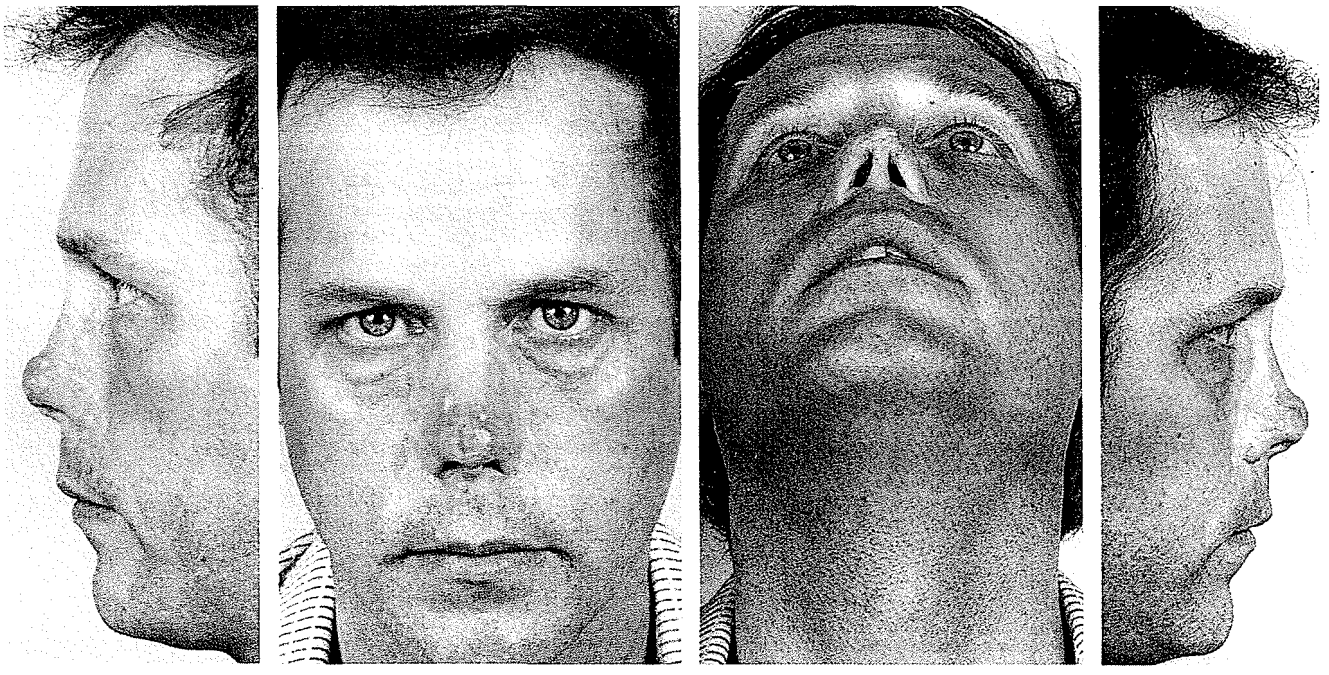




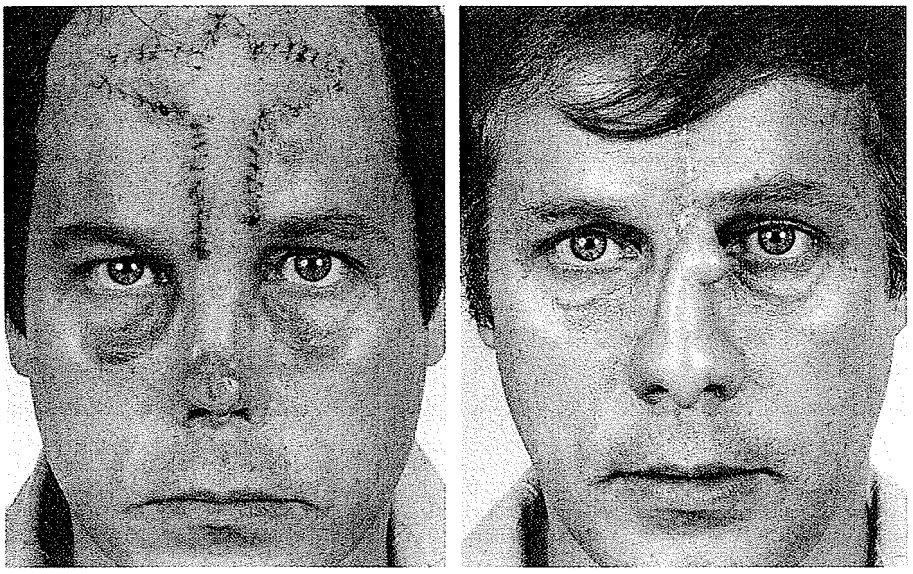
GENERALIZED SCARRING AND SHRINKAGE

Occasionally the damage done during a rhinoplasty and subsequent secondary rhinoplasties complicated by infection can be disastrous, necessitating radical reconstruction.

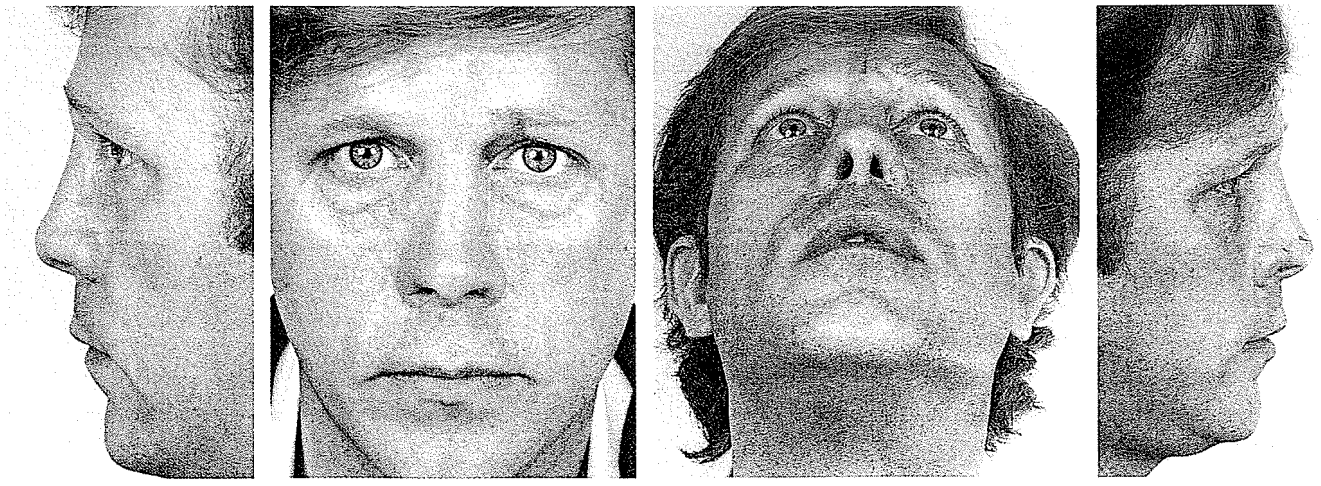
Here is a secondary case of a male who evidently started with only a moderately large nose. His primary reduction rhinoplasty probably was too radical and several frantic secondary procedures using auricular cartilage and skin grafts had truly complicated the problem. The patient, an actor from a southern European nation, expressed in a letter his great expectations and was strongly discouraged from coming to Miami. He came anyway and revealed, as feared, tight, scarred skin over the entire nose with loss of length and contour and no possibility of regaining his profile by insertion of support under the contracted skin. Not only was the skin of the nose irreversibly scarred but there was also loss of landmarks, units, subunits, relationships, and symmetry, as well as a distressing lack of normal rolls, creases, and highlights.



It was explained to the patient that to regain length, height, contour, natural color and textured cover for his contracted nose, a seagull forehead flap was indicated. From the look in his eyes I expected the patient to take the next plane back home. He was given time to consider this drastic step. Quite to my surprise he returned and submitted to a forehead flap delay and subsequently to a resurfacing of his nose with a thinned forehead flap and a T closure of the forehead donor area.



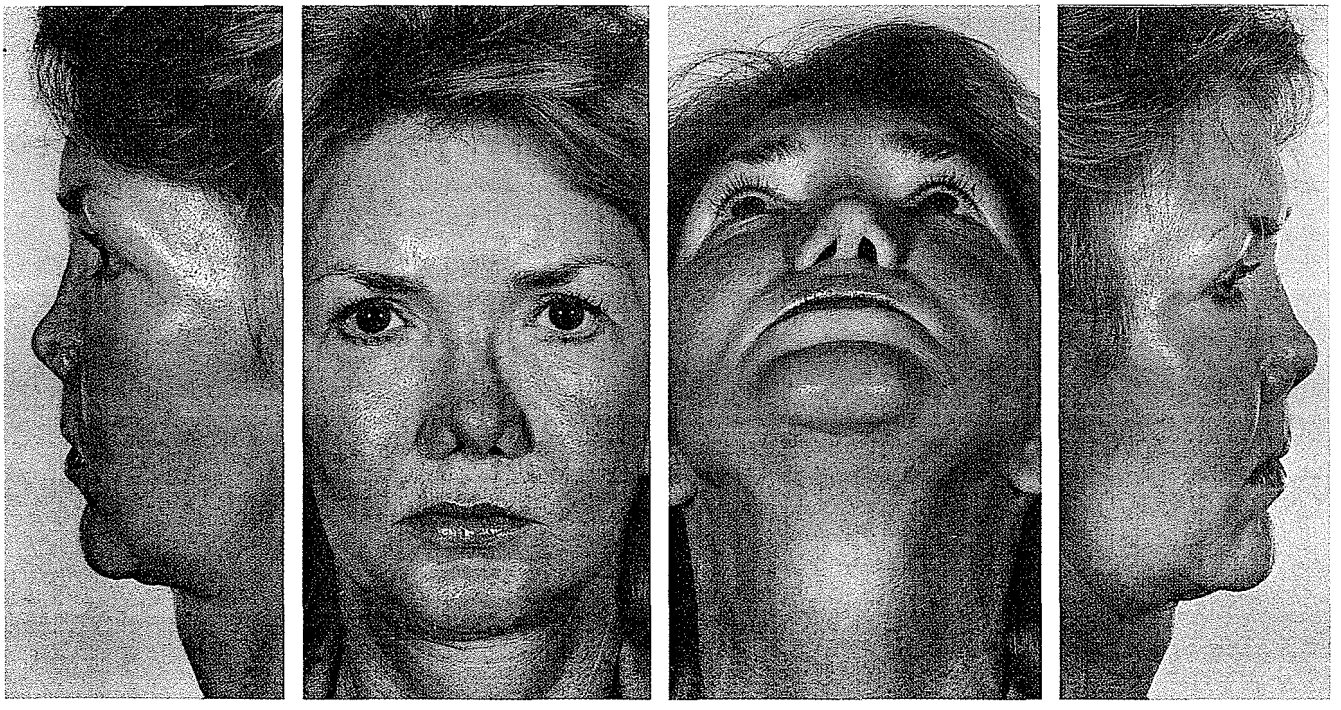
After three weeks the skin pedicle was divided, preserving the vascular bundle and replaced in the glabella-brow area. He finally returned for minor secondary sculpturing of the contours and in the end expressed satisfaction with his nasal reconstruction. He even returned years later for bilateral blepharoplasties but made no further request about his nose.



ANOTHER RADICAL SECONDARY CORRECTION

This 55-year-old female fractured her nose at the age of 12 and was operated at that time in an attempt to open her airway and straighten her nose. Although she had a well trained plastic surgeon, the surgery was not successful so at the age of 17 she was re-operated and her nose was shortened. This was also unsuccessful, so at the age of 29 another surgeon removed much of her nasal bones. At age 36 she had a silicone implant inserted and at age 52 she had the silicone implant removed and replaced with costal bone. A year later another surgeon attempted another bone graft.

When first seen at the age of 55, as would be expected the patient presented a short, flat, constricted nose with asymmetric collapse and such tense scarring that the skin envelope would accept no more structural support. What was even more amazing the patient did not seem bitter but was cheerfully willing to accept extra scars in an attempt to regain an unsnubbed nose and more normal profile.



Just proximal to her tip a through and through incision released her snubbed tip and skin was sutured to mucous membrane around the margins of the defect. Her bridge skin was delayed with circumscribing incisions and a small, falcon-shaped vertical forehead flap based on the left supratrochlear vessels was delayed with incisions.

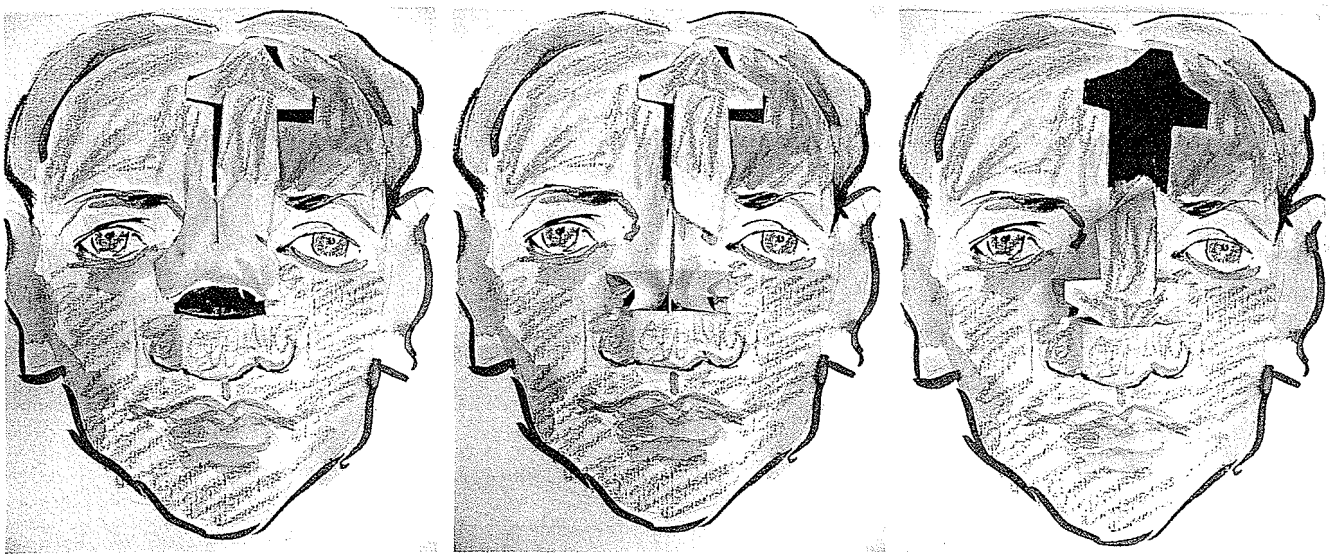


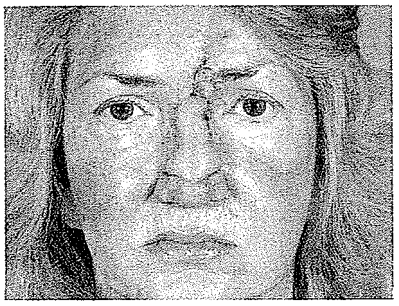
Three weeks later the bridge flap was turned down and split to fill the lining defect. A rib cartilage graft was fixed over the bridge, the forehead flap brought down to complete the cover, and the forehead defect was closed except for a small diamond.



Two thousand years ago in China, soon after paper was invented, the original Oriental art of paper folding was developed. Khoo Boo-Chai with I. Tange in 1970 duplicated the facial cleft problem in paper and then created origami models to facilitate the study of the deformity and its surgery. R. Picard has adopted this approach to help students visualize the shifting of flaps in nasal reconstruction: first release of the tip and delay of the lining flap and the forehead flap, second turning the split lining into the defect, and finally bringing the forehead flap in for cover.







After one month the pedicle was divided and replaced in the glabella area to release the left brow. After a healing phase the flap was trimmed.

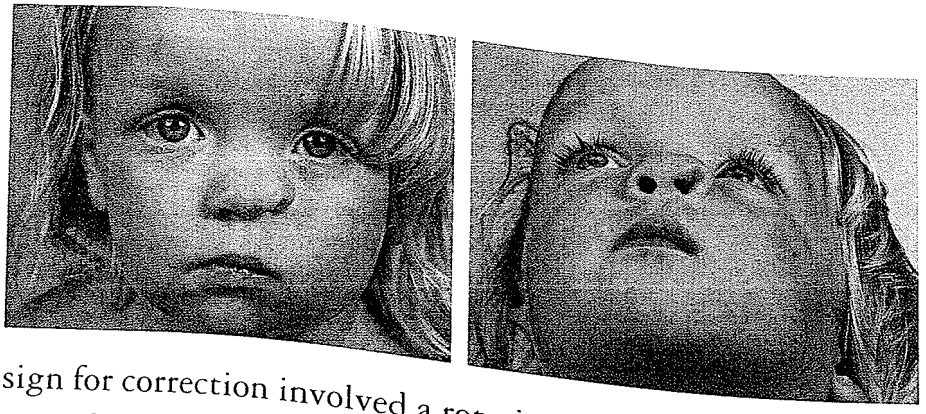


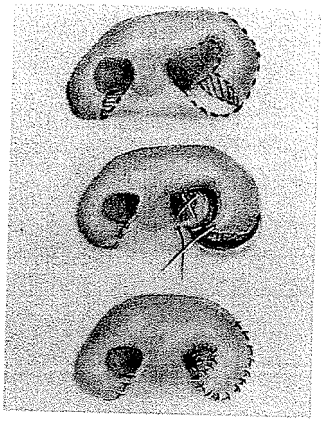
3.
Rhinoplasty in Congenital Anomalies

CONGENITAL deformities of the nose represent the failure of embryogenesis to carry the nasal development to the end point. In these cases treatment necessitates diagnosis of the state of developmental progress. Only then can surgery be directed toward continuing what should have happened in the first place. Usually this involves moving displaced tissue into normal position and retaining it there. When the congenital deformity includes actual absence of elements, these missing parts must be replaced with as close to similar tissue in kind as possible.

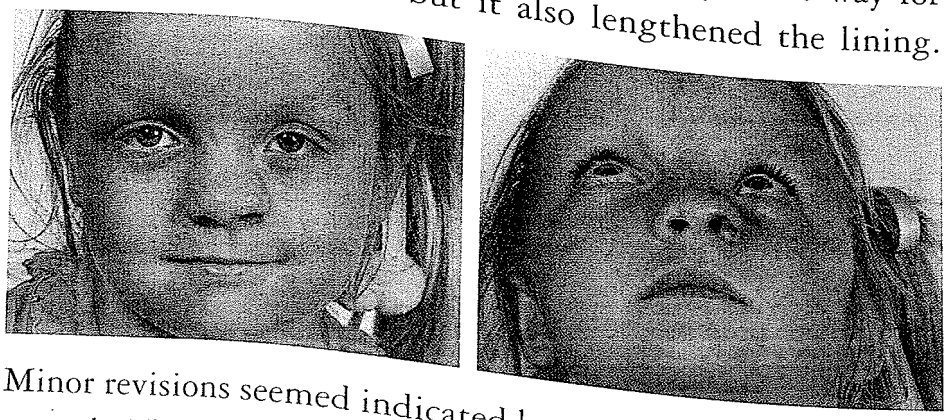
AN UNUSUAL UNILATERAL NASAL DEFORMITY

This female child was born with a retracted left ala which was longer in circumference than the normal ala, causing lateral bulging. She had already had one surgical procedure. The de-





sign for correction involved a rotation incision of the alar base extending around into the alar crease. This allowed the alar base to come down and around. The distal portion of the ala was resected. Then a flap of the skin of the upper lip in the area designated to receive the alar base's new implantation was lifted and transposed into a lining releasing incision in the lateral vestibule of the ala. This not only made way for positioning the alar base but it also lengthened the lining.



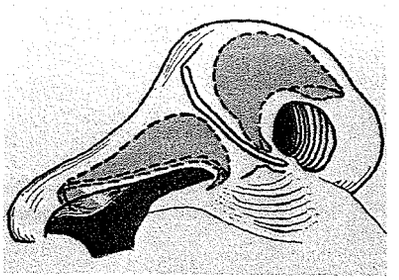
Minor revisions seemed indicated but would serve better after growth. The patient, from another state, never returned.

NASAL DEFORMITY IN UNILATERAL CLEFT LIP

In 1949 plastic surgeon W. C. Huffman and otolaryngologist D. M. Lierle gave a detailed accurate description of the unilateral nasal deformity in cleft lip. They noted:

1. nasal tip deflection,
2. cleft alar cartilage dome retroplaced,
3. obtuse angle between medial and lateral crus of alar cartilage,

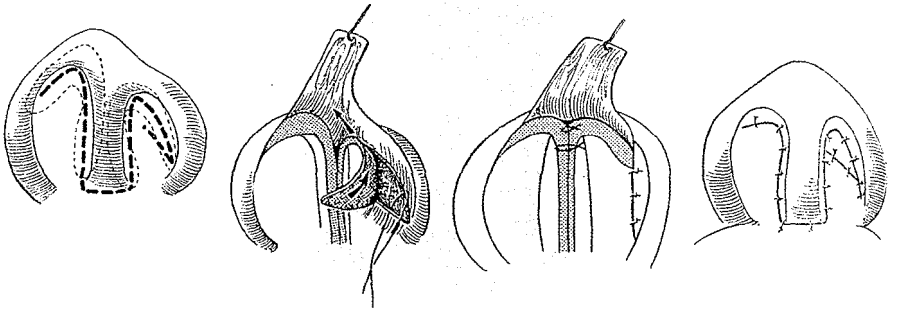
4. inward buckling of ala,
5. absence of ala-facial groove with alar attachment to face at an obtuse angle,
6. real or apparent deficiency of bony development,
7. overly wide dorsal extremity of nares,
8. a naris circumference greater than that of its fellow,
9. more dorsal position of the entire naris,
10. shorter columella on cleft side,
11. medial alar crus inferiorly placed in the columella, and
12. columella slanted obliquely with the dorsal portion of the septum dislocated off the nasal spine and presenting in the normal nostril with the anterior septal tip leaning over the cleft.

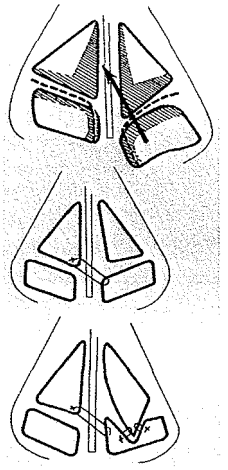


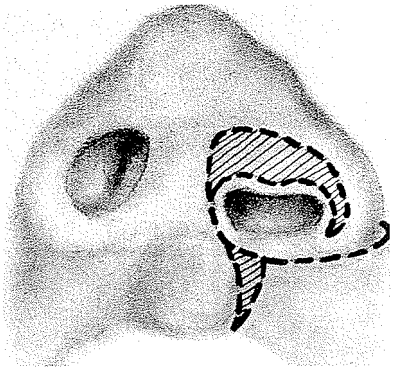
Berkely in 1959 added the bowstring contracture of interior of nostril extending from its apex along the upper border of the lower lateral cartilage to the margin of the pyriform sinus. I subsequently indicated that this web is involved with the distorted lateral tail of the dislocated alar cartilage. The total effect of these nasal distortions is exasperating asymmetry with the vertical axis of the normal nostril presenting an opposing contrast to the transverse axis of the cleft side nostril.

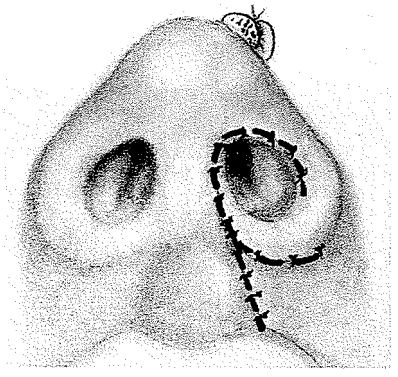
EVOLUTION OF THE CORRECTIVE SURGERY

In 1976 in Volume 1 of *Cleft Craft,* the evolution of the surgery of nasal correction in unilateral clefts was outlined in careful detail. Those methods that addressed the major nasal problems were directed toward moving displaced tissues into normal position. Harold Gillies' 1952 lift of the slumped alar cartilage, reduction of the normal alar cartilage, correction of the deflected septum, and medial advancement of the flared alar base gave improvement. In the severe slump he advocated an onlay cartilage graft. John Potter's 1954 Rethi exposure with medial advancement of the slumped alar cartilage of-







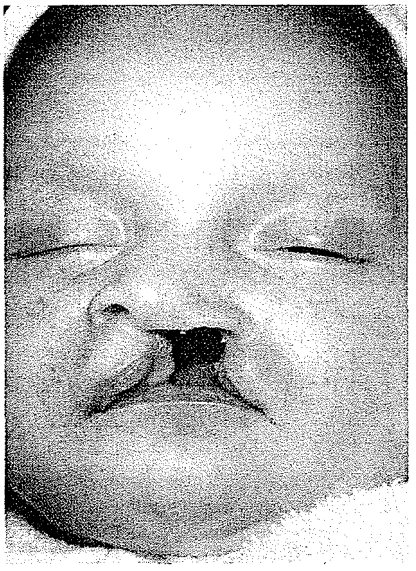
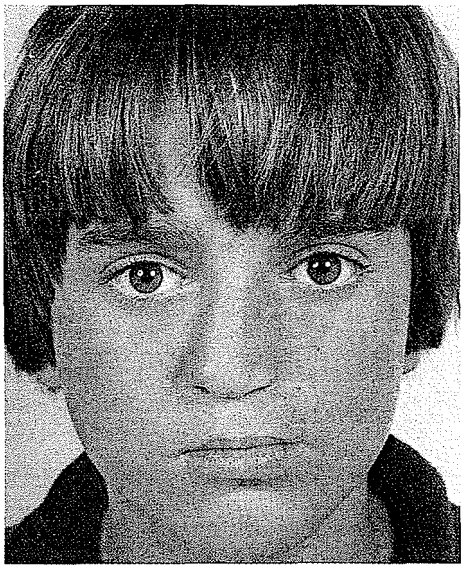
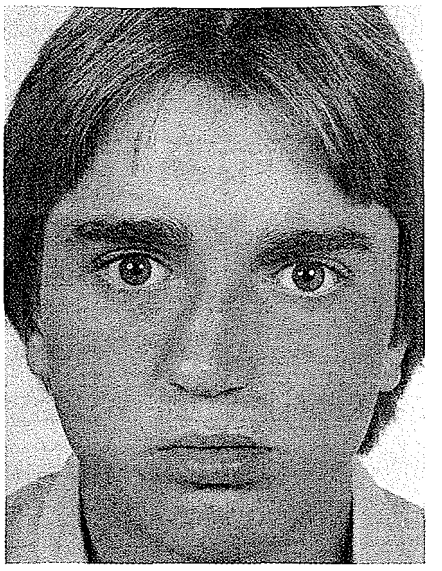
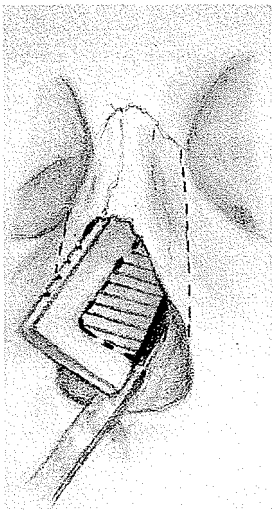
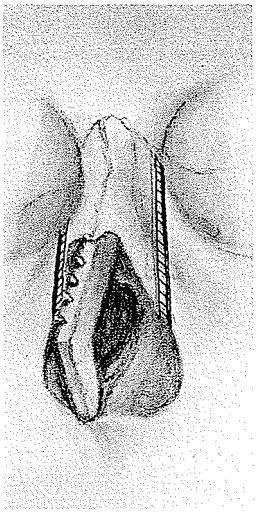
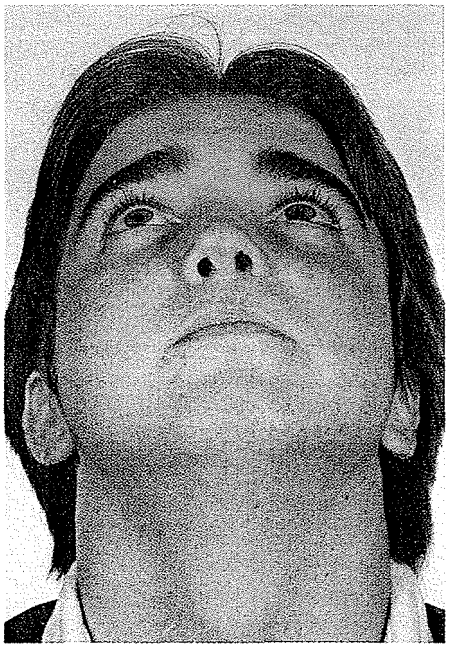
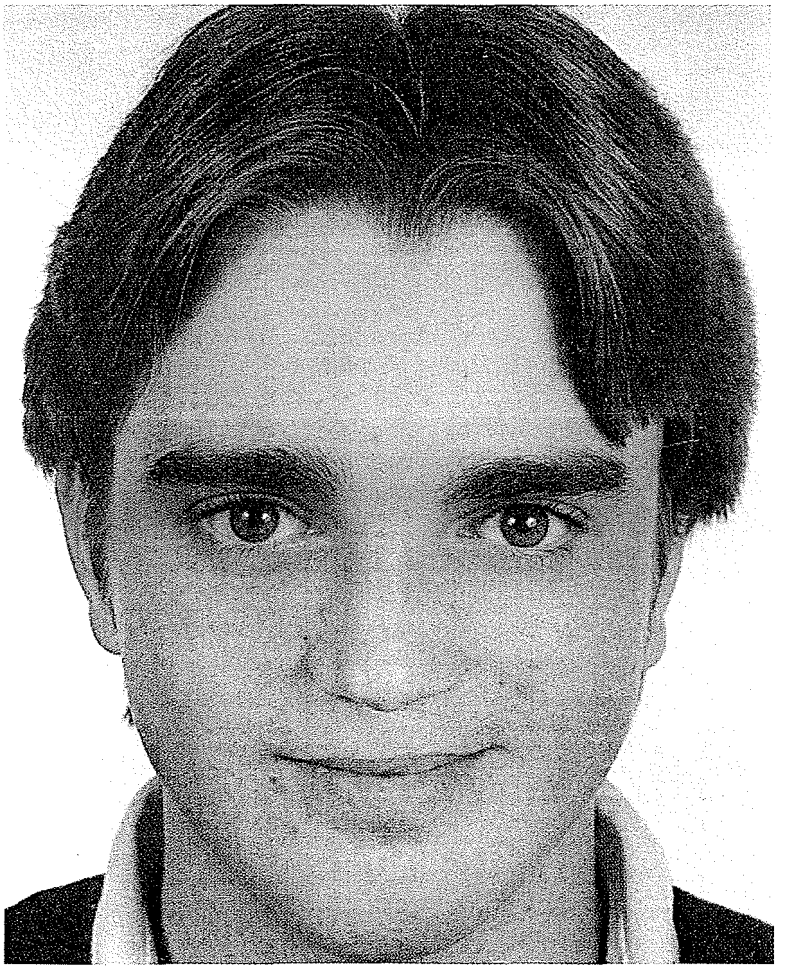


fered a variation in corrective design. John Reynolds with Charles Horton in 1965 designed a simple alar cartilage lift that was practical and probably better than preceding procedures. In 1972 Igor Kozin added onlay grafting of cartilage to the depressed bony base of the ala. In 1982 David Dibbel modified the nostril rotation with external incisions and excisions described earlier by Blair, Sheehan, Young and Joseph. Dibbel's procedure kept the scars within the margin of the nostril and, although not a perfect solution to the problem, became popular. He bolstered his approach with his Bowie knife shaped cartilage strut to force the nasal tip up. The extent to which any of these methods achieved placing displaced tissue into normal position and retained them there determined the merit of the method. None corrected all deformities.

The nasal deformity in unilateral clefts presents a different problem with multiple facets, the most exasperating of which is its overall asymmetry. In the adult the deformity is "set in its ways" and probably has suffered unsuccessful attempts at surgical correction which add scars to the deformity. Over the years I have found certain procedures that offer consistent, specific benefits.

Septal Correction

After the age of 16, correction of the deviated septum, as described in Corrective Rhinoplasty, is indicated. A submucous resection of the obstructing septal cartilage is carried out along with freeing the deviated septal base from its dislocated portions along the vomer and the scoring of the remaining septal cartilage on its concave side to allow it to curl into a

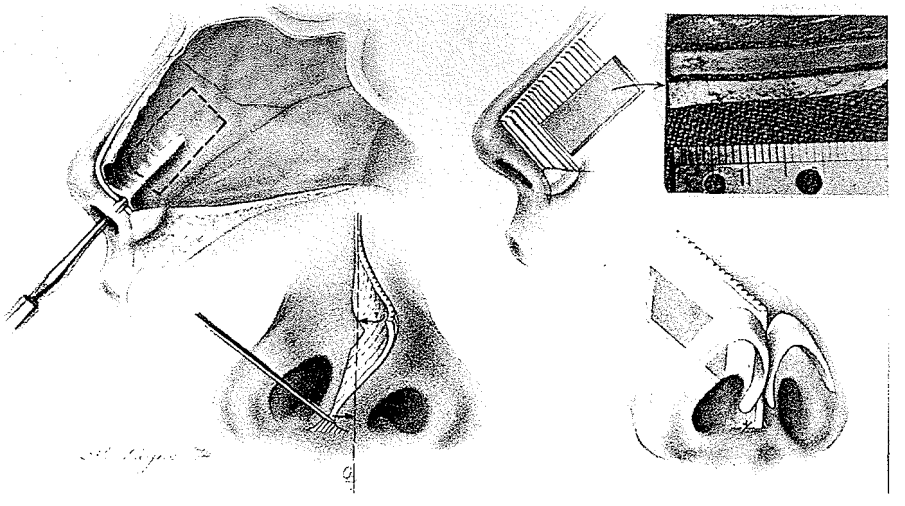
straighter position. A suture at the base of the columella on the side away from the curve of the septum will help to stabilize its correction. A 3–0 chromic catgut suture goes through the columella side of the membranous septum near the nasal spine, crosses to pick up the freed and scored septum at its inferior anterior border and then passes through the septal mucosa. Tying this stitch closes the membranous septal incision but pulls the freed septum into straight position and fixes it there. In this representative case the lip had been corrected with rotation advancement and the nasal alar cartilage rearranged in the tip. The deviated septum is seen at age 12 and 16. Correction of the septum with resection, freeing and scoring was accompanied by bilateral osteotomies and in-fracture.

This 15-year-old female patient had had a rotation-advancement lip closure. She had the typical nasal deformity of a unilateral cleft, including the deviated septum. The lip was re-rotated and the corrective rhinoplasty included alar cartilage lift, anterior septal cartilage shortening, submucous septal resection with scoring and bilateral osteotomies with in-fracture.

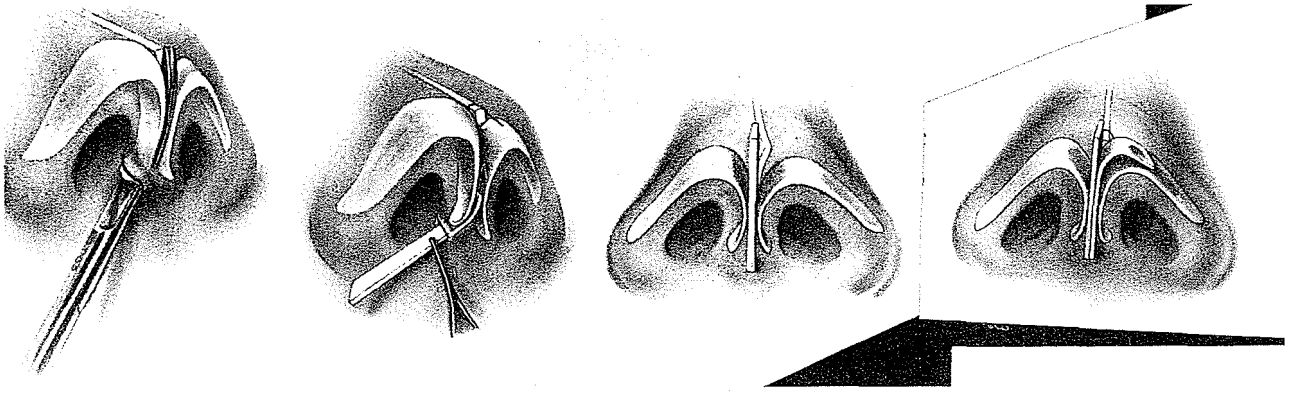


OBLIQUE CARTILAGE STRUT

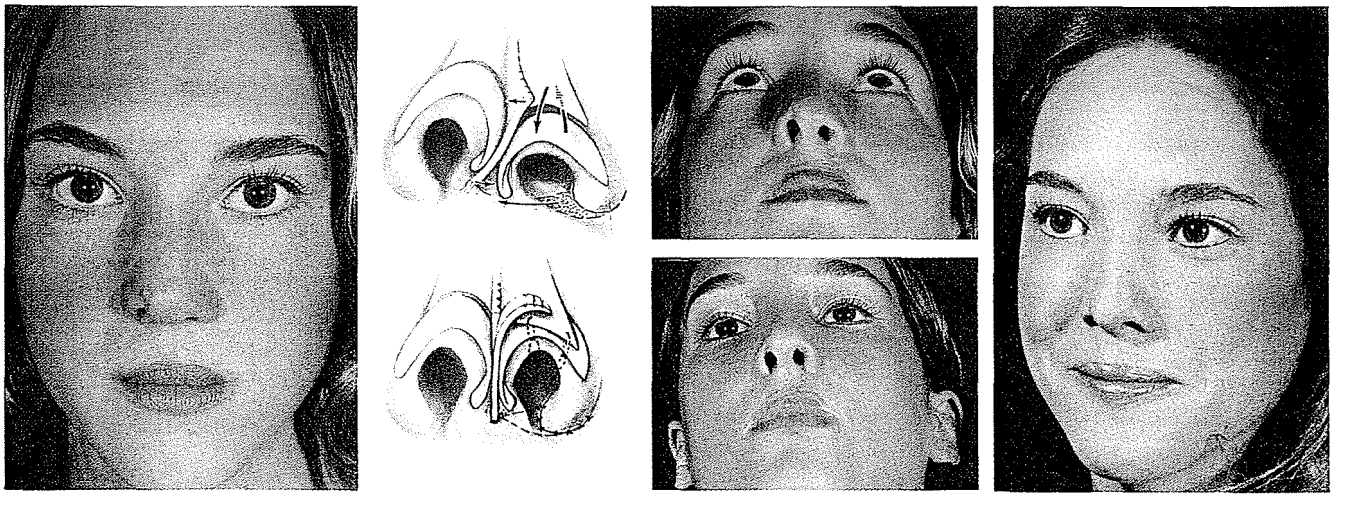
In 1964 I described an adjunct which has been and still is of value in certain cases. The rectangular shaped cartilage removed during the submucous septal resection is shaped into one or more straight struts. If necessary the septal cartilage is freed at the nasal spine and scored to straighten the septum.



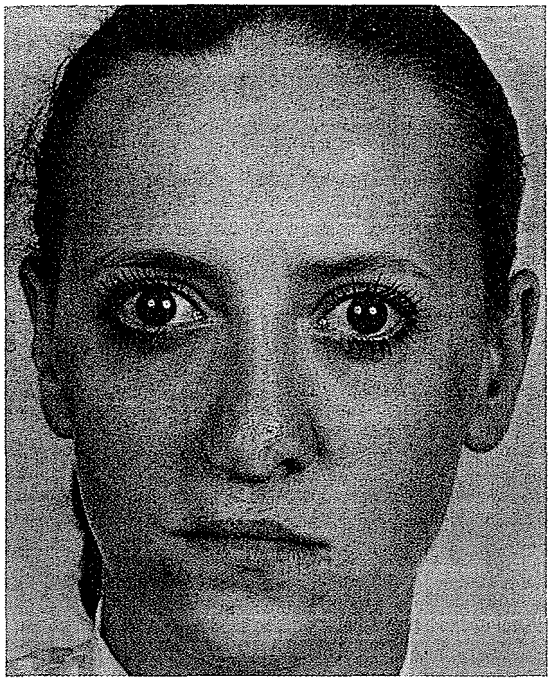
Through a stab incision at the base of the columella a pocket was tunneled under the anterior skin of the columella up to the tip and then directed in a slant obliquely across the nasal tip on the depressed side. A cartilage strut is threaded into this tunnel all the way across the tip to bolster the slumped side. This adjunct was used when the alar cartilage lift involved the less effective freeing only of the skin and fixation with temporary external sutures to elevate the cartilage.



Here is an example in a 20-year-old female college student with secondary deformities of a unilateral cleft lip and nose. A midline shield-shaped Abbe flap created a philtrum. A partial lift of the slumped alar cartilage still attached to the mucosal lining was bolstered by a unilateral oblique septal cartilage strut up the columella and over and under the slumped nasal tip which symmetrized the deformity.

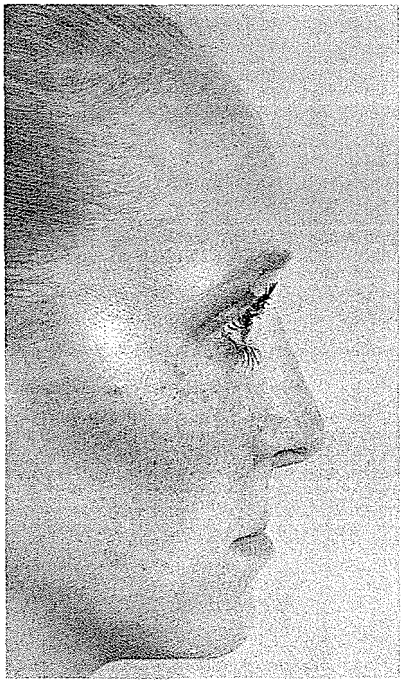


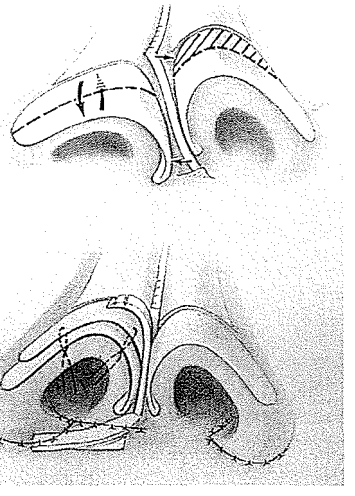
In this even more belligerant deformity the asymmetry and depression were corrected by reducing the normal alar cartilage, splitting the slumped alar cartilage, and overlapping the two parts and fixing them with sutures. Then a strong 3 cm septal cartilage strut was inserted up the columella and directed obliquely over to the slumped side to improve the projection. The flaring ala was advanced medially and the septum scored and freed from the nasal spine for straightening.



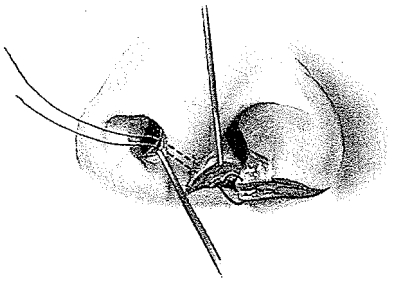


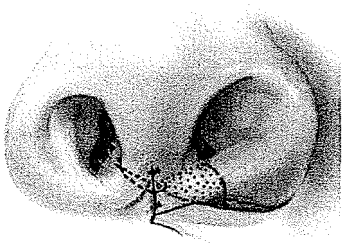






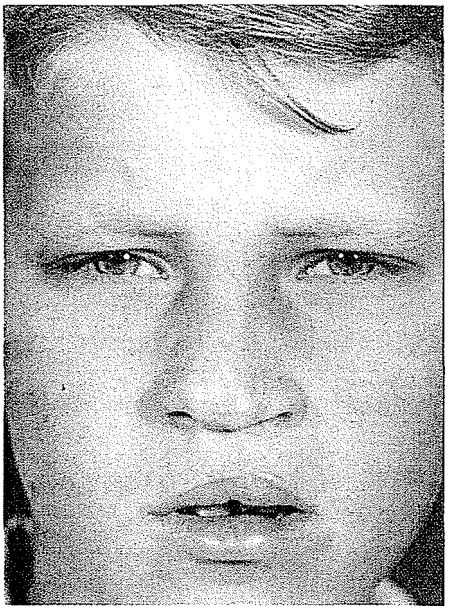
ALAR CINCH

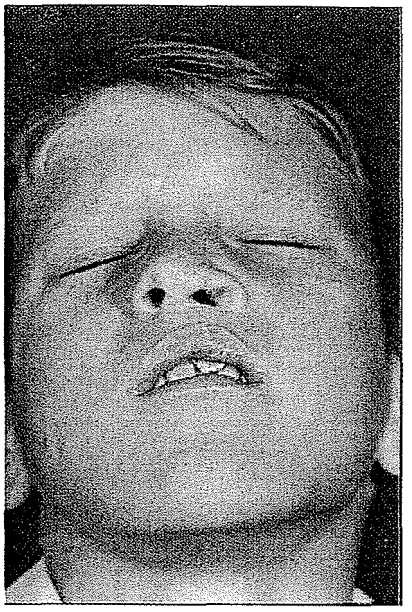


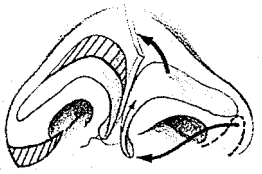


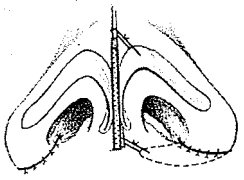
This procedure was described in 1976. The flaring ala is circumscribed by an incision incorporating the nostril sill. A tether of the alar base is developed in one of two ways. The usual method involves denuding the excess nostril sill and using this strong dermal attachment to be threaded through to the anterior base of the freed septum and fixed with a Prolene suture. This standard cinch will be demonstrated many times throughout this book. A variation of this principle can be useful in certain circumstances. When the nostril sill is absent and the alar base is thick, then a subcutaneous flap of tissue can be dissected out of the alar base, the defect closed with a suture and this flap used to cinch the ala (long arrow). This action not only corrected the alar flare but served to enforce maintenance of the septal straightening and also thinned the alar base.

Here is an early example of the subcutaneous tether in the alar cinch in a secondary unilateral cleft which required a midline lip-switch flap to create a dimpled philtrum and a cupid's bow. Other revisions, including a septal cartilage strut up the columella to the tip and alar cartilage lift, are diagrammed.

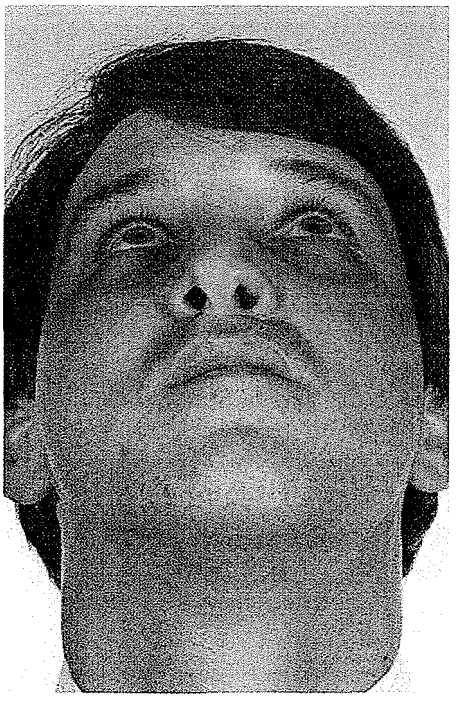








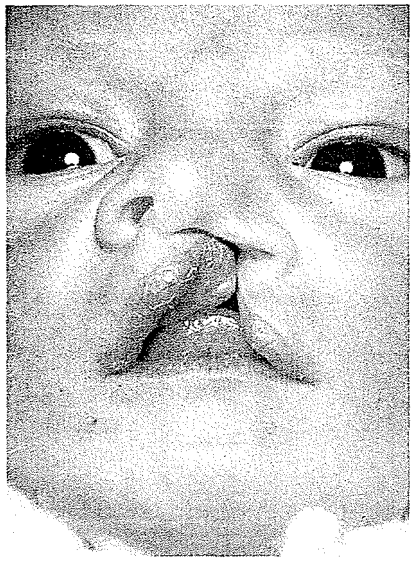
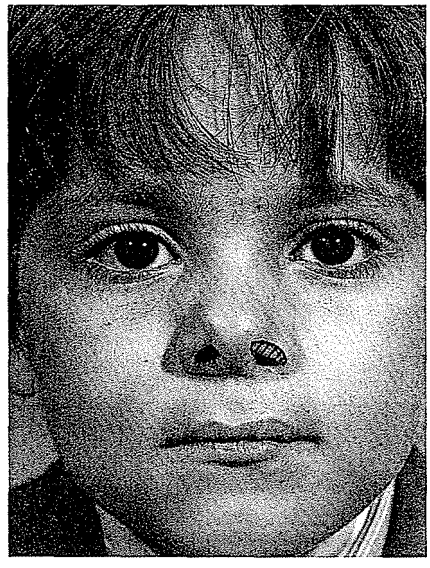
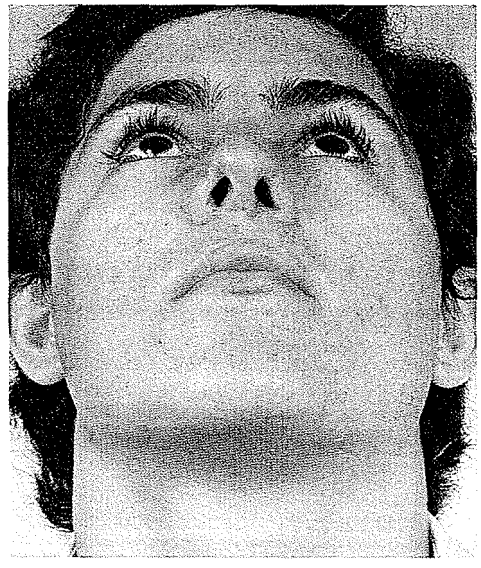




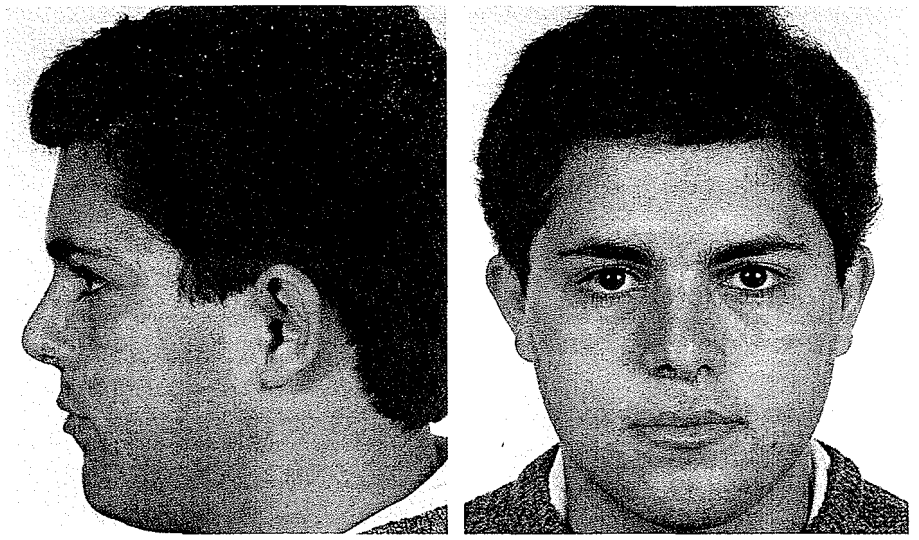
ALAR SCULPTURING

There are occasional incidents when even after all corrective procedures have been used the alar arches still do not match. Occasionally alar margin sculpturing of the overhanging edge can bring near symmetry. This was advocated first in 1964.

This unilateral cleft received the nasal improvement following a rotation-advancement lip correction. An alar cartilage lift operation improved the nasal tip but the drooping overhang of the ala on the cleft side was benefitted by alar margin sculpturing as seen at age 12.

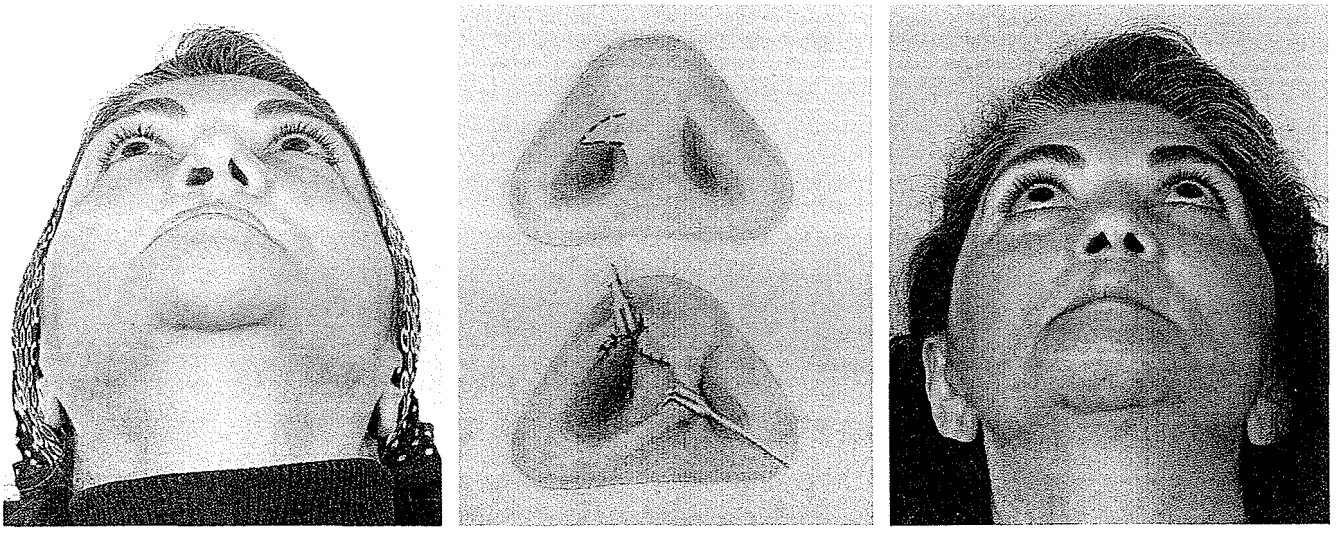




His nose healed well as seen at age 17.



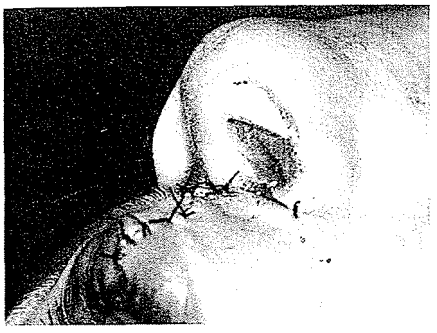
ALAR FLAP

There are various ways that the excess alar web on the cleft side can be used as a flap. It is usually based on the potential upper columella and can be folded in to give the effect of unilateral columella lengthening. This was first described in 1986 but has been rediscovered by H. G. Thompson and later by Burget and Menich. Here is an example.

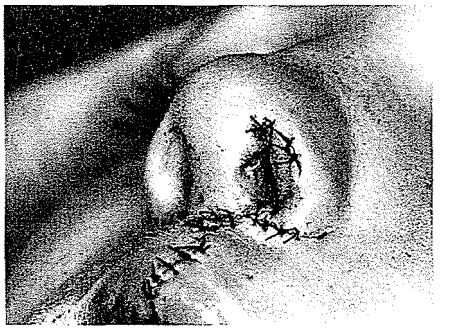


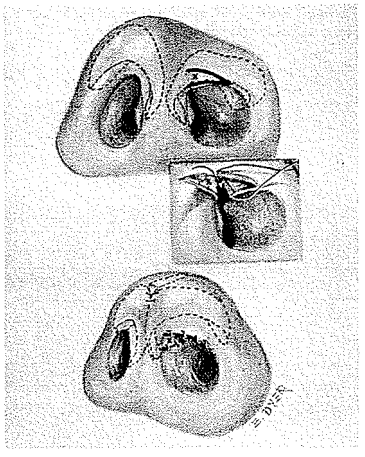
Another use for this flap is in the case where the ala meets the columella too acutely giving a sharp angle to the upper nostril. By releasing the sidewall from its constrictive attach-

ment to the anterior septum a space is created inside the vestibule. The alar flap can be wedged as a spreader along this gap to soften the ala-columella angle.







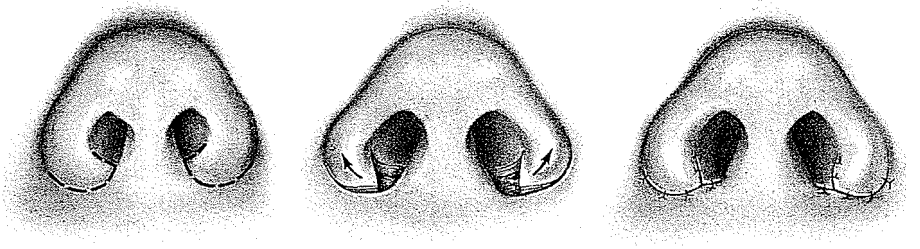


The alar web can be taken as a flap, which opens exposure for slumped alar cartilage dissection and positioning and then interdigitated into the vestibule to release the short lining in the upper columella.

CONSTRICTED NOSTRIL

Occasionally in unilateral clefts the cleft side nostril ends up constricted to an abnormal dimension. This can happen in incomplete clefts when closure of the lip cleft inadvertently reduces a nostril size that is already near normal size before surgery. In rotation-advancement of the lip in incomplete clefts when the nostril size is nearly equal it is important *not to interrupt or excise* any portion of the nostril sill. The advancement of the lateral lip into the rotation incision will reduce the cleft side nostril width and thus the sill should be kept intact to splint the base of the nostril floor and prevent unnatural and asymmetric constriction on the cleft side.

In complete unilateral clefts of course the nasal floor is open and the alae is stretched and the alar base is flared and everted. In radical irrational attempts to correct this defor-



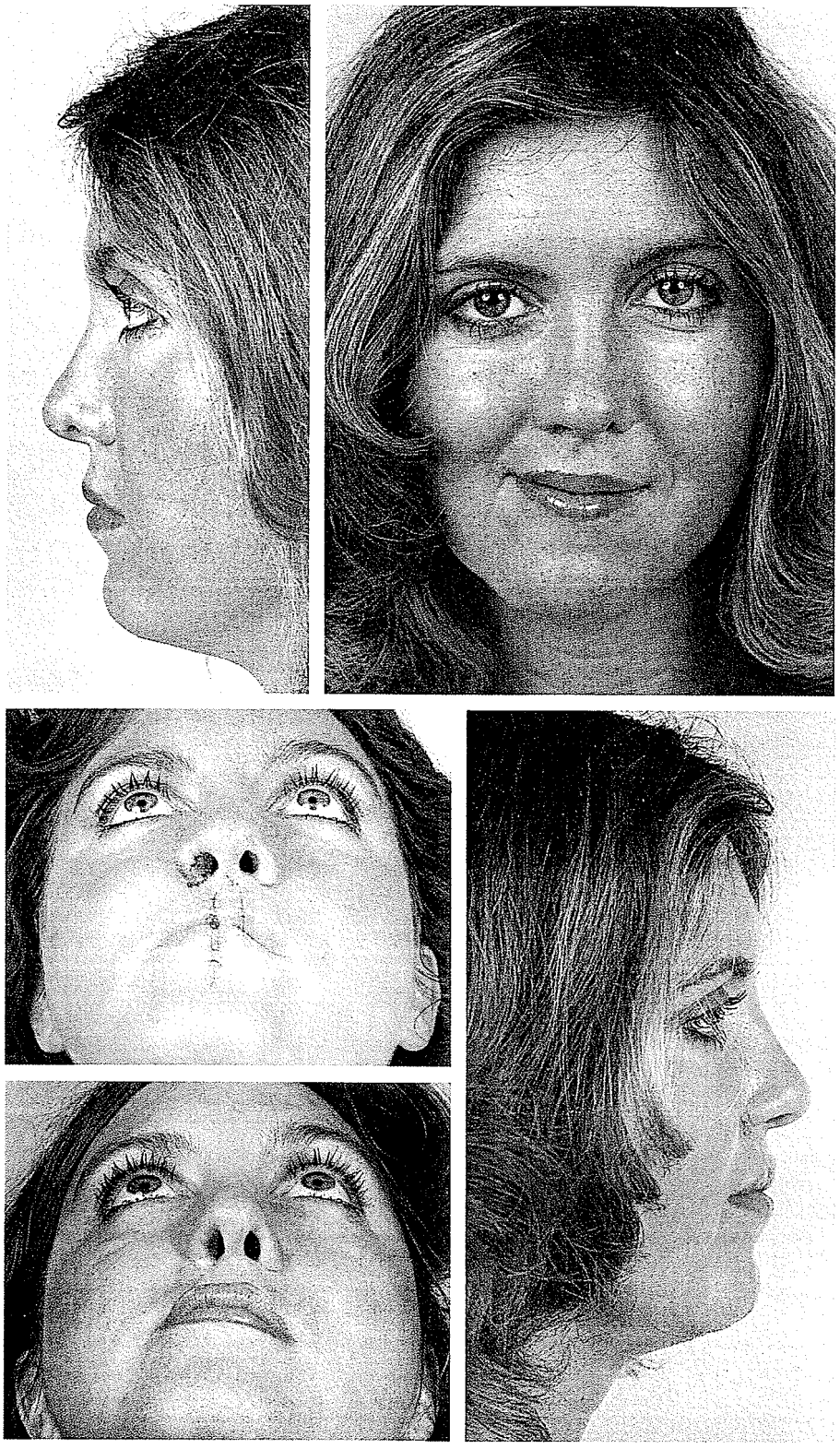
mity the inexperienced surgeon resects too great a portion of the alar base so that the final result presents a constricted nostril compounded by a shortened ala. Mild degree of nostril constriction can be aided by an outward V-Y of the alar base, unilateral or bilateral as the need may be.

COMPOSITE AURICULAR GRAFTS

In more severe contractions, particularly when the actual alar base has been resected, it is necessary to replace the missing tissue with similar tissue in kind. Release of the constriction opens a defect at the alar base which can be filled with a composite auricular graft. Here are two examples of this secondary correction. It should be noted that both of these unilateral clefts have had midline shield-shaped lower lip-switch flaps. These flaps have relaxed the tightened upper lip while reducing the protuberant lower lip and at the same time constructing a philtrum with its suggestion of a dimple, columns and a cupid's bow. The auricular composite grafts were taken from the appropriate area of the helix and concha to simulate the missing ala and its base. It can be 1.5 cm wide as it will be receiving blood supply into both sides of the graft. Once it has become vascularized it can be tailored to symmetry.

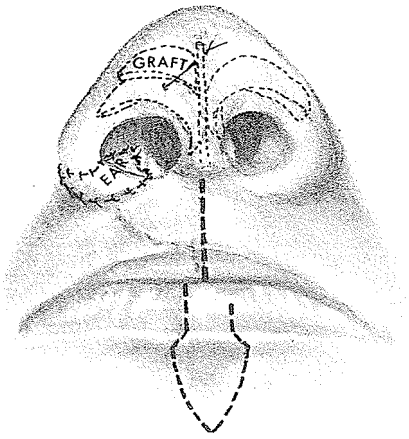
In one case there was generalized asymmetry of the skeletal structures, yet corrective rhinoplasty, relief of the constricted nostril with an auricular composite graft, and release of the upper lip with a lower lip-switch flap improved the overall effect.

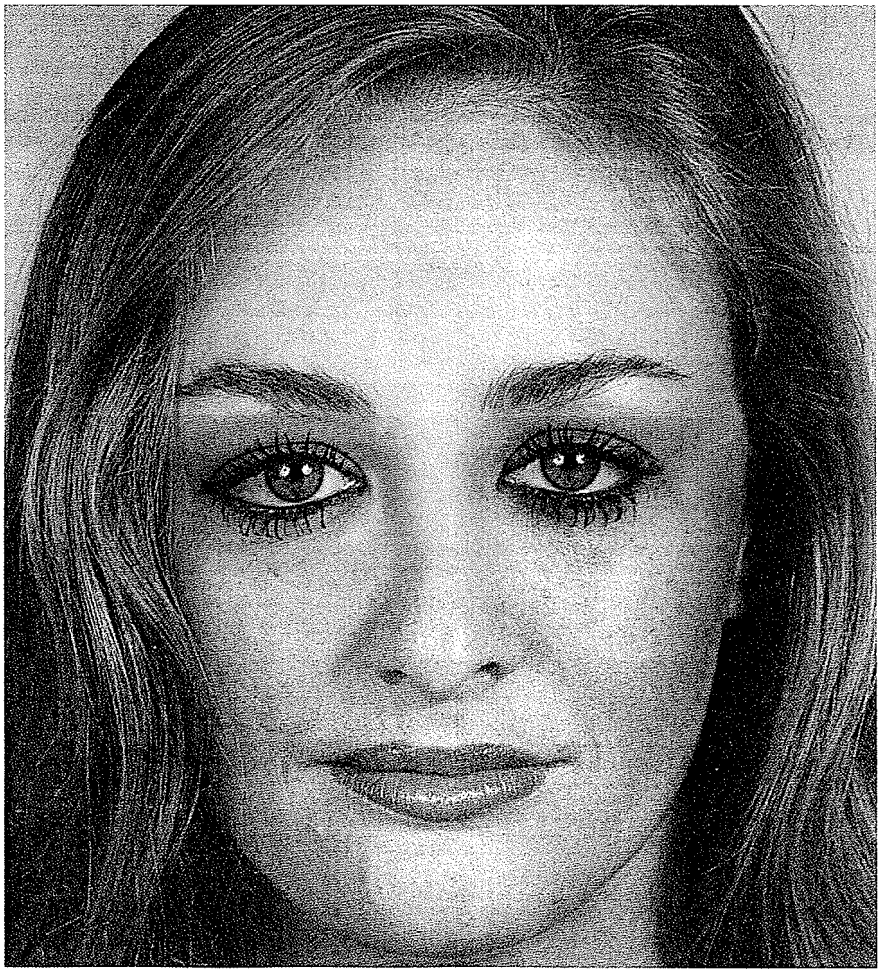




In the second case the severe nostril constriction was corrected by a radical release at the junction of the ala to the lip and cheek and filling this defect with a large composite auricular graft. Once there was alar symmetry the slumped alar cartilage was lifted and bolstered by the opposite alar cartilage onlay. Then the tight upper lip was released by a midline upper lip-switch flap.







Another Use of Composite Grafts

Here is a severely deformed unilateral cleft lip nose which after the usual corrective procedures ended up with the cleft side ala retracted. In this specific case an alar crease incision released the ala and the defect was filled with a chondrocutaneous auricular graft. It was later blended to its new site by minor surgical revisions. I do not advocate this approach except in rare incidences.



POT-POURRI



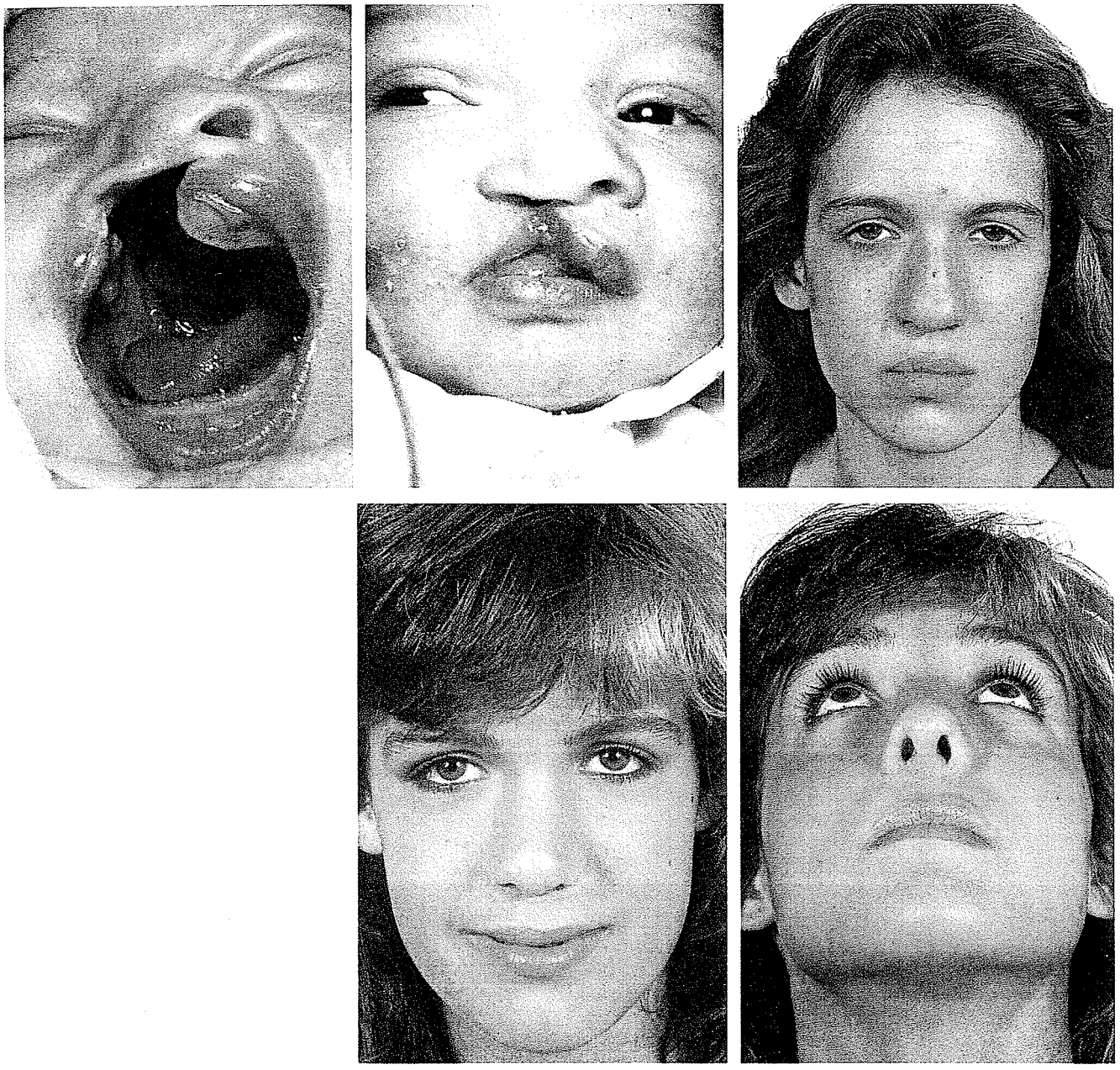


From 1960 to 1970 correction of the unilateral cleft nasal deformity utilized every trick in the proverbial book. If the rotation-advancement method had been used on the lip, the nasal deformity was less difficult and in a rare case the unilateral columella lengthening and alar cinch improved the nose.

During this period there was utilization of partial alar cartilage lift, onlay of alar or auricular cartilage in the tip, septal correction, oblique or straight septal struts in the columella, alar cinch and any or all corrective rhinoplasty procedures. The results were eventually reasonable but it took too long. These patients were *well into their teens* before they had shed the cleft nasal deformity. Here is a cardinal example.

This wide cleft had first a lip adhesion and then an effective rotation-advancement lip correction. As a teenager her nose

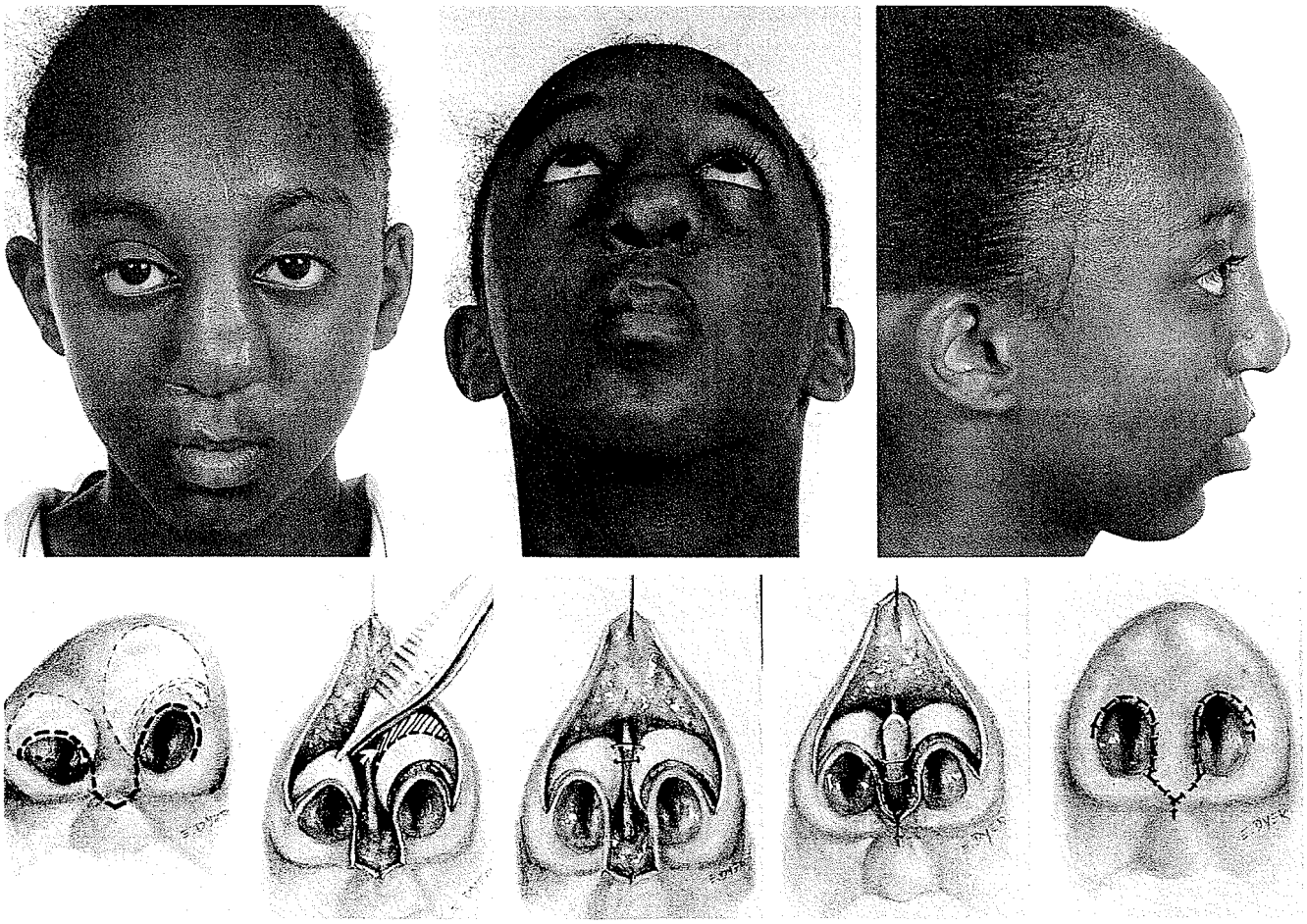
enlarged, requiring reduction as well as symmetrizing. The alar cartilages were reduced and positioned and tip definition improved with a tip cartilage graft.



FULL EXPOSURE

It is interesting that A. Rethi's 1929 open exposure for nasal correction in clefts, which subsequently was used by Potter to position the alar cartilages under direct vision, has not only become popular but touted as original. The Erich Figi flying bird incision was also used to uncover the deformity but the

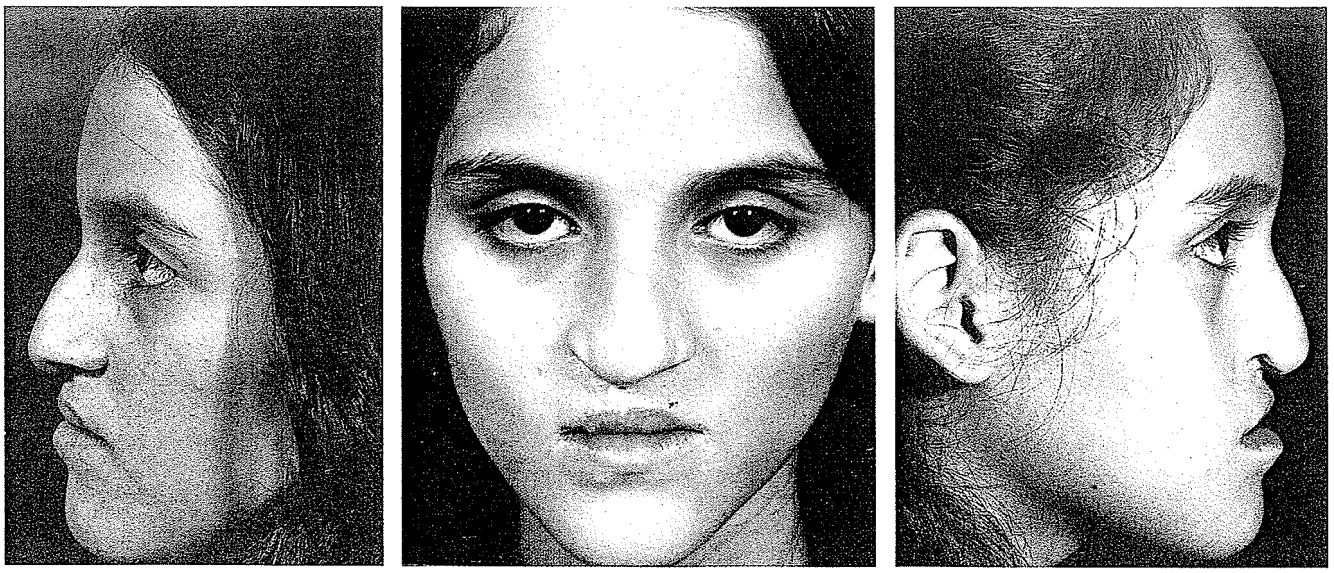
exposure is not as complete or the scar as well hidden. In cases of severe deformity in which the simple placement of the dislocated alar cartilage into normal position would not suffice, exposure through the Rethi incision simplifies the problem. I do not use this approach routinely, but in this Jamaican case in 1986 where further columella lengthening was desired I turned to a modified Rethi incision to extend the tip of the columella into the lip as a V-Y. This not only provided exposure but after placement of the other parts into normal position offered extra columella in the closure. As the lip had had a rotation-advancement closure well executed by S. Williams only the nose required radical surgery. Under direct vision the normal alar cartilage was reduced, the slumped alar cartilage was lifted and fixed. Then a strut of septal cartilage was used for tip definition. This is the precursor to the modern routine cartilage strut used in all open rhinoplasties (C. Johnson).



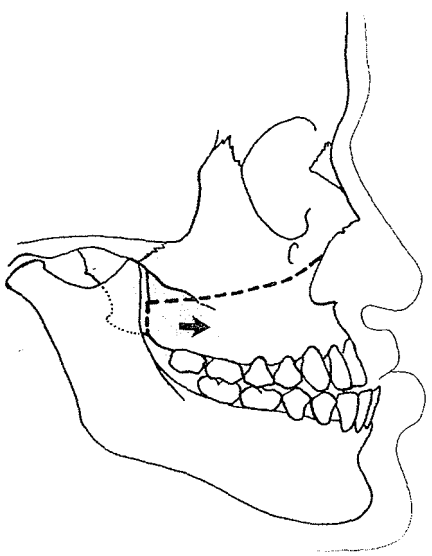


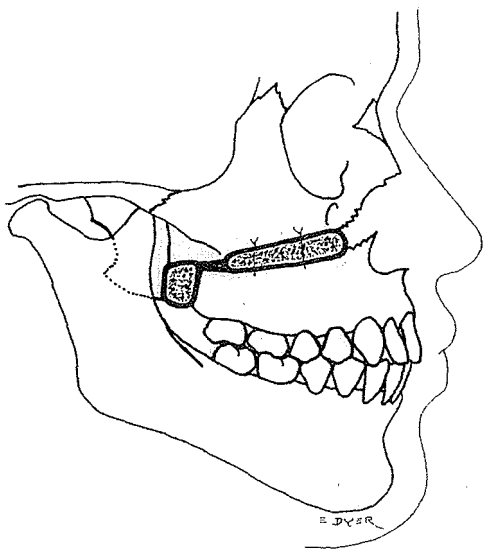
SECONDARY CORRECTION OF MAXILLARY PLATFORM

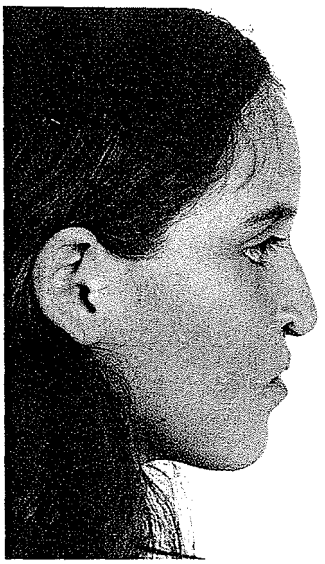
The maxillary platform should be first priority. This unilateral cleft lip and palate treated in Colombia, S. A. with a straight line lip closure and a pharyngeal flap evidently revealed lack of maxillary growth. At age 11 years she underwent a Le Fort I osteotomy with bone grafts but when seen at age 13 years revealed severe class III occlusion with profound maxillary hypoplasia. It was difficult to determine whether this occlusal relationship represented regression of the advanced maxilla or simply lack of growth of the maxilla in the presence of continuing growth of the mandible.

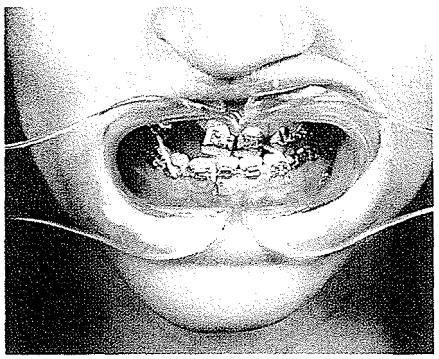


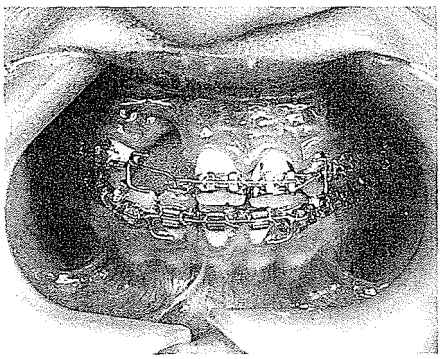
When she was 15 years old, S. A. Wolfe carried out a Le Fort I maxillary osteotomy fixed with bone grafts and S. Berkowitz assisted with traction in the right segment. This provided a satisfactory bony platform and occlusion in preparation for corrective surgery of the lip and nose.

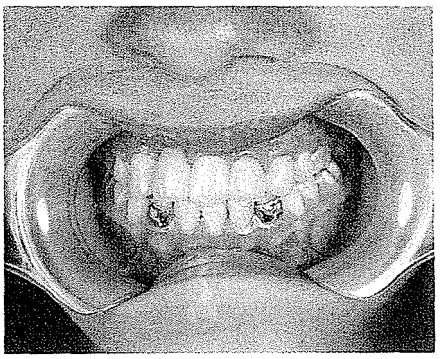






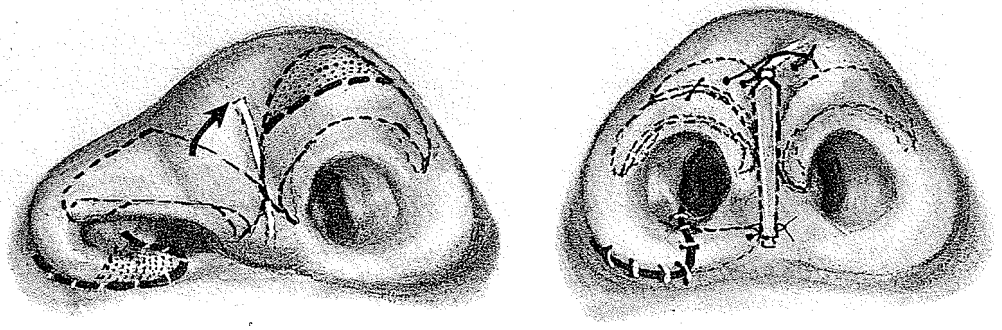


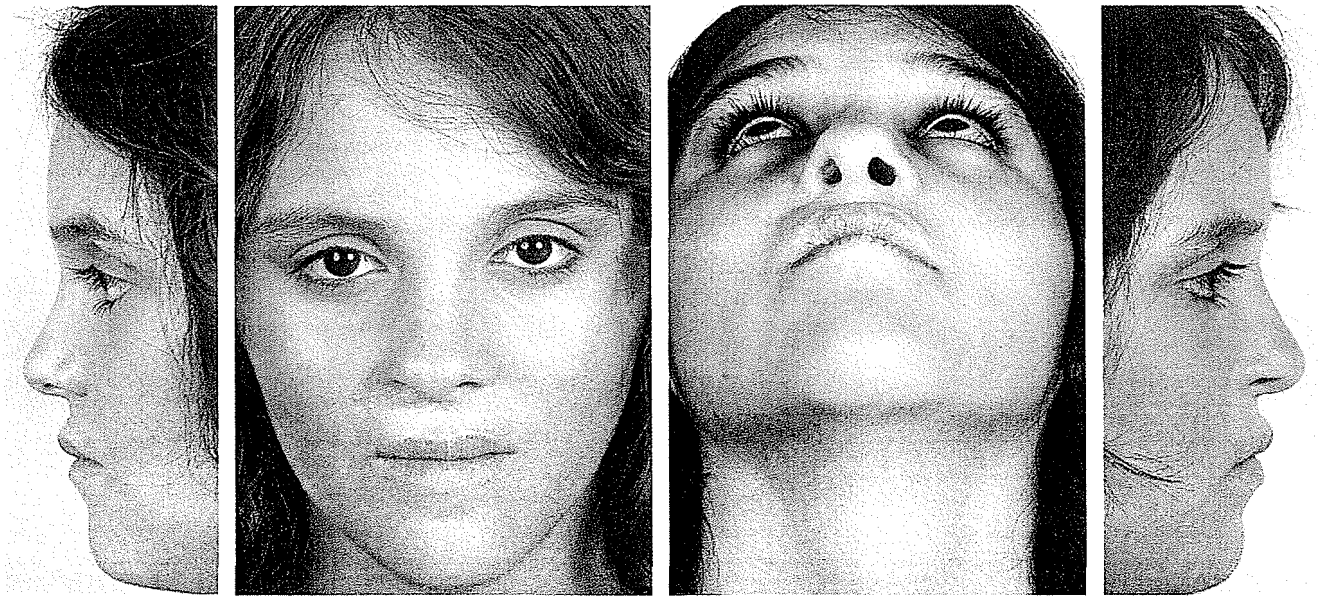




At age 16 years a cleft lip rhinoplasty was carried out which included hump reduction, anterior septal resection, bilateral osteotomies with in-fractures, reduction of the left alar cartilage and advancement of the right alar base with a cinch. The slumped right alar cartilage was dissected free medially, bolstered by an onlay from the left alar cartilage and sutured in a lift to the septum. A submucous resection of septal cartilage was used for a columella strut to support the nasal tip. A midline shield-shaped lower lip-switch flap was transposed into the direct center of the upper lip, ignoring the old scar present, and created a dimpled philtrum and cupid's bow.

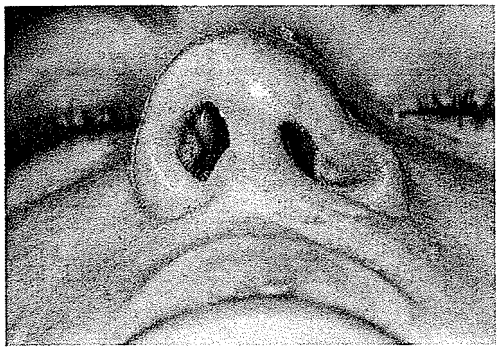
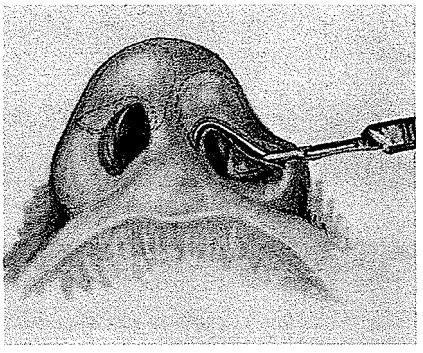
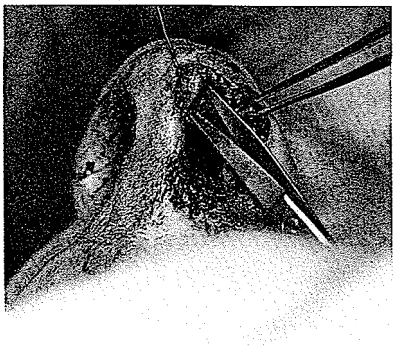


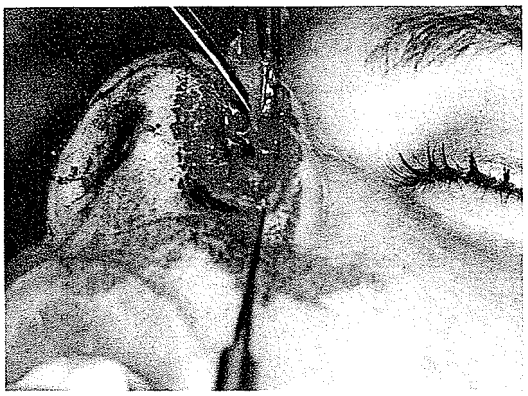
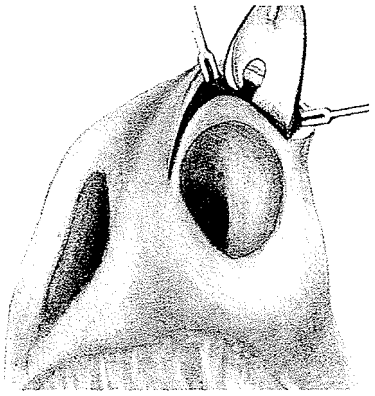
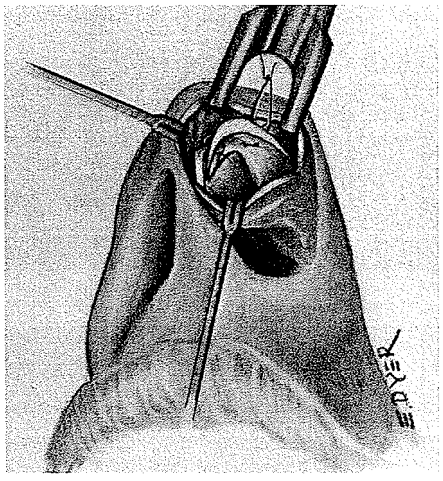




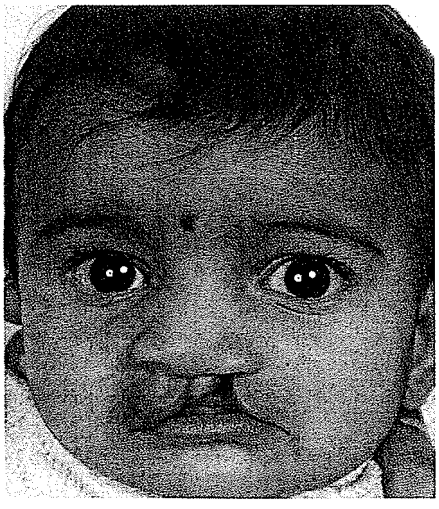
TRUE ALAR CARTILAGE LIFT

The problem of the dislocated alar cartilage had continued to pose a problem. Freeing it from the skin attachments and lifting it with sutures, did not correct the deformity. Finally in 1982 in *Plastic and Reconstructive Surgery* I described a method of freeing the medial two-thirds of the alar cartilage through a corrective alar margin incision. The appeal of this approach was that it enabled positioning the most displaced portion of the alar cartilage into normal position and fixing it with permanent sutures.

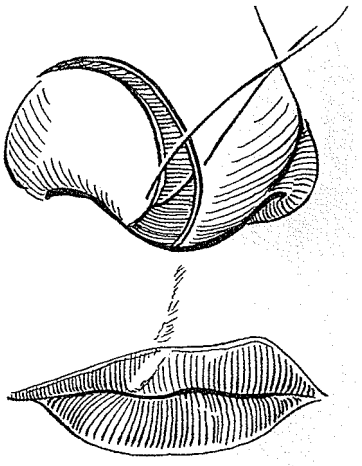

John Reynolds, who had previously described an alar cartilage lift procedure, wrote to me expressing his approval of this modification. This approach was used in adults but also at age four and a half to five years to prepare the child for school.

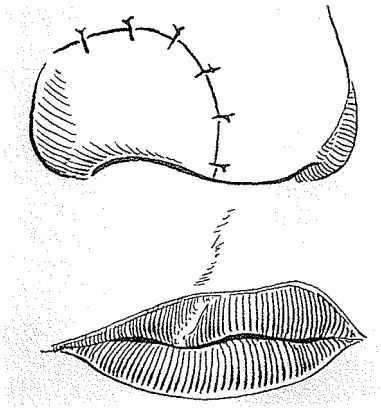




The freeing of the slumped cartilage on the cleft side through an alar margin incision was difficult before the age of

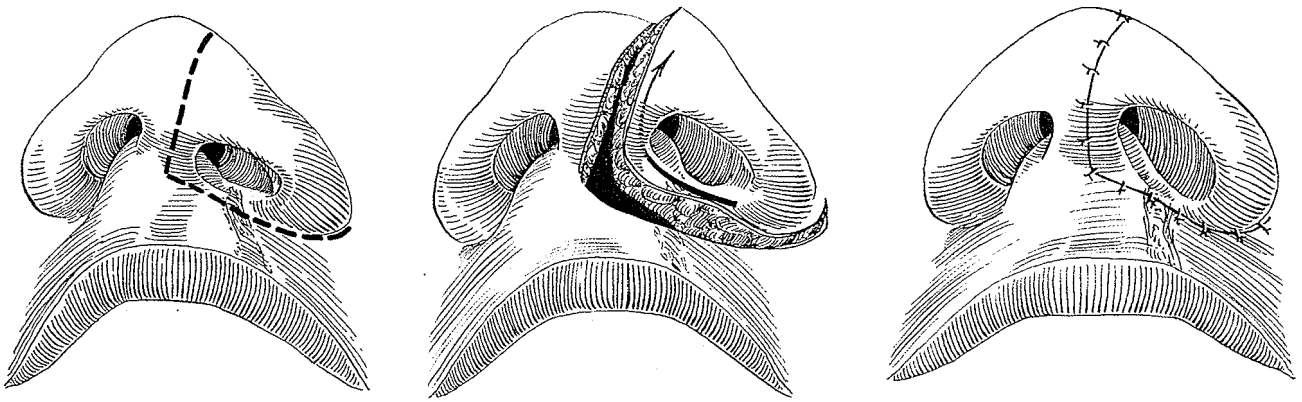
four years. Not only is the cartilage friable but it is severely adherent to the nasal lining which is extremely thin. Once dissected out of its abnormal position in the columella and along the alar margin for two-thirds of its length the cartilage can be lifted and fixed to the opposite alar cartilage at the crus, as well as to the septum with Prolene sutures to symmetrize the alar arches. This left the lateral vestibular web obstructing the nasal airway requiring direct excision. When the slumped alar cartilage was too attenuated to demand a respectful arch to match the normal side, half of the normal alar cartilage was taken and used as a sutured onlay to bolster the weak side. I began to use this lift of the alar cartilage at four years of age with some success. To wait to correct the nose until the patient is an adult or teenager offers only the advantage of more mature tissue for easier dissection. The correction of the lip early without associated nasal correction leaves an ugly nasal deformity, which is traumatic through the teen years, often taking a painful toll psychologically. This provided stimulus and pressure on surgeons to try again for early primary nasal correction.



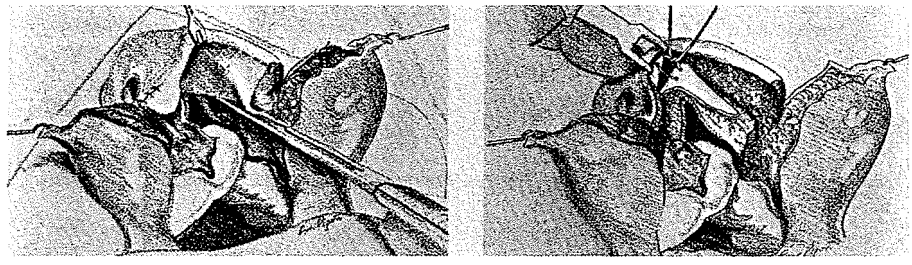


PRIMARY NASAL CORRECTION

W. T. Berkley in 1959 presented a primary correction of the unilateral cleft lip nose using the Joseph external incision rotating the displaced nasal component up into near normal position. He used a Z-plasty to correct the lateral vestibular web. The nose was improved but the external scar, although unnoticeable in some cases, was less than ideal.



In the mid-60s stimulated by Berkley, I went underground during the primary lip closure and, through an intercartilaginous incision, freed up the displaced alar cartilages, lifted and sutured it to the septum. This was described in *Cleft Craft 1*



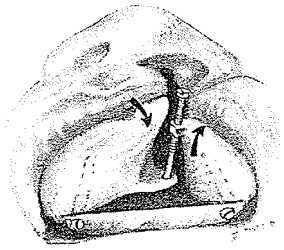
and the method gave early improvement but required more secondary work later, so eventually this primary nasal procedure was discontinued temporarily. Others continued to propose primary nasal correction. In 1985, R. Pigott, who had been a Fellow with me in 1967 while I was using the primary nasal correction, described the "leapfrog" positioning of the alar cartilage during the primary lip surgery. In 1986 E. Salyer also proposed alar cartilage positioning much the same as we all had described.

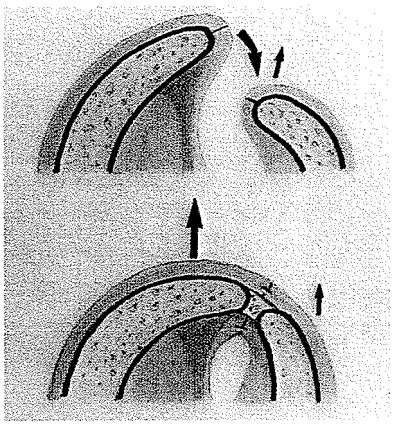
For years it was thought and taught that the severity of the nasal deformity was in direct proportion to the severity of the lip cleft. In 1948 at Professor T. P. Kilner's cleft palate clinic at Lord Mayor Treloar Hospital, Alton, England, I observed a microform cleft of the lip with merely a congenital ridge associated with a typical severe nasal deformity. I realized then that the severity of the lip cleft had nothing to do with the severity of the nasal deformity even though the severity of one is often accompanied by the severity of the other. Since then I have observed many cases of microform lip cleft with more severe nasal deformity.

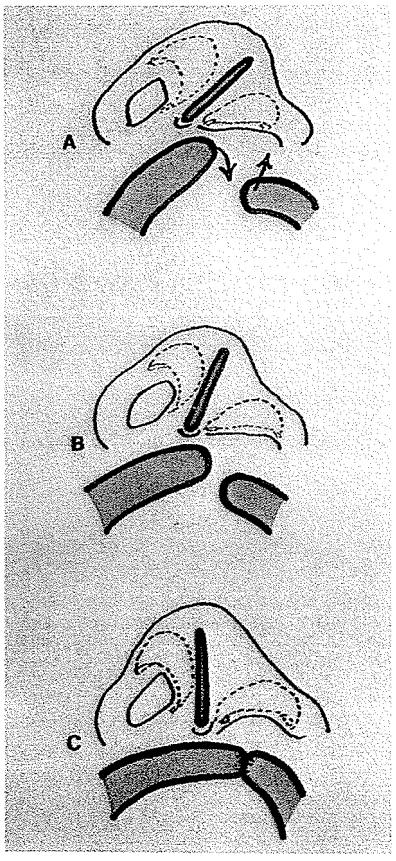
In a Hunterian Lecture entitled *"Embryonic Rationale for the Primary Correction of Classical Congenital Clefts of the Lip and Palate"* presented in 1993 in Oxford, England I outlined a treatment design to complete the specific cleft failures in the normal embryogenesis. At 7 weeks' gestation maxillary prom-

inences increase and migrate medially. Finally the cleft is overbridged by mesenchyme and fuse. The floor of the nasal cavity is completed by a pair of shelf-like palatine processes extending medially from the maxillary processes. In the classic cleft the nasolateral process unites with the maxillary process which joins the alar base to the lateral lip. The failure of mesenchyme migration anterior to the shelf-like palatine processes accounts for the cleft in the nasal floor and the resultant flaring of the nasal ala. Had the mesenchyme migration proceeded normally across the nasal floor, pushing the medial crus of the lower lateral alar cartilages upward into normal position in the nasal tip, the columella would have been stretched to accommodate this action and the septum would have projected straight forward. Failure of this mesenchyme action leaves the lower lateral cartilage in the slumped marginal position in the alar rim dislocated from its mate in the nasal tip. The septum, unopposed from the cleft side, is pushed from the normal side until it deviates into a slant over the cleft with its base dislocated out of the vomerian groove. The nasal vestibular web is but a slack in one direction and tenting in another in the chondromucosal lining, due to the failure of this entire component to be pushed up and rotated into balance with the normal side.

Correction of this embryonic failure is consistent with, but an extension of, the basic principle of moving tissue into normal position and retaining it there. Creating a symmetrical, sound platform for the nose was the first step in bringing tissue into normal position. Pre-surgical orthodontics, as started by C. K. McNeil in 1950, improved by Burston, Hagerty, Manchester, Hotz, Gnoinsky, Georgiade and Latham, was finally perfected by R. A. Latham in 1980. To lock the alveolar segments into their new, more normal position and close the anterior cleft, a periosteoplasty was designed first by T. Skoog in 1965 and later improved by R. A. Latham. This approach was presented by D. R. Millard and R. A. Latham in 1990.



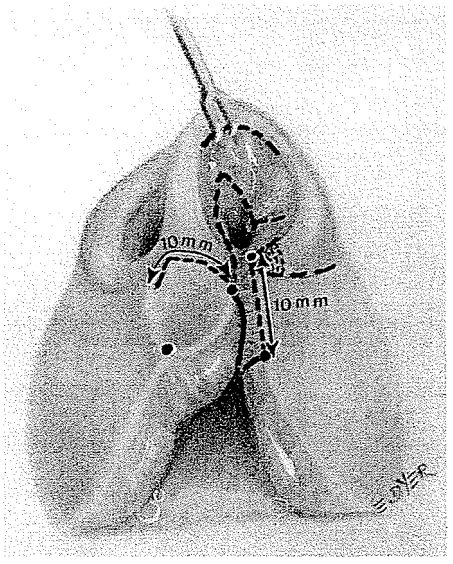


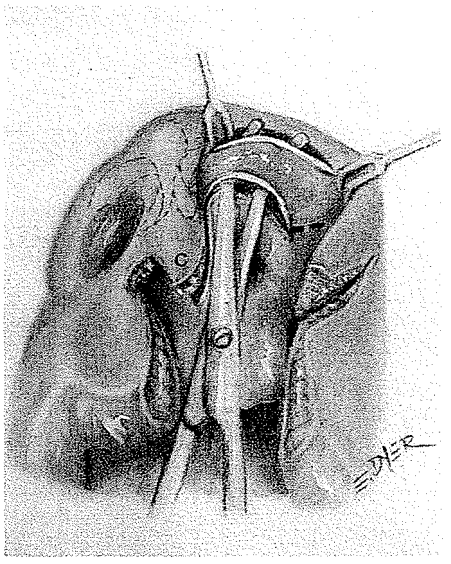


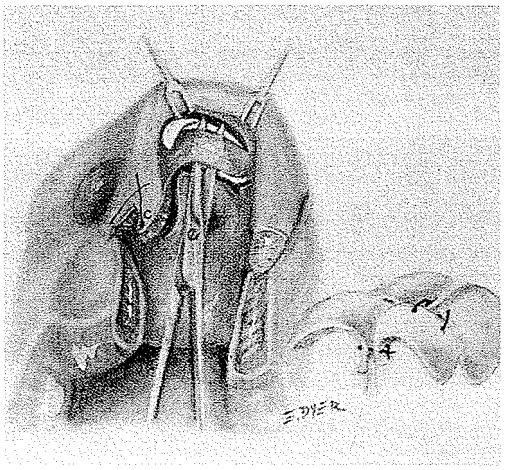
The Latham co-axial orthopedic appliance with its transverse bar and screw is fitted into the cleft and pinned. Each turn of the screw pulls the rotated maxilla in and pushes the retracted lateral maxilla out until alignment and approximation of segments to within 2 to 4 mm is accomplished. This creates a symmetrical platform. As soon as this is accomplished the cleft of the alveolus and anterior hard palate are closed with a periosteoplasty, which fixes the segments into normal position.

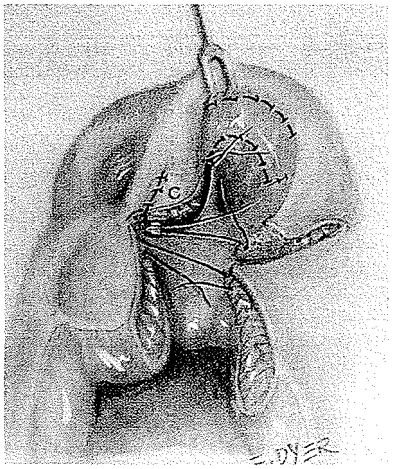
A SEPTAL CORRECTION DIVIDEND

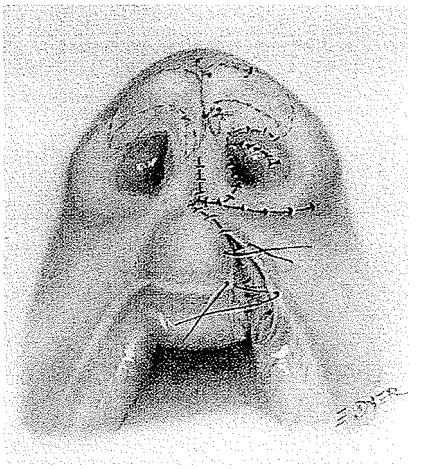
In the unilateral cleft during the corrective rotation of the two maxillary segments with the minimal aid of an intact outer nasal arch the cant of the septum is corrected as it pivots in the vomerian groove and gradually assumes a vertical (upright) stance. This of course does not happen in all cases but in most cases the correction is remarkable. At this point both the nose and lip can be constructed. At age six months the lip is rotated and advanced, and during this process flap c is cut off from the lip and through a unilateral membranous septal incision is advanced in a one-side forked flap lengthening of the columella. Through this exposure and through alar margin and intercartilaginous incisions the displaced medial two-thirds of the alar cartilage is freed carefully from the vestibular lining with scalpel and scissor dissection and from the skin covering with right-angled scissors. It is freed out of its depressed position in the columella and tip, lifted and sutured with a 4–0 Prolene (Ethicon) to create a symmetrical medial crus in the nasal tip and maintained with sutures from the freed cartilage's upper edge to the septum and to underlap the upper lateral cartilage. With a cut-back in the lateral extension of the intercartilaginous incision across the vestibular web, the chondromucosal lining is shifted upward closing the back-cut as a V-Y and flattening the web to improve the airway. The ala base is cinched to complete the nasal correction. The lip is then rotated and advanced as both the lip and nose have enjoyed their definitive correction at age six to eight months.


10 mm
10 mm
E. DYER

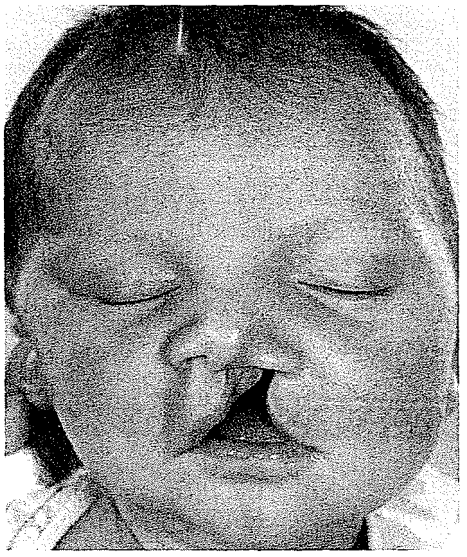

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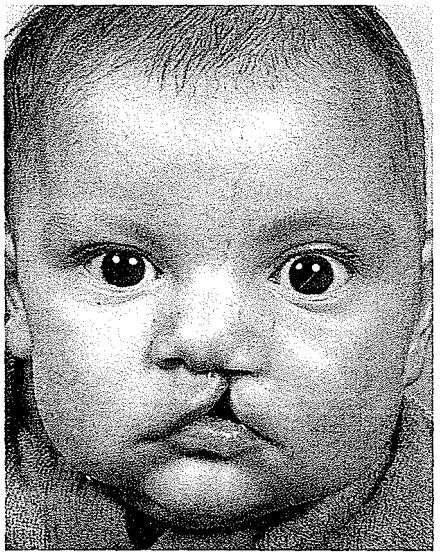

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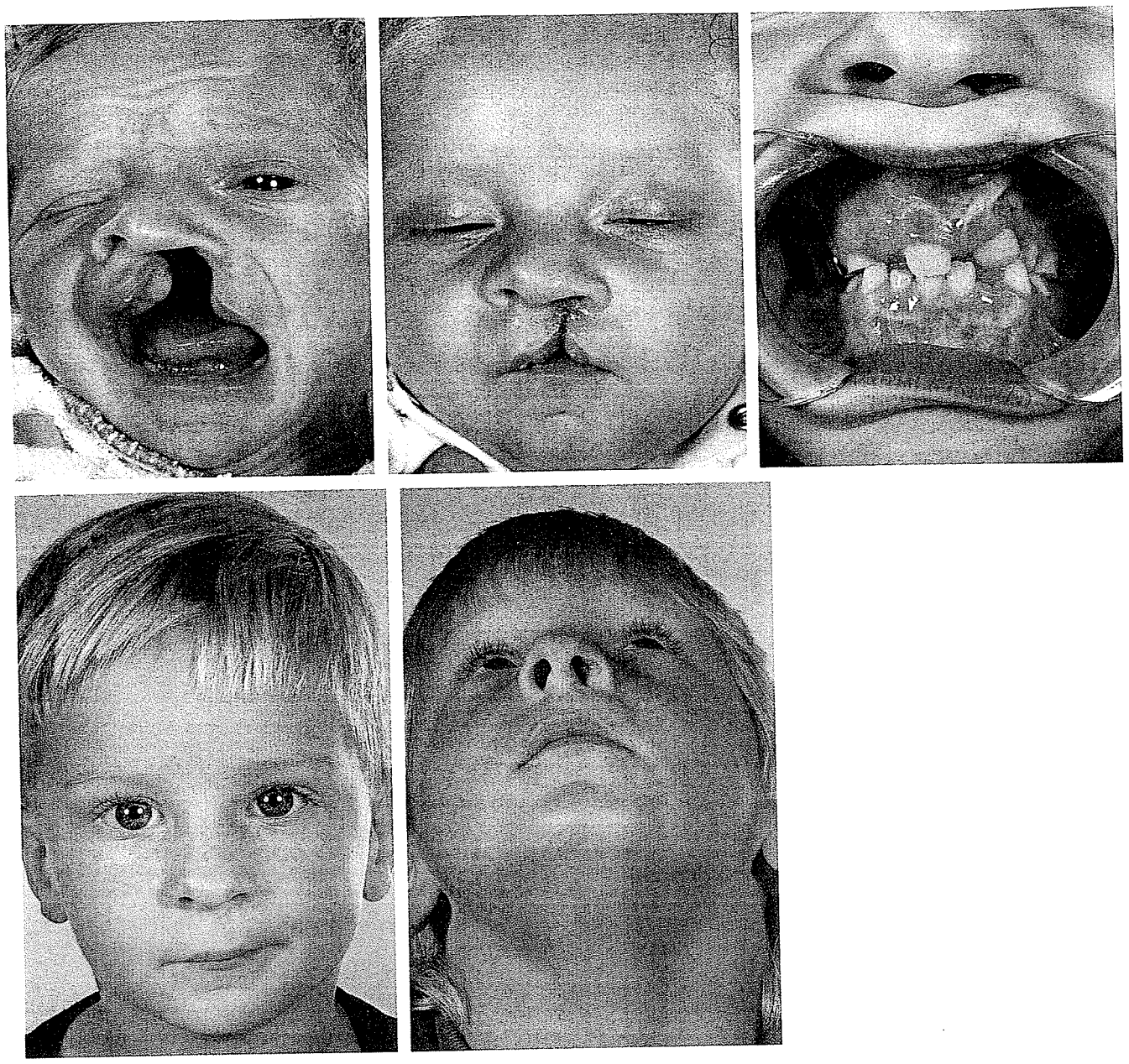

E. DYER

Here are three examples of pre-surgical orthodontics, peri-osteoplasty and lip adhesion followed at six to eight months with rotation-advancement of the lip and primary correction of the nose with alar cartilage freeing and lifting, columella











lengthening and alar base cinching. Finished at two years and seen again at three years.



For those concerned about normal growth following early surgery, let me cite this fact. From the 1930s through the 1950s Blair, Brown, Byers and McDowell freed the alar cartilage from the dorsal nasal skin radically and then tried to lift the cartilage into a better position with through-and-through sutures exiting the dorsal nasal skin and tied over a bolster. I observed these cases in early 1950 and noted that when the external suture was removed there was some loss of correction immediately and more over time. Of greater importance, I noted in the later postoperative results that there was never

any evidence of lack of nasal growth because of this early surgery.

The only remaining snag lies in the surgeon himself. If he believes in the principle of moving tissue into normal position and retaining it there and understands the technique required to accomplish this, then it comes down to his dexterity, patience, and persistence. There is also desire but as John Ruskin, the famous nineteenth-century English author and critic wrote, "Love of our work ensures honesty of our best endeavor." There is no way each case can be corrected 100% but the closer the better!

NASAL DEFORMITY IN BILATERAL LIP CLEFT

The nasal deformity in bilateral clefts is more than double that in unilateral clefts.

Projecting Premaxilla

Failure of mesenchyme migration from both maxillary processes into the nasomedial processes causes the maxillae not to form bony union with the premaxilla. At the time of birth this lack of union has allowed the premaxilla, at the head of the septovomerian growth spurt, to project ahead of the lagging lateral maxillae which exaggerates the deformity and disrupts the entire nasolabial platform.

Nasal Deformity

The maxillary mesenchyme not migrating across the nasal floor fails to push the lower lateral alar cartilages up into the nasal tip and give a compensating stretch to the columella. Rather, without maxillary mesenchyme penetration from each side, the muscleless prolabium sits forlornly on the end of a very short columella attached to a flat nasal tip with the alar cartilages dislocated from the tip, positioned along the alar margins and stretched over the cleft as flaring alae. Due to the inherent shortness of the entire fronto-nasal component from nasal tip, columella and vertical length of prolabium, the nasal septum has been restrained from normal anterior

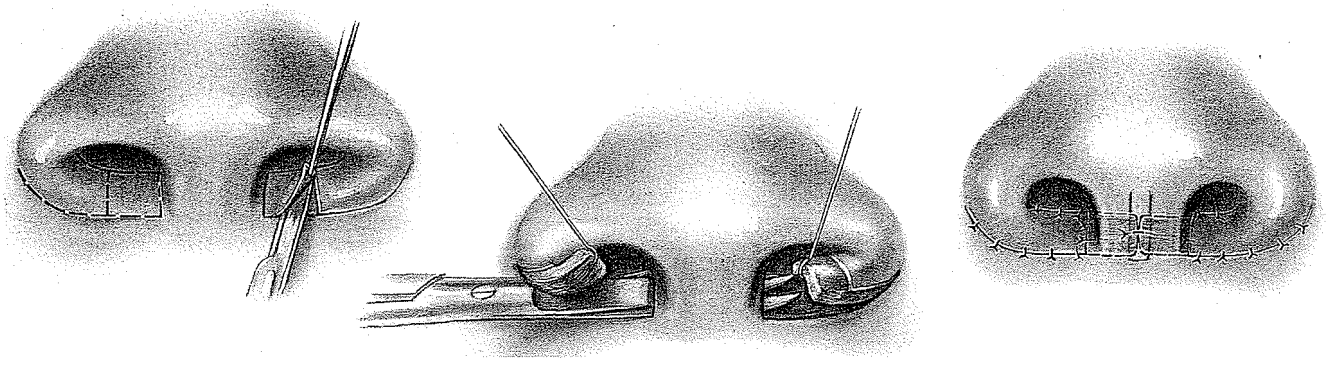
projection and no septal cartilage has been allowed to project normally into the nasal tip.

Symmetry

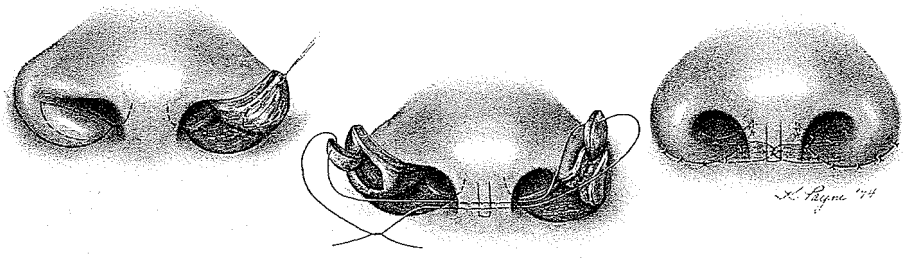
Complete bilateral clefts with all their faults do have one asset: symmetry. The asymmetric bilateral cleft cannot boast this advantage and necessitates its surgical correction be involved also with symmetrizing the defect.

Flaring Alae

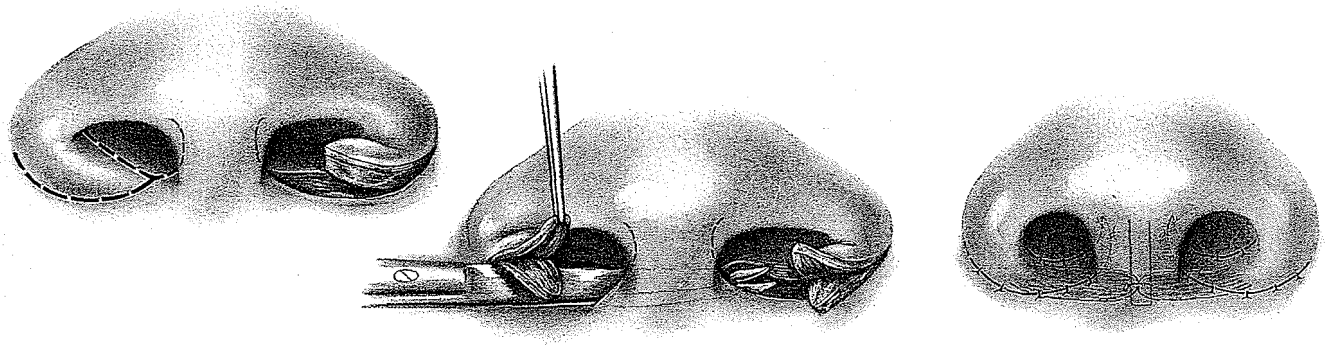
A procedure designed for correction of the flaring ala is the alar cinch which offers a double value in the bilateral cleft. There are three variations of this procedure. The standard design de-epithelializes the skin of the medial portion of the nostril sill flap which is based on the alar base. The alar bases are freed and the de-epithelialized flaps are joined to each other under the base of the columella near the nasal spine.



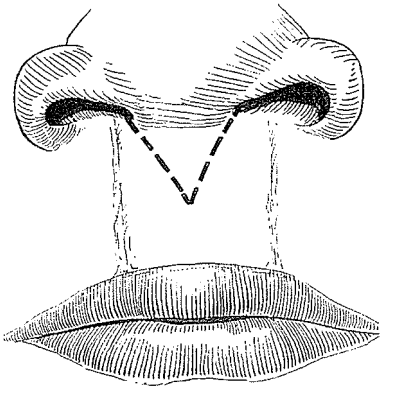
A second variation of this procedure is used in thick alar bases without much nostril sill. A flap is dissected out of the alar base and the defect closed to thin the alar base. The subcutaneous tether is sutured to the opposite tether behind the base of the columella as in the standard approach.



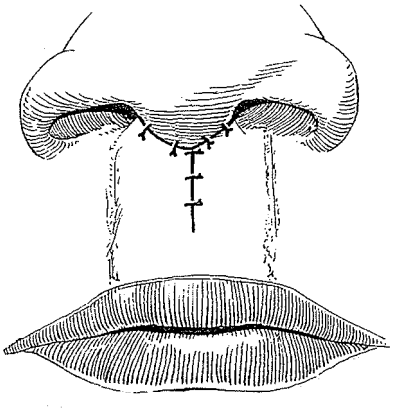
The third variation splits the nostril sill flap into a superficial skin flap and a deep subcutaneous flap. The deep flap is cinched in the usual fashion but the skin flaps are advanced into the skin defect between the columella and the septum.



SECONDARY COLUMELLA LENGTHENING

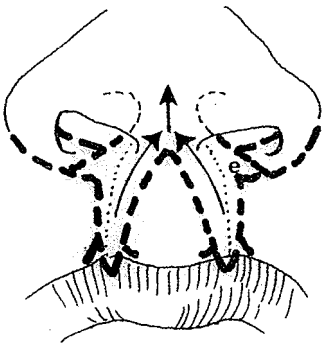


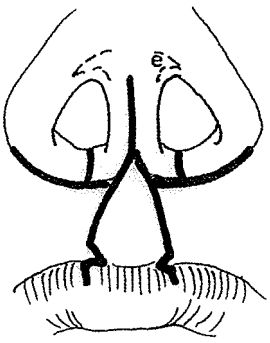
The most glaring deformity in bilateral clefts is the depressed nasal tip snubbed by the short bridle of little to no columella. Over 160 years ago in 1833 J. Gensoul directed his attention to this aspect of the deformity when he described a midline V-Y advancement flap from the upper lip to lengthen the columella. This achieved some lengthening but added a third scar to the bilateral scars already present in the lip. It was the abhorrence of adding to the gridiron of vertical scars of the lip that stimulated the conception of the forked flap for columella lengthening.



As in the 30-day embryo the future prolabium and columella sit side by side, it seems not unjustified to take from the prolabium to help the columella. This plan enabled simultaneous revision of bilateral lip scars to lengthen the columella while reducing an abnormally wide prolabium to normal philtrum dimensions. The forked flap was designed originally as a secondary procedure. It was first used at St. Joseph Hospital in Asheville, N. C. in 1956 and published in 1958.





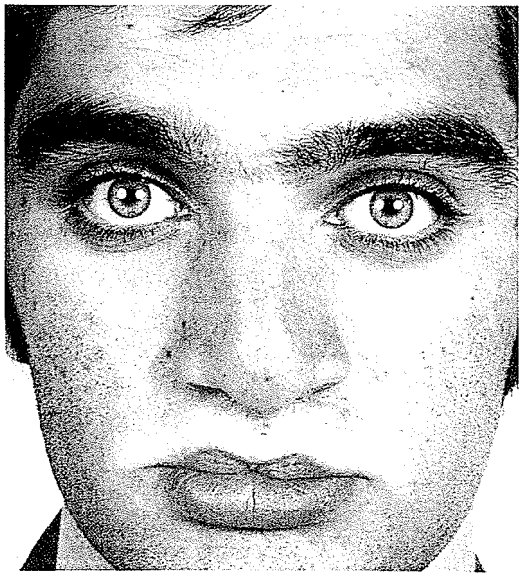




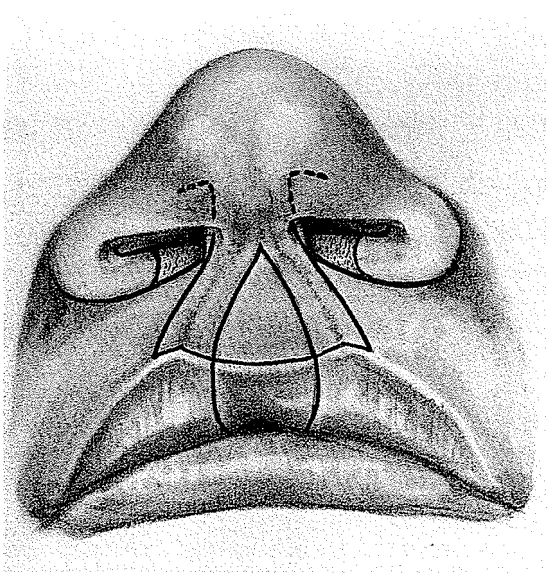
The forked flap is still used in this capacity in those cases where the prolabium is wide and can spare the fork.

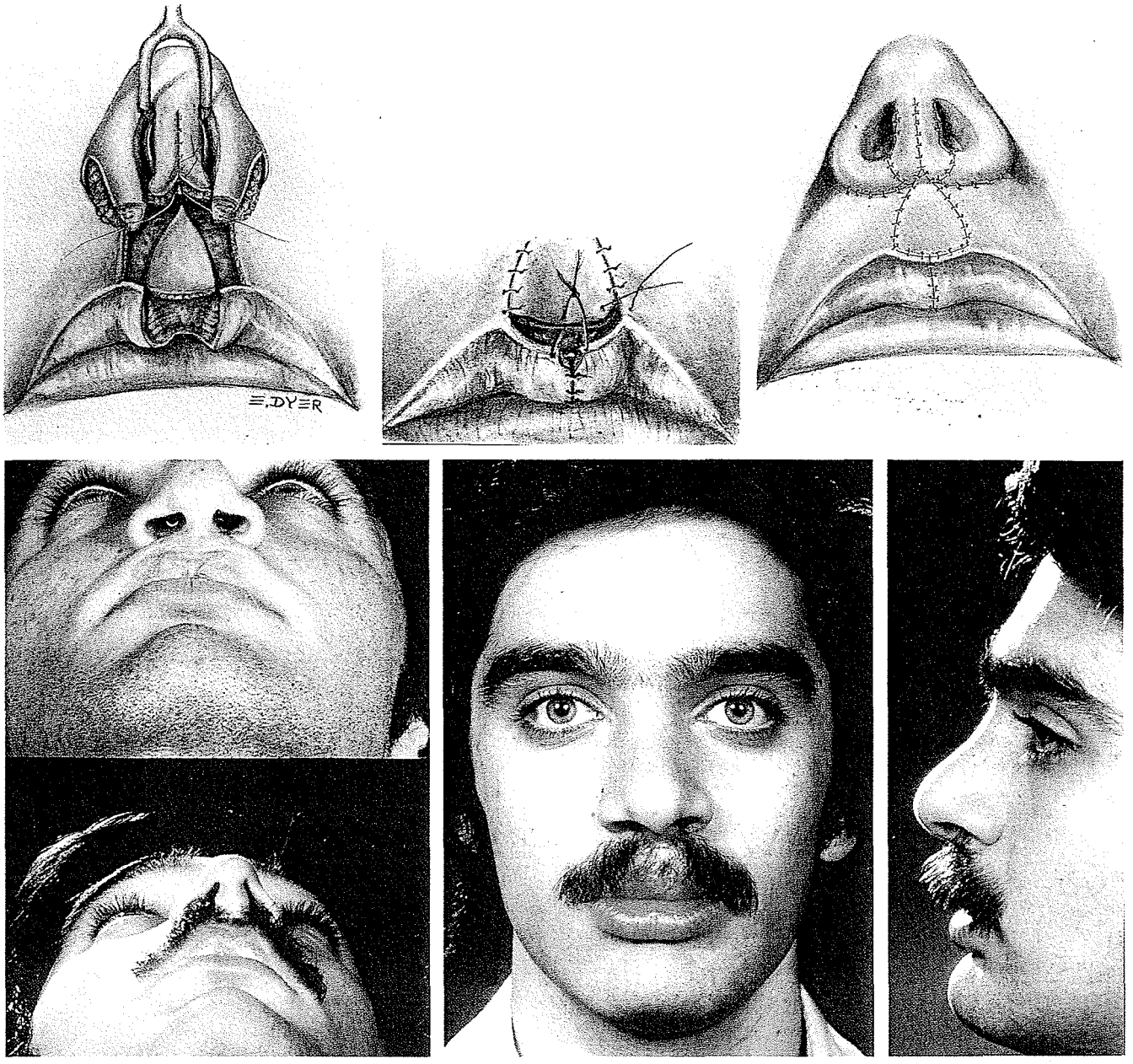
Standard Forks

Here is the use of a standard forked flap for secondary columella lengthening. The upper lip was ample enough to benefit by the sacrifice, and the closure of the lip following the forked flap enabled lateral advancement of mucocutaneous flaps to construct a cupid's bow and midline tubercle. Most forked flap advancements are accompanied simultaneously by whatever other necessary corrective rhinoplastic procedures, such as cartilage reduction, septal shortening and correction, bridge lowering and osteotomies. The forked flap of course provides open rhinoplasty.









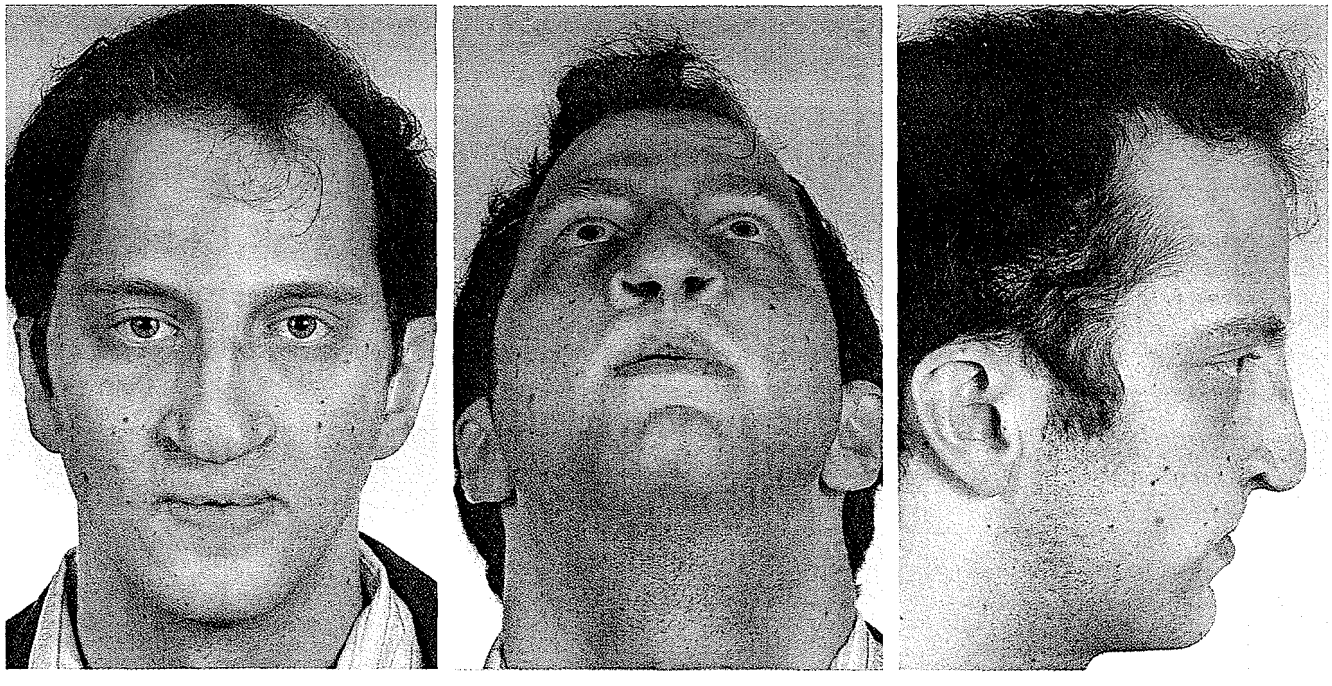
In those cases where a primary bilateral cleft lip closure, such as described by Manchester and others, was accomplished early with no concern for the nose, the lip often is acceptable. Unfortunately, the lip eventually has to give up skin to release the depressed nasal tip. A forked flap was used in this young female to shape the wide inartistic prolabium and lengthen the non-existent columella to allow release of the flat nasal tip. Bilateral alar cinch corrected the alar flare.



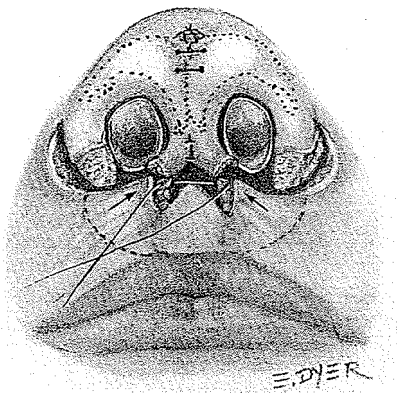


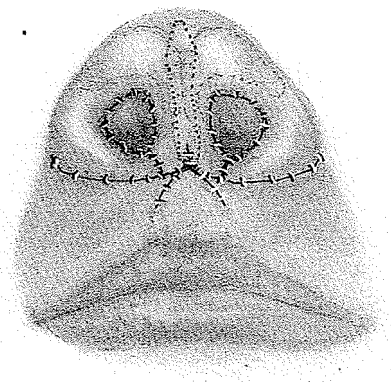
Short Fork

Variation in the plan of the forked flap depends on the specific case. In this 20-year-old male the lower border of the upper lip was relatively tight but the upper portion could spare a fork. Certainly the short columella and the grossly depressed nasal tip needed skin. A short fork was acceptable to the lip and improved the columella. From this natural open rhinoplasty the tip was reduced and the bridge and septum corrected.

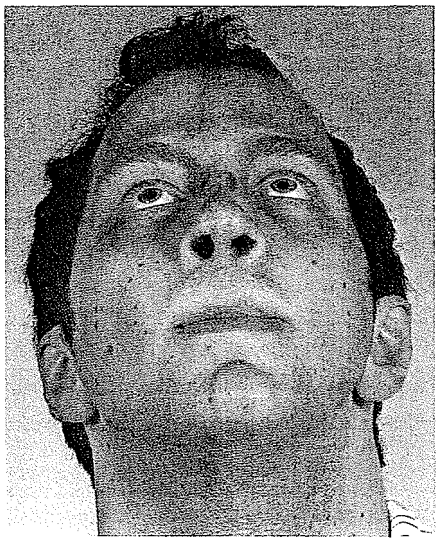










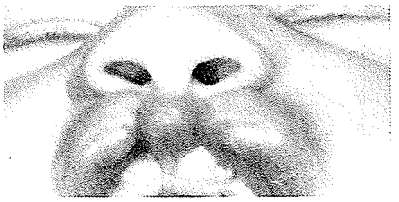


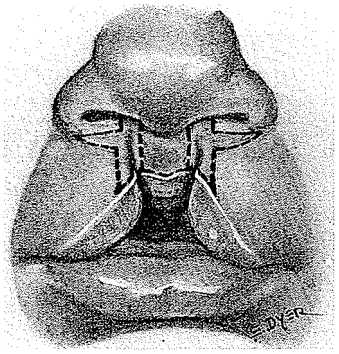


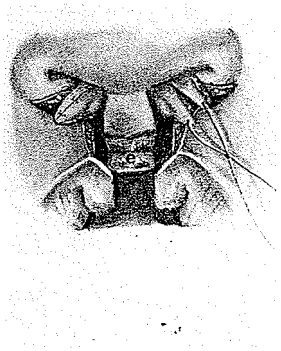
Odd Forks

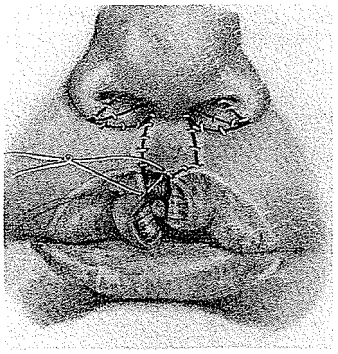
Again the case dictated the configuration of the forks. The diminutive short prolabium and the relatively long lateral lip elements called for a design that obtained skin for the columella and at the same time symmetrized the lip elements so that a philtrum and the lateral lip segments could be joined. The bilateral trilobed fork was gathered, trimmed, sutured together and banked in whisker position.





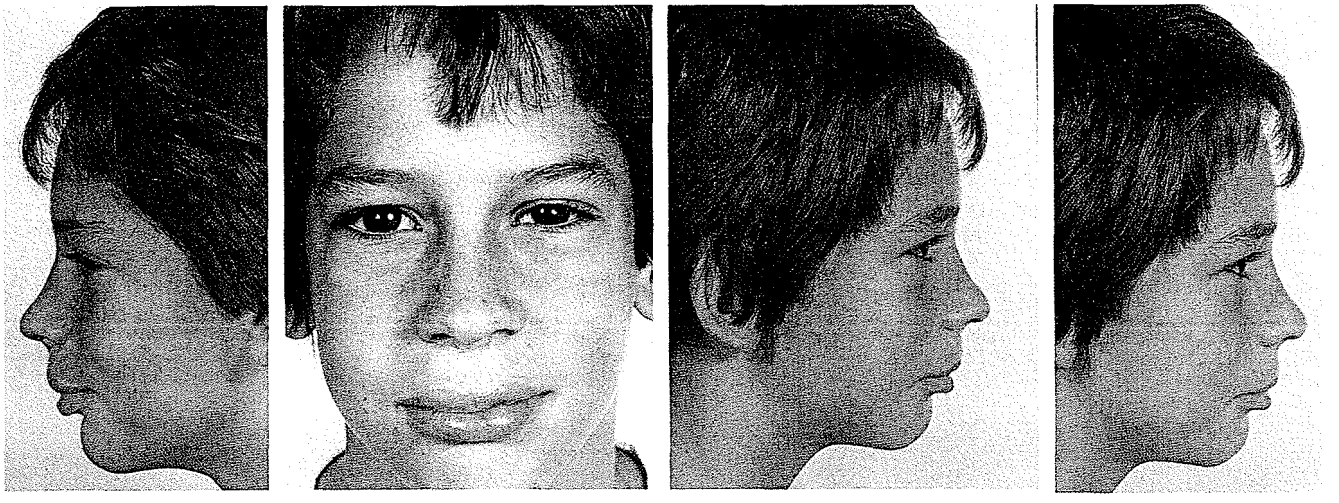








Three months later the banked forks were re-elevated and advanced to create a columella while releasing the depressed nasal tip. At the time of forked flap advancement and in natural open rhinoplasty the alar cartilages were freed, lifted and sutured to each other in the tip. The patient is seen after a 10-year period.



Forked Flap in Primary Closure

In 1960 the forked flap was designed as a delayed procedure in the primary bilateral lip correction. In 1966 it was tried as a primary procedure at the time of lip closure but the precarious prolabium blood supply coming from the premaxilla did not warrant the gain of this action. In 1975 H. McComb lengthened the short columella primarily with the forked flap at age 6 weeks. At three months, through an upper buccal sulcus incision, the skin of the nose was freed from the under structures particularly the alar cartilages. Silk sutures through the intercrural angles of the alar cartilages were brought out through the skin at the nasion and tied to lift the cartilage into better position. This certainly was a step in the right direction but as in most "tie-over" corrections when the suture is removed some of the lifting gain is lost, particularly when the displaced alar cartilages are not freed from their abnormal attachments to the lining. Long-term follow-up by McComb revealed less than ideal results, causing him to give up the use of the primary forked flap. I have always felt McComb was

over-lengthening his columella and that this would be better corrected by reducing the amount of the forks shoved into the columella.

It is true that after the forked flap has been advanced into the columella the depressed nasal tip has been lifted dramatically, causing the nose to appear too snubbed and short. This stimulated M. T. Edgerton and J. L. Marsh in 1978 to advocate the use of an external V-Y downward advancement of the dorsal nasal skin to correct this illusional problem. Growth with development of the nasal bridge, as seen in the young cleft patient from 9 to 15 to 17 years, will correct the relations without the need of adding skin scars. As the bridge rises the nasal tip turns down. If you look for it you will see it in other cases in this book. For this reason I vehemently opposed this



V-Y operation with its unacceptable dorsal skin scars.

In 1971 M. Duffy described banking the fork as a staged procedure. Subsequently I tried all variations of uses and stages of the forked flap which were described in *Cleft Craft 11.* Banking the forked flap has become a standard stage in columella lengthening. It avoids the five-point scar at the base of the columella and lets the lip construction be completed in the banking stage.

NEED FOR COLUMELLA SKIN LENGTHENING

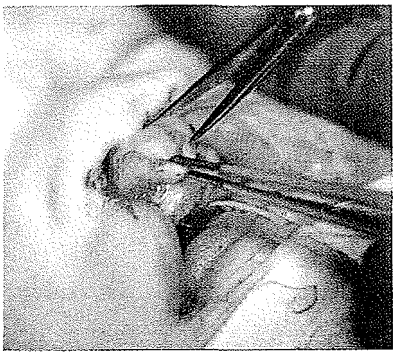
There are those who claim without actual justification that there is no true shortness of skin in the columella. The supposition is advanced that positioning the alar cartilages would correct the discrepancy like magic. Several surgeons such as R. Broadbent opposed the forked flap. Evidently these surgeons were not able to execute the forked flap to their satisfaction, but they never offered a better solution. When the primary surgeon devotes his entire surgery to lip construction, without anticipating the nasal needs, he may produce an accepted lip. Yet there are few predicaments more infuriating than to be faced with a respectable lip and its fine scars of infancy cowering under a flat nose without a columella. This condition is seen in most designs for bilateral cleft lip and certainly in the once popular Manchester approach. These methods require either acceptance of a snubbed nose or reentrance into the lip years later to release the columella, but in the process may produce scars that do not compare favorably with the early ones. Of course there is always the composite auricular patch graft to lengthen the columella.

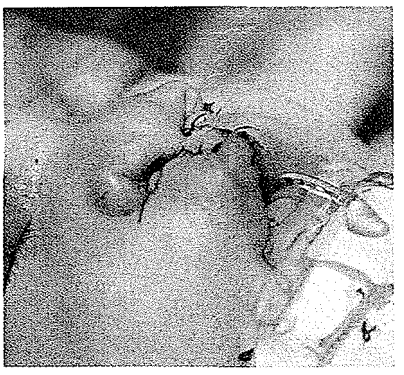
J. B. Mulliken tried to accomplish the same goal of lengthening the columella but without using the forked flap for extra skin. He freed the slumped alar cartilages through bilateral alar and a midline tip-columella incisions. The freed cartilages were sutured together in the midline in a more normal position. This entire maneuver was motivated to gain columella skin length without actually adding skin. The procedure improved alar cartilage position and might have given the slightest suggestion of increased columella length. It did not lengthen appreciatively a truly short columella and unfortunately most bilateral clefts suffer from very short columellas. His 1995 fine work suffers the same problem.

The same is true of the one-stage open tip rhinoplasty described by J. A. Trott and N. Mohan in 1993. By lifting the skin of the prolabium in conjunction with alar margin inci-

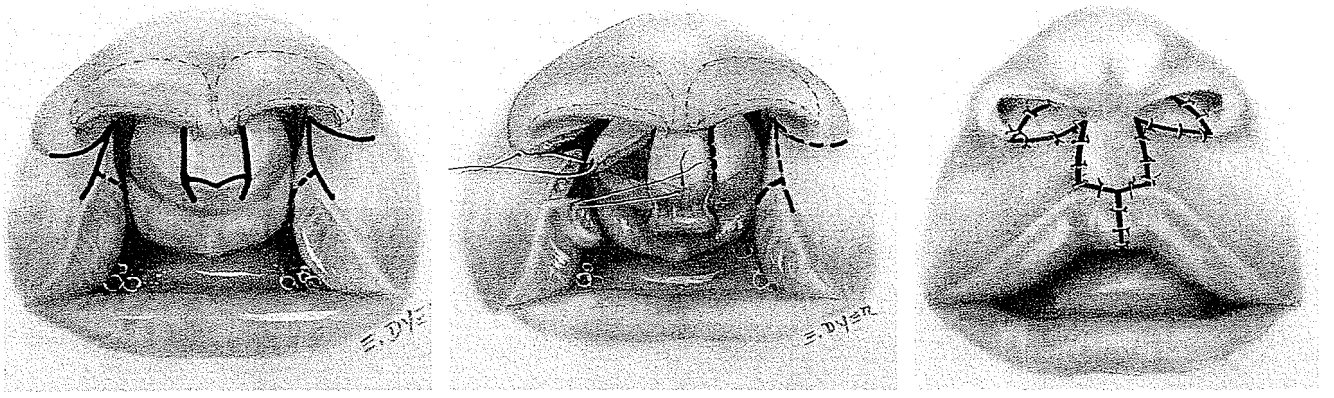
sions, an open exposure to the alar cartilages is achieved. Then the cartilages are sutured in corrected position and the prolabium replaced. The advantage achieved is in tip cartilage position with only slight relative nasal tip-columella improvement. There has been no true increase in skin in the area of columella shortness. In the Malaysian cases shown, where a flat nose and a relatively short columella may be better tolerated, those with some columella already present ended up short but almost acceptable, whereas those with no columella and lack of prolabial tissue resulted, as would be expected, in both inadequate columella and philtrum.

Mulliken, Trott and Mohan and others, by correcting alar cartilage position (which incidentally is necessary in almost all bilateral clefts), claim to lengthen the columella by squeezing the nasal tip skin into the upper columella. Coming from the opposite direction, in 1993 C. Cutting and B. Grayson proposed a thoughtful modification, which rolls superior prolabium skin up into the lower columella and lines it posteriorly with superiorly based flaps of lateral prolabium mucosa. This method unfortunately takes skin from the upper prolabium which is limited in most bilateral clefts. There seems to be a resultant asymmetry of the columella-lip junction in a relatively high percentage of their eight cases. This secondary deformity calls for a Z-plasty, H. S. Deneke and R. Meyer, the scars of which, of course, partially cancel any gains. As noted honestly by Cutting, "Patients with a small prolabium are not candidates for this procedure . . . while the lip segment seems to stretch as usual, the columella does not. In such patients, we prefer the two-stage method described by Millard."

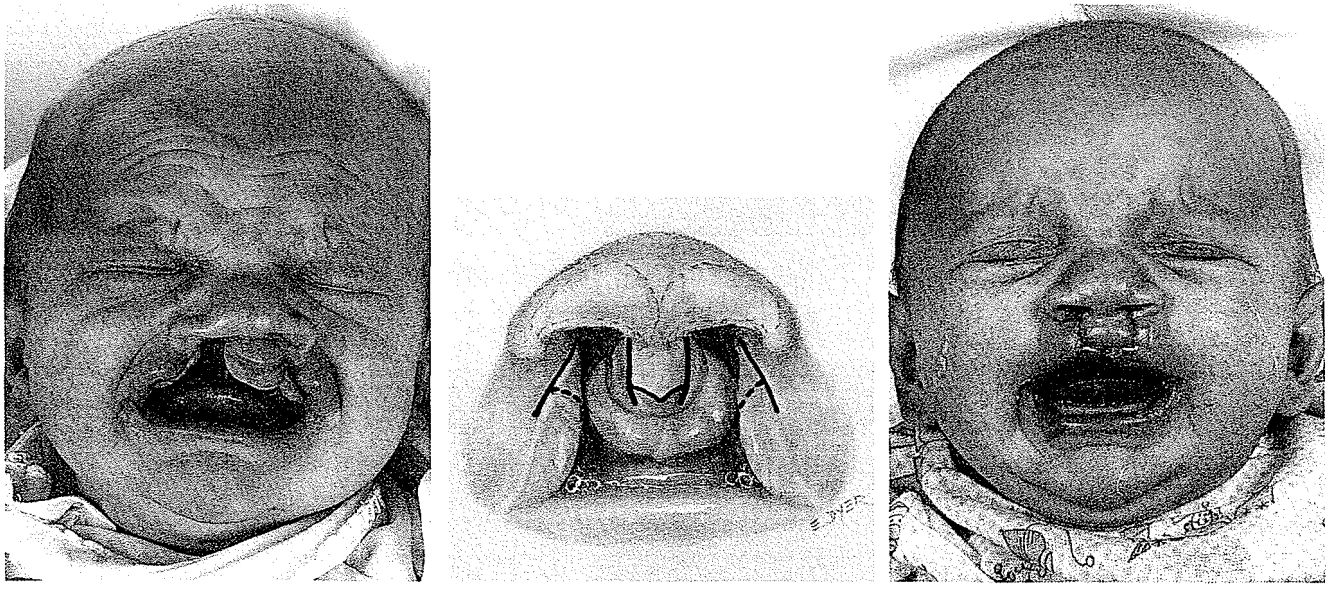


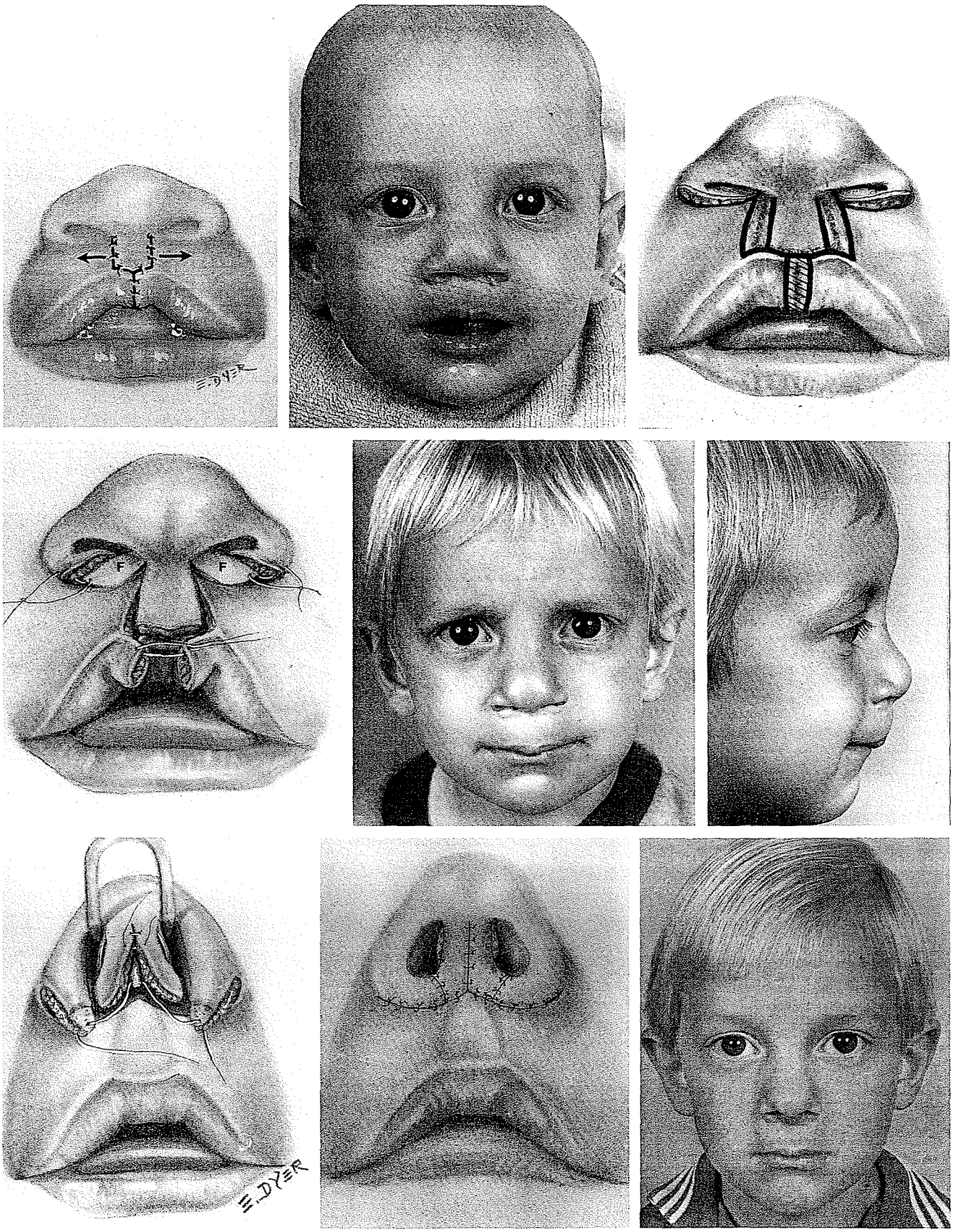


For 20 years, from the mid-1960s to the mid-1980s, my standard two or three stage approach depended on the size of the prolabium. When the prolabium was large it could spare a forked flap primarily pared off its sides. These flaps were banked in the first stage and later advanced into the columella at a second stage. Yet to have a large prolabium in Miami has been rare.

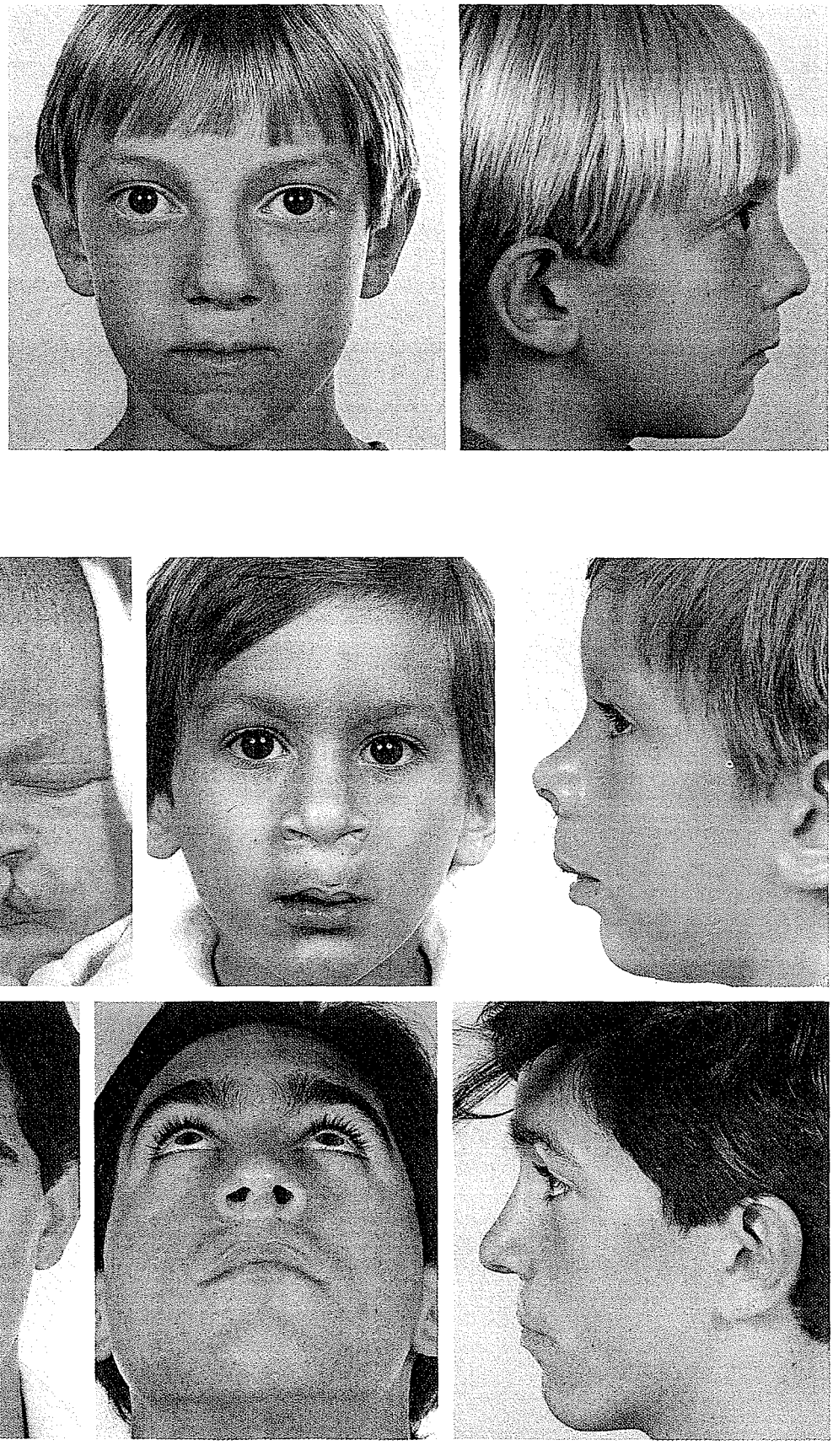


When the prolabium is small, which is the usual state, then the edges of the lateral lip elements are attached to the freshened sides of the prolabium. In time the lateral muscular elements will stretch the prolabium to double its size providing plenty of tissue for a forked flap. The flap is first banked in whisker position and then is advanced into the columella with release of the depressed nasal tip. Here are three bilateral clefts treated in this manner of prolabium stretch, then forked flap banking, and finally advancement into the columella with alar cartilage correction. These patients were in their early teens before the nose became acceptable. Note also that the snubbed nose in the child after forked flap advancement settled into normal position gradually with age and nasal



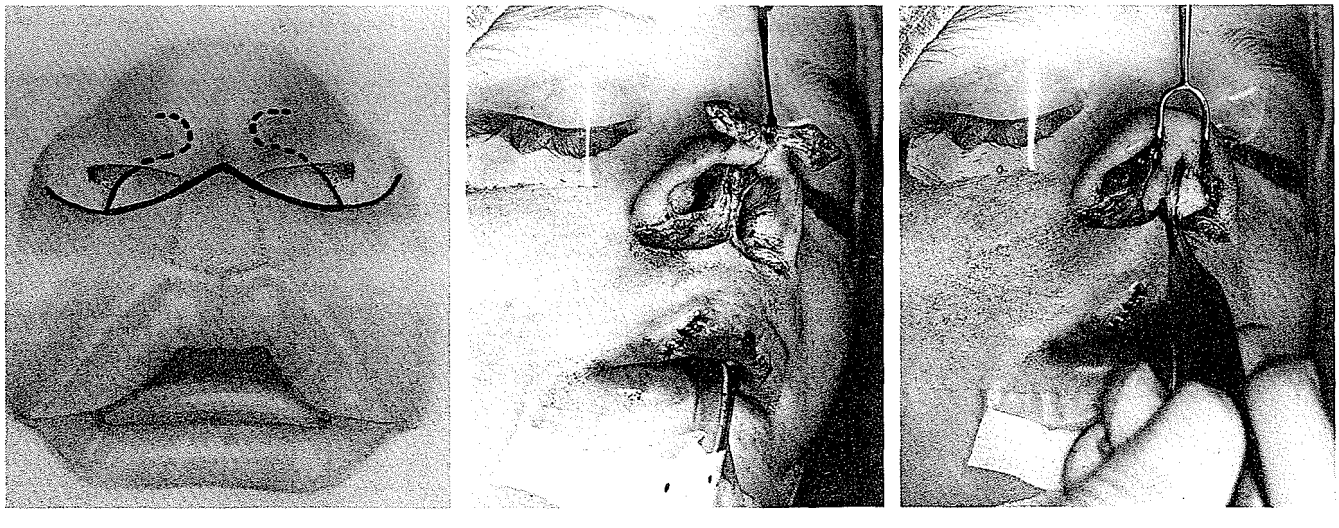


bridge development. Here he is at the age of 12 years.



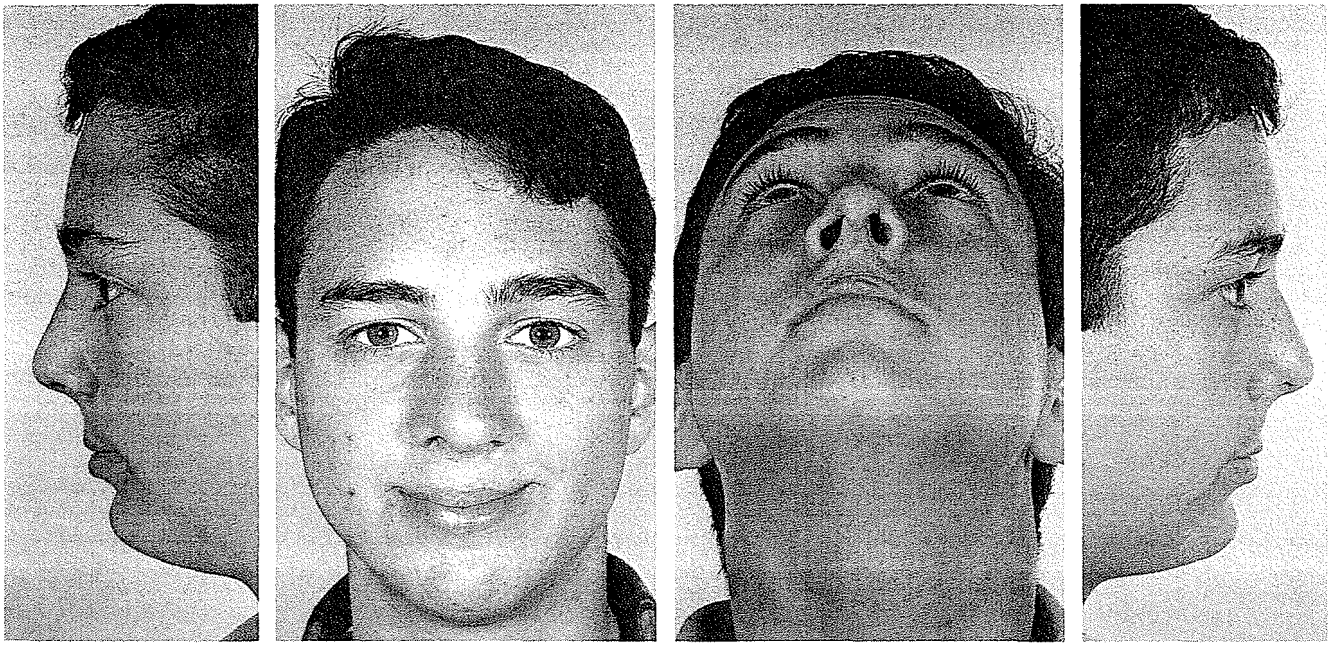




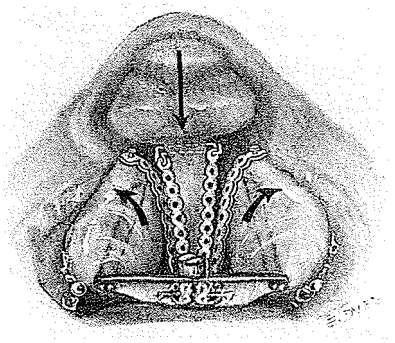




Here he is at the age of six and at the age of fifteen.

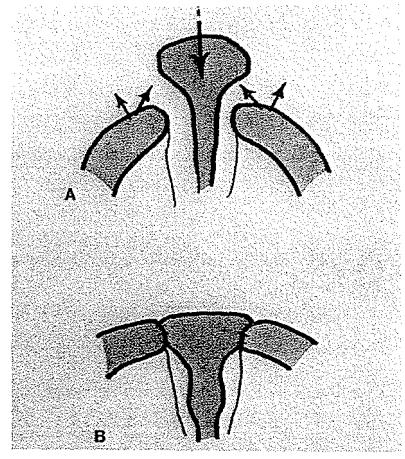


CORRECTION BASED ON BIOLOGIC DESIGN

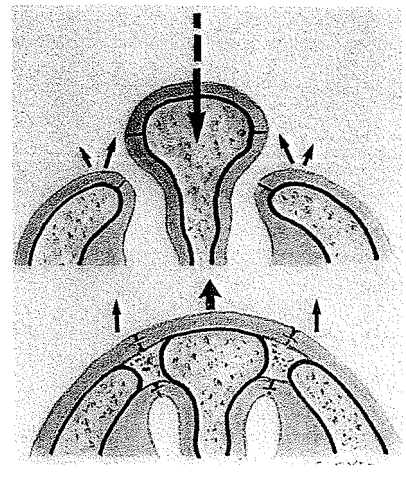


Before correction by completion of the forked process in bilateral clefts is possible, alignment of facial parts is a first priority. Presurgical orthodontics as pioneered by McNeil and Burston, Georgiade and Latham and developed by Latham is the initial corrective step. The premaxilla and maxillae are aligned by the use of an elastic chain, two vomer pins and an expander appliance. By direct and gradual force the maxillae are spread and advanced as the premaxilla is restrained and set back without buckling the septum. It is pressured back like

closing a drawer and is not bent by flexion. There may be reaction to the compression by temporary swelling of the septum but this soon subsides. Once in alignment and 2–4 mm apart on each side it is possible to turn mucoperiosteum out of the alveolar clefts and construct a periosteal tunnel across the bony gaps as diagrammed in 1990. Correction of the mesenchyme migration failures in the nasal area, after stabilizing a symmetric platform and constructing the nasal floors, involves lengthening the columella and freeing and positioning the alar cartilages and cinching the flaring alar bases.



Eighteen years ago Ralph Latham first teamed with me on several cases and over the past 12 years all complete clefts have had the Latham presurgical orthodontics followed by bilateral periosteoplasties, which stabilized a symmetrical platform and constructed the nasal floors. This has set the stage for earlier correction of the nose.

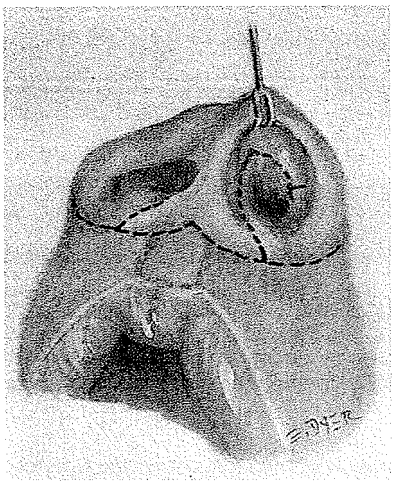


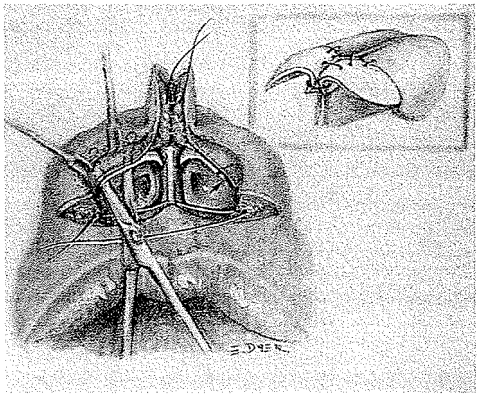
At the time of periosteoplasty, the type of primary lip closure depends on the size of the prolabium. If the prolabium is small, an adhesion is achieved and stretching of the prolabium over a year or two will provide adequate tissue for a forked flap, leaving enough tissue to form a normal philtrum. If the prolabium is large, the forked flap can be spared from its sides and banked in whisker position at the time of primary closure of the alveolar defects and the lip.

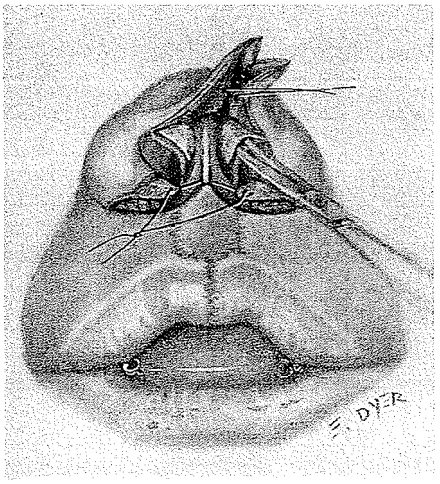
Banking Stage of Forked Flap Preferred

Whether the forked flap is banked primarily or as a secondary procedure during palate closure after the prolabium has stretched, the banking procedure offers assets. It avoids the five-point scar at the base of the columella and it allows completion of lip construction during the stage of banking. Then, too, advancement of the forked flap from banked position is easier because the lip does not have to be re-entered. The general action of advancing the banked fork is similar to the Carter-Cronin procedure except for one cardinal point. By banking the fork in whisker position under the alar base there is actual new tissue provided for columella lengthening.

Advancing the fork from the banked position or from the lip into the columella is similar in technique. The fork is tubed with skin sutures in front and then the forks are curled into a column with 5–0 catgut sutures in the subcutaneous tissues posteriorly. This extended column is advanced along the membranous septum as columella and the tips of the fork are trimmed and splayed to help in construction of the nostril sill. One of the advantages of the forked flap has always been the improved advancement of the slumped medial crura of the lower lateral alar cartilage as the tip of the nose was released during columella lengthening.



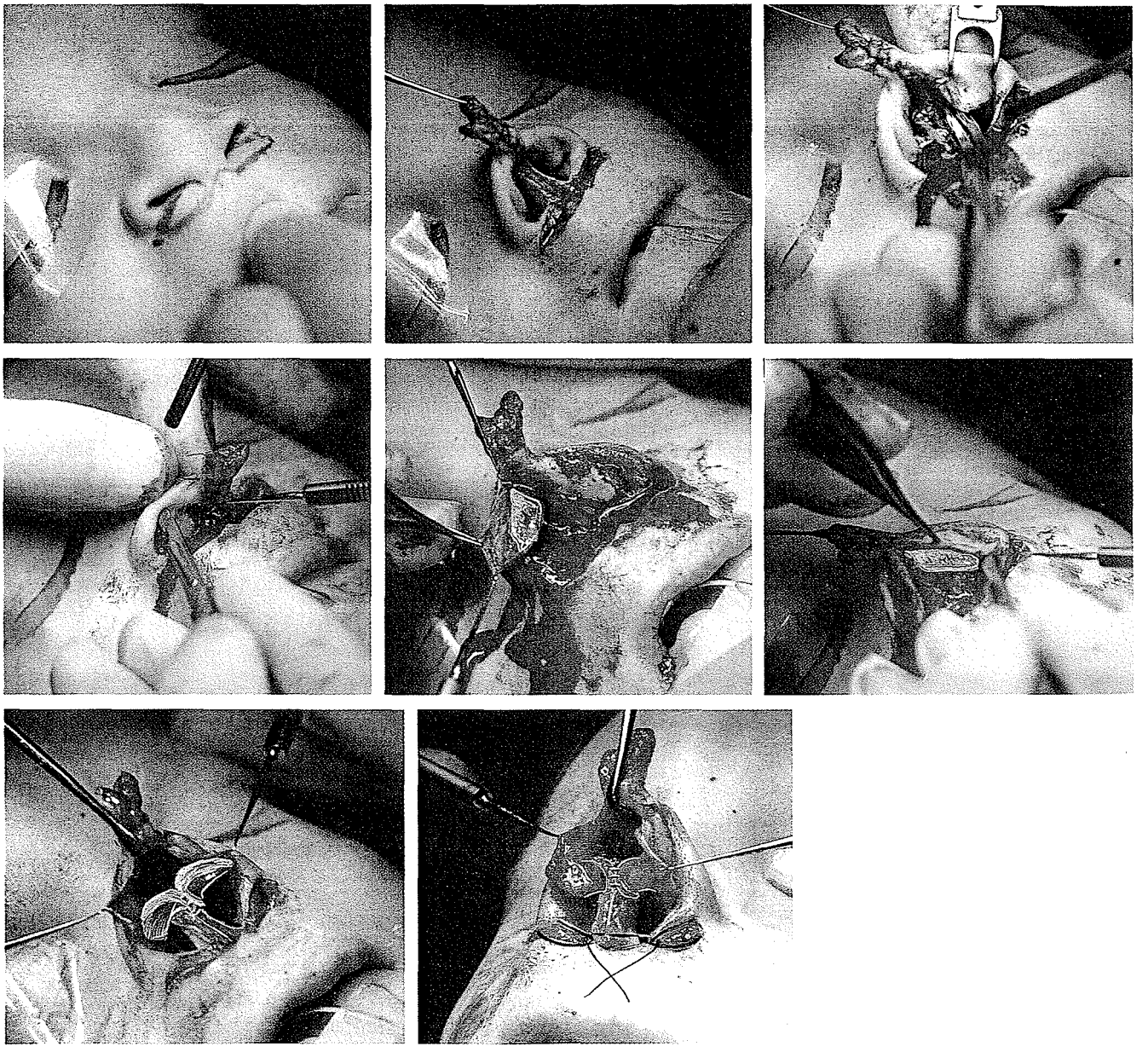


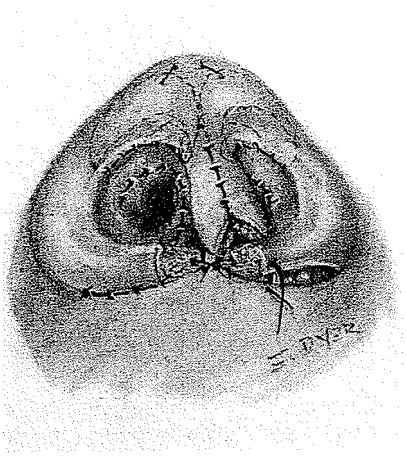


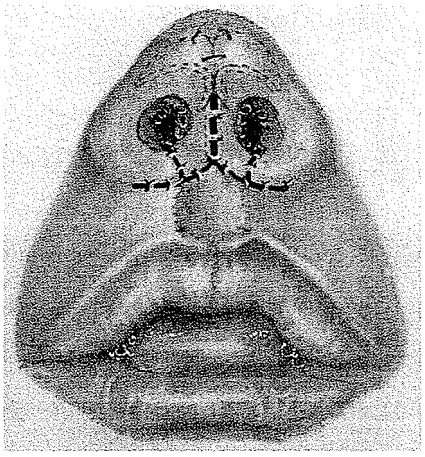
Over the last 8–10 years, the advance of the forked flap into columella and open rhinoplasty has led to extension of the membranous septal incisions as intercartilaginous incisions with lateral back-cuts across the vestibular mucosa at the webs. This allows freeing of the medial two-thirds of both alar cartilages from the overlying skin and the inferiorly lying mucosa. This dissection is facilitated by alar margin incisions to give even better direct view of the cartilage adherence to the nasal lining. The freed ends of the alar cartilages are sutured to each other with mattress sutures of 4–0 Prolene to create a matching pair of medial crura in the nasal tip. The upper edge of each freed alar cartilage is sutured under direct vision to the septum and to underlap the upper lateral cartilages. The vestibular lining is closed carefully with catgut su-

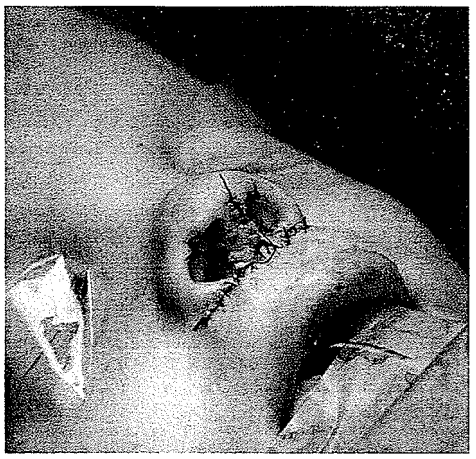
tures, letting the lateral back-cut close in a V-Y to eradicate the vestibular web and open the airway. This approach is similar in broad principle with a method described by R. Pigott in 1988 but different in technical detail. Finally the alar bases are cinched to complete the nasal corrections.

These intraoperative views may clarify the dissection and suturing of the alar cartilages during the advancement of the forked flaps.



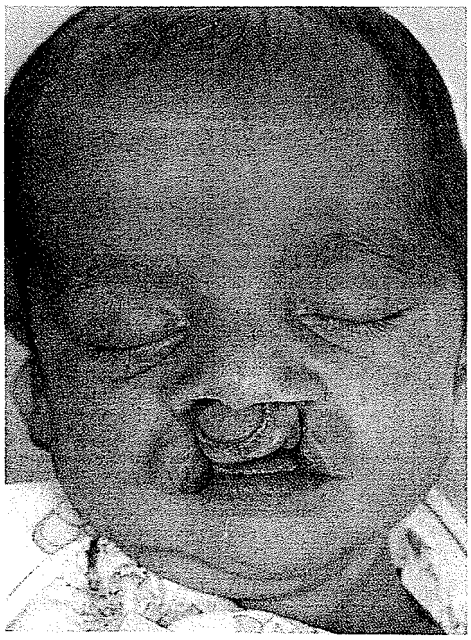


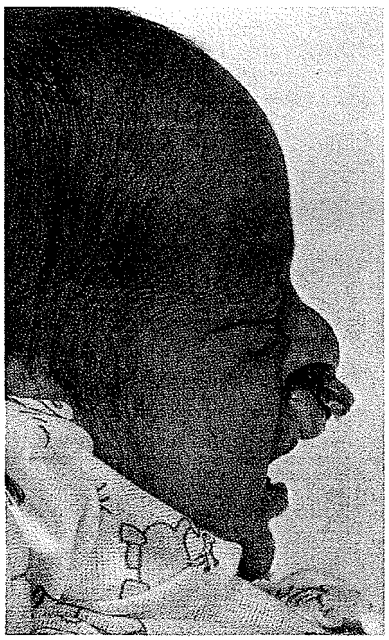


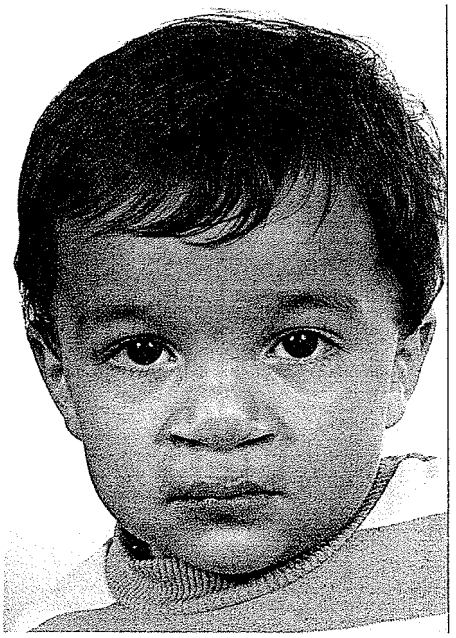


The principle of fashioning the treatment of clefts toward the completion of the arrested embryogenesis was presented in a Hunterian lecture and published in the *Annals of the Royal College of Surgeons,* 1994.

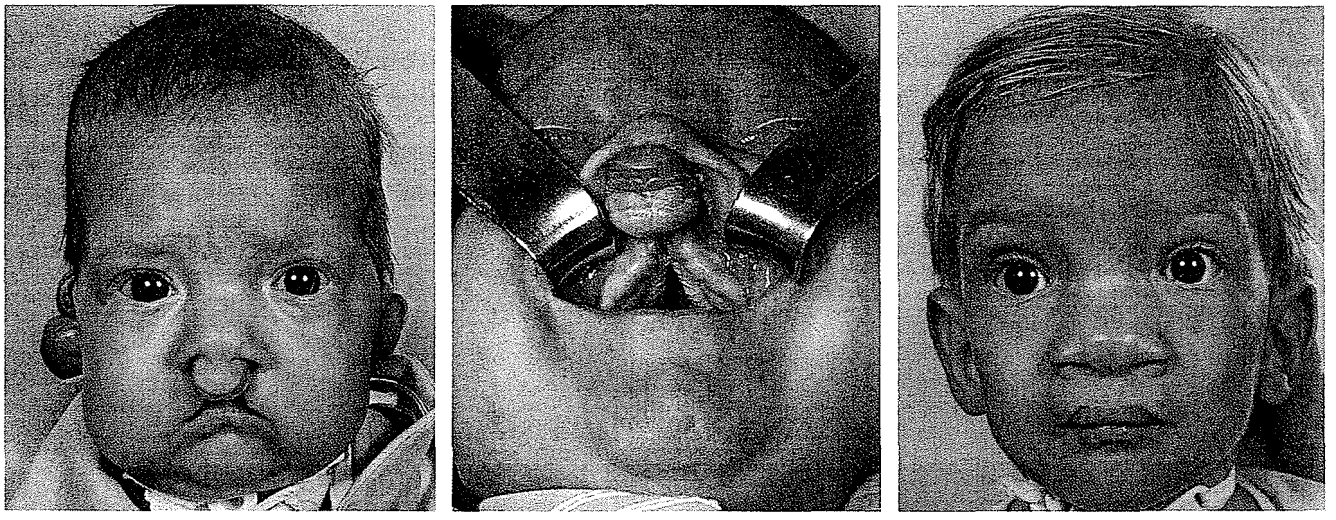
Here are two examples of this approach in bilateral clefts with small prolabiums who had presurgical orthodontia, periosteoplasty and a lip adhesion followed by banking of forked flaps. Then at the age of about four years the forked flaps were advanced from the banked whisker position into the columella. During this open rhinoplasty stage, the alar cartilages were freed, lifted and sutured together into normal position. The alar bases were narrowed by an alar cinch.

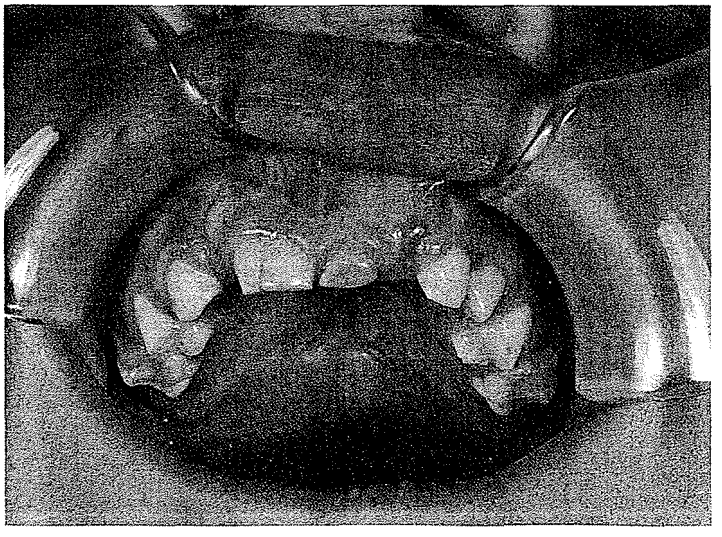




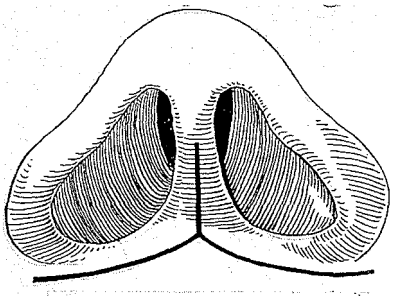


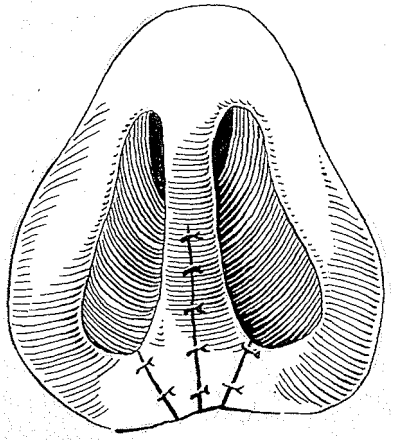








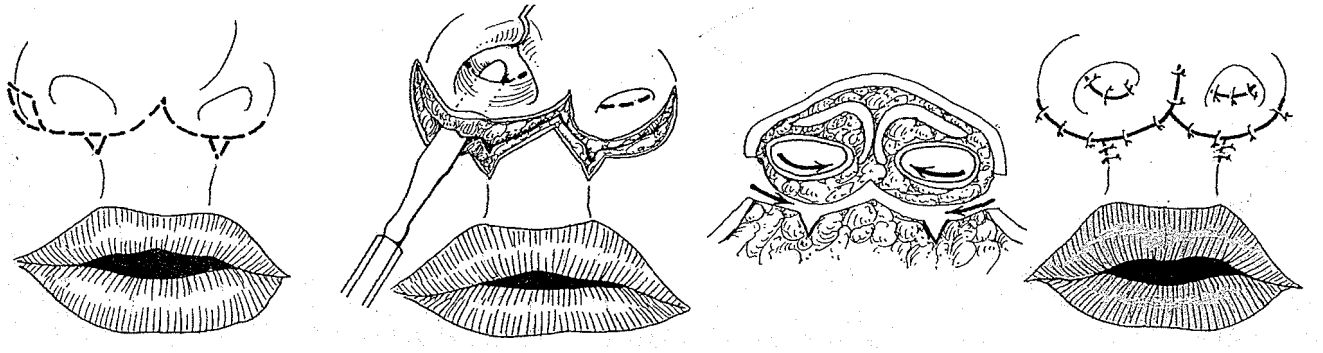




Forked Flap Not Always Necessary

There are circumstances in certain bilateral clefts where the forked flap may not be necessary. If the nasal tip is not extremely depressed and the columella has moderate length but the nostril sills are long and the nasal floors wide, a type of nostril sill advancement into the columella may suffice. This is more likely to be effective in incomplete and some asymmetric bilateral clefts.

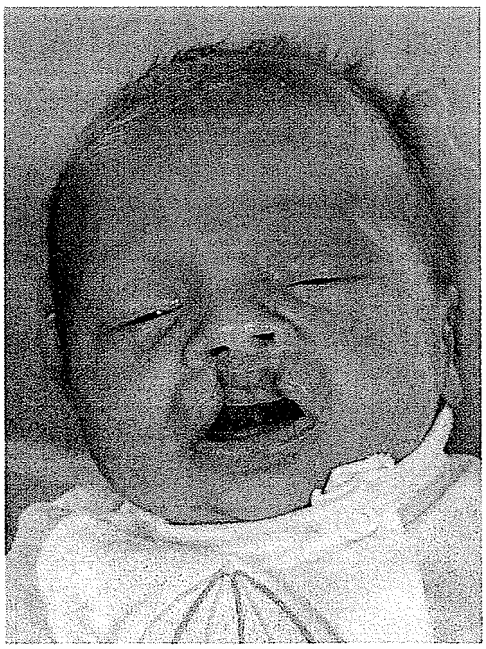
As early as 1914 W. Carter described a columella lengthening procedure that advanced the nasal floors and alar bases with an inverted Y shaped incision. The alar bases were freed and advanced medially with some benefit to the short columella. In 1956 D. Cardosa and in 1957 J. Converse each described V-Y advancements from the nostril floors into the columella. Then in 1958 T. Cronin described an improved rendition of this same principle of advancing the nostril sills with the columella.

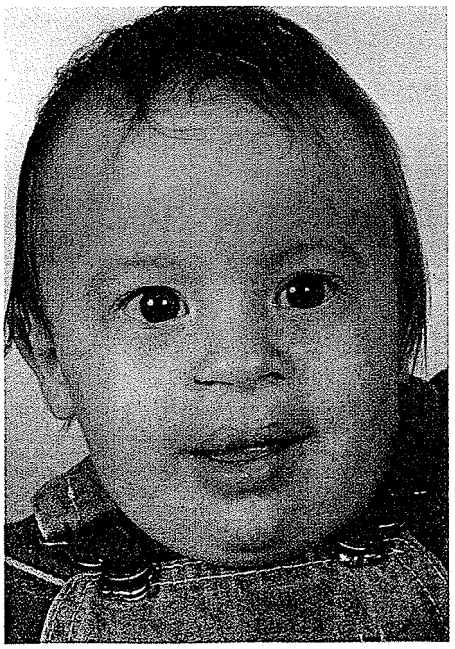


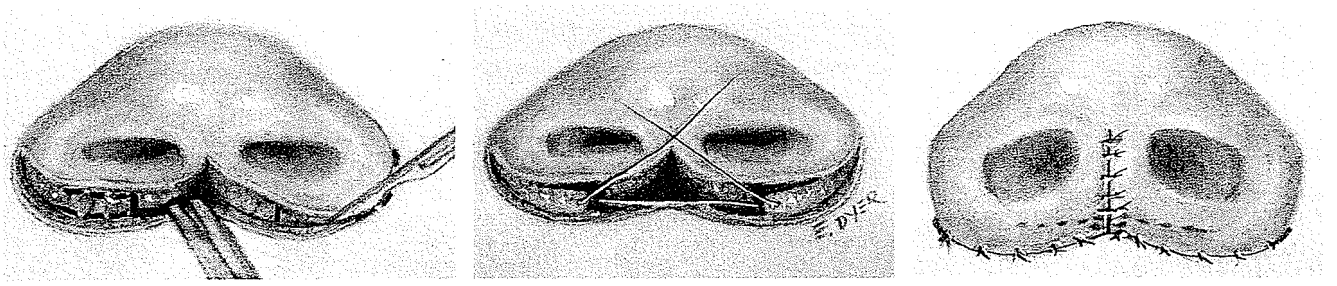
In my view of this technique in *Cleft Craft,* Volume II, I noted that in all of Cronin's published cases, in my opinion, the columella seemed to be just a little short of ideal and the nasal tip never quite up enough. There was one case in which Cronin had carried out the procedure twice so that the columella and tip, although slightly snubbed, was within acceptable proportions.

When there is some columella present in the original deformity or in a good percentage of incomplete and even asymmetric incomplete bilateral cleft, then the V-Y advancement of the nostril sills into the columella length, if maintained by developing bilateral tethering strips to be cinched at the nasal spine, has a chance. This tethering action not only reinforces the columella lengthening but controls and fixes the medial advancement of the alar bases essential in the overall positioning of the involved parts.

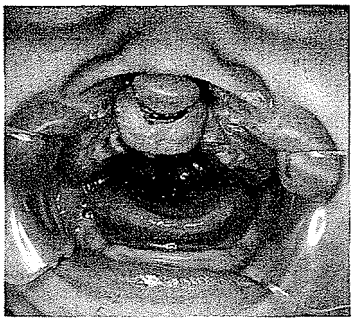
Here are two examples of this general approach which I seldom use. In one the original cleft was incomplete with some columella present. Advancement of the alar bases in a V-Y externally aided by a bilateral cinching gave modest columella improvement.





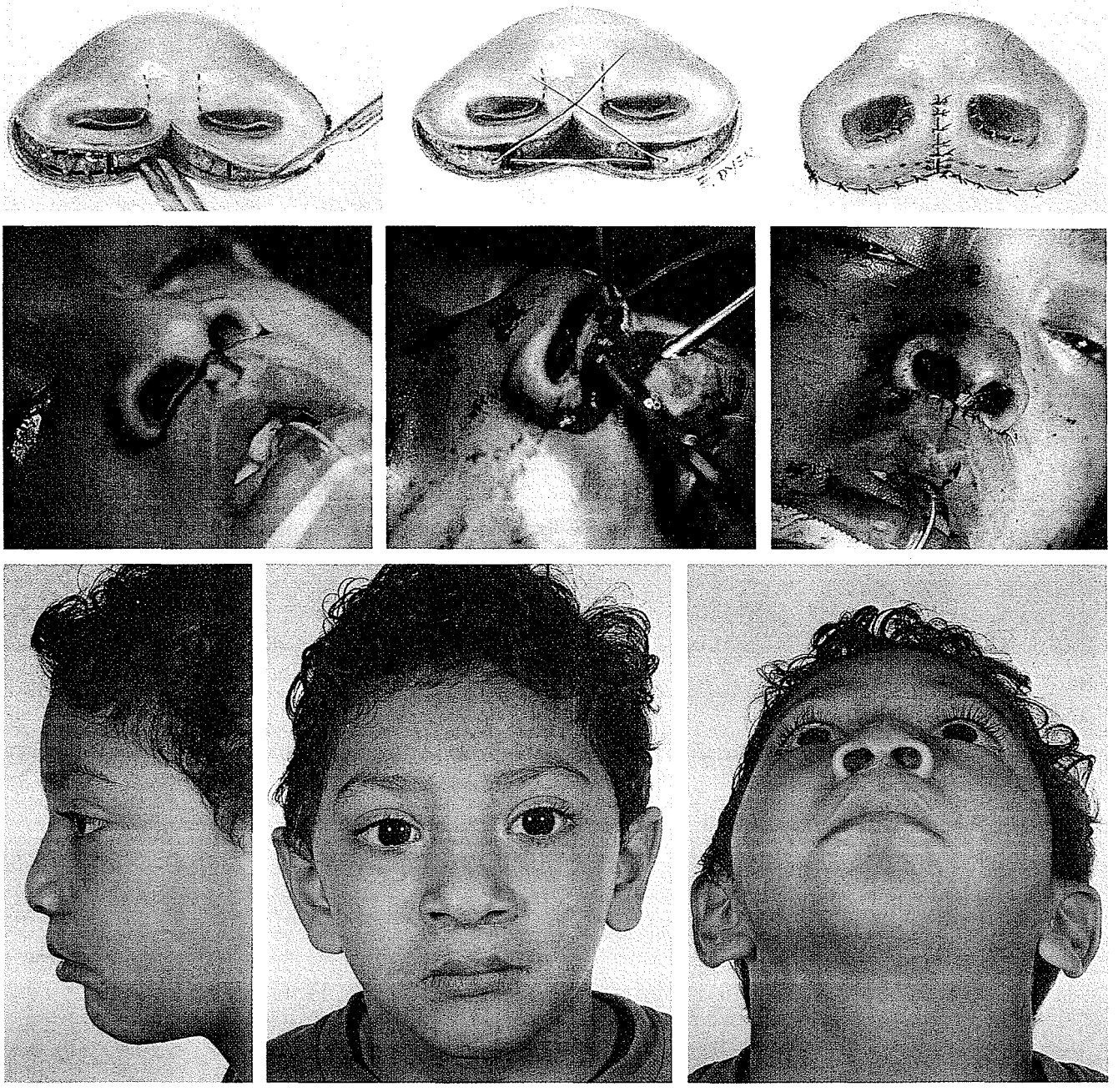






In the other short columella the nostril sills were cut as strap flaps attached to the alar bases and extended into the short columella by a membranous septal incision. This allowed greater advancement of the nostril sills into the columella with medial advancement of the alar bases. This maneuver was enhanced and stabilized by a bilateral alar cinch which lengthened the columella modestly and reduced the flare satisfactorily.





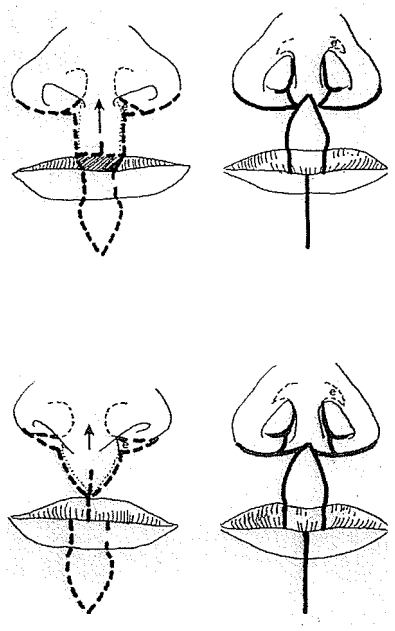
When selecting the most appropriate procedure for the specific case there is one factor in the equation that must not be overlooked: the ultimate goal of each patient. Those races such as the Oriental and the Black, where a certain amount of nasal flatness and broadness is normal, there is no need for the long columella necessary in the Caucasian. Here the bilateral alar advancement may suffice. Yet do not get caught in the rut of routine here either and do not rule out forked

flaps on all Black or Orientals. In many bilateral clefts the columella is so non-existent that substantial new skin must be brought in to give a normal result. Here the forked flap is first choice.

It is difficult for me to evaluate fairly the practical value of all the excellent Japanese work being reported on bilateral clefts because their normal goals are often quite different from those of the Caucasian.

A Contraindication for Forked Flap

There are certain secondary cases in which the forked flap cannot be used to advantage. The Robin Hood principle must be monitored carefully to make certain the donor area is not harmed by too much sacrifice. When the nasal tip is depressed and the columella is short but the upper lip is enough tighter than the lower lip that a severe discrepancy is visible, especially in profile, the upper lip then obviously cannot afford a forked flap. Do not get caught in routine and force a fork when the costs are extravagant. In these patients the shifting of the entire prolabium, whatever its shape, into the columella releases the tug-of-war between the lip and the nose. The freed prolabium can be trimmed, thinned, tailored and rolled into a column to imitate an excellent columella and then shifted along the membranous septum releasing the depressed nasal tip. The flaring alar bases can be cinched. The lateral lip elements can and should be advanced medially to create a midline philtrum-sized defect. This follows the principle of never cutting a flap to fill a defect but rather maneuver the defect into an aesthetic unit and then cut the flap to fit that asesthetic unit. The protuberant or relatively protuberant lower lip will benefit by sparing a midline shield-shaped lip-switch flap to reconstruct the philtrum of the upper lip. It is important that the lower lip flap be fashioned of adequate length to reach the split columella base and dovetail into it not only for camouflage but also for aesthetics. The coronary vessel pedicle is left seven to eight days and

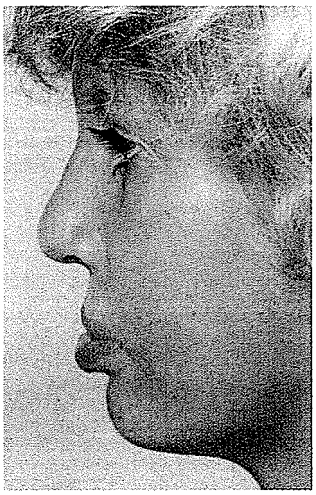


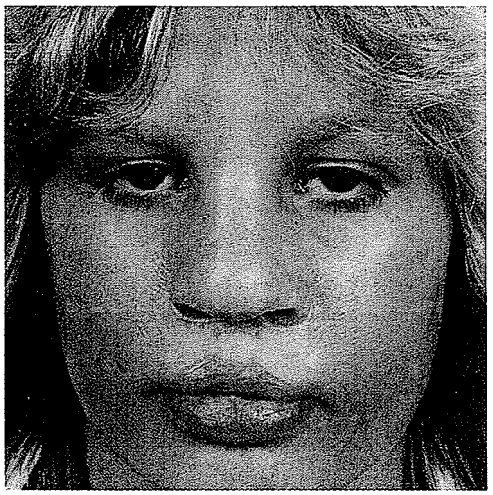
when divided this area of the upper and lower lip are revised carefully.

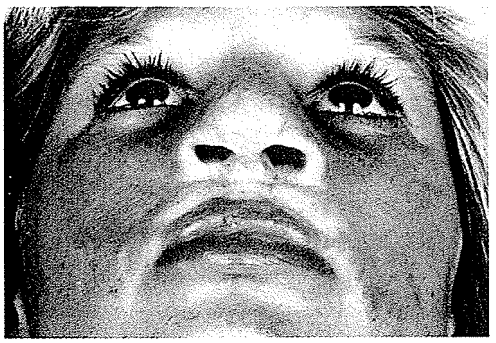
EXAMPLES OF ADVANCEMENT OF PROLABIUM INTO COLUMELLA

In complete bilateral clefts the failure of mesenchyma migration to bolster the central frontonasal component ends up with severe deficiency in tissues along this line. The distance from the tip of the nose to the inferior edge of the prolabium is short and the area of greatest deficiency is in columella length. When the lateral lip elements are simply attached to the sides of the prolabium, preserving the prolabium vermilion, not only are the needs of the nose ignored but the lip has been ineffectively constructed.

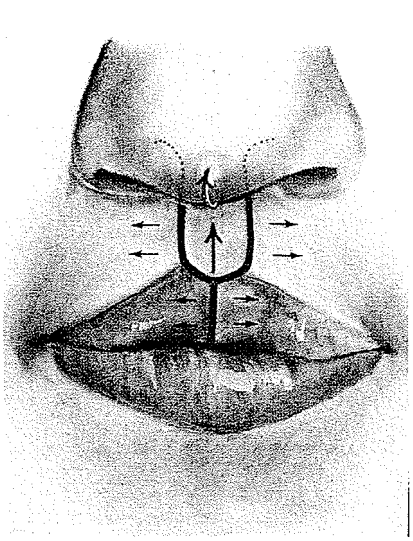
At age 16 this patient's face was a conflict of scars, deficiencies and tensions that in themselves were not drastically severe but when observed together made her face look as if it *hurt!* The key to this confusion of tension lay in the fair redis-

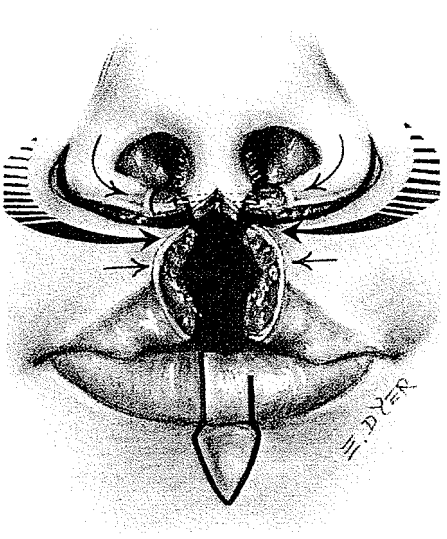


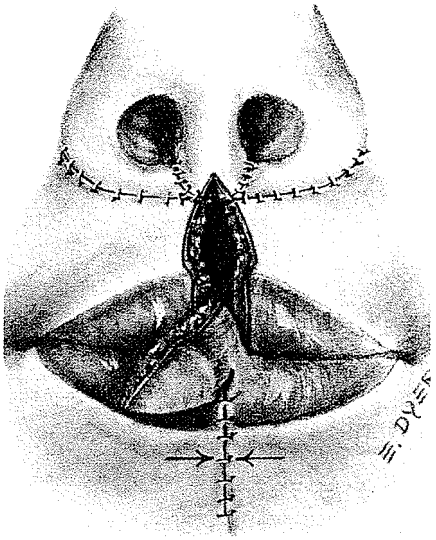


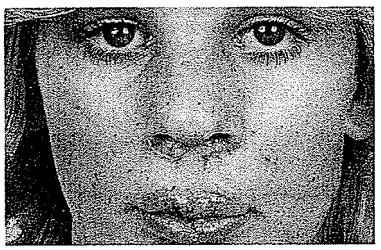


tribution of tissues. The prolabium was advanced into the columella to release the depressed nasal tip. Then by advancing the upper lip elements through release and rotation around the alar bases a natural shape and size philtrum defect was prepared. This was filled with a shield-shaped midline lower lip-switch flap which reduced the protuberant lower lip.

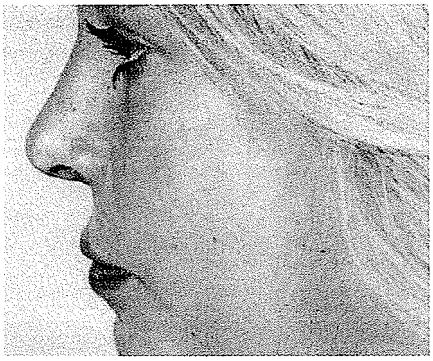








After one year the tissues were content in their rearrangement. A corrective rhinoplasty reduced the alar cartilages, rasped the bridge, narrowed the nasal bones by osteotomy with in-fracture and improved the columella contour and tip definition by insertion of septal cartilage grafts.





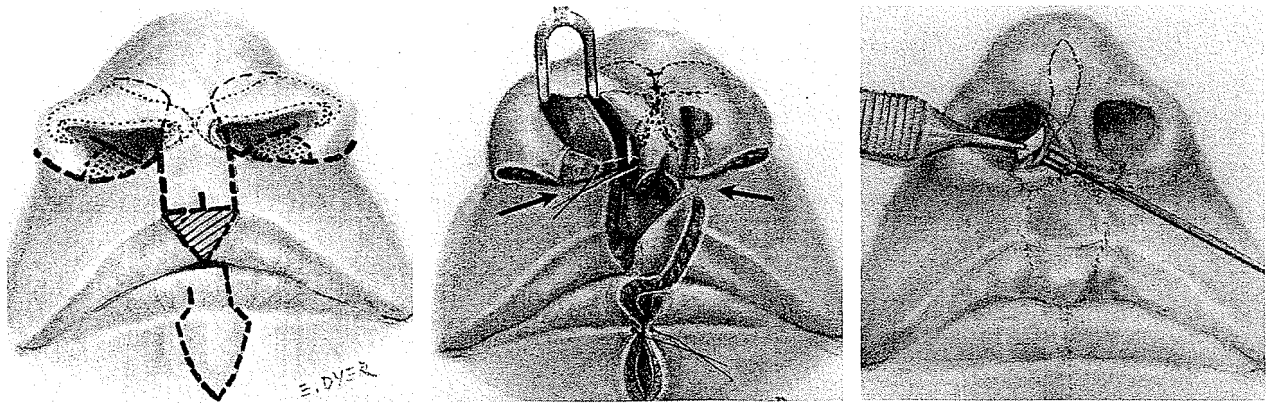


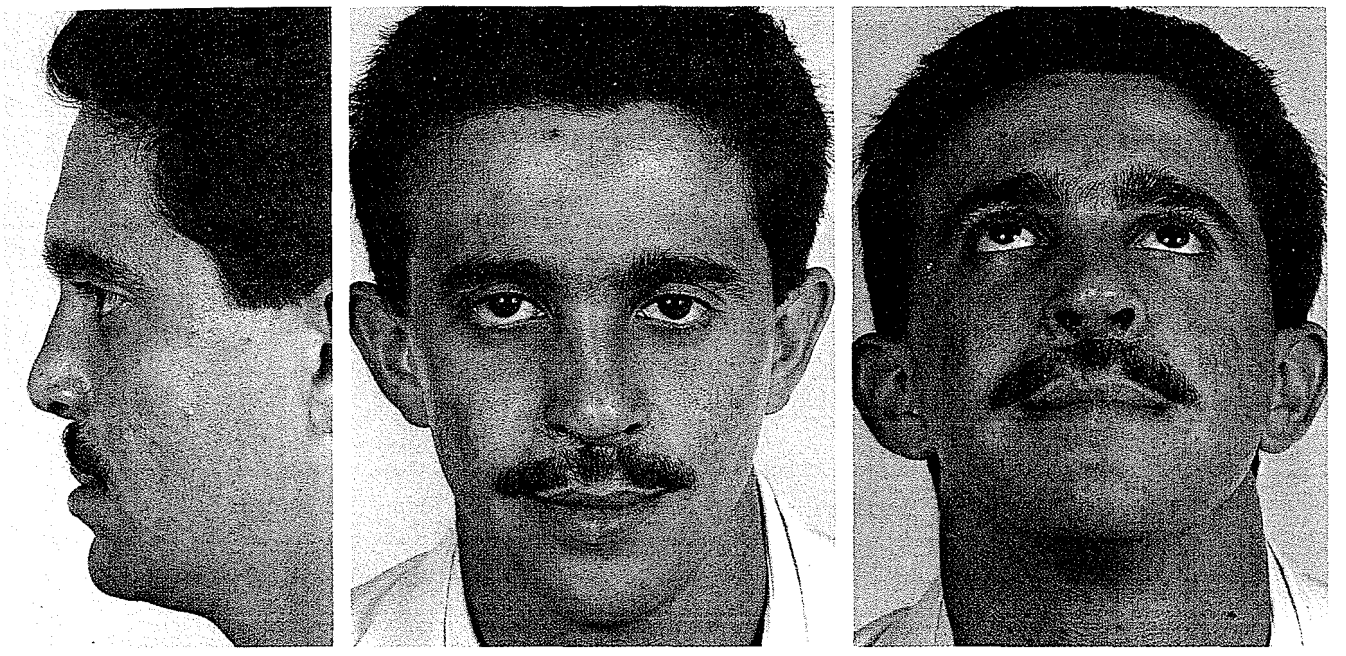


This Hispanic male had been treated primarily in Cuba. Subsequently he underwent a Le Fort I osteotomy by S. A. Wolfe with spread of the maxilla to enable the fitting of a prosthesis and improvement of the nasal platform. This set



the stage for midline shifting of tissues to relieve the shortness in the frontonasal line. The prolabium was cut out of the lip and lifted so that extension of the membranous septal incision could be carried bilaterally in the intercartilaginous line. This enables exposure, dissection, advancement and midline suturing of the alar cartilages in the nasal tip. The prolabium was thinned, rolled into a column, and advanced along the septum to lengthen the columella. The alar bases were cinched, and the lateral lip elements were advanced to create a philtrum shaped central defect. A shield-shaped lower lip flap was transposed into the upper lip defect. In seven days the pedicle was divided. In a second stage and as a final adjunct, the septal deviation was corrected and the septal cartilage obtained was inserted up the columella into the tip.





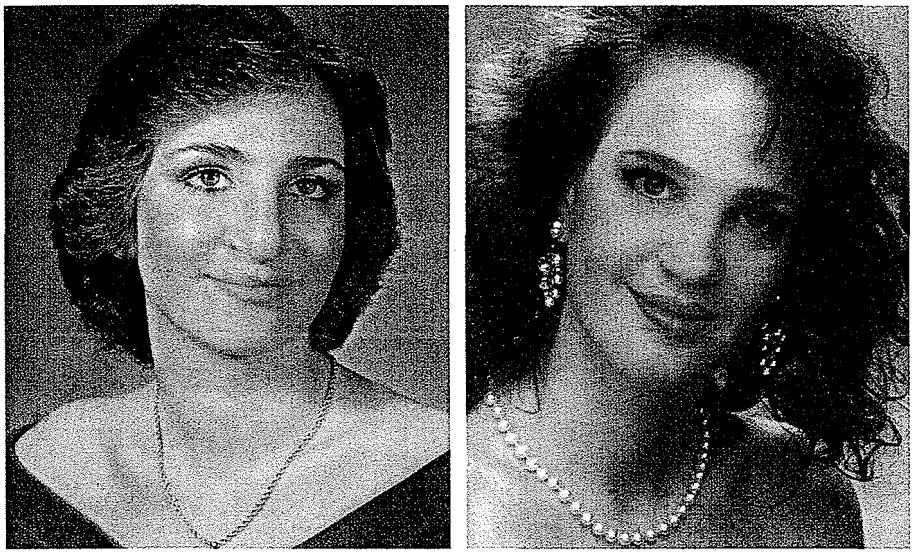
This 17-year-old female was born with a bilateral cleft, which after multiple procedures presented a hooked nose with a broad tip, flaring alae and short columella, a patch of prolabium surrounded by scars, no Cupid's bow, protuberant lower lip, fair occlusion and good speech.

Our approach involved advancing the prolabium out of the lip, thinning it and curling it into a column to allow columella lengthening as it was advanced along the membranous septum. From this open position the anterior septum was resected, alar cartilages reduced, bridge straightened, and bones narrowed with osteotomies and in-fractures. An alar cinch procedure narrowed the flaring alae and reconstructed the nostril sills. The lateral lip elements of the upper lip were advanced to create a philtrum size and shaped defect. A shield-shaped lip-switch flap from the protuberant lower lip was transposed into the upper lip defect and the pedicle divided in seven days. Minor revisions completed the reconstruction.

Eleven years later I received a letter from this patient. I will quote parts of her note:

"In this cruel world we live in, I was often teased while growing up. The scars to the heart, unfortunately, have taken a long time to heal. I recently went through some old pictures

of myself and came across my high school senior picture. This was six months before you did your first surgery. About one month ago, I had professional pictures taken of myself. I couldn't believe the difference. It was then that I realized that the ugly duckling had been transformed into the beautiful swan."



Success of plastic surgery is suggested when the surgeon and other spectators are pleased with the result. The ultimate success, however, is reserved for the time when the patient, as the beholder, realizes there is indeed beauty to behold.

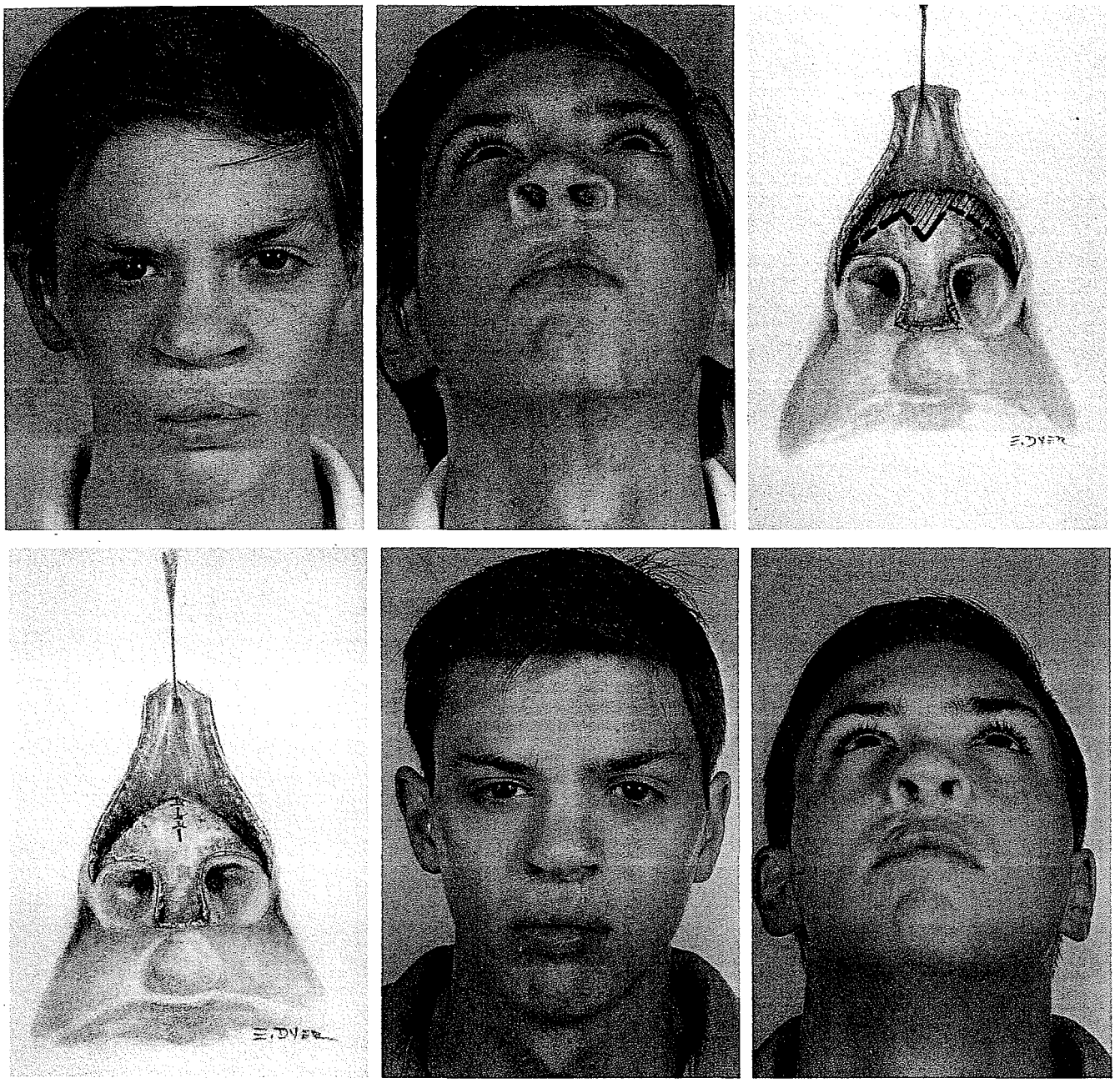
ODD PROBLEMS

Due to the complex nature of this bilateral cleft anomaly, the various surgeons who undertook the surgical correction of these deformities and the fact that many of them had no idea about the principles that should govern their surgical actions, some strange problems do appear. Except to be guided by principle in diagnosis, planning and execution, there is no easy formula. A few unusual cases which do not fit in any special section will be presented just to show how each was handled at the time.

A GROSS TIP

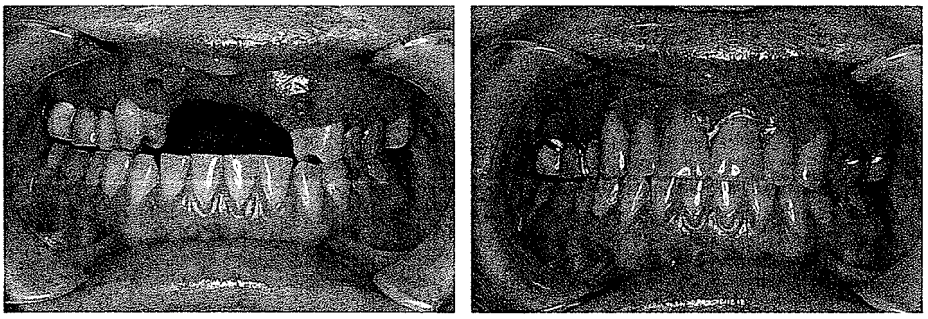
As a result of numerous operations this gross result in a bilateral cleft presented a thick, broad tip. Through open rhino-

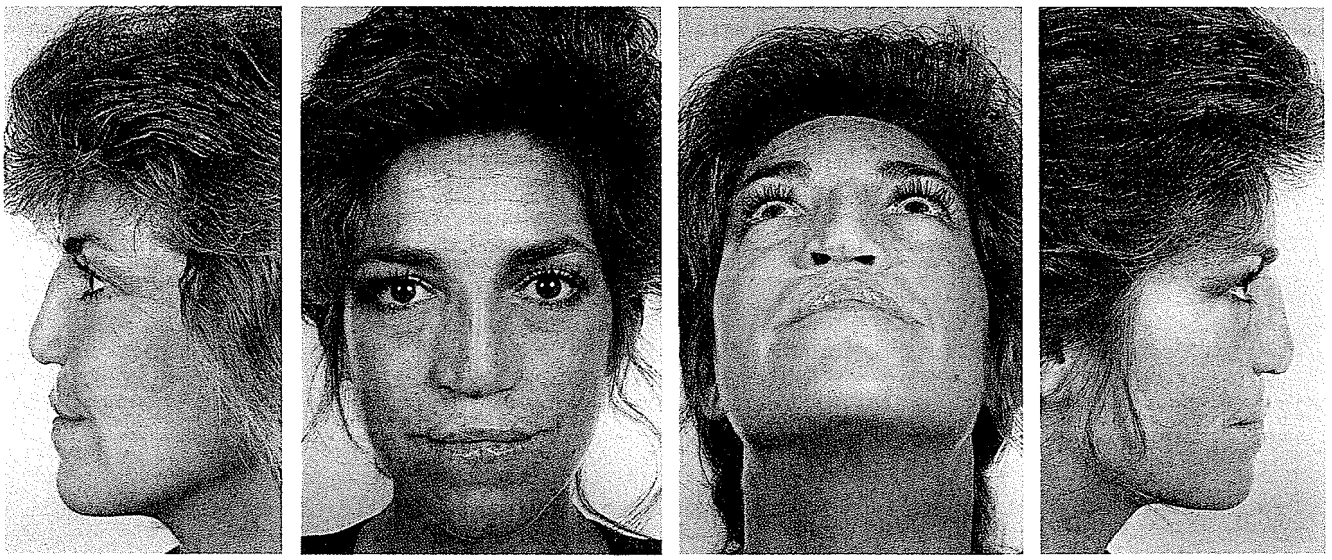
plasty the skin was elevated and the bulk of cartilage and scar was resected as designed, sutured, and the skin trapdoor replaced. In this case at this time that was what was done, but



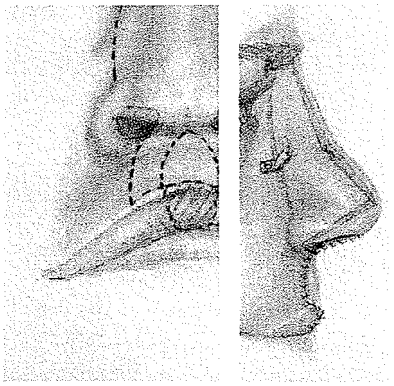
such an approach for me is very rare and usually not indicated.

This 33-year-old female with a bilateral cleft after multiple surgical procedures, presented a flat, wide nasal bridge with a depressed nasal tip and horizontal nostrils. One of the most exasperating aspects was the rigid, downslanted nasal bridge, the result of a long bone graft. Her prolabium was unnaturally wide and there was severe retroposition of her maxilla. Maxillary osteotomy with forward advancement fixed with bone grafts by G. Lovaas was followed by the fitting of an upper prosthesis.





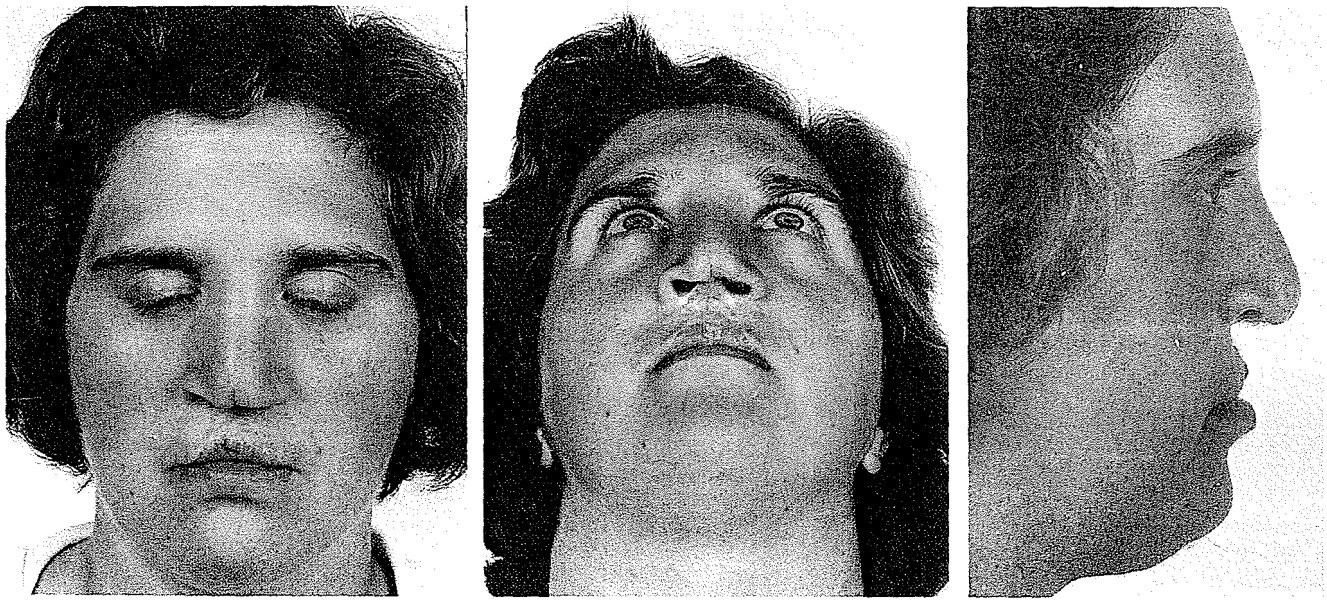
The wide, scarred prolabium was reduced by creating forked flaps which were advanced into the columella. A costal cartilage strut in the columella supported the nasal tip after a greenstick fracture of the bridge bone graft allowed the tip to rise. Bilateral osteotomies through the upper buccal sulcus gave the exposure needed for Lovaas to move the nasal bones in and fix them with his L-shaped microplate screwed to the maxillary bases. An alar cinch narrowed the flare and placed the nose in better harmony.





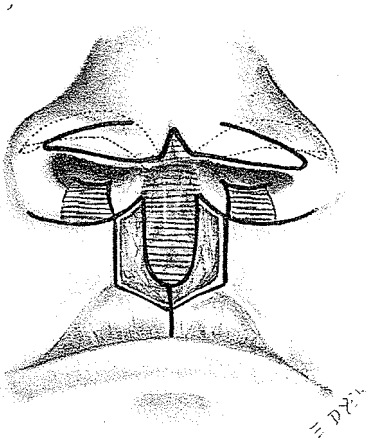
A COMPLEX DEFORMITY

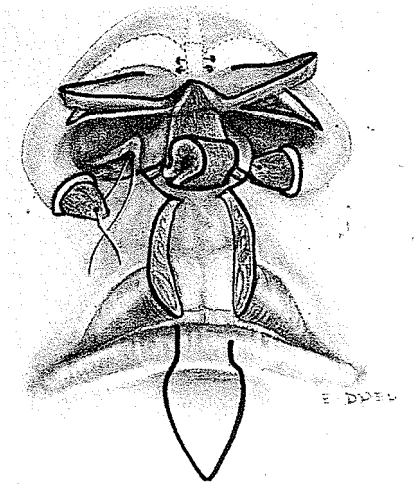
This 22-year-old female with a bilateral cleft suffered multiple surgical procedures which had been disastrous to both the lip and the nose as presented in 1979. The lip was short, tight, retracted and scarred. The nose was thick, wide and flat with scarred notching of the tip, overhanging alar rims, flaring alae and a short, scarred, retracted columella.

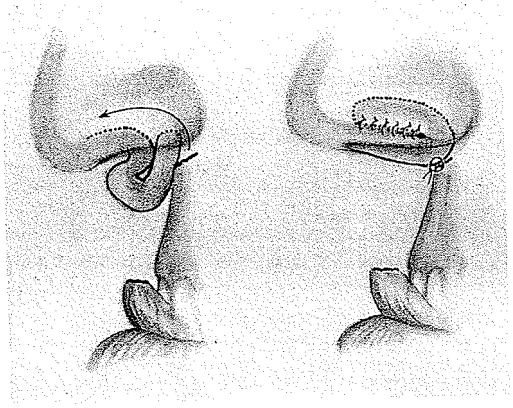


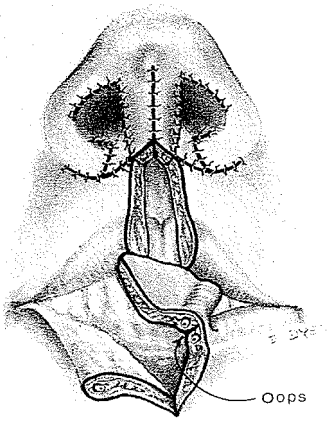
Correction of this complex problem required multiple applications of the Robin Hood principle of tissue apportionment: taking from the rich or excess for the poor or deficient. The excess alar rims were marked as flaps based on the tip on each side of the midline scar to be transposed together onto

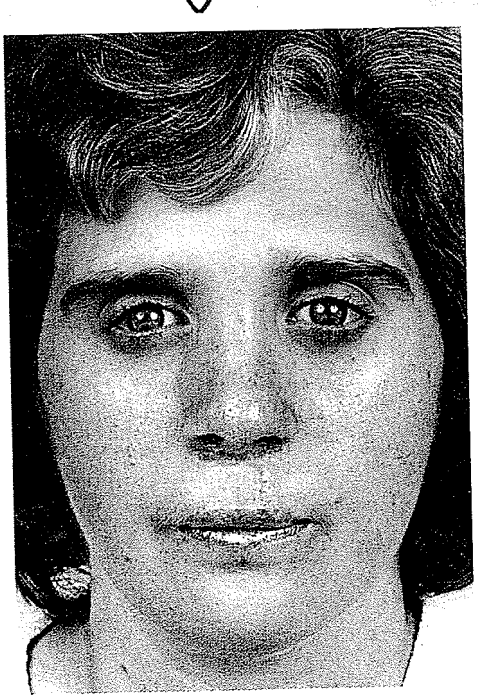
the columella. The nostril sill extensions of the alar bases were de-epithelialized for an alar cinch procedure. The scarred skin of the center of the lip was excised and a superiorly based vertical flap of remaining subcutaneous tissue was cut out of the middle of the lip, tucked under the columella base and inserted up into the membranous septum to fill out the retracted columella. The lateral lip elements were advanced to present a natural philtrum defect. A midline shield-shaped lower lip-switch flap was transposed into the upper lip. The pedicle was divided on the eighth postoperative day and the upper and lower lip revised at the pedicle sites.

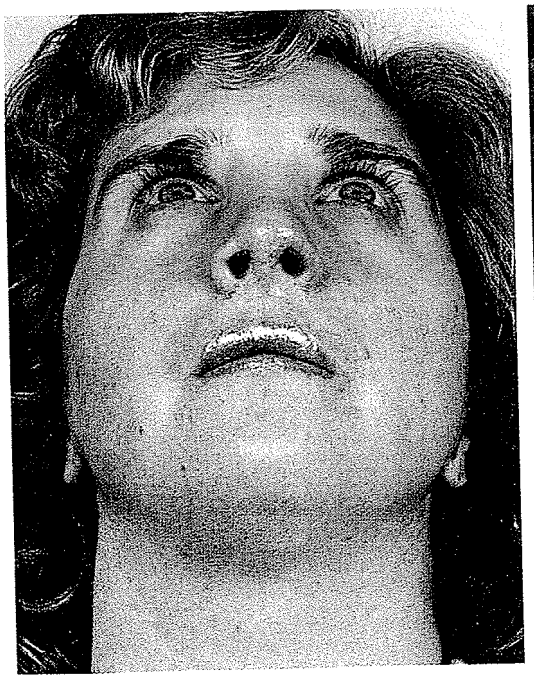










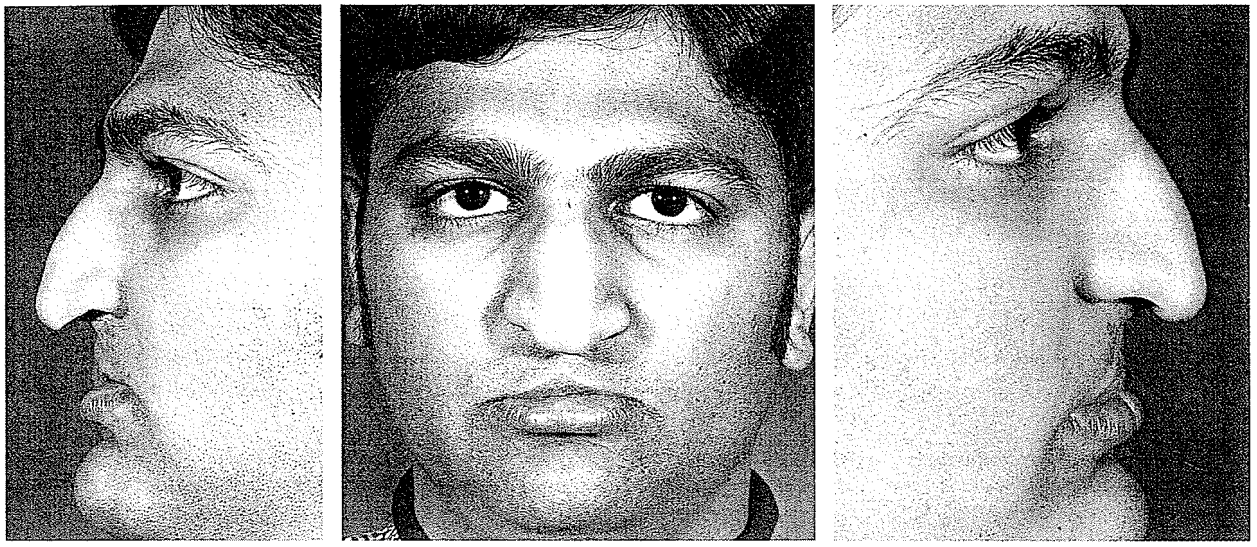




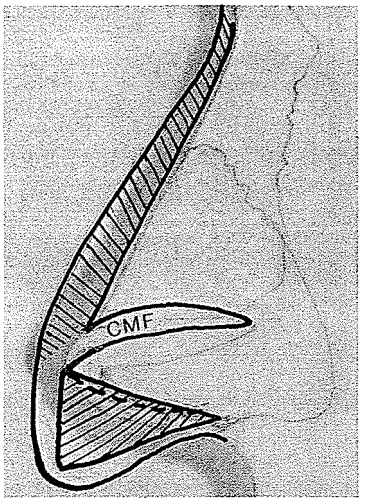
BIZARRE BUT AMENABLE

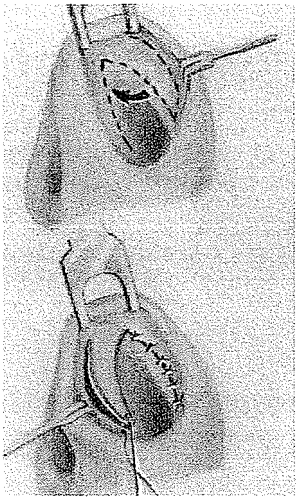
This bilateral cleft was treated first in India. In 1948 while I was a student with Gillies, the patient came to England and had a Gillies-Fry operation which lengthened the palate but created an anterior fistula. This was closed with an obturator resulting in good speech.

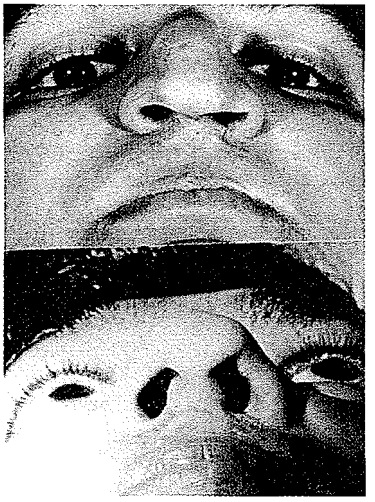
The patient found his way to Miami 20 years later, revealing a tight upper lip, protuberant lower lip and a short, retracted columella with a severely depressed nasal tip.

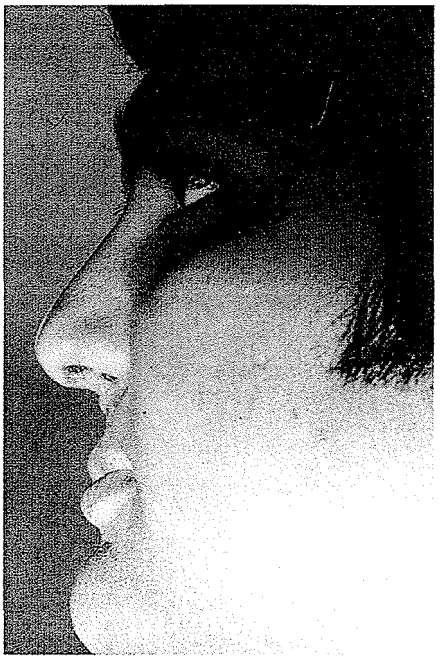


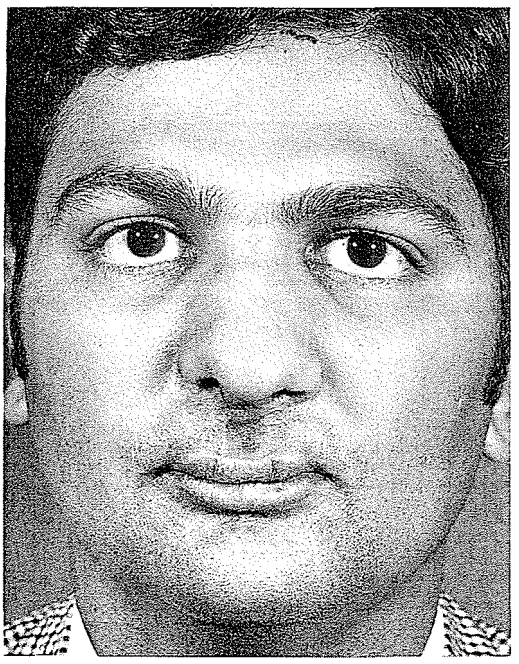
The first operation included hump reduction, septal shortening, bilateral osteotomy with in-fractures, submucous septal resection with cartilage graft to tip and bilateral chondromucosal flaps transposed to each other in the releasing membranous septal incision which brought the columella out into profile view and reduced the alar cartilages in the tip. A midline lip-switch flap was transposed from lower to upper lip and the pedicle divided in ten days.

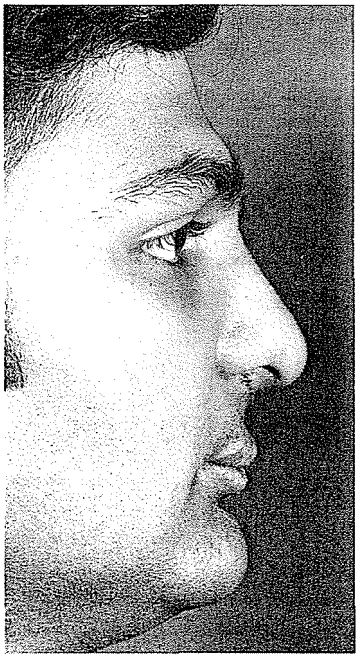


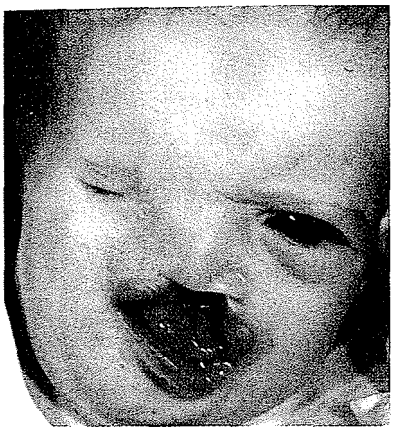


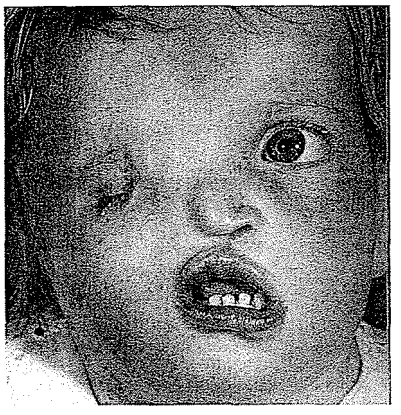








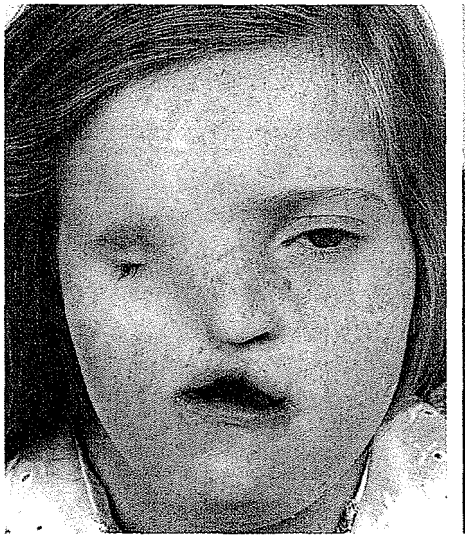


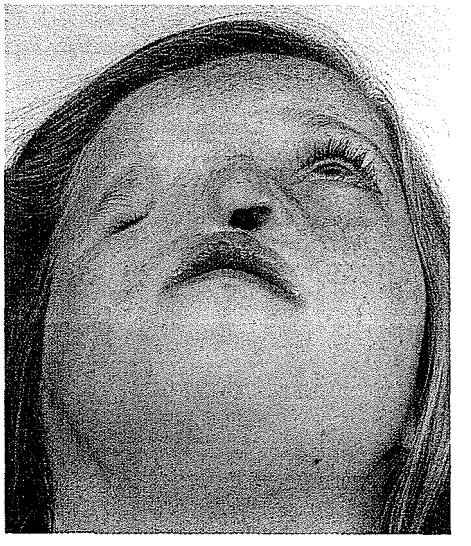


NOSE IN ATYPICAL CLEFTS

There are various atypical congenital nasal defects which require specific solutions. This requires a little imagination guided by principles. Here is a patient born with a partial facial paralysis with sympathetic hemiatrophy, asymmetry of the maxilla, atypical cleft of the lip, wide cleft of the palate, lack of half a nose and absent right eye. She also had transposition of the great vessels with a ventricular septal defect and a life expectancy of 18 months. A lip adhesion was performed to aid feeding and later a prosthesis was fitted to help speech but no further surgery was contemplated.

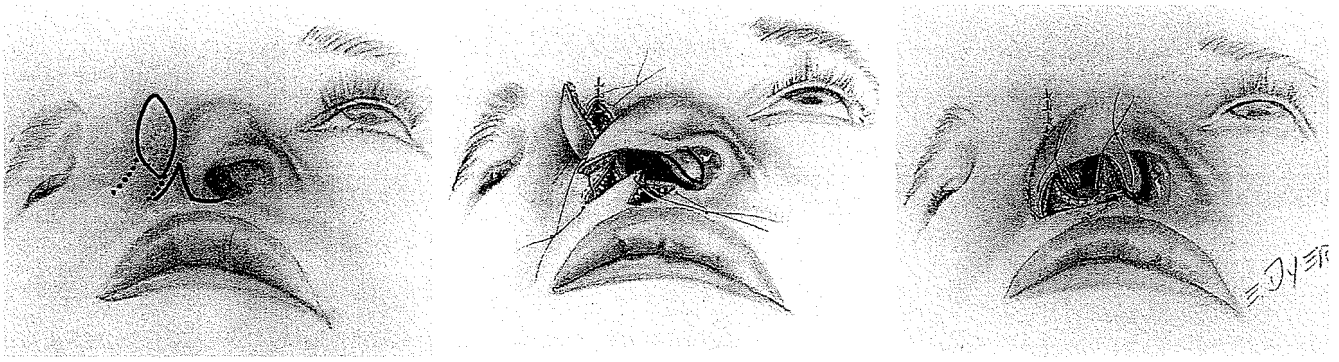
By the age of nine years the patient had convinced her mother that life was not worth living if she could not have a more normal nose. The situation was presented to anesthetist, S. McMahon, who, noting her great pulmonary hypertension, took precaution to prevent hypotension during surgery to avoid cessation of pulmonary vessel blood flow and certain death.





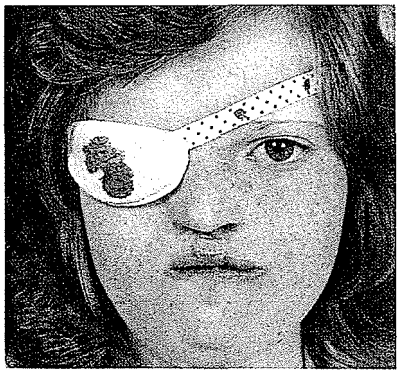
This would be a difficult problem under normal circumstances, but in this patient's case the surgery had to be in one stage and still achieve at least symmetrical alae and a columella in as simple a procedure as possible. The right side of the nasal arch was cut free and transposed laterally into the cheek, and a flap was transposed medially in a "Z" to make room for positioning the right ala. The left vestibular web,

typical of clefts, was taken with its distorted alar cartilage as a flap based on the nasal tip and set high in the center of the upper lip to form the front of the columella. Then the excess cheek skin to the right of the nasal bridge was taken as an island on a peninsula flap based on an inferior subcutaneous pedicle, as described by J. Barron. This was threaded under the upper nasolabial skin and brought out in the nasal cavity to line the raw areas of the right ala, the adjoining lip and the back side of the new columella.





The nasal reconstruction healed with minimal contracture so the patient and the team were remobilized for a midline shield-shaped lip-switch flap from the lower to the upper lip.



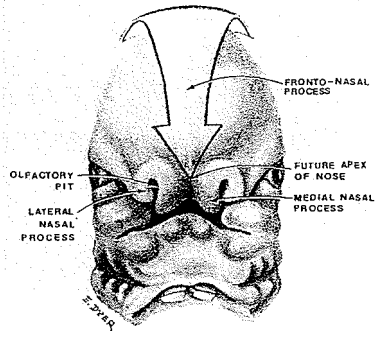
At the age of 11 years the patient came in for a visit. She had had her hair styled and was dressed in pink stockings, her favorite blue dress and a gold chain. She had been unwilling to wear a Hathaway black eye patch but had been delighted with the fancy and colorful patch made especially for her by

our nurses. She showed pride in herself but also increased cyanosis. One year later at the age of 12 she passed away in her sleep.

CONGENITAL BILATERAL CLEFT NOSE

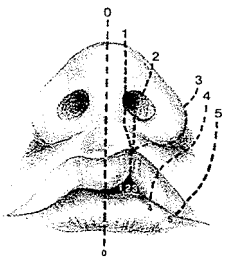
Although the nose is considered by some an unpaired midline structure of the face, it is most definitely composed of paired components that must be carefully balanced during any surgical procedure.

Embryology



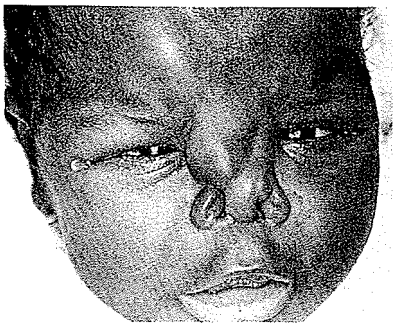
This abnormality, cleft nose or doggenase (dog nose), is a rare congenital deformity that may be hereditary, but most often it presents as an isolated event. The major components of the nose are formed from the substance of the frontonasal process that migrates dorsocentrally over the forehead region of the embryo. These components are formed by a thickening of each element of the epithelium at the ventrolateral margins of the frontal prominence. These nasal placodes further demarcate into medial and lateral processes, which form the alae, tubercle, and columella. It has been speculated that the alae mesodermal migration lags in development behind the central nasal area, and interruption during this process may result in clefting or notching of the alar rim. Other structures formed by the frontonasal process are the forehead, glabella, interorbital region, and prolabium. Beneath these soft tissue structures, the prechordal mesenchyme produces the median skeletal structures of the central face: the crista galli, the ethmoid nasal bone, the vomer, the nasal septum, the premaxillary bone with its four incisive teeth, and the anterior palatine triangle. Irregularities (frontal nasal dysplasia) resulting in changes in any of these structures demand investigation of the others to rule out associated abnormalities, such as cranium bifidum of the forehead, irregular hairline, encephaloceles, other clefts, epidermoid inclusion cysts, hypertelorism, duplicate nasal septum, accessory air sinuses, widening of the

lesser wing of the sphenoid, choanal atresia, nasal dermoids, and gliomata.



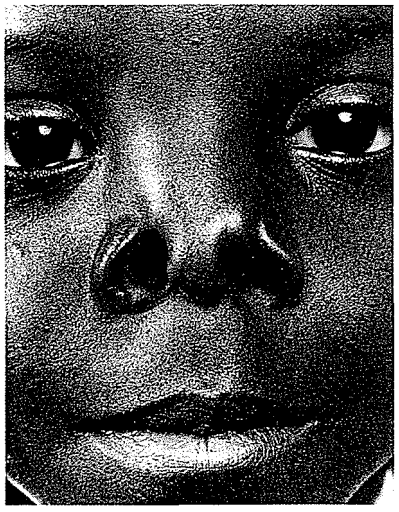
Tessier developed a useful numbering system to standardize the understanding of specific cleft locations.

This rare case of congenital bilateral cleft nose demonstrated Tessier 1 and 2 clefts of the distal nose. In the infant there was frontal bossing and interorbital fullness (pseudotelecanthus). The improvement through growth to the age of four years is quite remarkable.

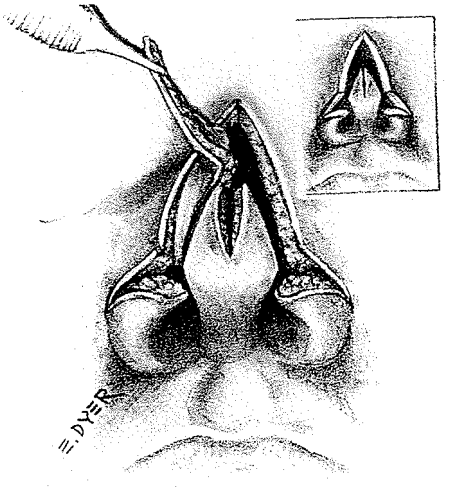


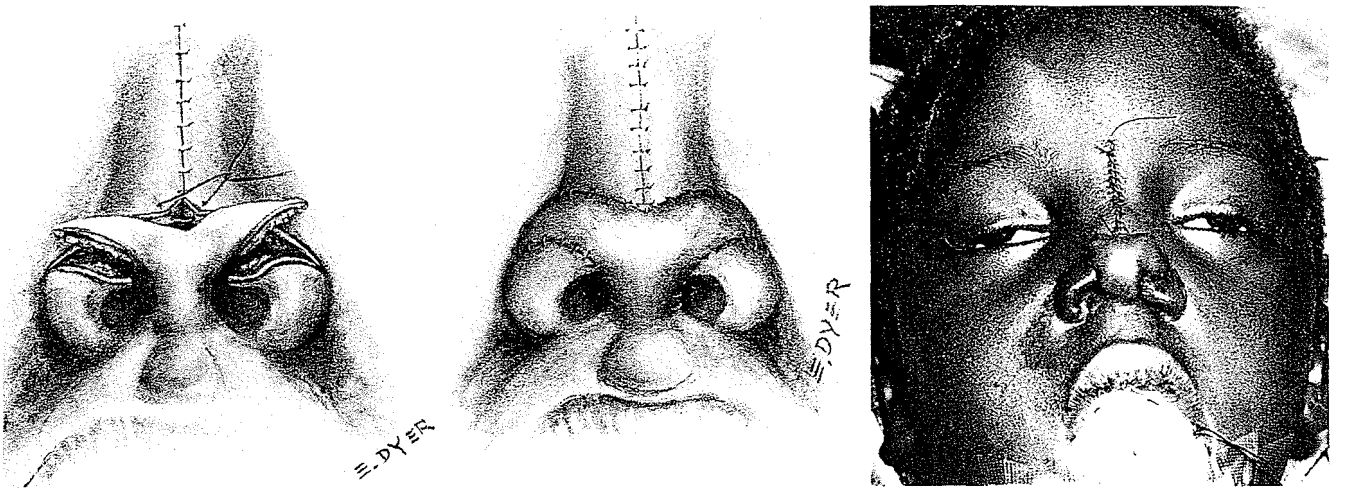
The surgical correction was carried out by W. R. Mullin and D. R. Millard. The primary surgery was designed as a V-Y flap of excess dorsal skin with a split forking at the V flap to produce bilateral transposition flaps destined to fill the gaps developed after downward rotation at both alae into normal position. The advancement humping of the base of the V created the nasal tip fullness. That lateral transposition of the forks created contour to simulate intact normal lower lateral cartilages. The V-Y flap taken from the tissue in the intercanthal nasal bridge area not only served to reduce this excess but also provided exposure for surgical access to the excessive subcutaneous tissue beneath. After removal of this tissue, simple closure of the dorsal defect presented an ideal midline scar. After thinning the excess of the large V flap it was split into two flaps destined to fill the bilateral defects left behind as the alae were rotated down into normal position. Reduction



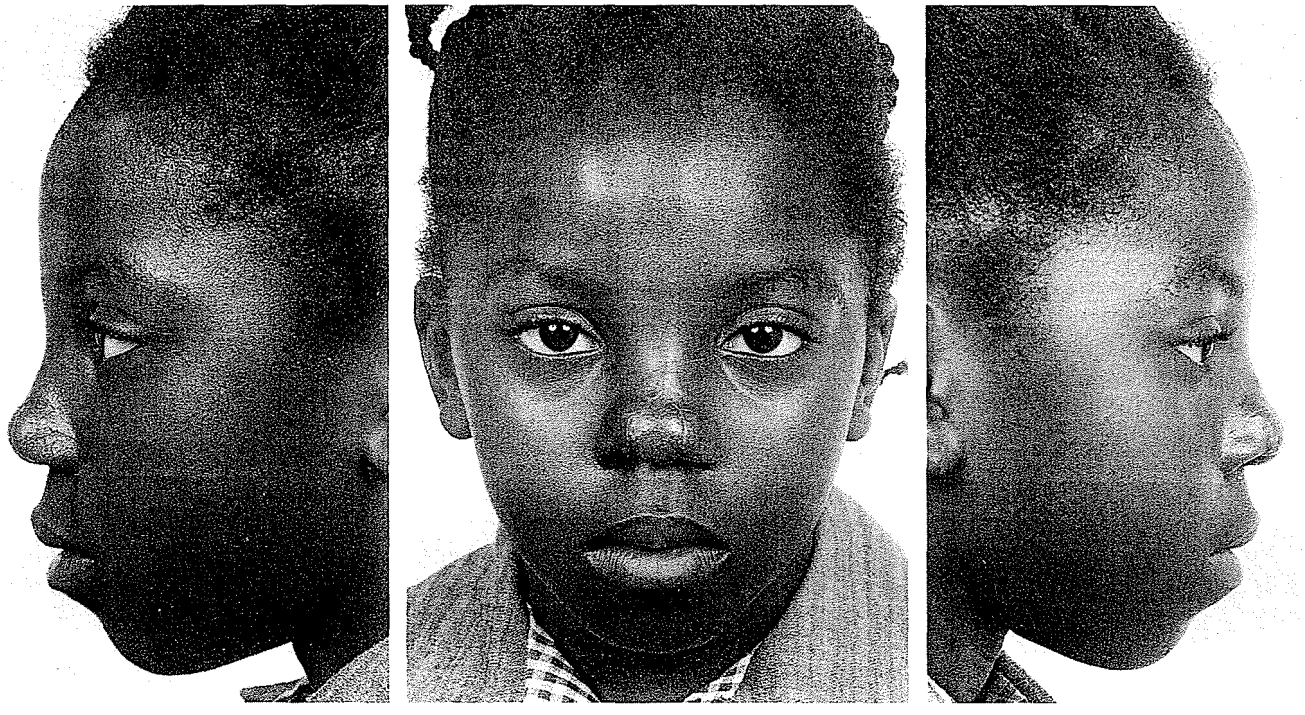






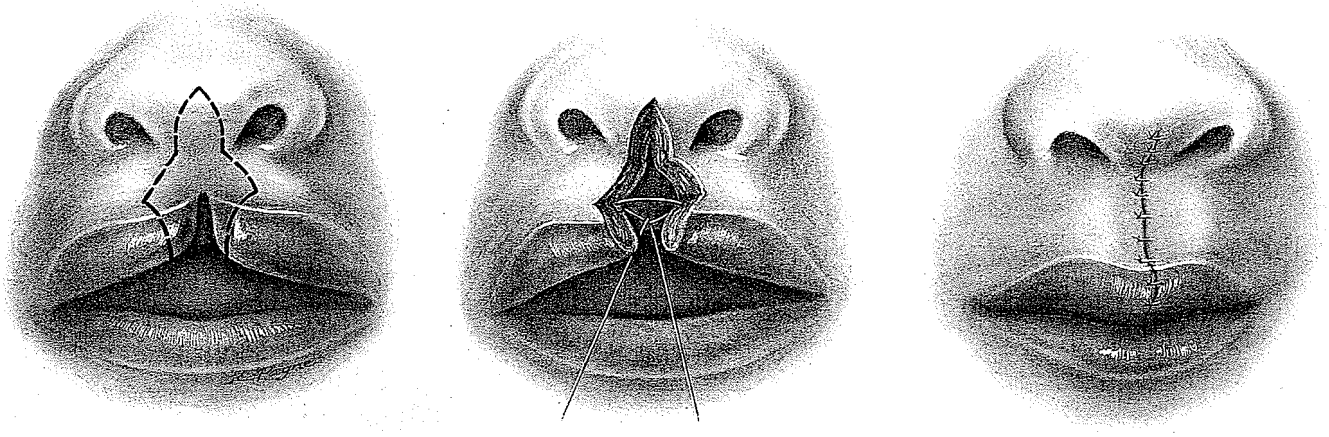


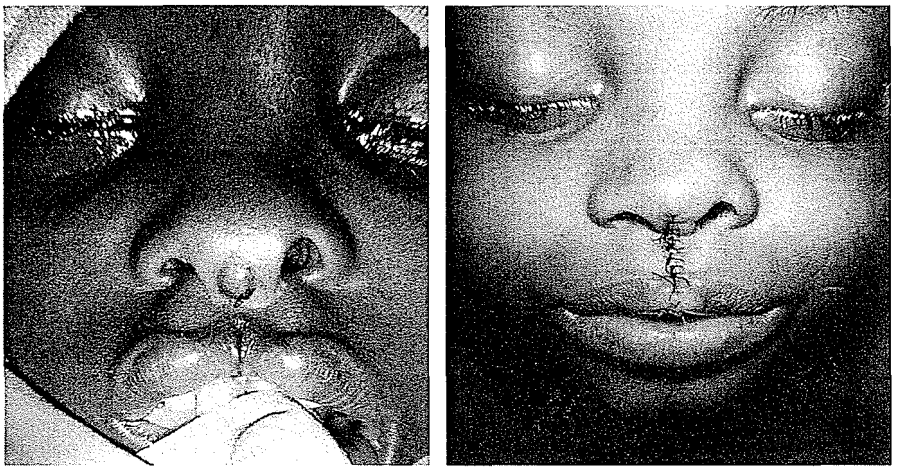
of the tip bulk was carried out after a few months. At age seven years alar margins revisions blended the reconstruction. She is seen at the age of 9 having adjusted well in school and in life.



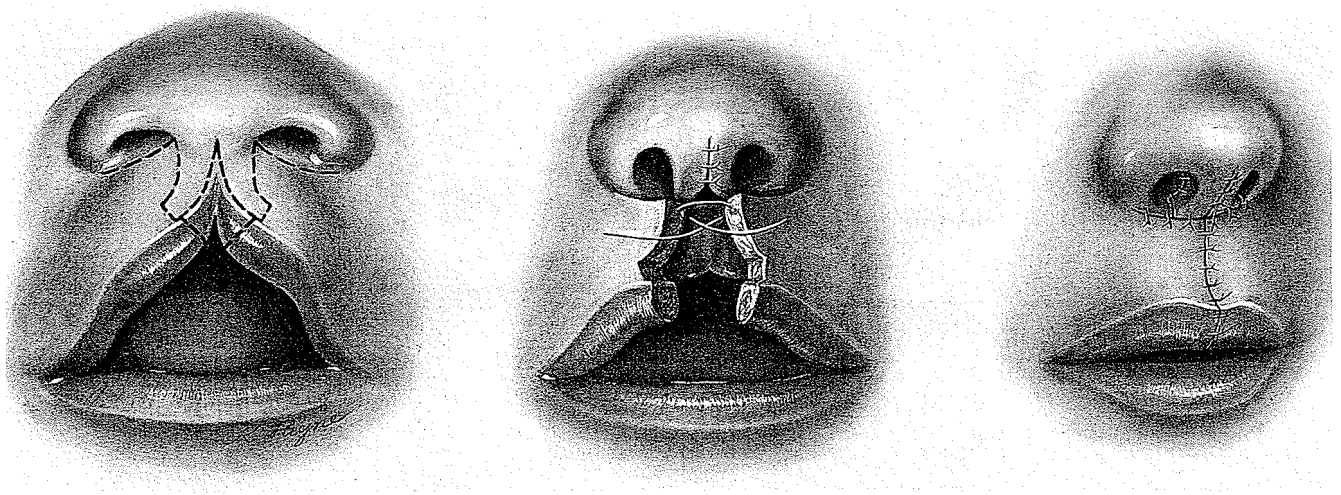
MEDIAN CLEFTS OF THE LIP

In this median cleft deformity the columella was present but wide and the median incomplete cleft of the lip was also wide. Correction of this deformity was achieved by a vertical wedge of columella and upper lip which if angled correctly can produce a narrow columella and a lip with a cupid's bow.

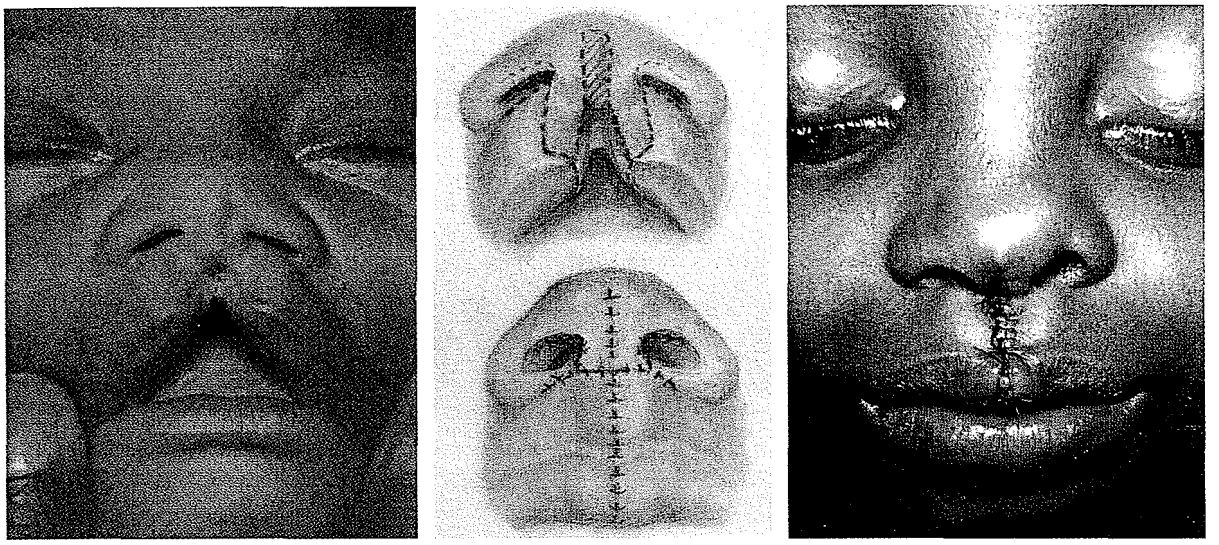




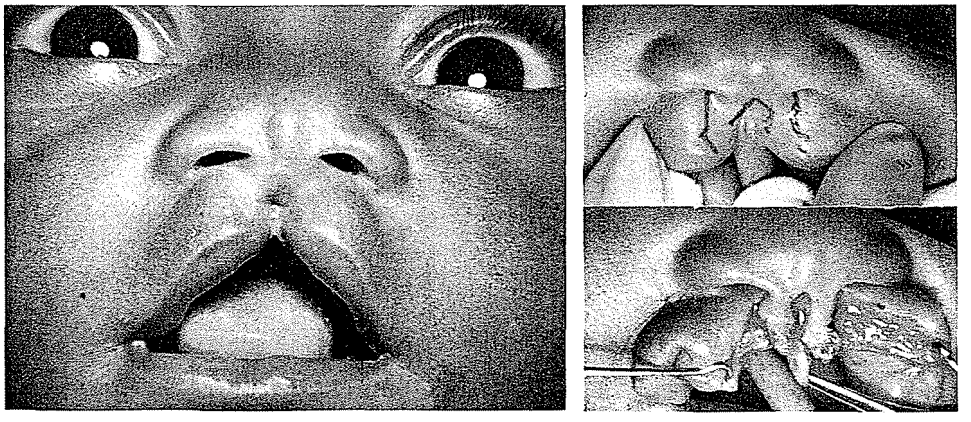
In those median clefts which have a short or absent columella, forked flaps can be taken from the sides of the median lip cleft and advanced to create a columella. The pared edges of the lip can be approximated to create a natural lip with a semblance of a cupid's bow.

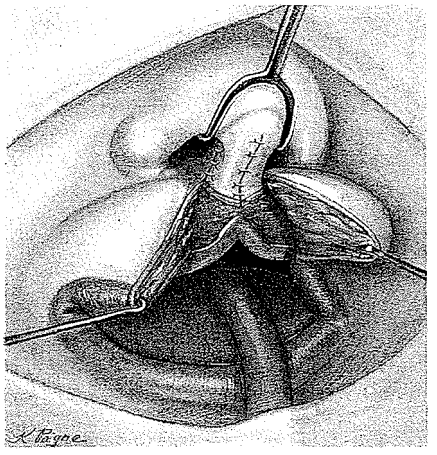


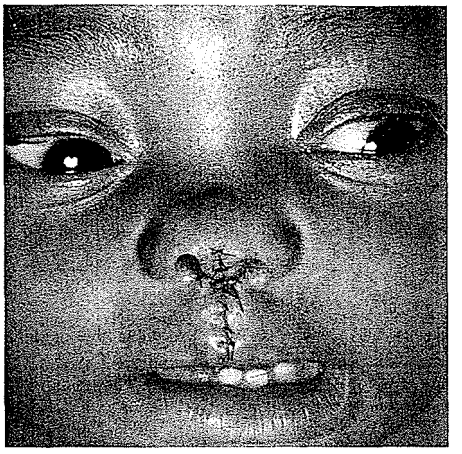
Here is a median cleft of the lip with no columella but a midvertical ridge in the nasal tip. In this case the forked flaps were taken from the sides of the lip cleft. This not only allowed construction of a columella but it pared the edges of the lip cleft so that approximation created a natural looking lip.



This design of a forked flap in a median cleft lip was used in one of the Caribbean Islands. The vertical ridge of the nasal tip and wide, short columella was excised. The lateral edges of the median cleft of the lip were marked to produce a forked flap, and the angle of the cut at the bottom of each fork was placed so that when the lip was brought together in the midline there would be extra length of skin at the center of the lip to create a cupid's bow. The forked flap was trimmed, sutured to each other and advanced into the nose to create a columella. The nurses in attendance were instructed in suture removal on the fourth postoperative day.

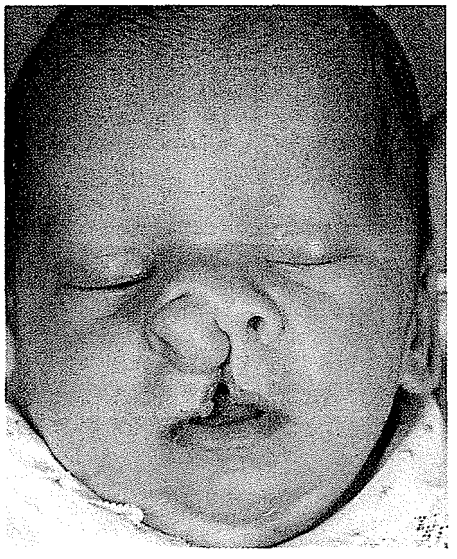


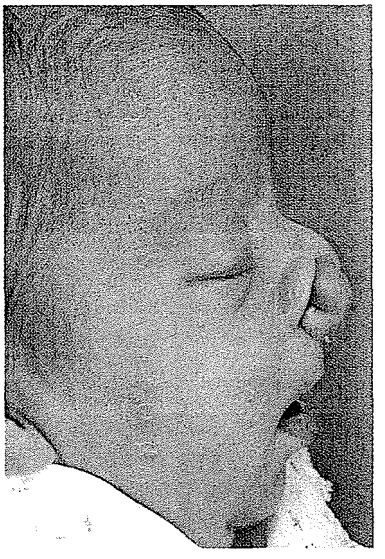




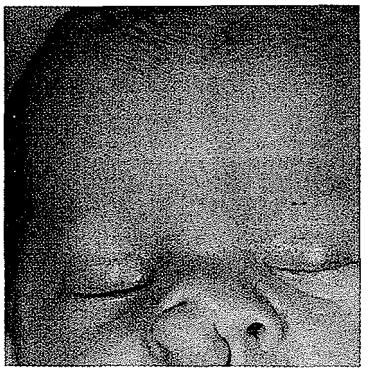
A Median Cleft with a Nasal Excess

This three-week-old female was born with an asymmetric median cleft of the lip without cleft of the alveolus or palate. There was a partial cleft of the right ala with retraction and a tubed protrusion of skin and subcutaneous tissue extending from the ala notch.





At one year the lip was closed by the method already described in this section for median clefts. The retracted and notched right ala was released by a through-and-through rotation incision along its crease, which allowed the ala to come down into normal position as it was sutured to the side of the upper columella. The excess blob of tissue was left attached at the right side of the nasal tip but thinned and trimmed to fit the defect above the ala rotation both as cover and as lining. The alar base was advanced for symmetry.

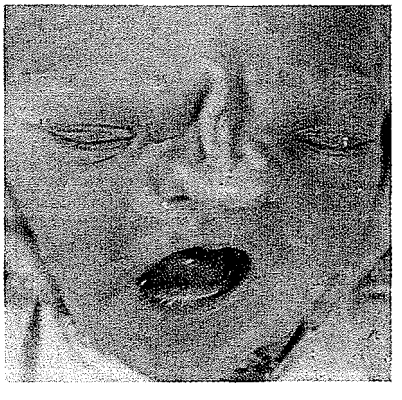




Five years later minor revisions sculptured the ala and revised the scars.



The patient will receive final work in her early teens.



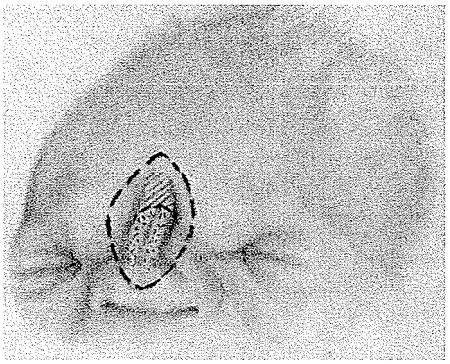
MIDLINE SYNDROMES

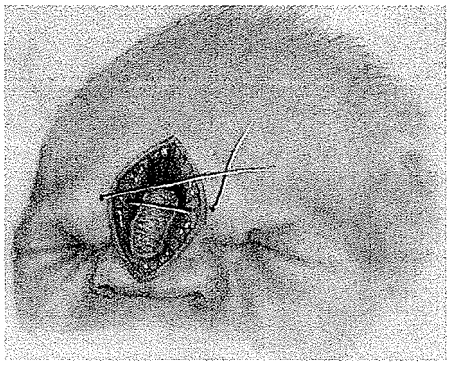
A Midline Syndrome

This 10-day-old male infant revealed a strange, rare midline deformity. There was a moderate hypertelorism with rudimentary nasal bones widely separated and of low height. The septum was also lacking in projection. There was a redundancy of skin pinched into a longitudinal furrowed fold extending from the nasal tip along the nasal axis into excess

skin gathered in the intercanthal area and the glabella and lower midline forehead region. The nasal tip and columella seemed within normal limits except they were quite thick and lacking in definition.

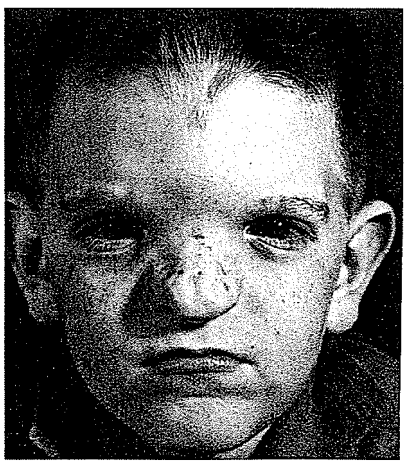
At 6 months a longitudinal ellipse of skin, one and one-half inches wide at its center point and extending from the midline of the lower forehead and glabella area down the nasal bridge to the tip was excised. The excision included a cyst and some subcutaneous tissue. The closure advanced the lateral subcutaneous tissue to create the semblance of a nasal bridge which was covered with skin by advancement.





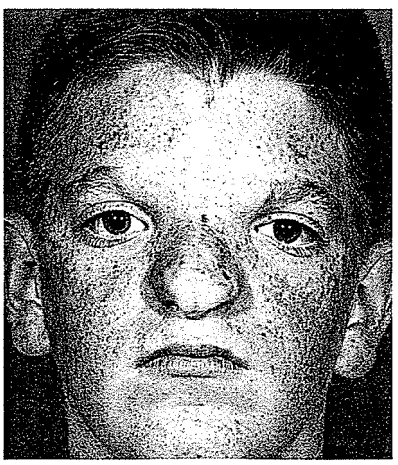
C. Straith was in observation during this case as he had been requested to report back to the hierarchy of the American Society of Plastic and Reconstructive Surgery, who were trying to decide for the third time if I was worthy of membership.

At 7 years a silastic block was inserted in the bridge area to stretch the skin during the growing years and give the semblance of a bridge line.



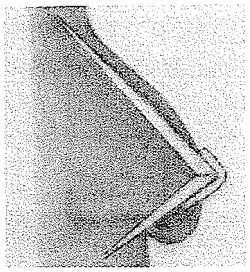


Seven Years

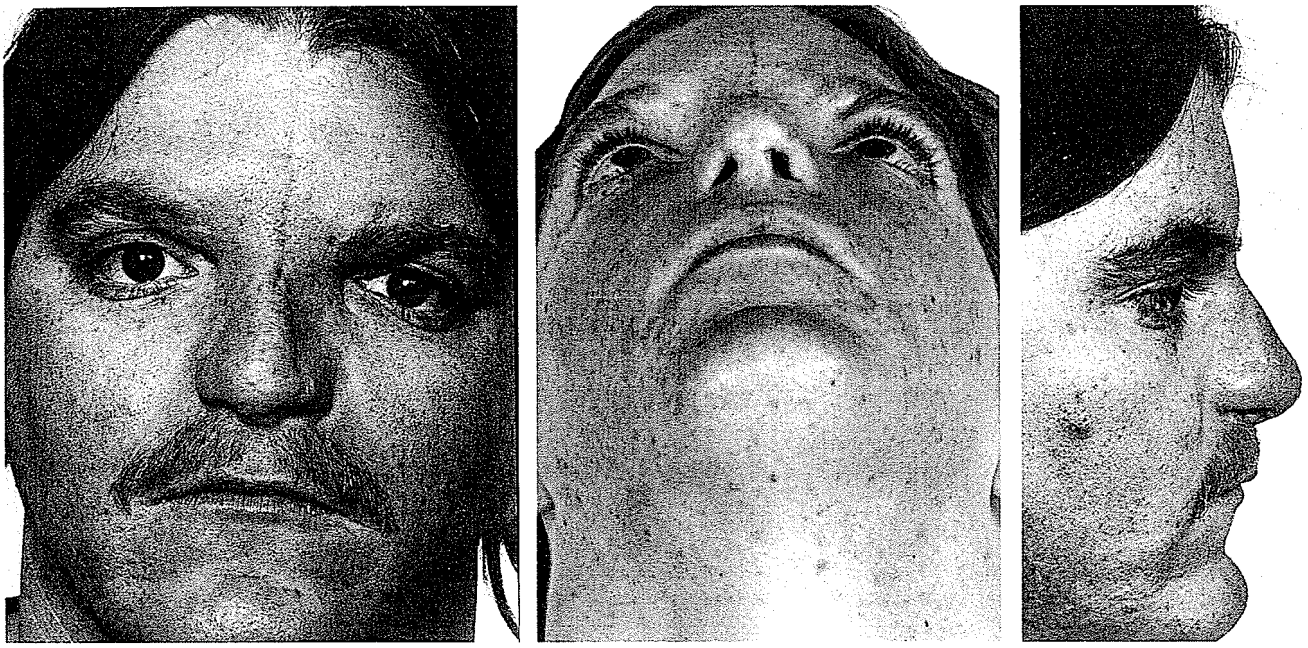




Fifteen years



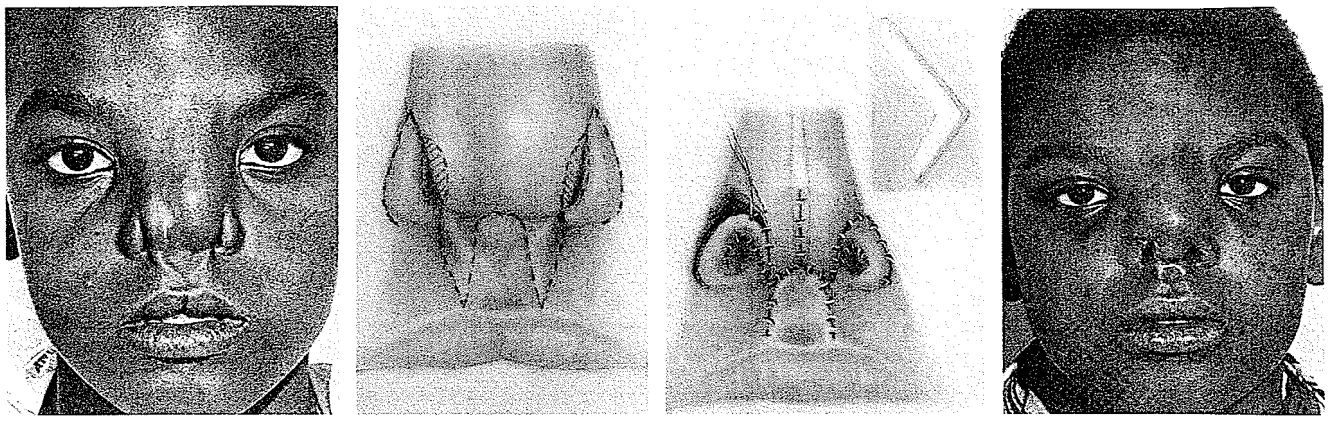
At age 16 years the silastic implant was removed, the nasal bones received osteotomies and in-fractures and a costal cartilage hinge graft was inserted through a columella splitting incision to create a bridge, lift the nasal tip and support the columella. Here he is at the age of 23 hoping to join the Air Force.



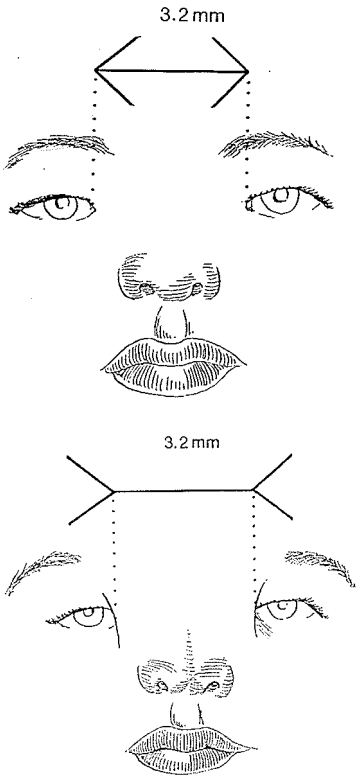
THE BIFID NOSE

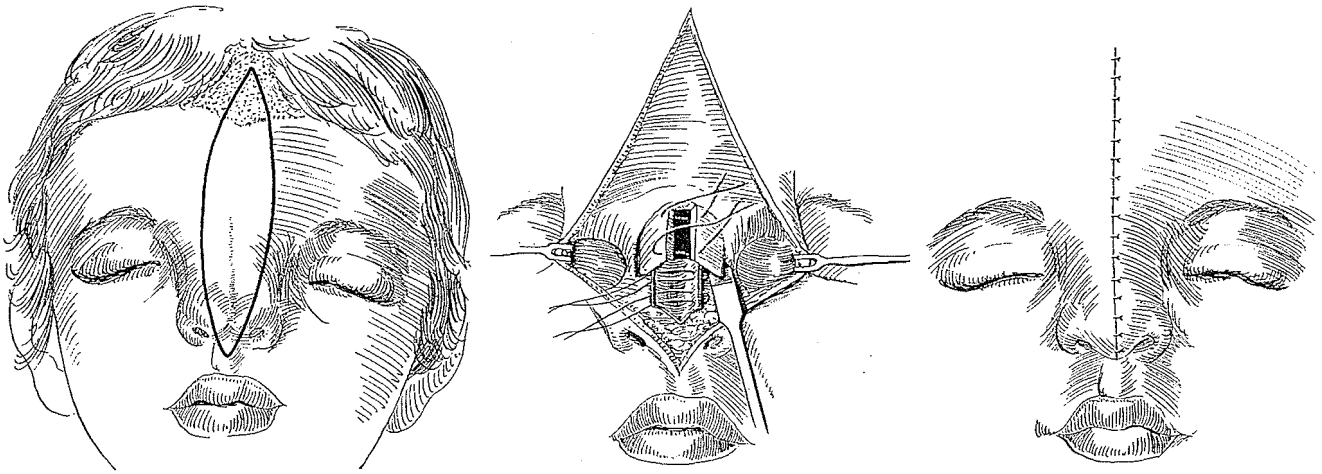
This deformity varies greatly in depth of the clefting, extent of the spread and amount of asymmetrical distortion. Surgical correction includes bisection with removal of the excess midportion of the skin, subcutaneous tissue and bone combined with the shifting of the distorted elements into balance. Closure should bring alar cartilages side to side. Alar notches can be corrected by local rotations.

This was the approach on this ten-year-old boy from Antigua who also had an atypical median cleft of the lip. A forked flap of the diverging philtrum columns was used to construct the columella and revise the lip. An L-shaped silastic was used to support the bridge and tip and the alar bases were rotated to correct the notching. The patient's return to Antigua postponed surgical refinement.



In 1950 J. P. Webster and E. G. Deming pointed out that hypertelorism was associated with bifid nose in only four of the ten cases but the illusion was present in eight of the ten. They accounted for this illusion being due to wide spacing of component parts of the face adjacent to the eyes, such as increased intercanthal distance, flatness of a broad nasal bridge, presence of epicanthal folds and widely spaced eyebrows. Webster focused his attention on soft tissue and nasal bone reduction and shifting to reduce the illusion. This was accomplished by excision of a wide vertical ellipse of forehead, glabella, nasal bridge and tip skin from hairline to columella. He in-fractured the nasal bones and wired them together. If the nasal tip was flattened and the nose shortened he used a midline V-Y advancement of dorsal skin to reposition the parts.

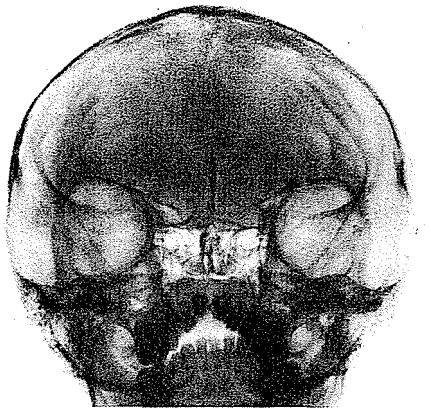




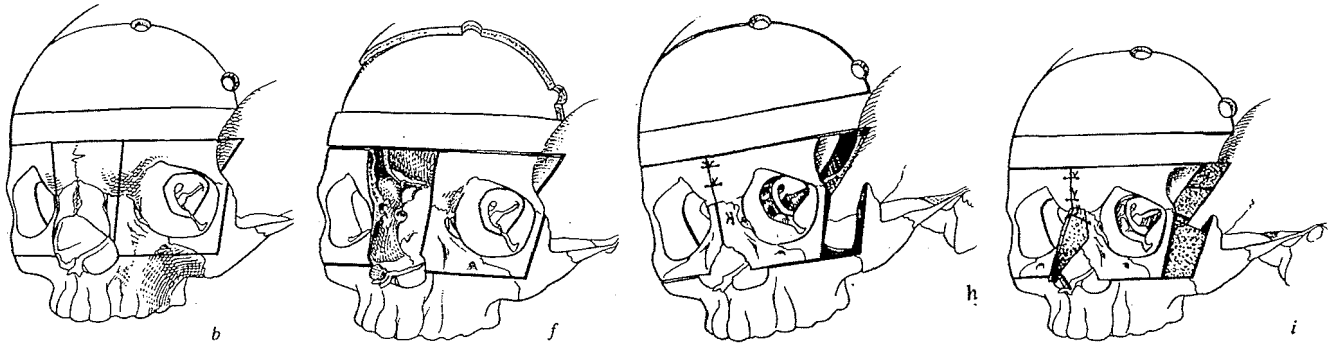
A bifid nose associated with a true wide hypertelorism can only be corrected if the underlying bony structures are placed into normal position. This is a complicated procedure that should be carried out only by an expert craniofacial surgeon. Here is a rare cardinal example of an 0–14 cleft of the Tessier classification which is actually a craniofacial dysrhaphia presenting a frontonasomaxillary cleft with considerable hypertelorism and preoperative xray film revealing duplication of the crista galli.

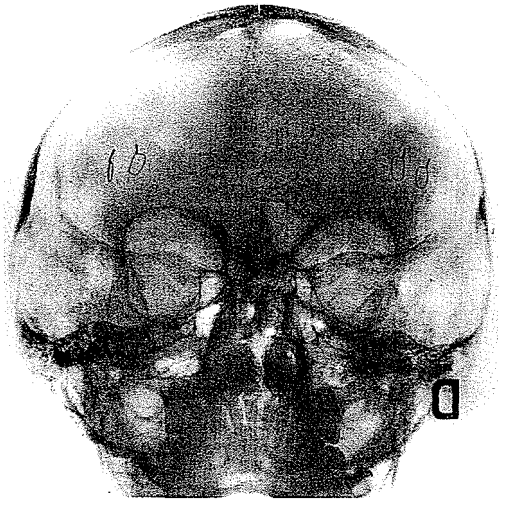


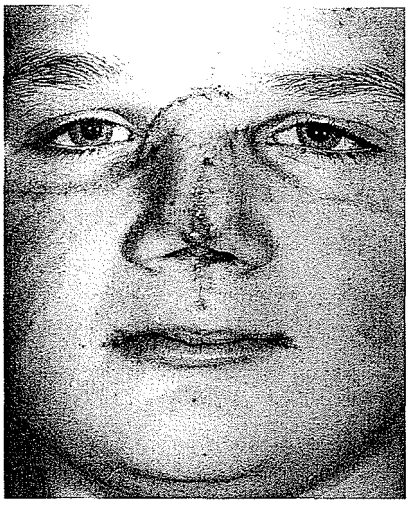




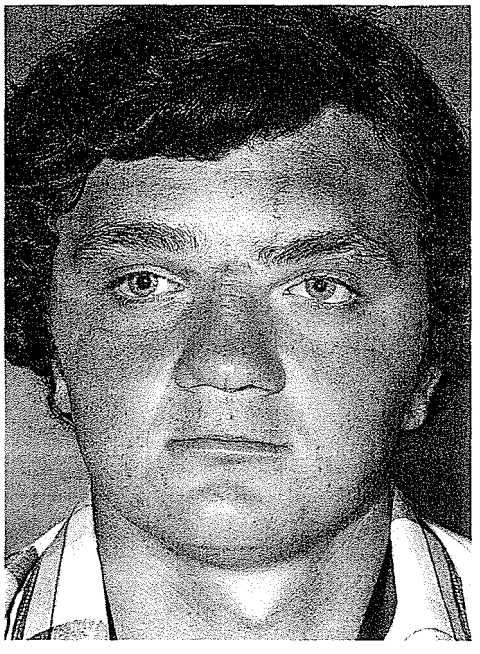
The case was treated by Paul Tessier himself with transcranial surgery. Subperiosteal dissection of the upper facial skeleton and orbital cavities through a coronal incision enabled "square-like" osteotomies to mobilize the orbits. The excess bone between the orbital cavities, mostly ethmoid and duplication of the crista galli, was removed. This necessitated a complete submucous resection and a nasal bone graft for nasal support. The orbital cavities were brought together into a normal relationship with a normal interorbital distance and the voids in the bone from the displacement of the orbital cavities were filled with bone grafts. Medial canthopexies and

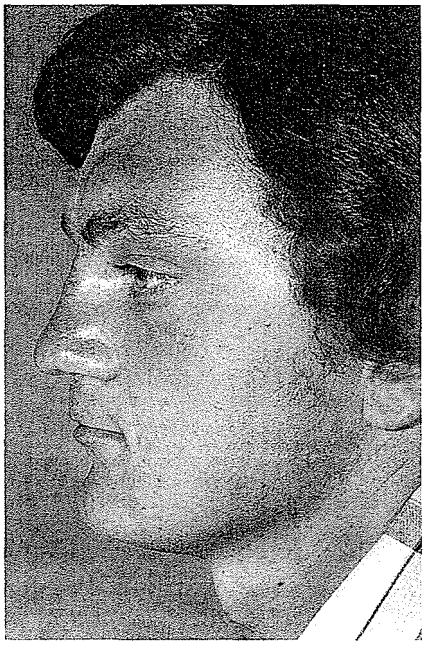






the iliac bone graft to the nose were effective but the nasal skin scars, lack of bridge and tip subcutaneous substance and inadequate columella eventually forced the use of a paramedian forehead flap.



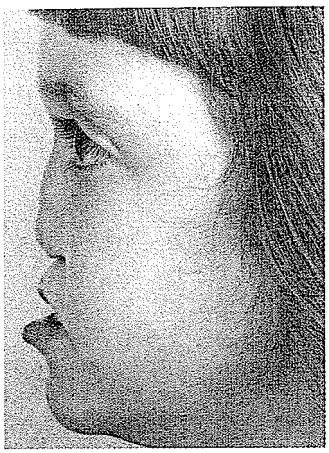


INTEROPHTHALMIC DYSPLASIA



This patient was born with a unilateral cleft lip but also with a rare nasal deformity. S. M. Lazarus corrected her lip with an excellent rotation-advancement and closed her palate resulting in good speech. Her general appearance reminded one of the spectrum of holoprosencephally, certainly a form of arhinencephally, and even a touch of Binder's. Her ventricles were normal as was her life expectancy. She could be labeled of the

DeMyer Sequence—an interophthalmic dysplasia as described by Spolyer, Eldis, and Benjamins.



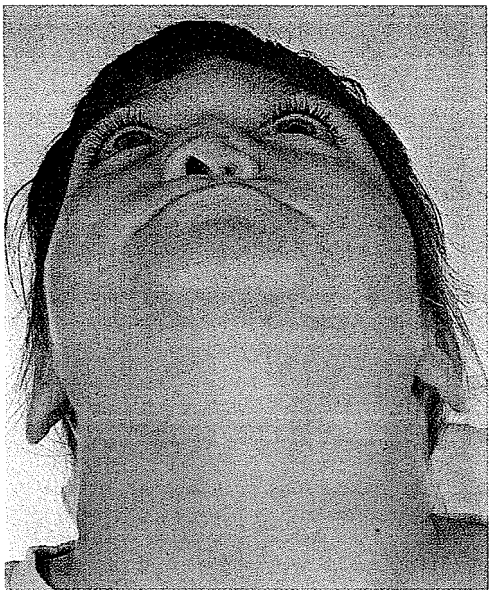
The lack of maxilla and the failure of its growth stimulated S. A. Wolfe to do an onlay bone graft to her maxilla at age 7 with improvement in the platform.

This child developed well in spite of her nasal deformity, which prompted her parents to request early nasal surgery.

The distal half of her nose was an attenuated funnel with no septum and virtually no columella. The left ala had the usual characteristics of a unilateral cleft. Due to lack of distal nasal support and the absence of a skin envelope in which to introduce support, I kept putting off surgery. Frankly, I did







not see how to help her, short of reconstruction with a forehead flap and costal cartilage. The family kept asking me to do something . . .

Reconstructing nasal support ideally requires a propped cantilever, the proverbial L. This cantilever must rest on a fulcrum proximally and be propped distally. In most cases this is not an impossible task and with various maneuvers already described can be accomplished. When there is no columella or the columella is a skin shell with no substance in which to house the prop, then the cantilever will tend to droop and the tip fall. Bone graft cantilevers screwed to fixed bone above are inefficient at the distal end of the long axis of the cantilever

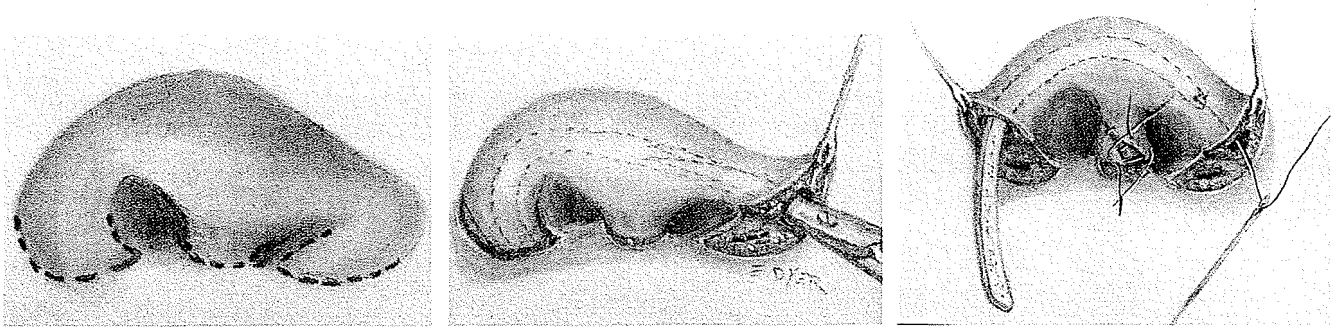
even in resisting just gravity. When there is also the downward pull of skin and lining shortness and the contracture of scar the odds are even greater against proud tip support.

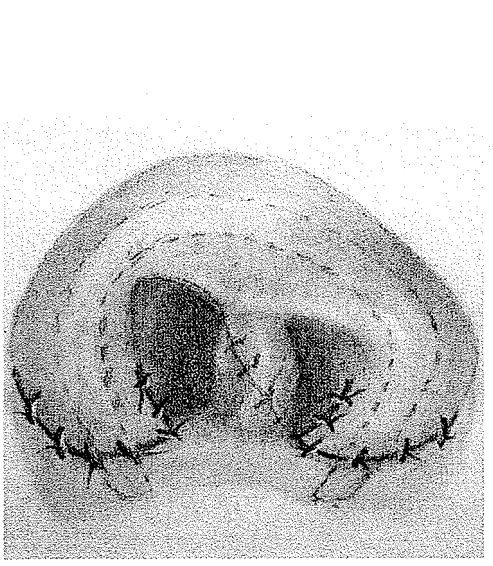
Transverse Arch Support

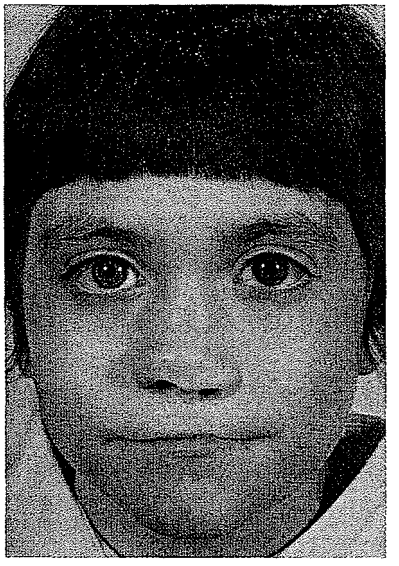
Faced with the dilemma of insufficient distal structures to accept columella struts, an alternate architectural arch support was conceived. Instead of the standard longitudinal, vertical L support, a *transverse* arch from ala base to alar base was designed to span across the front of the nose to lift the tip.

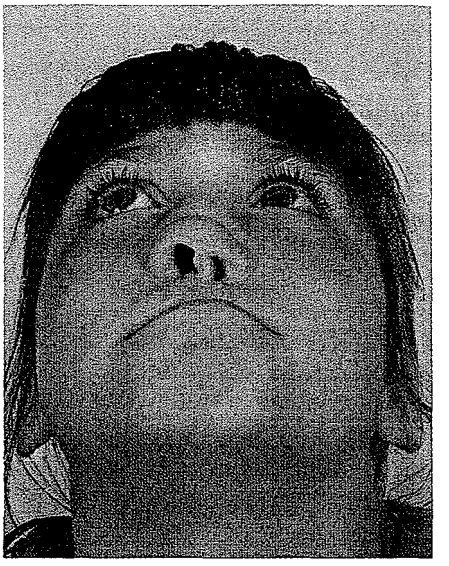
I first used this transverse arch principle in 1993 in a 71-year-old patient in which cancer of the septum had been treated with so much radiation that support to the distal nose had been destroyed. The flat shell of the nasal tip and alae without sufficient columella was benefitted by a transverse arch of costal cartilage threaded through a subcutaneous tunnel from ala through the tip to the other ala.

Application of this transverse support approach to this congenital deformity was achieved by freeing the ala bases from their cheek-lip attachments, enabling a subcutaneous tunnel to be dissected across the distal nose from alar base through the nasal tip and out the opposite alar base. A 1.4-cm × 6.5-cm costal perichondrial cartilage strut was carved and threaded through the tunnel. The protruding ends of the cartilage arch, one centimeter on each side, were introduced into stab wounds extending down to the maxilla. The alar bases were sutured back into place to cover the cartilage arch. This indeed gave the distal nose a supportive lift. The attenuated stub of columella was freed from the lip and bolstered by a chondromucosal flap from the left vestibular web.

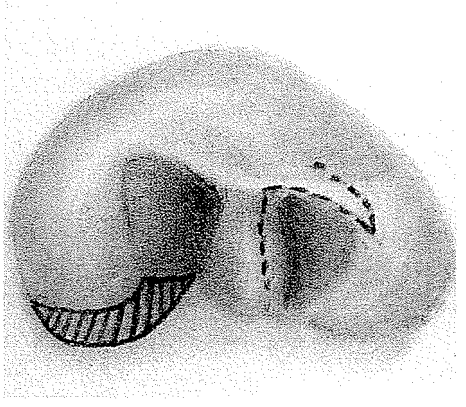


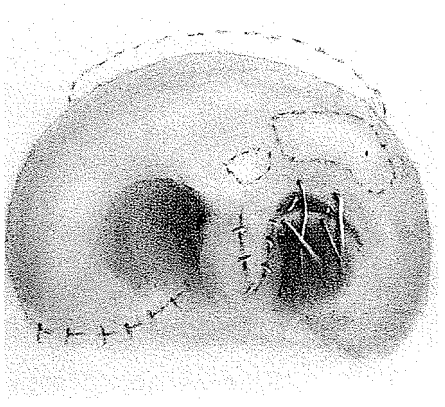




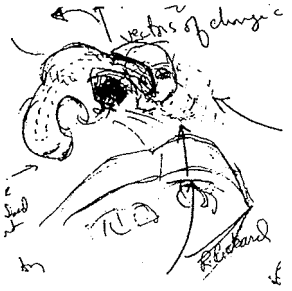


One and a half years later the left alar slump was transposed to the columella and a second rib graft added just posterior to the first graft for support continuity. Cartilage grafts were placed in the tip for better contour.







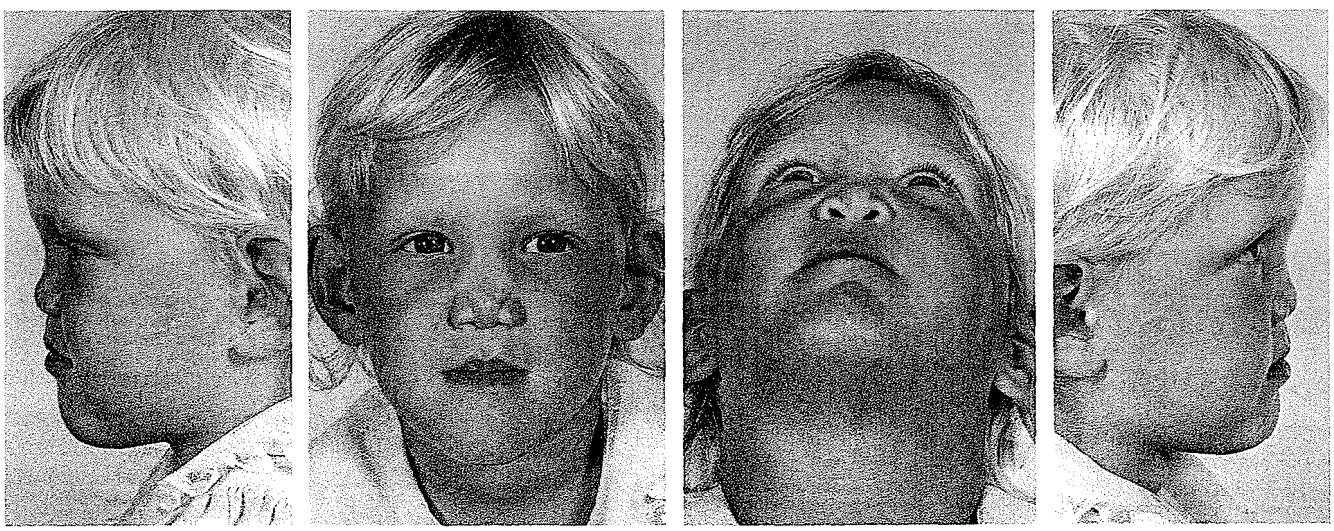


Nine months later, through an upper buccal incision, the deficient maxilla was dissected free of periosteum and costal bone was inserted as an onlay graft to improve maxillary contour. It was also wedged under the left extremity of the cartilage arch to lift the depressed left alar base. A costal cartilage strut was inserted on her nasal bridge.



A Temporary Silastic Arch

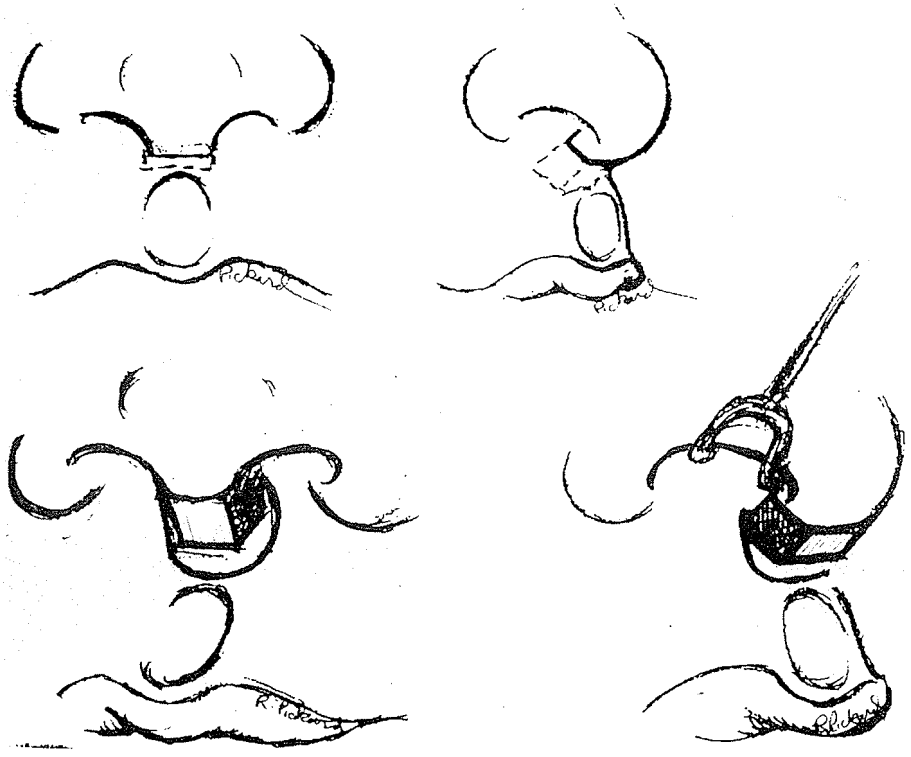
In April 1995 I had the opportunity to treat a similar problem. A female patient was first seen at the age of four years. She revealed a nasal deformity that indicated the midline structure of the septum was absent as there was no bridge, no tip support and no forward growth of the nose. The skin and alar cartilages were collapsed and foreshortened with only half a columella. There was not enough lining and cover to house the usual L support. The lip was well formed with a natural philtrum dimple.



Again the use of a transverse architectural support, that had served in two previous cases, was contemplated. Yet the young age of the patient stimulated me to start early but

avoid costal cartilage, which would be difficult to exchange. I decided on silastic which could be used as an internal expander to be replaced every five years, if necessary, for internal stretching until time for the final costal cartilage arch.

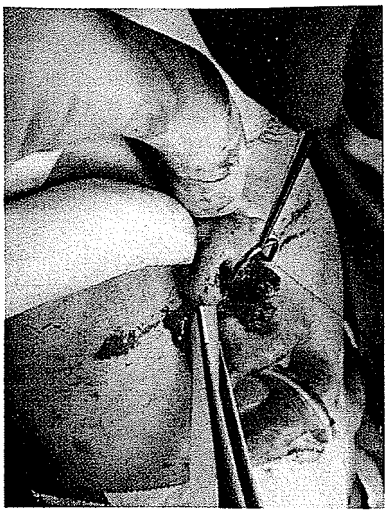
A columella lengthening procedure I had used in 1963 in a luetic case offered the best method of lengthening the columella without scarring or deforming the lip. A composite ear graft would not have served in continuity with the transverse arch support procedure. Thus a skin incision around the base of the short columella enabled dissection of a subcutaneous-muscle flap out of the thickness of the middle of the upper lip. It was slanted obliquely down and back to obtain 1.5 cm of extension without affecting the lip and its philtrum. This extension was further released with a moderate

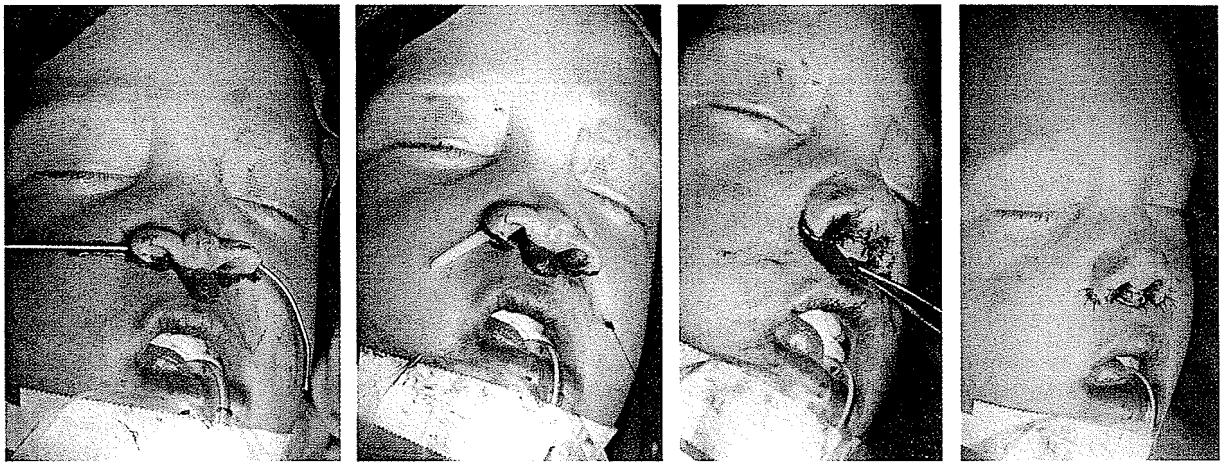


membranous septal incision. Incidentally, through this membranous septal exposure a pocket was easily dissected back over the flat bridge and a silastic strut was inserted for improved contour and bridge skin stretching.

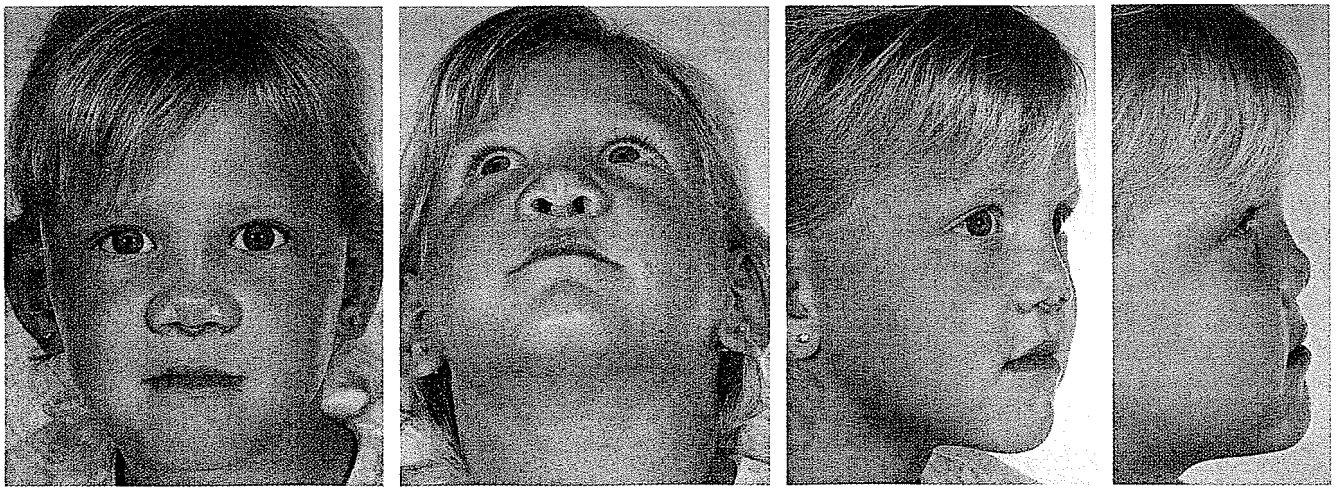
Both alae were divided at their bases from the lip-cheek attachments which enabled the anterior nasal arch to flatten to

near a straight line which facilitated the dissection of a subcutaneous tunnel from ala to ala just above the mucosal lining but under the alar cartilage and dorsal skin of the tip and alae. A probe was passed through the tunnel carrying a suture attached to a specially shaped 6½-cm solid silastic strut. This allowed easy tugging of the silastic through the tunnel so that the ends extended well beyond each alae. A stab was made in the raw area at the previous base of each ala and extended down to maxilla. The silastic ends were cut to fit into the stab wounds with enough thrust off the maxilla to give a transverse arch lift to the front of the nose.





The raw extension of the columella was wrapped in a thinned postauricular skin graft fixed with sutures. The extended columella was fixed in the upper center of the upper lip and the alar bases were sutured with care to enclose the silastic arch support.



The early result was promising. Time will tell. It is my plan to replace this silastic strut with a longer strut every five or so years to stretch the nose. Eventually the silastic will be replaced with cartilage.

BINDER'S SYNDROME

Maxillary dysplasia, or Binder's Syndrome, is a congenital malformation with an extremely flat and retruded nose, often combined with maxillary retrusion and Class III maloclusion.

In 1969 I treated a mild case of Binder's Syndrome which revealed a failure in normal development of the vertical height of the nasal tripod, more marked in the tip than in the bridge. This discrepancy in nasal growth was also associated with some lack of maxillary development. The patient considered herself ugly.



The Defect

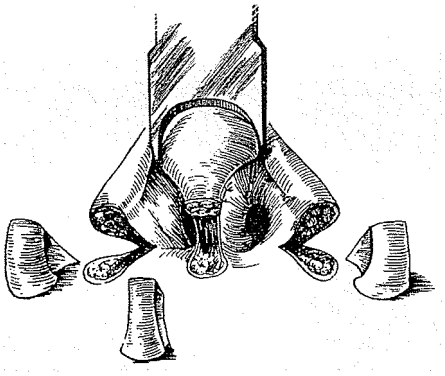
The vertical length of the columella and both sidewalls, when measured from the height of the alar arch to the join with the lip, was little more than half that of normal. Although the amount of deformity in itself did not appear staggering, there was a subtle, inherent shortness of all tissues. Its correction was complicated by the three-fold requirement for lining, support and cover in the columella and in each ala.

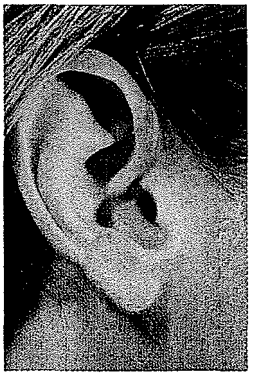
Possible Solutions

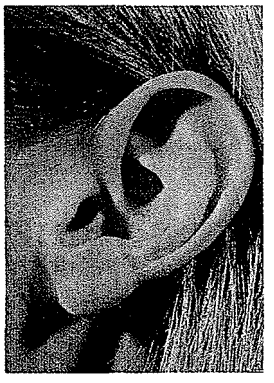
The most tempting approach, but least likely to succeed, was the forcing of an "L" shaped bone or cartilage implant into this inadequate nasal jacket. V-Y flaps out of the lip continuity for lengthening of the columella and both alae were possible but promised too much scarring. Distal flaps were considered too complicated.

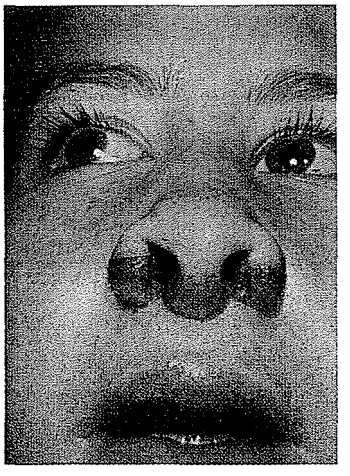
Three Composite Auricular Grafts

The columella and each alar base were divided at their join with the lip and the release was carried deep enough so that the entire arch of the nasal tripod could be lifted into normal position. The columella release required a membranous septal incision to allow the columella to advance upward. Forward pull by a two-pronged hook on the tip opened three yawning gaps, into which were fitted a triplet of composite auricular wedges taken from the junction of the helix and the lobule of each ear; the block for the columella was taken from the postauricular area, all without great loss to the ears. Each composite graft was cut in a specific shape, but with skin extensions to be used to curl as a sill into the nasal floor. The only cause for anxiety was whether all three grafts would take equally well.









Perfect Take

The grafts went through the usual color changes that Konig observed first, Brown and Cannon and Dupertius demon-

strated, and McLaughlin described but we all suffer through—white, blue black, purple, and pink.

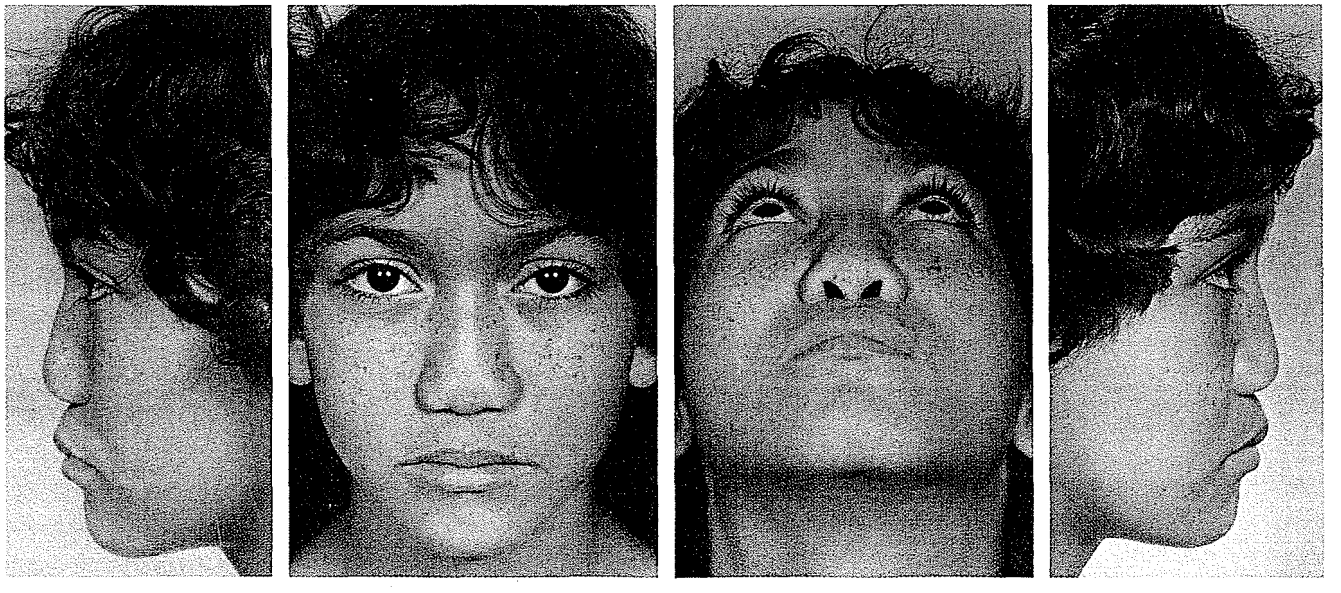
Revisions

Five months later a septal cartilage strut in the columella gave better support to the nasal tip. Alar margin sculpturing camouflaged the blending of the grafts with the columella and alae. A silastic implant under the alar bases on the maxilla improved the platform. In fact, the patient expressed the feeling that she was no longer ugly. The case was published in 1971 in *Plastic and Reconstructive Surgery.*

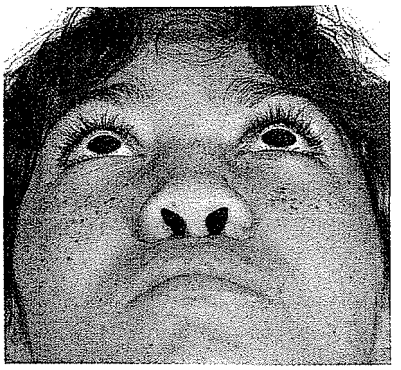


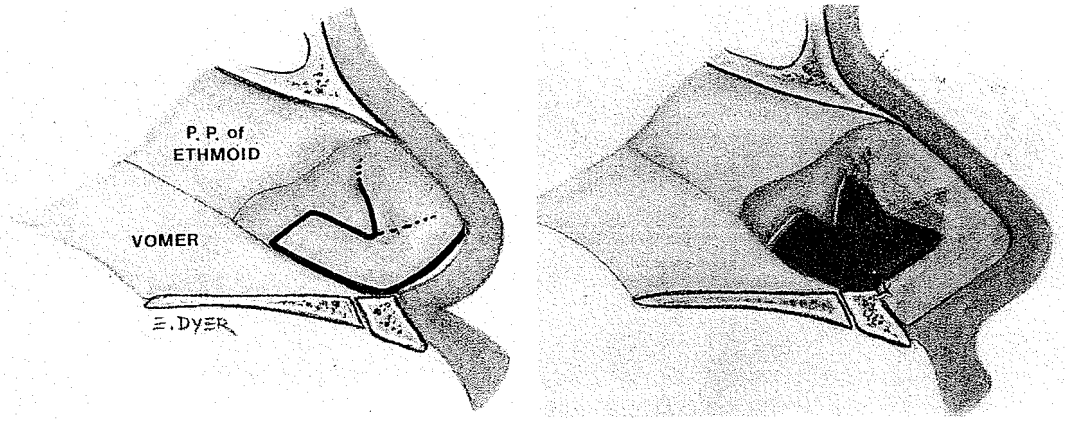
MORE TYPICAL BINDER'S

This is a more severe and typical Binder's Syndrome.



Three composite ear grafts had been inserted by plastic surgical resident R. T. W. Yuan as previously described but without great improvement. It occurred to me that the septal composite L-shaped advancement flap would be very effective in this type of nose, and it was. In the design of the L-shaped septal chondromucosal flap the dotted lines indicate the area of subperiosteal sectioning of the cartilage to facilitate the L-flap advancement by rotation to elevate the bridge and tip.





In 1986 Holmstrand advocated correction of the retruded nasal base with subperiosteal onlay bone grafts, and this was carried out in our case with cranial bone. An onlay strut of cranial bone was applied to the nasal bridge, the alar base grafts were excised, and the columella graft revised. This case was published in 1988 in *Plastic and Reconstructive Surgery.*

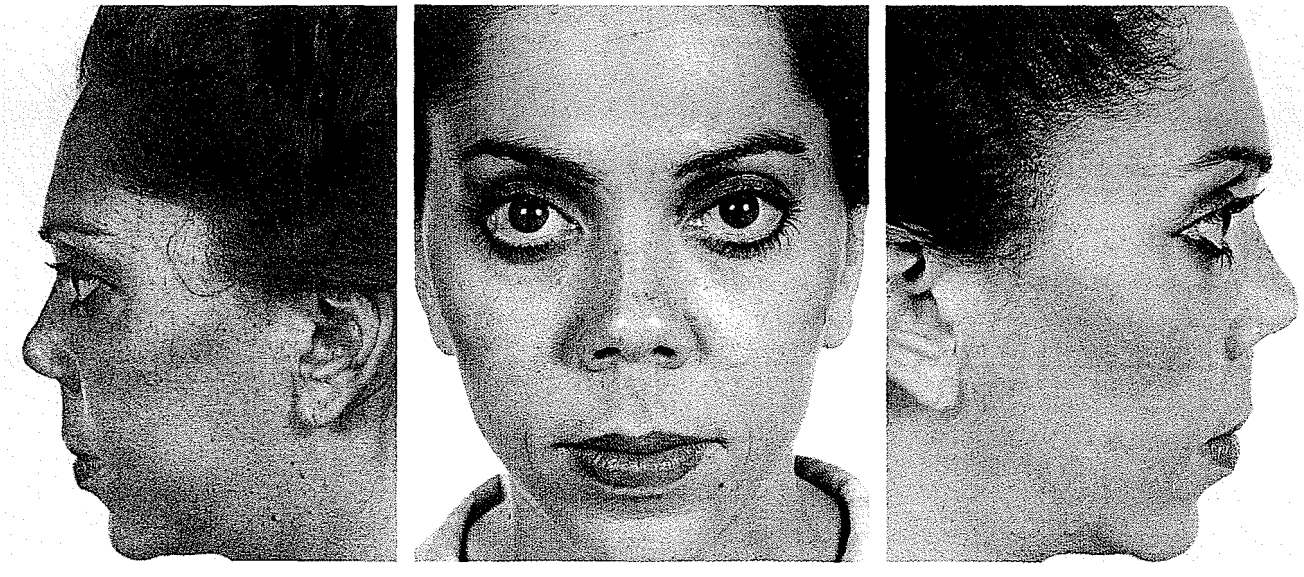


A SHORT NOSE

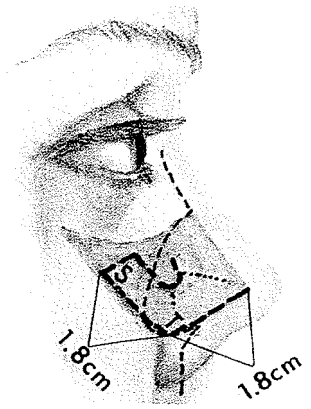
This 29-year-old female suffered with maxillary hyperplasia and mandibular retrognathia. She had Le Fort I maxillary os-

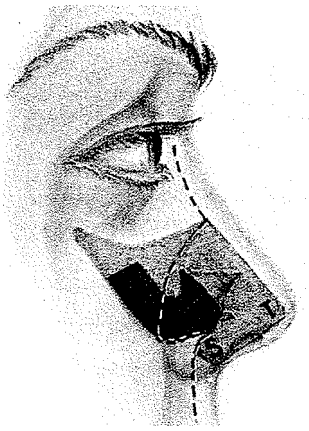


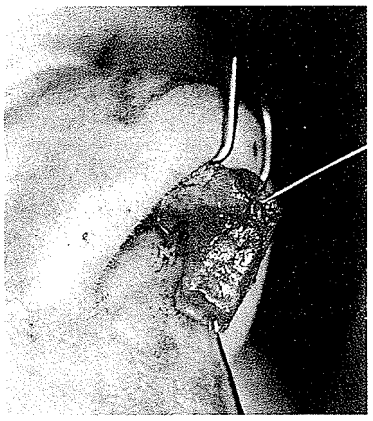
teotomies and osteotomies with direct bone plate/screw fixation of the maxilla and a segmental mandibular osteotomy (sliding genioplasty) with bone screw fixation by S. H. Holms. The surgery did improve the maxillary mandibular contour and occlused alignment but resulted in a nose that was relatively short for her facial skeleton. She was referred for nasal lengthening. There was no history of septal surgery.



A subnasal advancement of the L-shaped septal chondromucosal flap was designed. A membranous septal incision hugging the distal septal cartilage was carried from the nasal spine up toward the tip extending bilaterally along the intercartilaginous line. Through the lateral vestibular intercartilaginous incisions the skin of the dorsum was freed to improve the potential for longitudinal nasal lengthening. In the design for lengthening the framework of the nose, the membranous septal incision exposed the anterior edge of the septum which was destined to rotate outward and become the extended nasal bridge and tip. The additional nasal length, being estimated at about 1.8 cm, was marked on the inferior septum just above the nasal spine. At this point the full thickness horizontal cut of the L was advanced posteriorly in the septum parallel, but just above the septal join in the vomerial groove. The length of this full-thickness incision was another 1.8 cm, the estimated length of required columella support from nasal tip down in front of the nasal spine. The rest of the septal L was incised, keeping a wide enough flap of over 1.25 cm to maintain vascularity. This action was achieved without visual difficulty in spite of the intact nose. Careful subperichondrial dissection enabled release of the cartilage at the proximal kink to ease deliverance of the septal flap out through one nostril. This improved access for trimming excess cartilage along the undersurface and back side of the L flap so that mucosa could be sutured to mucosa without tension with 5–0 catgut to achieve a closed chondromucosal unit. The L flap advanced up and out to form the lengthened tip, and the distal leg was sutured with 4–0 Prolene in front of the residual nasal spine. This forced maintenance of the nasal lengthening and correction of the columella retraction through the advanced propped cantilever behind the tip and columella. The flap was sutured to the membranous septum and the lateral lining incisions were also gently sutured. Bilateral alar wedge resections narrowed the flaring nostrils.









HEMANGIOMA OF THE NOSE

Hemangioma of the nose may be capillary, cavernous, or a combination of both. In the early phase there is often rapid proliferation, but by 6 months involution usually is in progress. Most observers estimate that more than 50% of general hemangiomas will show regression by the time the patient is 5 years old and 70% by 7 years with continued improvement up to 10 to 12 years. Unfortunately nasal hemangiomas have a history of slow regression, as noted by J. B. Mulliken in 1988 and I. T. Jackson in 1993. J. C. Vander Muelen, et al. in 1994 advocated early excision of nasal hemangiomas using the L incision. The results shown were good and the scars in unit lines.

Rarely will hemangiomas progress into rapid ulceration and hemorrhaging. If they do, immediate early excision and coverage with grafts and flaps may be necessary.

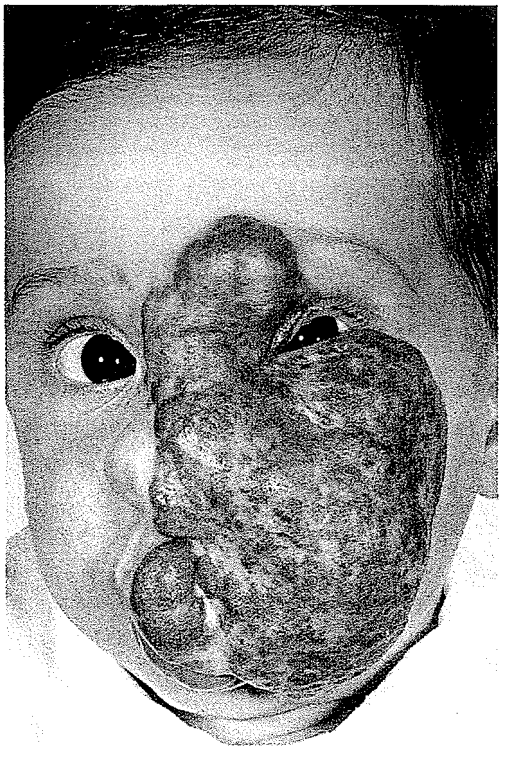
My usual approach to nasal hemangiomas has been observation up to five years of age supplemented with Prednisone under the supervision of the pediatrician. Once the spontaneous regression has reached its optimum, then surgical excision and reconstruction is indicated.

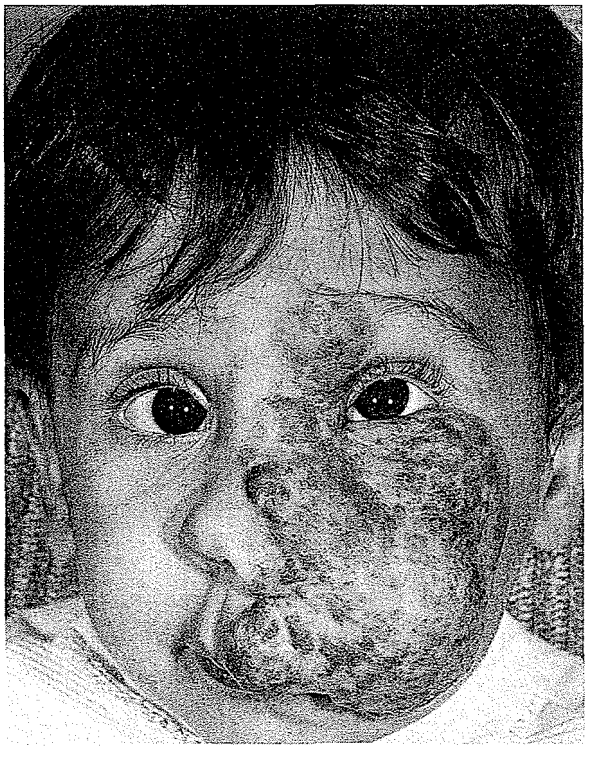
During the dissection and resection great care is taken not to injure the dermis or the alar cartilages but to take all tumor from between the two.

Embolization and ligation of predominant vascular supply are techniques occasionally used. A running mattress suture through skin and subcutaneous tissues encircling the lesion just outside its borders can be used to constrict and thus reduce hemorrhage during surgery. This has not been necessary in any of the nasal hemangiomas I have treated.

This patient was born with a nonraised capillary hemangioma which in the following three months revealed marked progression of the cavernous component with severe orbital, nasal and oral distortion. Radiation was deferred because of lack of acute symptoms or further progression. When the baby was first seen at seven months the face was severely involved.

The primary treatment was carried out by pediatric surgeon Mark Rowe. At interrupted periods the patient received oral Prednisone (20–40 mg). Ligation of predominant vascular supply was deferred to avoid enhancement of collateralization. Gradual spontaneous regression with blanching and shrinkage was seen over the next three years.

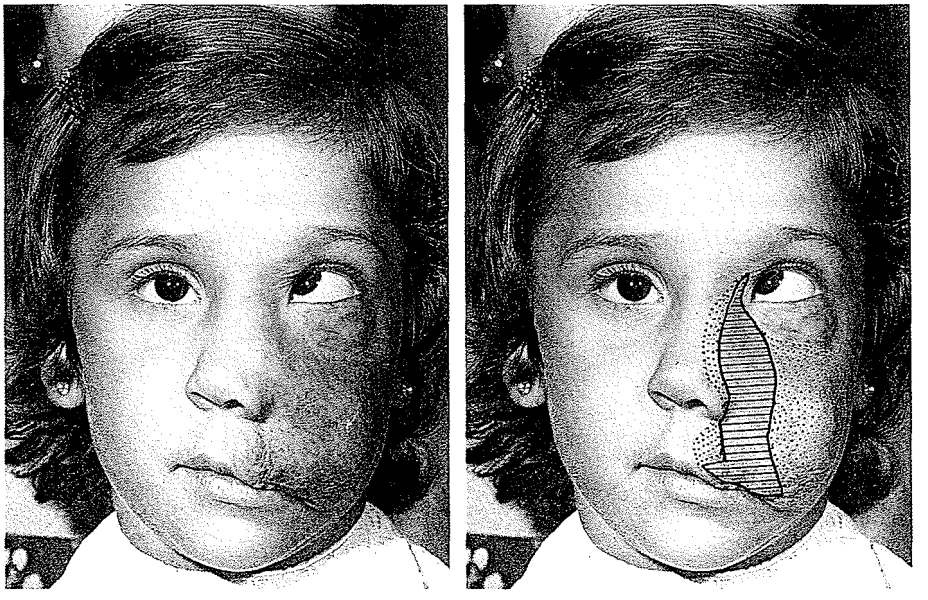




Angiogram revealed hemangioma of the left face filled primarily by maxillary artery division of the left external carotid.

Serial excision was chosen as the method of treatment and possibly could have been facilitated by the use of expanders. The serial excision principle of surface tissue stretcher was first used by H. Morestin and later popularized by F. Smith. Excision in stages enabled removal of large scars, pigmented nevi, hemangiomas, neurofibromas, and other benign lesions not removable in one stage. By serial excision the tension is fractionated into safer portions. It is important that the excisions be carried out along natural lines like the nasolabial crease to hide the scar. Amounts to be excised should be calibrated so that the tension of closure produces the desired balance.

My first operation on a patient four years of age was an excision of diseased tissue along the side of the nose and nasolabial line (crosshatching), removing deep hemangioma tissue (stripping) from the nose, cheek and lip followed by closure with moderate tension.



Ten months later a wide strip of scar, skin and hemangiomatous tissue was removed (crosshatching) from the nose join to the cheek and the nasolabial line including redundant tissue (stripping) below the commissure. Lipectomy of the

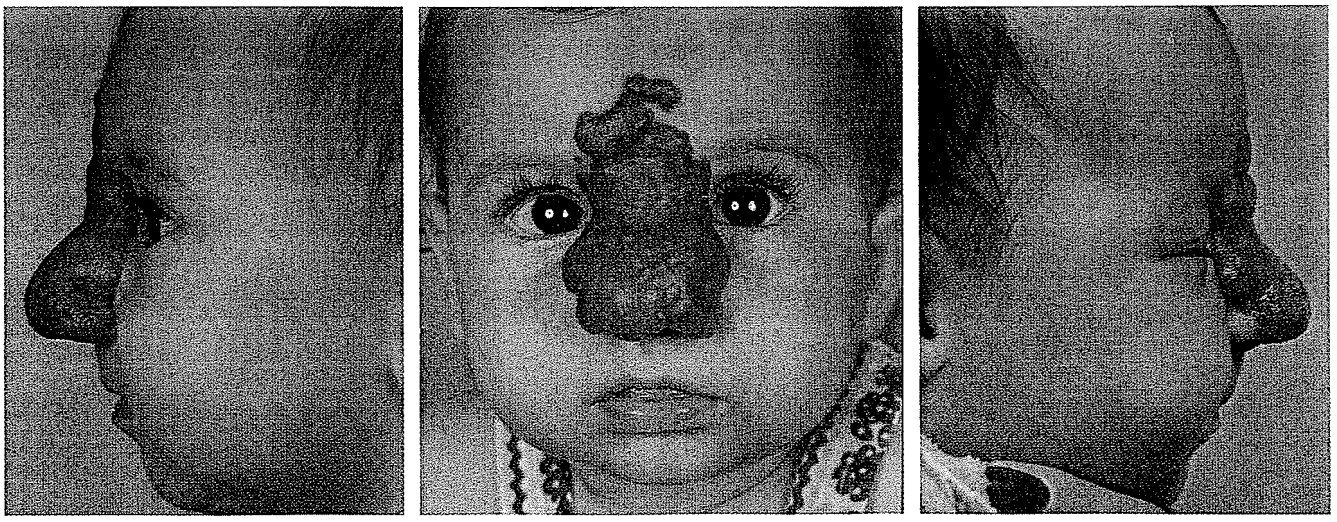
left lower lid and scar abrasions were accomplished and the strabismus was improved.

One year later, skin, scar and tumor tissues were excised (crosshatching and strippling) in the left medial canthal area along the palpebral fold. Six months later, wrinkled and deeply pigmented skin was tightened with a phenol peel. The patient is seen at age 13 years with well healed scars along natural lines.

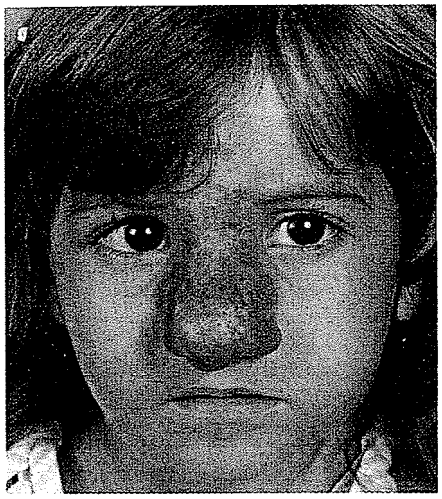


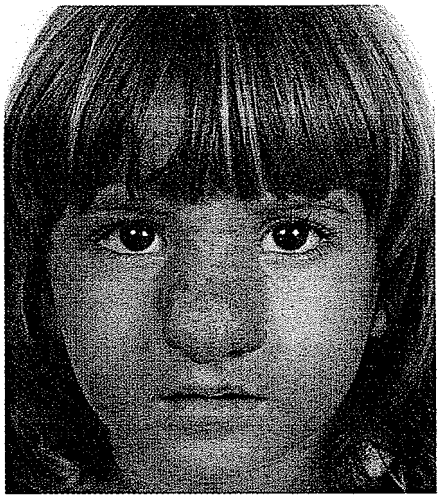
ANOTHER SERIAL EXCISION

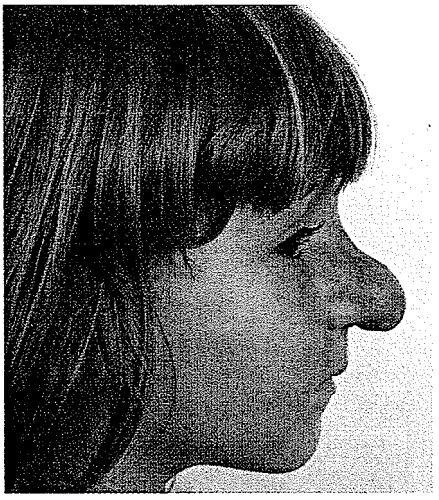
This patient was born with a normal appearing nose that developed a hemangioma early and progressed rapidly. She is seen at the age of six months. No treatment was advised. Ob-



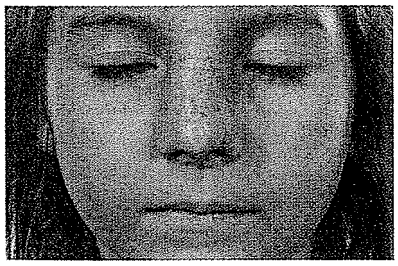
servation at ages two and three years revealed gradual recession.









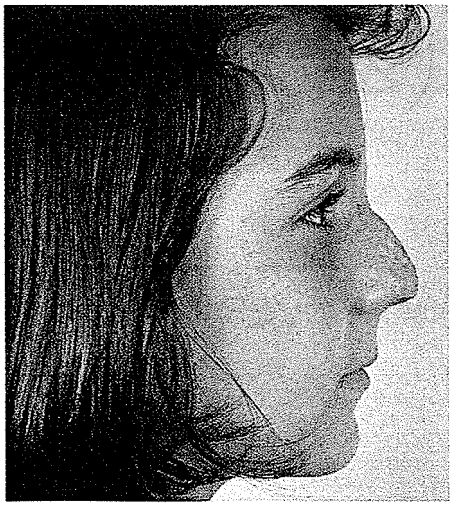


First surgery at age three years involved distal incisions along the alar rims and down around the columella similar to an open rhinoplasty. This allowed elevation of the skin and excision of hemangioma from dermis to alar cartilages. Freeing the skin produced distal excess which could be excised and sutured. The improvement is seen two years later.

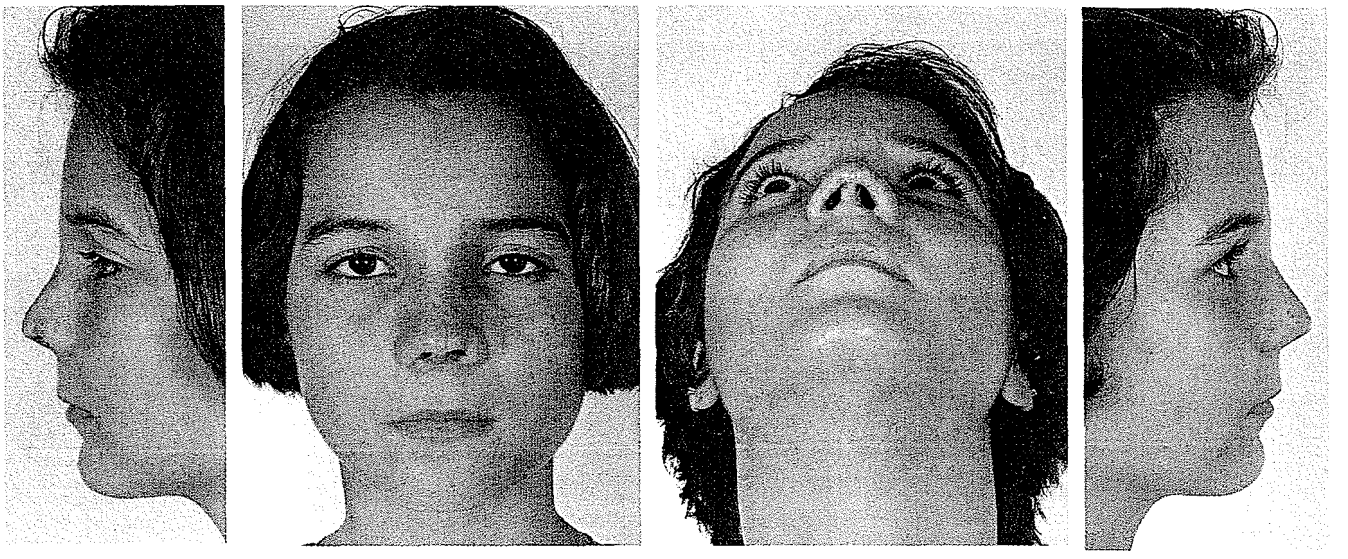
A year later a vertical excision of skin of the nasal dorsum allowed lateral undermining and excision of more hemangioma on either side. Bilateral osteotomies with infracture narrowed the nasal base and a vertical diamond excision of the columella reduced its width. Wound was closed carefully down the midline of the bridge.

Patient returned at age 14 years with a hump.





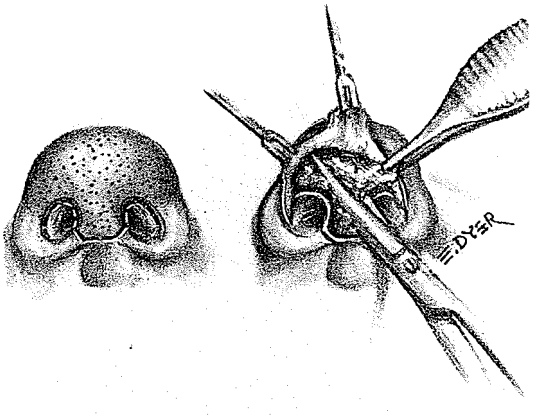
As the patient was mature for her years a corrective rhinoplasty with hump removal, septal tip resection, columella tip graft and other minor revisions improved her result.

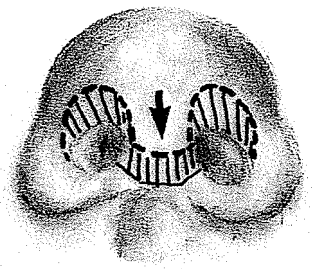


This patient was born with a red spot on the tip of her nose. At two years the capillary component had subsided spontaneously but the cavernous portion has progressed to a bulbous blue swelling.

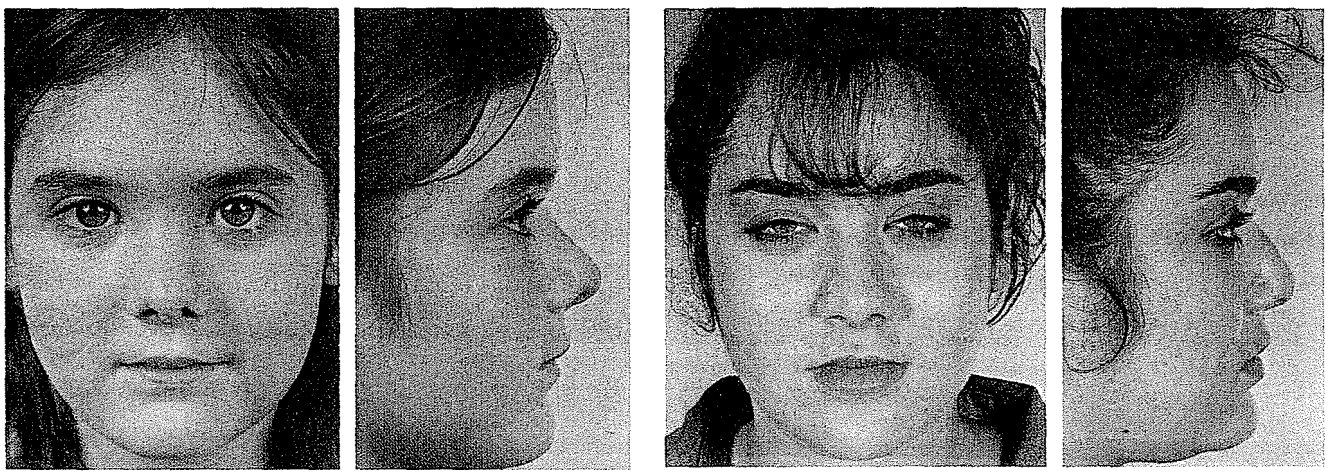
Since observation is a wise adjunct in treatment of hemangiomas, the patient was requested to return in three years at the age of five. The nasal tip swelling was relatively less but no more improvement was expected.



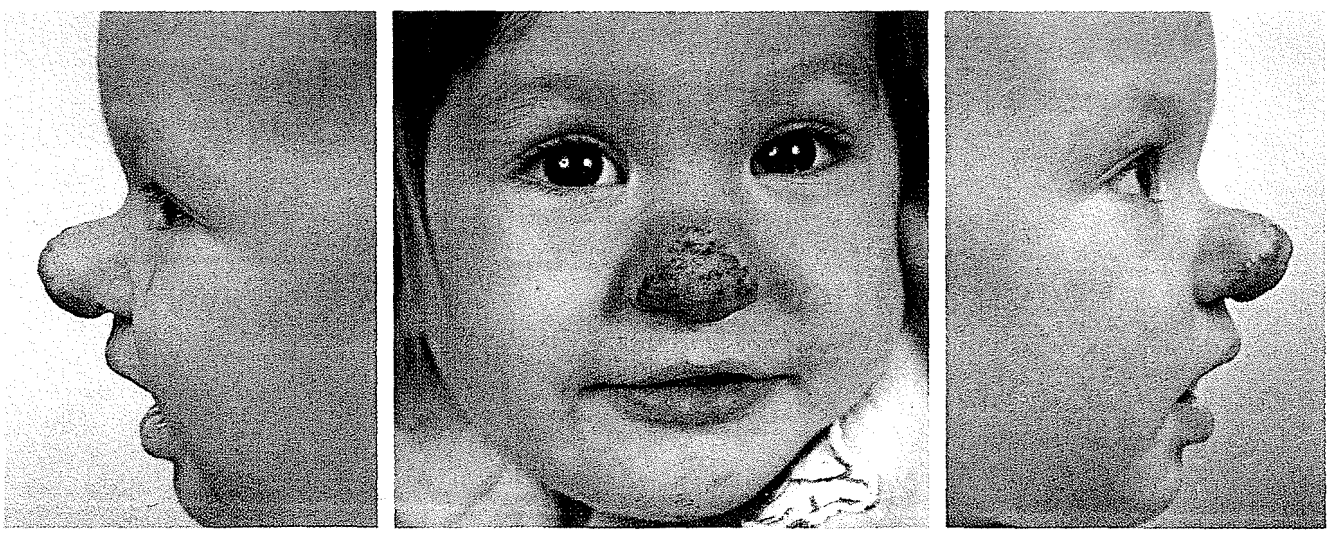




An open rhinoplasty approach through a modified flying bird designed at the inferior periphery of the lesions involved incisions along the alar margins running down the sides of the columella and across its base. This allowed elevation of the thinned skin of the columella and tip. The diagnosis of hamartoma was made, and the excess angiolipomatous tissue was excised from the columella, alar cartilages and distal bridge. Then the alar cartilages were sutured together and the excess skin draped, trimmed and sutured along the alar margins, down the sides and across the base of the columella in hidden positions. The patient is seen at age 5 and 19 years of age.



This ten-month-old baby girl was born with capillary and cavernous hemangioma of the nasal tip. Surgery was postponed with the hope that the usual spontaneous regression would occur. A course of Cortisone was without noticeable effect.



At the age of three years an open rhinoplasty across the base of the columella and along the alar rims allowed the skin of the nasal tip to be elevated with good exposure for excision of hemangioma from off the alar cartilages out to the dermis. The excess skin was trimmed and sutured back into position with good improvement. Two years later minor revision of the alar rims was carried out. The patient was then lost to follow-up.

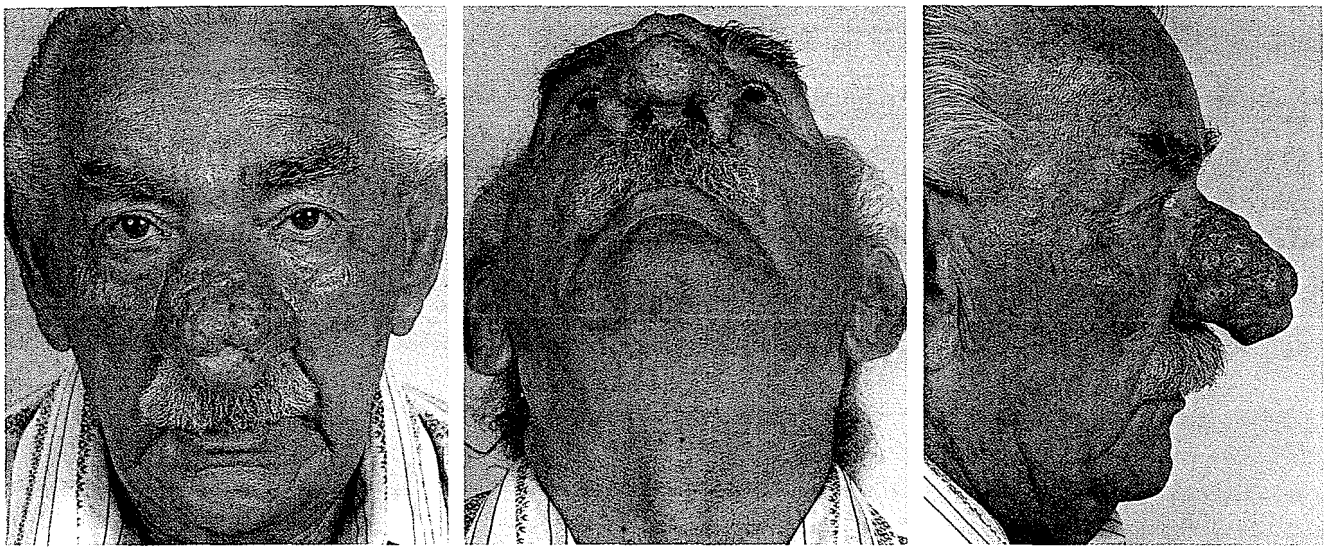


RHINOPHYMA

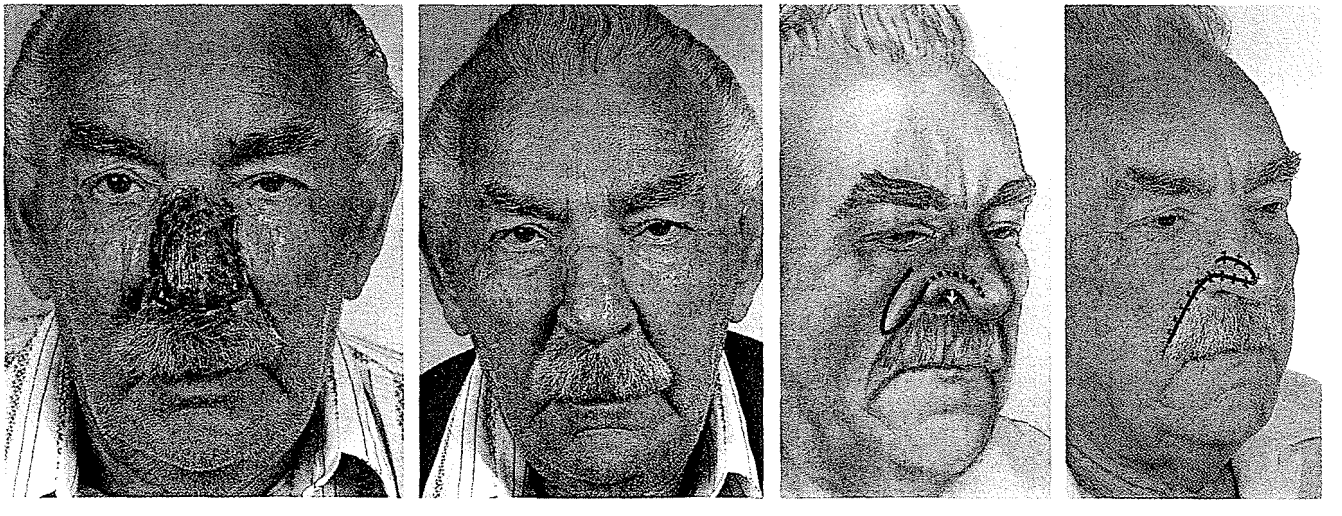
A rhinophyma represents excess sebaceous adenomatous hypertrophy in the skin of the nose. This lobulated pile-up can grow to enormous proportions but its correction is relatively simple. With a gloved finger in the nostril to gauge the remaining thickness of the rhinophyma, a no. 10 Personna Plus scalpel blade is used to pare the excess tissue. The final refined shaving is carried out with a sandpaper abrader which is also used to feather the peripheral edges. Every effort must be made to avoid exposing bare alar cartilage in the tip and to maintain an equal thickness over all shaved areas. The remaining sebaceous glands are notorious for re-epithializing the nose. Yet, as this presents a large granulating surface, there will be varying degrees of contracture during the healing. Usually the shaved nose will heal spontaneously and in

time will become a reasonable color. Here are three examples of the treatment of this deformity.

A 67-year-old male developed an impressibly large, lobulated rhinophyma. He let it grow without concern until his wife died. Then he was forced to make new friends and this stimulated his quest for nasal correction. The excess tissue was

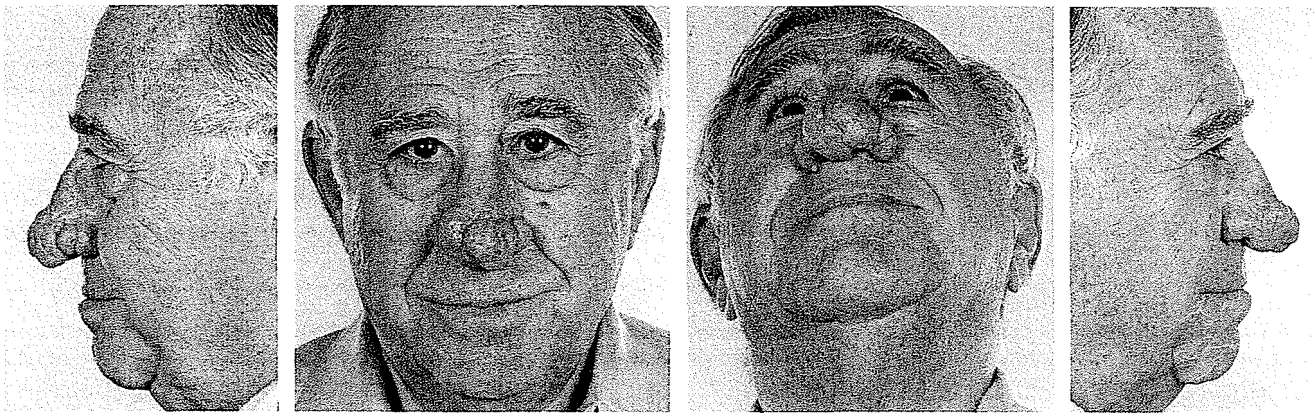


shaved off with a scalpel to a reasonable reshaping of his nose. The alar cartilages were not exposed and the granulating area gradually healed with re-epithelialization. It is difficult to gauge exactly the depth of shaving or the extent of surface contracture during healing. In this case the right ala, evidently pared slightly deeper than the left, healed with more retraction. This was symmetrized by release of the right ala retraction and covered with a nasolabial flap from the excess facial fold.

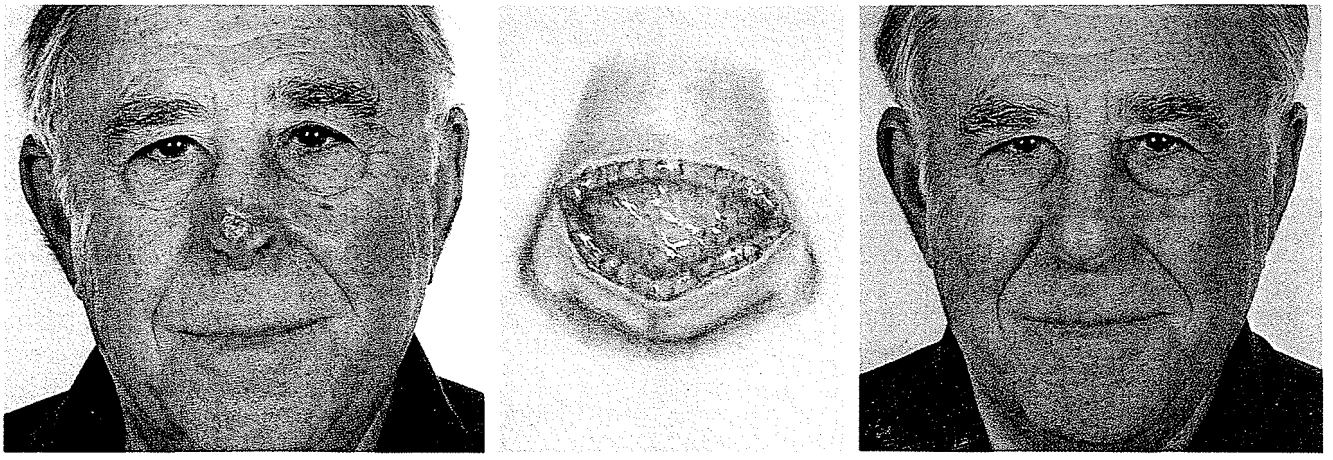




The second example was a 68-year-old male also with lobular rhinophyma that also was pared with a scalpel and the edges smoothed with a sandpaper abrader. In this case the

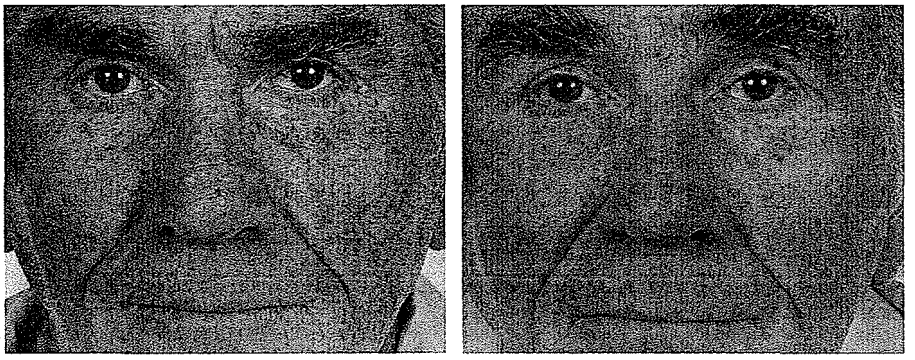


granulating area healed rapidly with more contracture than epithelialization so that there was severe retraction of the tip and alae. In my experience this is unusual. At three months the contracting scar was excised and the alae released. The raw area was covered with a postauricular skin graft which healed without incident. His general health prevented him



from returning for late final photographs but he reported satisfaction with his reduced and grafted nose.

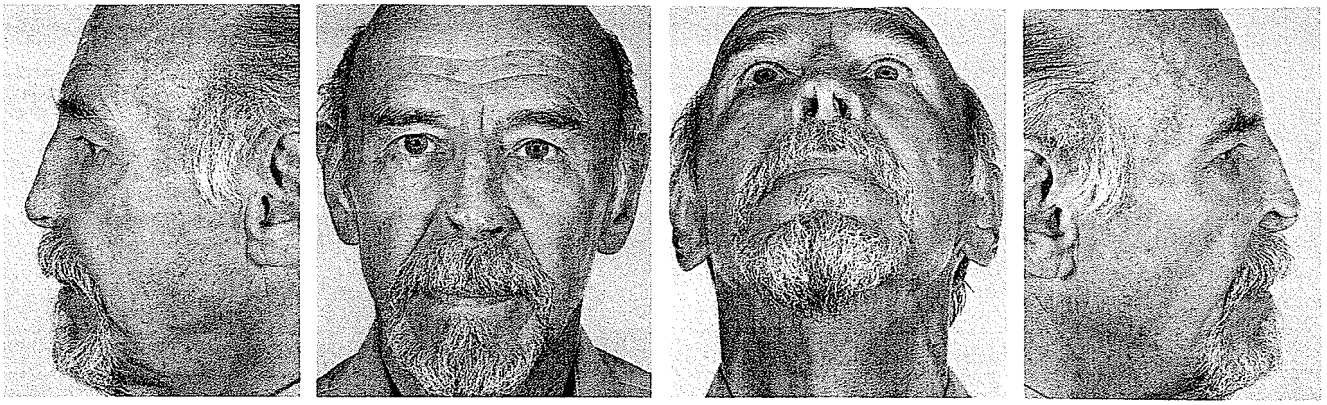
Here is a case of first degree rhinophyma which also had basal cell carcinoma. Paring the rhinophyma with frozen section study of the shavings determined the extent of the paring. He healed satisfactorily.

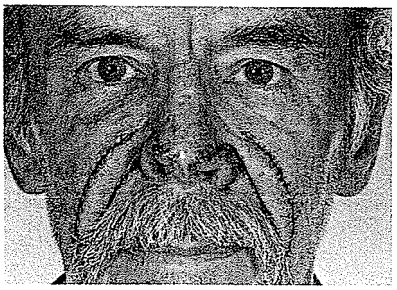


Secondary Correction of Rhinophyma
This 66-year-old male developed a rhinophyma that evidently was treated by excessive shaving. The healed result revealed

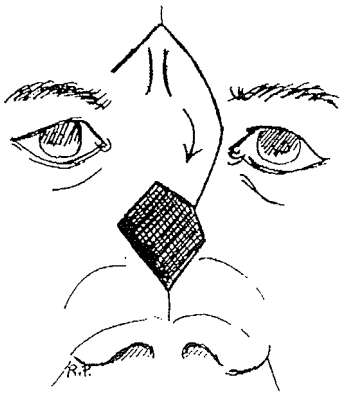


scarred skin of the nasal bridge and retraction of both alae more marked on the right. His nose was so constricted that his breathing was impaired.





The excess of the patient's nasolabial folds stimulated their use in repair. The retracted alae were incised to delay turn-down flaps of alar lining. Bilateral superiorly based nasolabial flaps were delayed by incisions. Three weeks later submucous septal resection aided the airway. The alar flaps were turned down for lining and covered with bilateral nasolabial flaps. Closure of the nasolabial donor areas provided a modest face lift.



The residual scarring on the dorsal bridge was replaced by the rotation of a bishop's mitre flap from the glabella area, based on the right supratrochlear vessels and taking the corrugator frown with it. Other minor revisions and flap thinning completed the reconstruction. This replacement of scar with three-flap cover needs time for flap edema to subside.



4.
Reconstructive Rhinoplasty



ALTHOUGH the goal in nasal reconstruction is both functional and aesthetic, other practical factors may occasionally be involved. For instance, a not uncommon injury seen in the trench warfare of World War I occurred when an Allied soldier tipped his helmet back to have a smoke. The moon came out from behind a cloud lighting his face and a German sniper in an apple tree put a bullet through his upper nose and one eye.

As plastic surgeons found, it was important not to rebuild the nasal bridge aesthetically and dangerously high, so that the patient could see an oncoming car from his blind side.



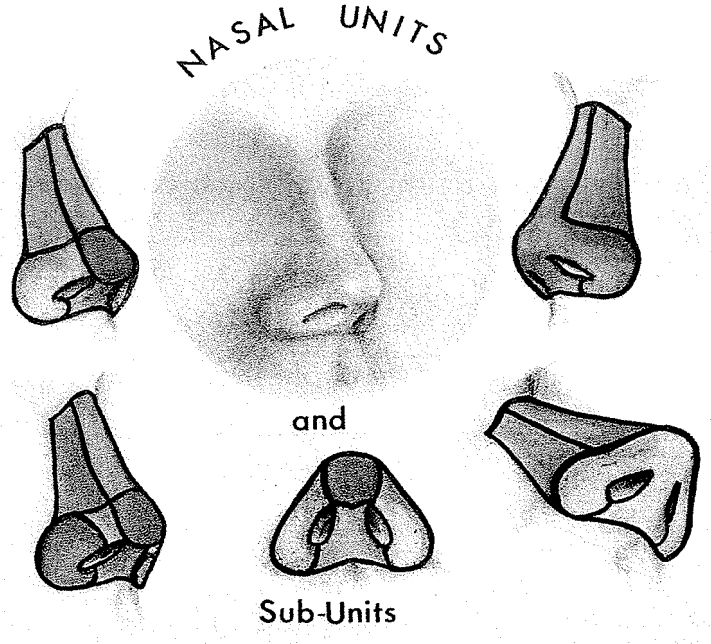
There is precedent for this surgical adaptation in the Middle Ages. The one-eyed Duke of Montefeltro had a portion of his nasal bridge removed to increase his field of vision. Thus his one good eye, peeking through the notch in his nose, discouraged guests sitting on his blind side at banquets from trying to poison him.

Nasal reconstruction is the attempt to return the nose to normal, even the ideal, state. Whether a small piece of tip

skin is missing or the whole nose is lost, the first requirement in treatment is in-depth diagnosis of what is displaced, what is missing, and what is in excess. The next step is the careful planning of moving what is normal into normal position and retaining it there. The displacement may be from crushing trauma, arrested embryogenesis, or long-term scar contracture. Release and replacement are essential. The final step is the design of replacing what is missing with as similar tissue as possible, skin for skin, mucosa for mucosa, cartilage for cartilage, and bone for bone. The replacements will be taken from excesses whether they are on the nose itself or from adjacent or distal areas, depending on the ability of the donor to spare the parts and the quality and vascularity of the donor area.

RESPECT UNITS

In nasal reconstruction nasal units and subunits must have priority. The various nasal units and subunits have been charted using the flow along the bridge over the tip into the columella as the main central unit. This is flanked by the upper-side units and the alar wings swinging into the nostril sills. All of the units are bounded by margins, creases, ridges, highlights, and shadows which can be used as guidelines in reconstruction.

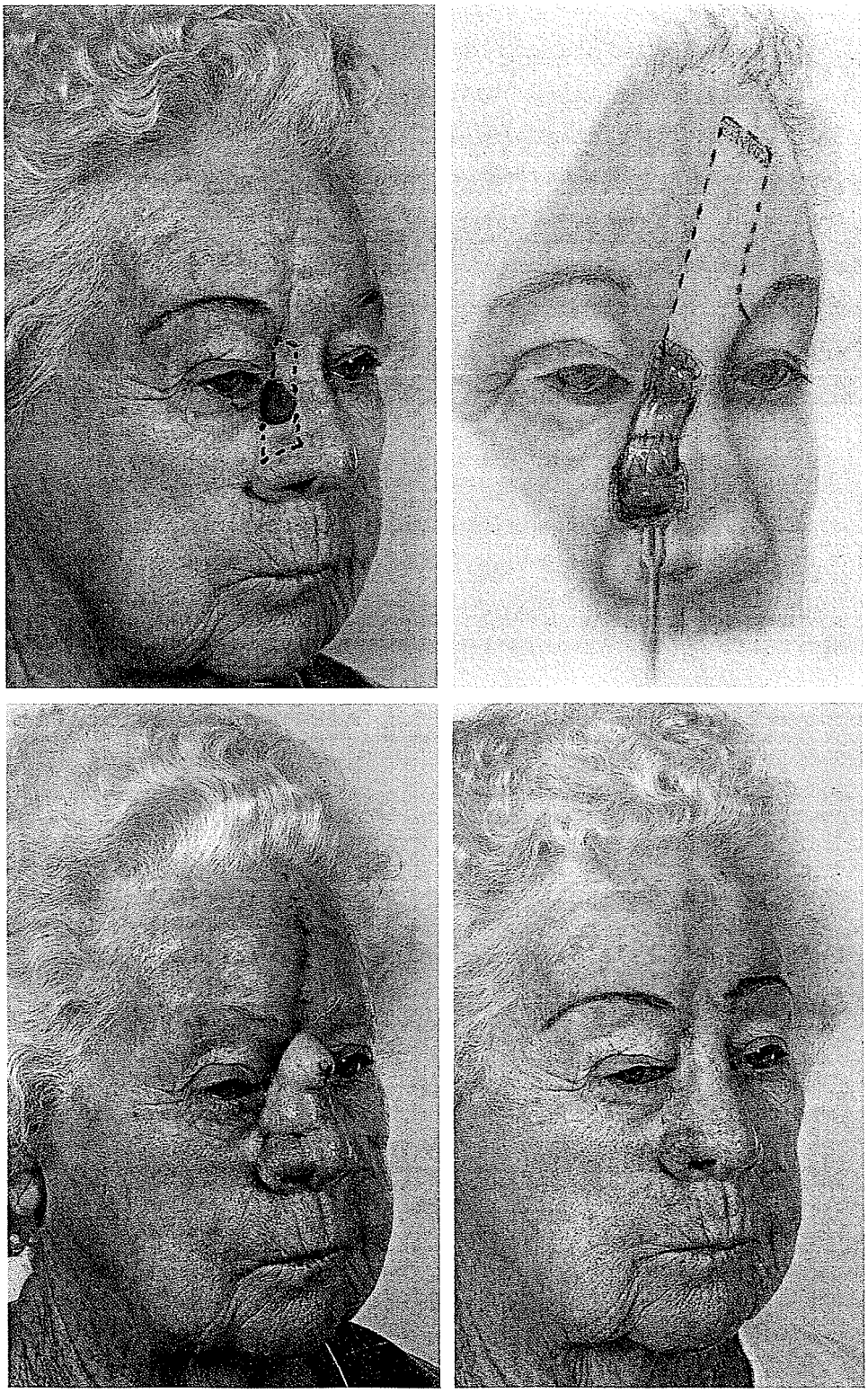


When the defect involves most of a unit, the defect can be extended to an exact unit with camouflage advantages. For instance, if the defect is only a portion of a subunit and direct closure is not possible, one may better turn the partial subunit defect into a total subunit defect and then fill this unit. My basic principle in plastic surgery is: *"Do not cut a flap or a graft to fit a random defect. Make the defect fit the natural aesthetic unit and then fit the flap or graft to that unit."* When the sanctity of a unit is ignored the result is offensive as seen here.



This 83-year-old female had multiple basal cell carcinomas which eventually required D. Robinson to ablate the full thickness sidewall of her nose, including removal of the nasal bone, lacrymal bone, and a portion of maxilla. When the area was pronounced clear, local skin flaps provided lining along

the aesthetic unit. Then a midline vertical forehead flap, based on the left supratrochlear vessels and its end denuded of epithelium, was brought in as a cover to the sum of subunits from the alar crease to the brow. This disguised the repair.

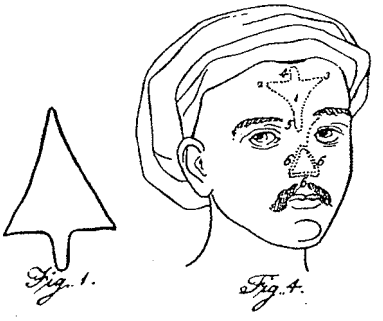


THREE NASAL LAYERS

The nose is composed of three general layers: skin cover, mucosal lining, and cartilage or bone support.

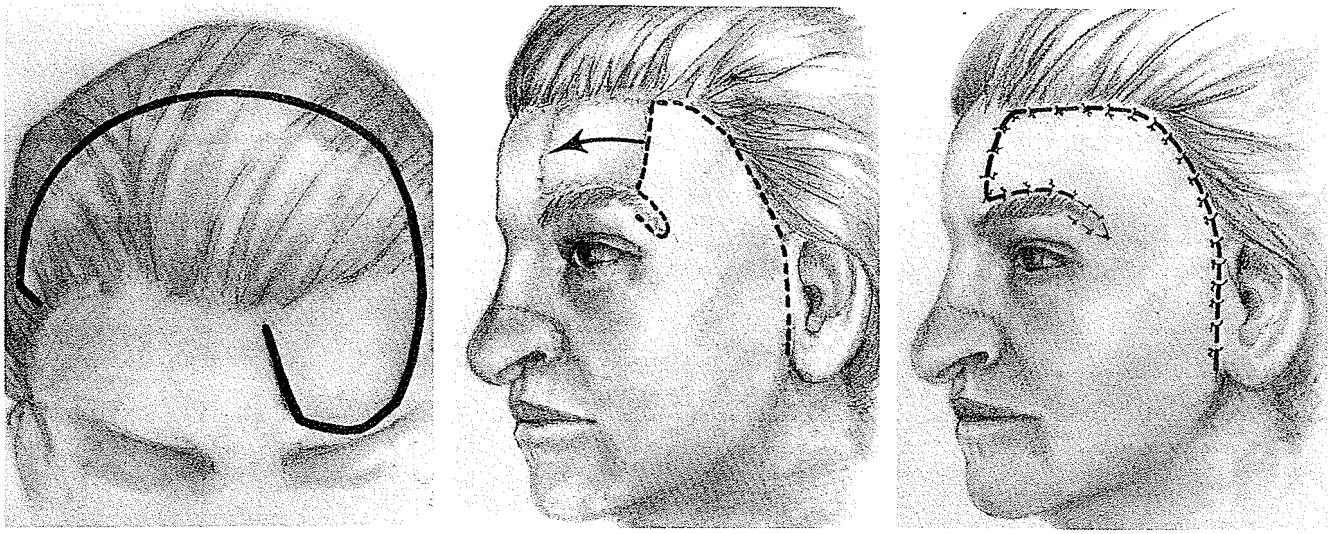
Skin Cover

At first rhinoplasty was limited to flaps for cover utilizing the cheek, then the forehead, and later the arm. It was not until World War I that the tube pedicle became popular. In our time the forehead flap is most popular for important nasal cover.



EARLY FOREHEAD FLAPS. According to the translation of the Sushruta Samhita, the art of nose-making with a forehead flap was born in the backstreets of India in the hands of the Koomas caste of potters, centuries before Christ. J. C. Carpue in 1816 revived the forehead flap in England and J. M. Warren followed in 1837 in America. Further development of the use of the forehead flap as cover in rhinoplasty extended through World Wars I and II during reconstruction of the war injuries. The different forehead flaps with their various bases and the scalp rotation flaps used to close the donor area are of only historical interest. Even the Converse scalping flap which hid the scars of the pedicle in the scalp is no longer popular. The depressed skin graft donor defect was quite noticeable and required such calisthenics as a temporofascio-cervical rotation flap which needs a delay before advancement, as described by J. Luri in 1982.


GRAFT
NO
YES



As the forehead flap, if specifically designed, is the best choice for nasal cover it will be described later in detail.

Mucosal Lining

The lining phase of reconstructive rhinoplasty began erratically with Volkmann in 1874 who turned down skin from the remaining nose. In 1819 Thiersch turned up flaps from adjacent facial areas and in 1898 Lossen utilized split thickness skin grafts. In general, however, the early reconstructive surgeon did not appreciate the importance of lining. He did cut his covering flaps 1/3 larger than necessary to try to offset the inevitable shrinkage of the unlined cover. It was not until 1900 when Keegan published the results of his five years of work in India that the importance of nasal lining in the prevention of cover contracture was clarified. When available, local flaps are preferred for lining, as they afford better lymphatic and venous drainage. Under certain conditions a forehead flap has been used for lining. There are also free skin grafts and even chondrocutaneous grafts for lining and support of the alar rim.

Cartilage or Bone Support

As larger reconstructions were attempted the need for support became embarrassingly apparent. At first various external metallic platforms were fixed within the nasal cavity with a

projecting framework shaped as desired, such as the 1828 gold-and-silver profiles of Rousset. In 1864, Ollier attempted autogenous bone grafting when he brought down a forehead flap with a piece of frontal bone attached by periosteum. Israel, in 1887, used a forearm flap carrying a strut of ulna and in 1896 used autogenous bone from the tibia as a nasal bridge support. The latter was adopted in 1907 by Joseph. Wolkowitsch, in 1902, used the little finger, and Mandry, in 1908, used a clavicular flap incorporating a portion of clavicle for subtotal nasal repair. Von Mangold, in 1900, was the first to describe transplantation of costal cartilage for nasal support. The surgeons of World War I on both sides capitalized on these developments and proceeded to improvise and modify.

FOREHEAD FLAP

The forehead, bounded by hair of the scalp and eyebrows, with its hairless, smooth textured pink-colored skin, robust vascularity and proximity of position, is the favorite site for covering flaps in nasal reconstruction.

A PLEA

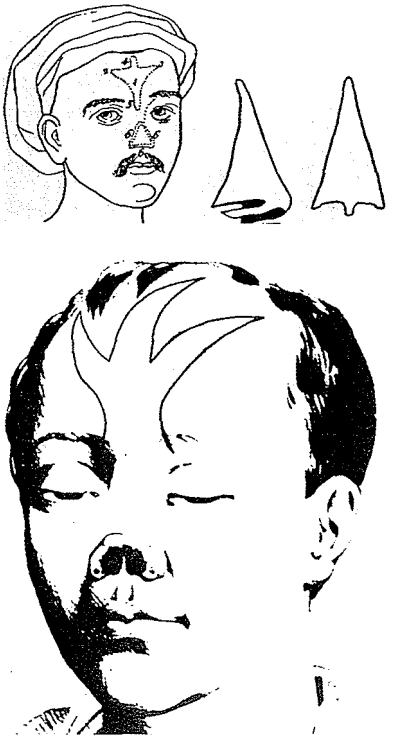
Careless or haphazard use of an important area of facial expression, such as the forehead, by the untrained should be *outlawed.* There is a tendency for surgeons untrained in reconstruction to use poorly designed forehead flaps which not only destroy the forehead but render the nose unacceptable. Also, this type of amateurish floundering about with facial tissue is infuriating! Such plastic surgery experts as Barrett Brown and Brad Cannon, during World War II at Valley Forge, became involved with a forehead flap rhinoplasty that added more scars than assets. If they set a precedent against forehead flaps by army plastic surgeons, certainly this procedure is a no-no for the untrained!

Forehead Design

The natural wrinkles and folds of the forehead mostly run transversely except in the glabella area. The best position for

placement of scars is transverse, with the midvertical next best. If a moderate portion of the forehead must be sacrificed electively, as with a flap, it is well to design the flap along the midvertical and transverse lines as seen in the seagull flap.

There is a subtle and important difference between the seagull design and the triangular Indian flap of 600 B.C. or the French three-finger flap of Delpech with the extensions running obliquely along an almost parallel axis. Although the similarity is remarkable the subtle difference offers double advantages. The wings of the seagull can extend as alar bases into nostril sills, and closure of the earlier flaps offered far greater difficulty as neither divides the donor axis as fairly as seen in the seagull. E. Peet set 1¼ inches as the optimum amount of tissue that can be removed from the transverse axis of the forehead and allow direct closure. This is generally true but it is usually possible to predict how much forehead is expendable by pinching it up into a fold. I recall one forehead flap in an elderly woman that was 2½ inches in width but its donor area closed primarily without difficulty. There have been others that would not spare a full inch.

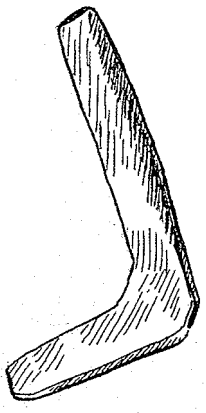


Expanders

This is somewhat historical because tissue expansion as developed by C. Radovan has rendered direct forehead donor closure far easier. I emphasize that expanders should be placed under the lateral unused forehead and not under the forehead flap itself. By expanding the lateral forehead, midline closure of the defect is facilitated and the tension of closure will retain the expansion achieved. When expanding the actual forehead flap a false security is engendered, and when the stretched flap is placed on the recipient bed without tension the flap will retract enough to threaten the result.

Layer Assembly

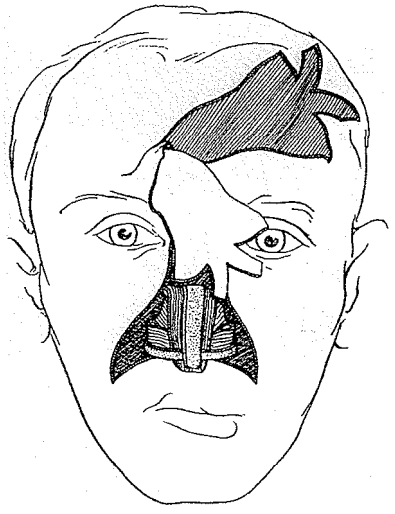
In full thickness nasal losses where replacement of the three layers is required, the order of assembly has four options.



1. Transport soft tissue for cover and lining to the nasal area first and later insert the supporting framework. Simple bone or cartilage rods were ineffective cantilevers offering no tip support. This precipitated uses of various L-shaped propped cantilevers, such as the hinge cartilage graft of Gillies in 1922, and the one-piece L-shaped cartilage described by J. B. Brown in 1940. R. Farina in 1951 inserted osteoperiosteal bone grafts from the crest of the tibia 90 days after supplying soft tissue. H. Antia in 1963 advocated retrograde insertion of ulnar bone graft wired to the nasal bones in leprosy. J. Converse in 1964 delayed his bone graft support until the soft tissue was in place.

Delayed insertion of support is architecturally unsound. The major function of framework is to achieve and maintain height of profile and potency of airway. Once these have been partially lost by the slightest collapse, shrinkage, and contracture, they can never be regained completely.

2. Bone and cartilage grafts can be incorporated under the covering flap to be brought down as one component. This option has had many champions, from Neleton in 1900 to Schmid in 1964. Gillies noted in 1920 "embedding the cartilage in the cover is an entire mistake" and he reconfirmed his feelings in 1952. The framework possible to carry in the cover cannot provide a propped cantilever for both bridge and tip support.



3. Cartilage struts can be incorporated in the lining to form a propped cantilever with a three-point tip support. This option was developed by Gillies during World War I. Three cartilage struts were implanted under the future lining flaps, one in the glabella region and one in each nasolabial fold. In a second stage the three composite flaps were turned as a supported lining tripod to receive the covering flap. The result of this approach was too bulky and not amenable to refinement.

4. The supporting framework can be inserted on top of the lining and covered directly with a flap. Delorme in 1889 was the first with this option, using metal for his frame. With bone or cartilage as the support a propped cantilever is possi-

ble and the main detraction is the resultant bulky sidewalls and an especially thick columella.

In general I prefer and use the fourth option but also incorporate part of the second option. For instance, the forehead cover flap has its alae lined with skin grafts and supported with cartilage strips. The same is sometimes done to the columella. Thus the nose is partially prefabricated in the forehead flap. Then the lining is turned down, the support is wired into position, and the prefabricated cover is brought over to complete the three-layered assembly. In certain cases it is conceivable that any or all four options could be involved to advantage in a specific reconstructive assembly.

Usually defects of the tip or ala or columella are not strictly confined to the one subunit area. More often the defect of the tip extends off into an ala and/or down into the columella. Whatever the case, the effect of the final result will rest on how well the repair blends the subunits into a unit. This may be achieved by extending a half subunit to a total subunit or extending several subunits to one full unit. Multiple examples of this camouflage will be seen in case after case. Look for it and see if you can see it!

COLUMELLA

The columella is the central column of the nasal tripod, flowing from the upper philtrum of the lip into the nasal tip. It assists in the support of the nasal tip as it divides the nares. It reflects any deviation of the anterior septum. Its deficiency can be seen in one or more of the triad, retraction, shortness, or absence. Without a columella the nasal entrance is an open funnel, an undivided tunnel, characterless, collapsible, even comical.

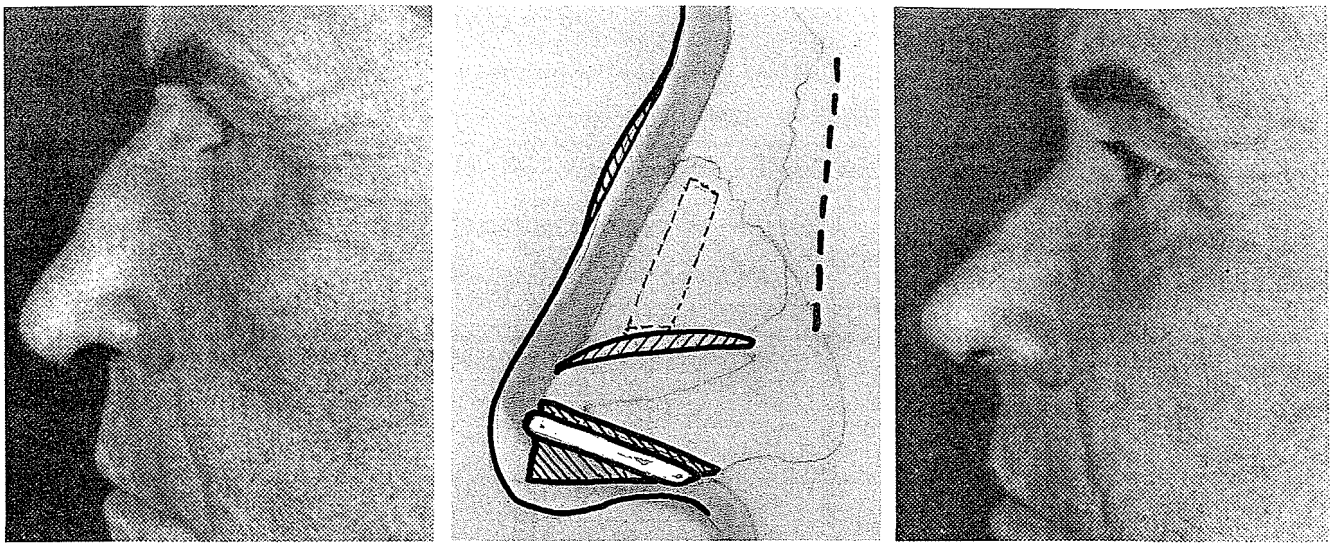
Retraction

Retraction of the columella indicates that through trauma or over-enthusiastic anterior septal resection of the septal backing the columella is deficient.

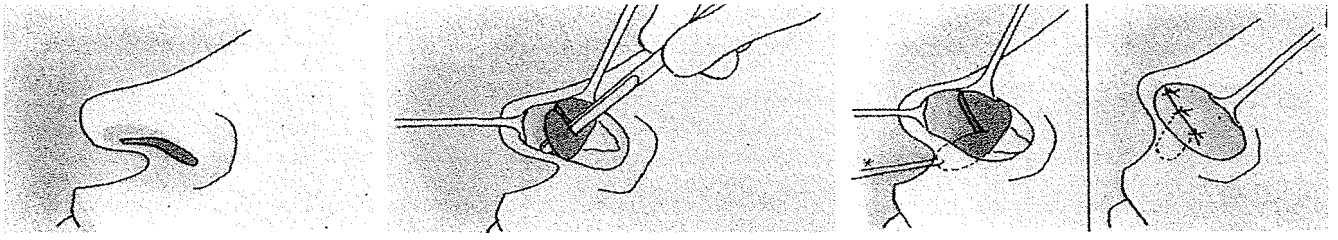
MINOR RETRACTION. Minor degrees of retraction can be corrected with a septal cartilage strut graft inserted up into the membranous septal tissue just behind the columella skin. When this graft is contemplated and a membranous septal incision is necessary for other corrections, it is important that this incision be made as far posteriorly as possible, flush with the septal cartilage to maintain enough membranous septum attached to the back of the columella to accept and house the cartilage strut.

An incision is made at the base of the columella inside the vestibule so that a tunnel can be dissected just behind the columella skin all the way to the nasal tip. A strut of septal cartilage can be inserted into this pocket without difficulty.

This 51-year-old male had several minor nasal deformities besides a retracted columella after over-enthusiastic anterior septal resection. At the same time that the hump was shaved and the anterior septum shortened at the tip, a cartilage strut was obtained during a submucous septal resection. This cartilage graft was inserted into a pocket in the membranous septum behind the columella to correct the retraction and support the tip.

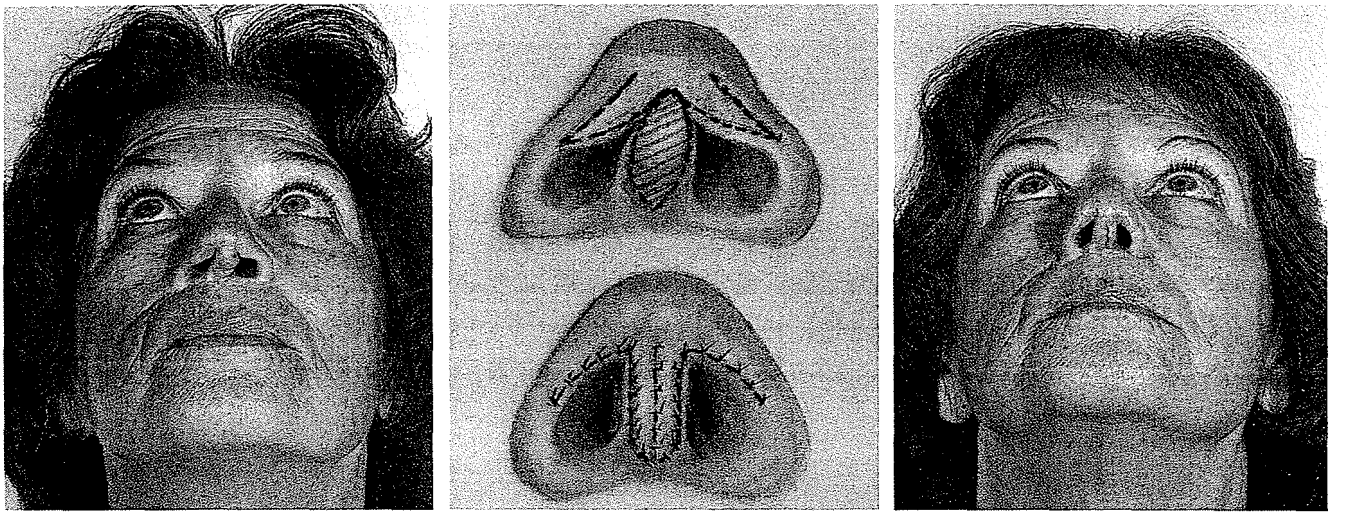


SEVERE RETRACTION. In severe columella retraction with shortness of mucous membrane lining and insufficient anterior septal cartilage several methods are available. For the exceptionally long nose associated with columella retraction, Cinelli's method has appeal. It takes excess septal tip as a composite flap and transposes it to correct the retraction at the columella base.



When the nasal sidewalls are relatively excessive, the onlay of alar margin flaps will reconstruct the columella and increase its contour. This flap was first described by Gillies in 1949 and we presented its various applications in 1957. Here is an example.

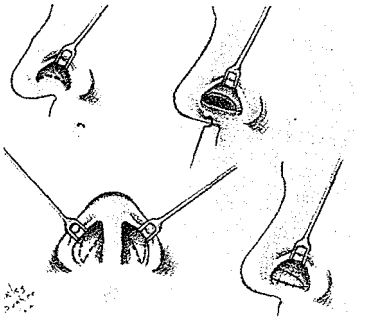
Excision of a columella cyst left external columella retraction. Bilateral alar margin flaps not only improved the retraction but symmetrized the front entrance of this distorted nose. Other uses of the alar margin flaps appear in secondary correction and in congenital deformities.

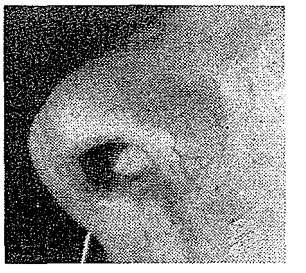


Nasal Chondromucosal Flaps

To avoid normal scars—and especially adaptable to long and/or bulbous tipped noses—an alternate method for severe columella retraction was described in 1963. A generous membranous septal incision releases the columella retraction. Then to maintain this correction the gap between the columella and the septum is filled by bilateral alar chondromucosal flaps. These bilateral flaps, taken from the nasal lining and carrying mucosa and cartilage, are long and narrow (3 cm × 0.5 cm). Their posterior incisions are along the intercartilaginous line. They are based superiorly at the upper edge of the septum at the nasal tip just beside and above the membranous septum incision. 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 these flaps are sutured together between columella and septum. The cartilage in these flaps not only maintains the forward projection of the columella but protects by splinting the blood supply during the twist. In addition to the correction of columella retraction through this approach, there can be simultaneous reduction of the long bulbous nasal tip. A dividend from this procedure is a relative gain when the overhanging sidewalls are lifted when the lateral vestibular defects are closed with sutures. When the overhang is not enough to allow this lift then the lateral donor areas of the chondromucosal flaps can and should be skin grafted.









Columella Shortness

The most common cause of columella shortness is lack of complete embryogenesis, as seen in bilateral clefts and to a lesser degree the asymmetric shortness of the columella in unilateral clefts. This deformity is discussed in the congenital section. When the shortness of the columella is due to contracture by disease or loss by trauma or surgery, then reconstruction is required.

Total Absence

Absence of the columella with the septum intact is merely a problem of cover and contour which can be repaired by the usual ear lobe graft, composite graft, or nasolabial flap. Reconstruction of the columella in the absence of the anterior septum calls for columella support and lining in addition to cover and contour. Total columellas have been constructed with varying success from skin of the forehead by H. D. Gillies (1949), C. Heanley (1955), A. D. Cardosa (1959), R. H. Ivy (1925), V. H. Kazanjian (1948), and F. X. Paletta and R. T. Van Norman (1962). When the forehead is required for the reconstruction of the nose and the columella is included, this is ideal. When the forehead is used to make only a columella, justification is more difficult.

The columella has been reconstructed from neck skin by H. D. Gillies and D. R. Millard (1957) and F X. Paletta and R. T. Van Norman (1962). It has been made from the arm by E. F. Malbec and A. R. Beaux (1958), and even from the hand by V. P. Blair and L. Byars (1946), M. H. Shaw and S. R. Fall (1948), and F. Young (1949).

Labial mucosa is in ample supply in the vicinity and has been used by several surgeons. Liston in 1846 took the full thickness of the upper lip philtrum on a superior base, excised

the skin and sutured the flap with the mucosa externally. Liston claimed mucosa assumes the color and appearance of integument after a time of exposure.

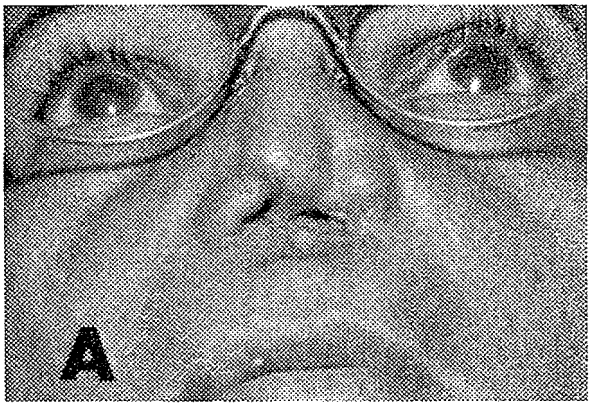
H. D. Gillies in 1920 presented a columella made from lip mucosa. Even after many months it still retained its red flare in contrast to the pale skin, and looked more like a nasal hemorrhoid than a columella. He simply excised it. E. Lexer in 1931 used labial mucosa in the form of a vertical tube pedicle and pulled it through an opening in the upper lip. F. Smith in 1950 lined a mid-vertical mucosal strap with a skin graft, and dividing its upper base, swung the lined flap out and over the lip for attachment to the nasal tip with skin external. This required an awkward period of several weeks.

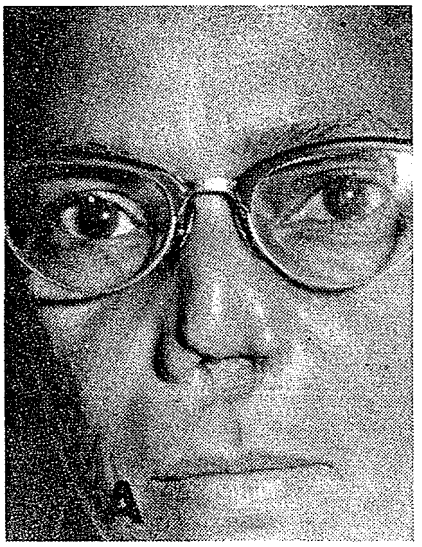
In the early 1960s I tapped the upper labial sulcus mucosa for columella reconstruction. Buccal mucosa can be recommended for columellas in dark-complexioned patients where the degree of pigment is sufficient to camouflage the mucosal color. A buccal mucosal flap can be tubed primarily, transported to its final columella position and later resurfaced in front with a postauricular skin graft.

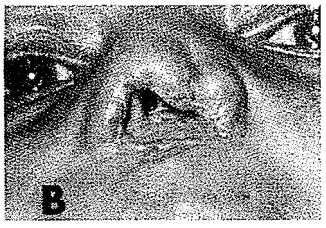
A better approach first lined a horizontal buccal mucosal strap flap with a chondrocutaneous graft from the postauricular area. This produced a natural skin color for the future front of the columella and at the same time produced a support and definition to the column. The mucosal strap need not be as wide as is necessary for making a tube, making closure of the donor area easier. The medial base of the flap is set just past the midline and as soon as the chondrocutaneous graft has become 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. The method of inset involved one triangular flap turned forward on the lip, leaving a recipient area for the base of the new columella. The triangular lip flap, if let into a split in the anterior base of the columella, tends to blend the columella-lip join.

Noses that have been unlucky enough to lose their columellas often have suffered damage to their lining of mucous membrane. Here is a luetic nose with loss of septum, columella, nasal lining, and distortion of skin cover (A).



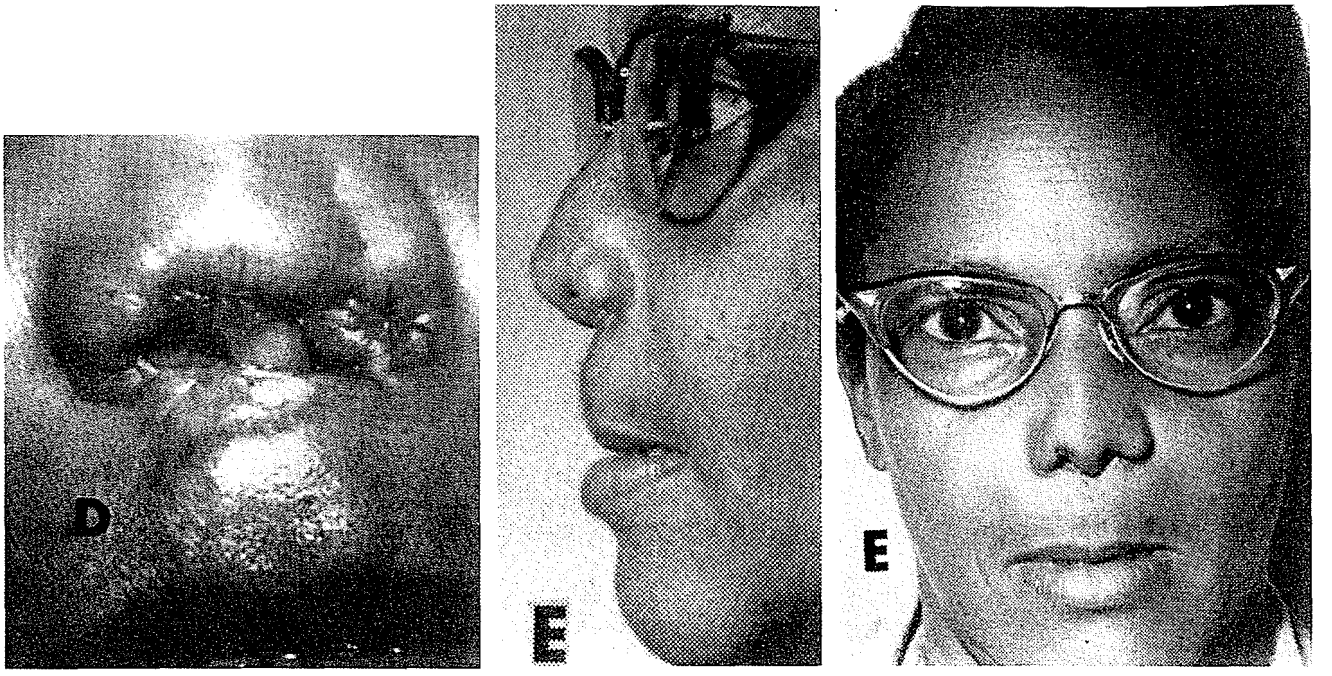








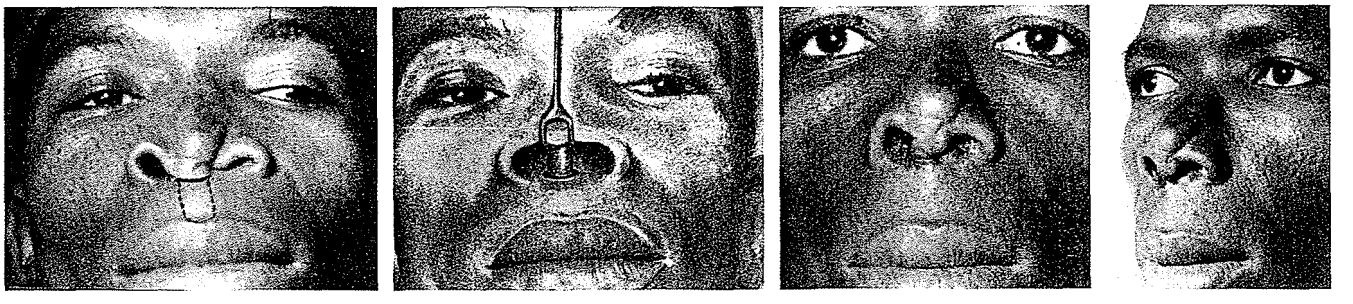
First, lining was supplied by a Gillies inlay skin graft (B). A buccal mucosal strap, ½ inch by 1½ inch, was lined with a chondrocutaneous postauricular graft (C. *arrow*). The distal end of the flap was delayed so that an extra ½ inch of mucosa would be available to line the raw area presented when the rolled nasal tip was uncurled. Thus, as the mucous membrane pedicle was pulled through the upper lip buttonhole and attached under the nasal tip, it takes a turn which presents the postauricular skin graft forward into view as columella (D). Finally the inferior pedicle was divided and implanted into the lip at the columella base (E).



Although this method has served well occasionally and specifically in a Leishmaniasis case, which is presented under the specific disease, the popularity has waned. The blood supply of these mucosal flaps is not robust and requires surgical delay. There is also the color contrast of the mucosa in the Caucasian.

A SUBCUTANEOUS FLAP AND GRAFT

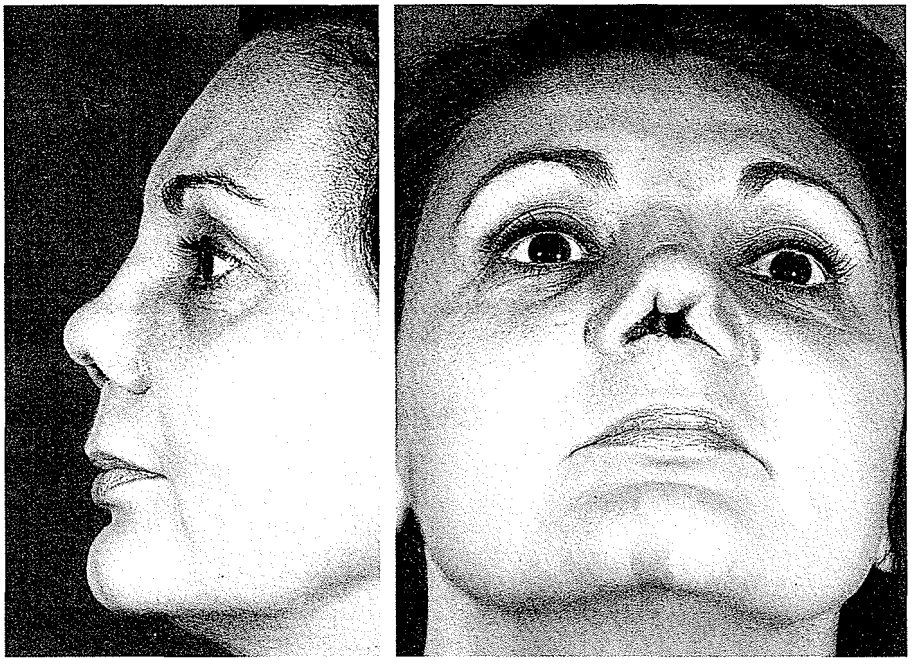
Here is a luetic nose in a Jamaican with loss of nasal lining and support as well as almost the entire columella. A vertical muscle flap with its base at the residual stub of columella has been marked for subcutaneous dissection. The only skin incision circumscribed the columella base. A raw muscle flap was cut and pulled out of the lip like a fat earthworm and wrapped with a split skin graft. A Gillies onlay graft released the nasal lining with modest improvement to the nose and airways. This case was published in 1963 but the principle will appear again.





Nasolabial Flap

The nasolabial flap is my favorite form of columella cover. The color and texture are natural and the donor scar unnoticeable. For instance, here is a nose that had had a primary rhinoplasty and six secondary procedures by the same surgeon. The nose revealed generalized contracture and snubbing and the presence of a mummified columella. Closer scrutiny revealed two scars of open rhinoplasty, one at the tip join of the columella and the other at the base. Obviously the surgeon had forgotten or ignored his first scar when he made the second cut and inserted a silastic strut for tip support that sloughed the entire intervening unit.





First, it was necessary to release the vestibular lining and replace the loss with a skin graft to lengthen the contracted nose. Then a nasolabial flap was attached to the nasal tip and finally the other end was divided from the cheek and inset in the upper lip for a good columella repair.

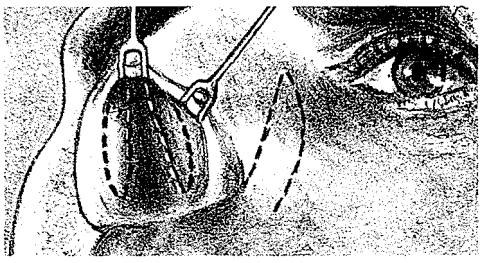


The ideal reconstruction is one that replaces lost tissue with similar tissue in kind. Thus a whole new columella requires skin cover with natural nasal color, cartilage support of medial crura proportions, and mucosal lining snugly adherent to the cartilage to avoid a bulky effect. Such a reconstruction is possible by taking a portion of each alar cartilage along with its attached mucosa as chondromucosal flaps. They are based superiorly and forward under the nasal tip. When swung down the anterior edge of each chondromucosal flap turns medially touching the other, and then they can be sutured together. The cartilage strips now face forward, backed by mucosa. This simulates the normal columella with a pair of cartilage strips similar to the medial crura and neatly adherent to their lining. A nasolabial flap is then let into this chondromucosal cradle with its tip joining the tip of the nose.

This procedure was first used as an immediate repair following radical excision for squamous cell carcinoma of the base of the columella. V. Dembrow made a transverse incision



through the skin of the columella where it joined with the nasal tip. The resection was a block excision of the entire columella, the attached 1½ inches of anterior full thickness septum, adjacent upper lip, and left alar base. With such total loss of the columella and any back-up of septum required a reconstruction that would stand on its own.

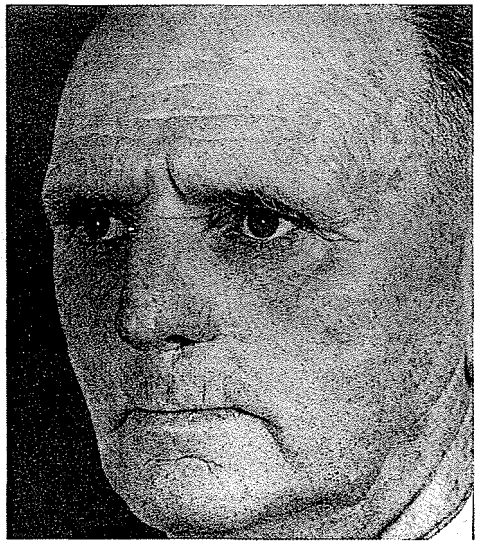


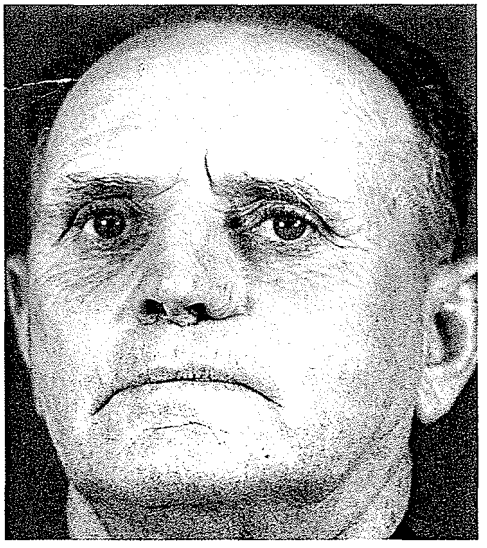






Reconstruction was begun immediately by development of bilateral vestibular chondromucosal flaps which were cut, swung out, sutured together and covered anteriorly with a nasolabial flap. The donor areas were closed after undermining. Three weeks later division of the base of the nasolabial flap allowed it to swing left so that its tip could repair the left alar base defect. Two weeks later the flap was divided and attached to its final destination as a columella base. This columella has a graceful stand-up quality with natural color. The method





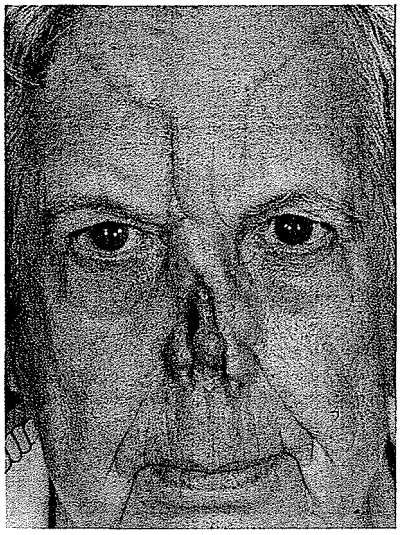
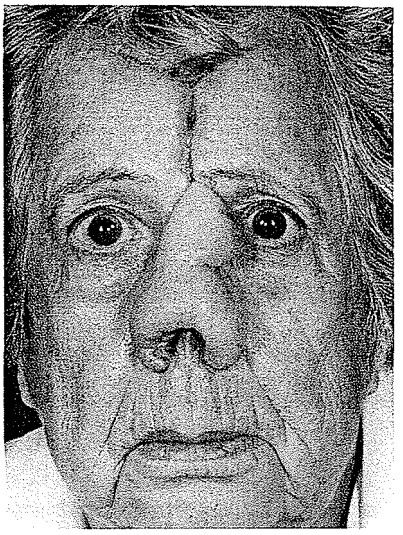


was first published in *Plastic and Reconstructive Surgery* in 1963.

When a good part of the entire distal nose is missing, columella reconstruction is merely a fraction of the total lining,

support, and cover required. The columella is usually designed as an elongated midline extension on the end of the forehead flap. Yet the fact that it is at the distal end of the pedicle increases the hazards of its arrival and survival as a columella. Adequate surgical delays are essential and are described specifically in this book.

When the forehead seems insufficient in height to allow a long columella to be designed on the end of the forehead flap, then the sides of the forehead flap can be taken wider than required for alar reconstruction.

Later a pair of flaps can be pared off the edges based near the tip and brought together in the midline to reconstruct a substantial columella.



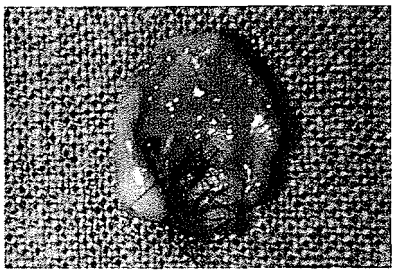


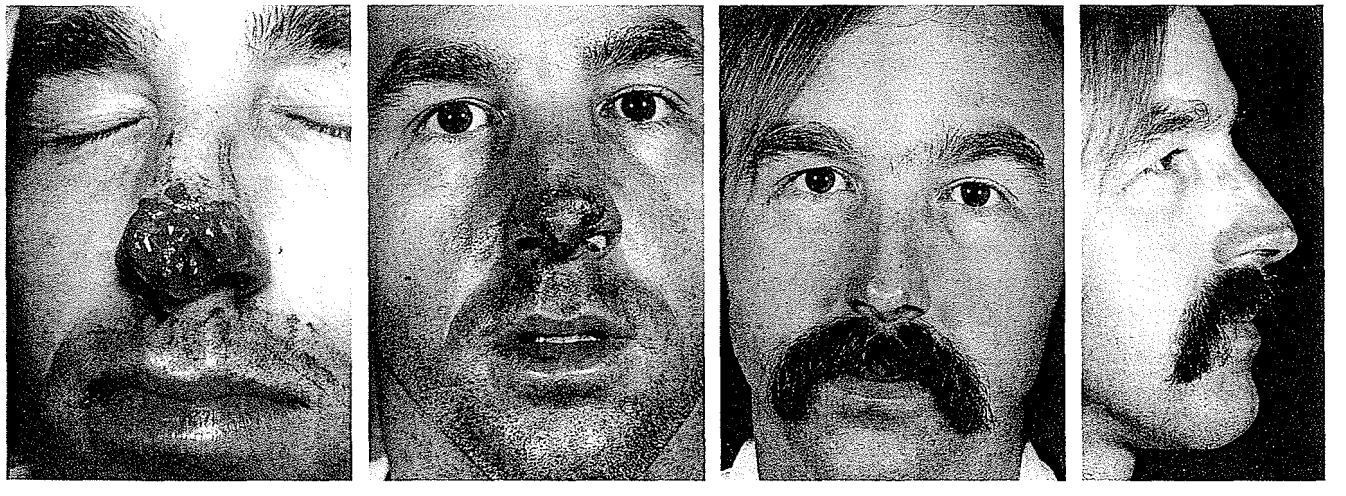
RECONSTRUCTION OF THE NASAL TIP

Replacement of a composite graft to the nose, according to Carpue (1816), goes back to the sixteenth century. A Spaniard had a piece of his nose sliced off by an irate soldier. Sir Leonard Fioravanti, an Italian surgeon, who happened to be nearby, grabbed the amputated part, irrigated it with his urine, and replaced it on the Spaniard's nose. Eight days later the dressing was removed. Suppuration was expected but instead the graft was healthy and all of Naples marveled thereat.

Following Avulsions

This patient had the tip and a full thickness portion of his left ala bit off by an angry friend. The patient arrived in the emergency room without the end of his nose. True to the axiom "Keep the piece," another friend was dispatched to the scene of the injury to retrieve the missing nasal bit, but not without concern because it was known the patient's dog was loose in the house with every opportunity of getting to the tip-bit first. Fortunately, the nasal tip was found, irrigated with saline, and carefully sutured into position with 100% take.





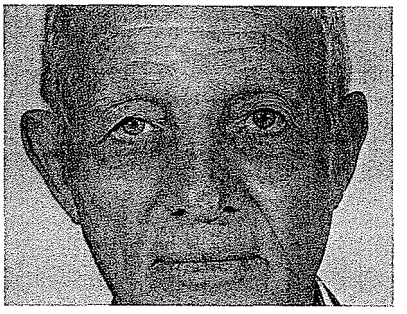
Auricular Grafts

Of course successful replacement with the original in kind offers the best possible reconstruction.

When the nasal tip is truly lost then replacement in kind is next best when taken from the ear. Simple skin defects of the nasal tip are often seen after excision of basal cell carcinoma.

These defects can be well covered with full thickness post-auricular skin. The resultant color blends well with nasal skin as seen in this example. Occasionally the graft may be a little





too pink or brown during the early healing phase but eventually blends in well. Sometimes the graft heals paler than the skin.



If the graft is depressed, dermis or cartilage can be inserted under the graft in a second stage if the patient so desires.

When there is discoloration, either too pink, brown, or pale, then make-up may be all that is necessary.

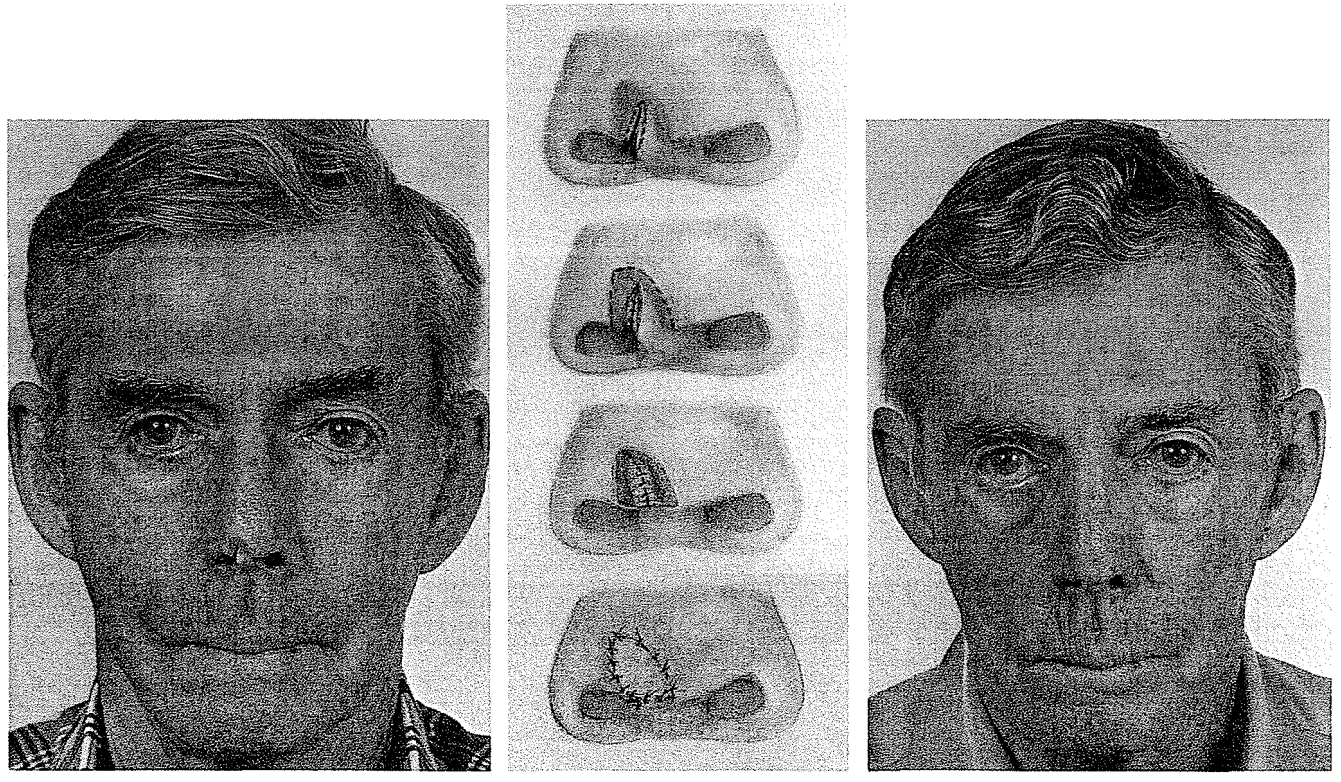


I have used postauricular skin for replacement of a pigmented nevus on a Black nasal ala. This graft healed with a reasonably good color match.



SIMPLE COMPOSITE GRAFTS

The seemingly simple little tip defect represents missing lining, ala, and composite tip. By in-turning the edges of the lining defect and suturing them, the platform of the defect was delineated. Excision of the rest of the surface scar provided a bed for an auricular composite graft.



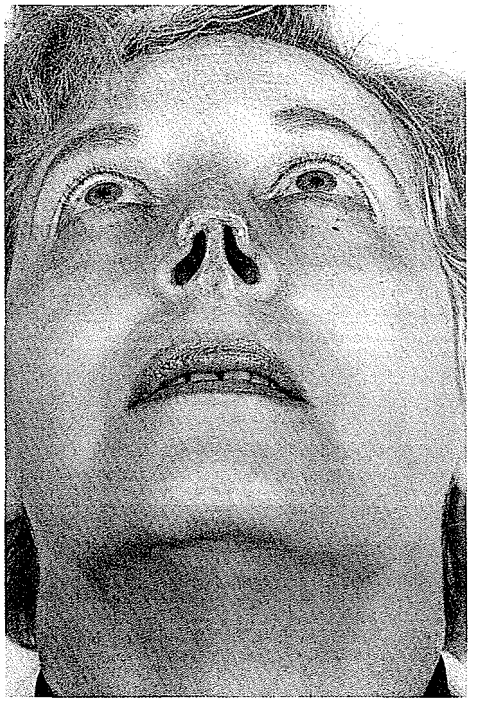
Antitragus Graft

My favorite donor area for nasal tip reconstruction is a chondrocutaneous graft of the prominent antitragus cut in the shape of a tricornered hat to top the nasal tip and blend off along both alae and down the columella.

This graft was described in 1981 and part of its appeal is the fact that the antitragus often is too prominent, requiring reduction during routine otoplasty. Thus theft of this expendable mound improves the auricle and leaves an unnoticeable scar.

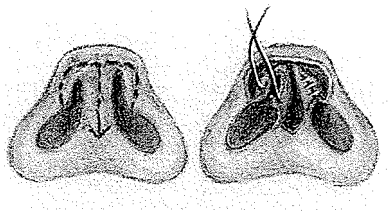
This 60-year-old female presented a nasal tip deformity following chemosurgery for a basal cell carcinoma. There was a defect of the tip, columella, and alae with no area loss more than 1 cm in thickness. This placed it within the safe range

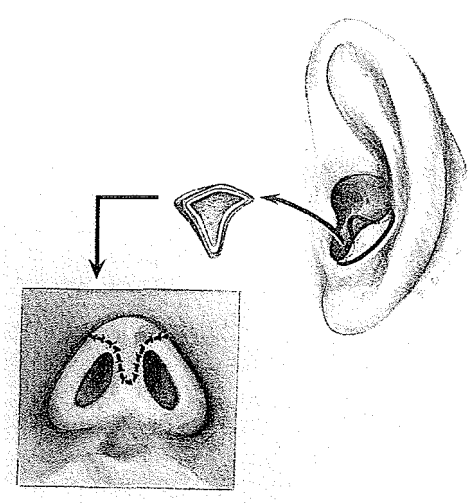


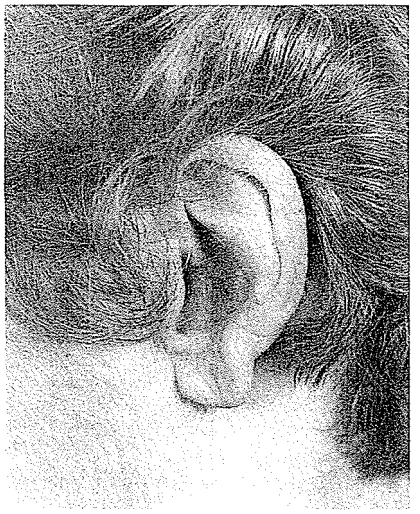




for a chondrocutaneous free graft. An efficient way to freshen this defect was to split the upper columella and turn the dissected edges out and suture them to the freshened alar edge to reline the alar webs. The tricornered composite graft of antitragus was applied to the freshened defect, resulting in a perfect take and an unnoticeable donor scar. Corrective rhino-

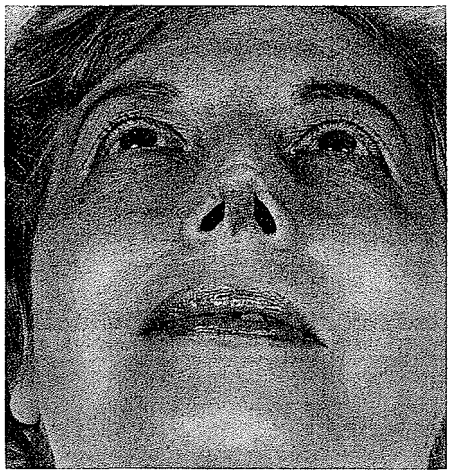






plasty with straightening of the bridge hump and bilateral osteotomies rendered the patient's nose more aesthetic than her original. It is interesting to observe how this chondrocu-

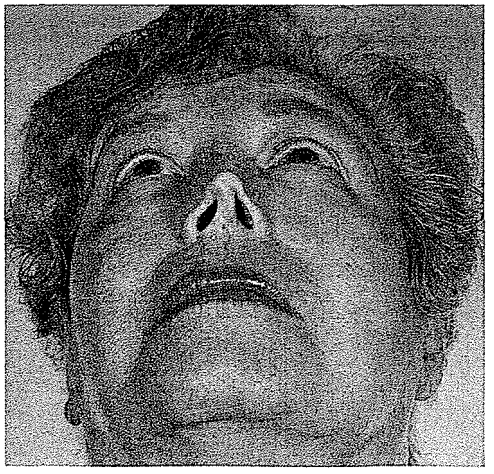


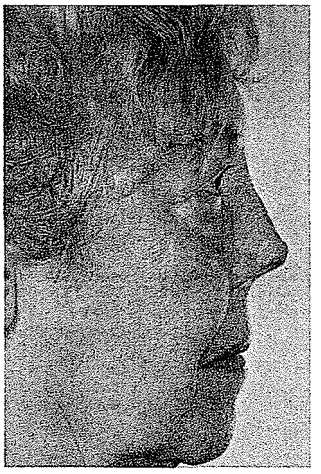




taneous graft survived and thrived with minimal absorption over the next 15 years.

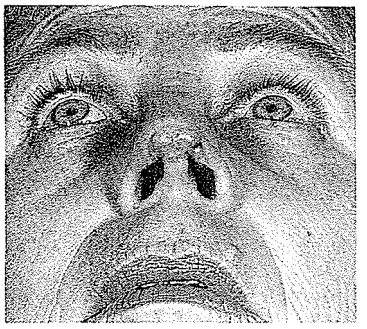






This 58-year-old female lost her nasal tip, a portion of both alae, and the upper columella during chemosurgery for a basal



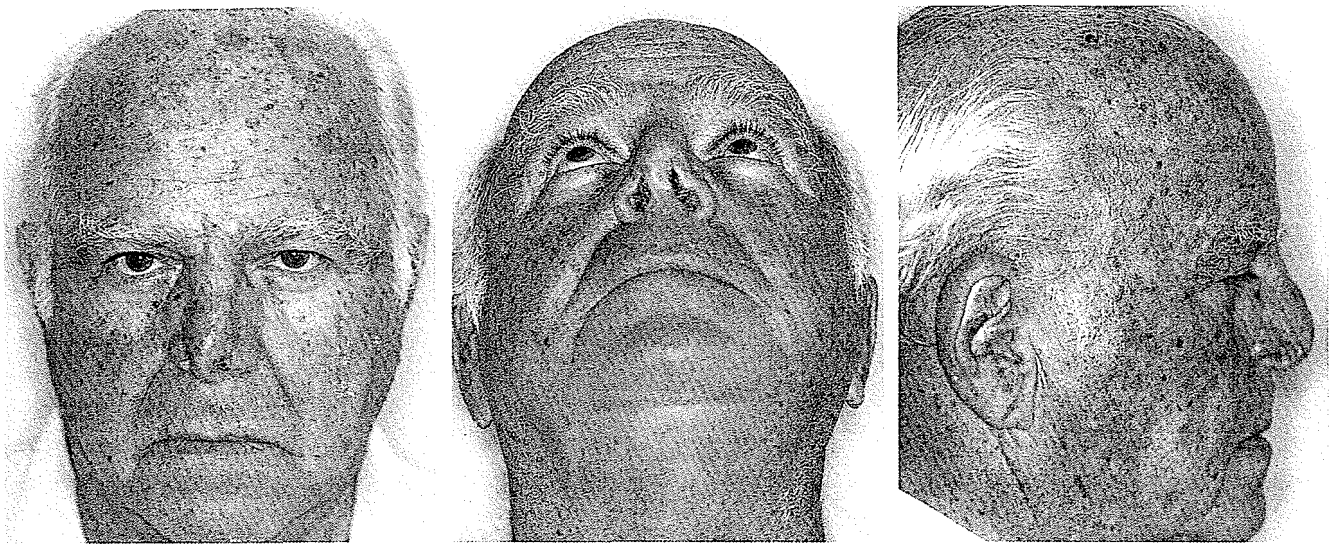


cell carcinoma. The area of the defect was freshened and covered by a tricornered composite graft taken from the auricular antitragus with a small extension of skin and cartilage from the conchal hollow for the columella. The take was satisfactory and the result a success after one minor revision.

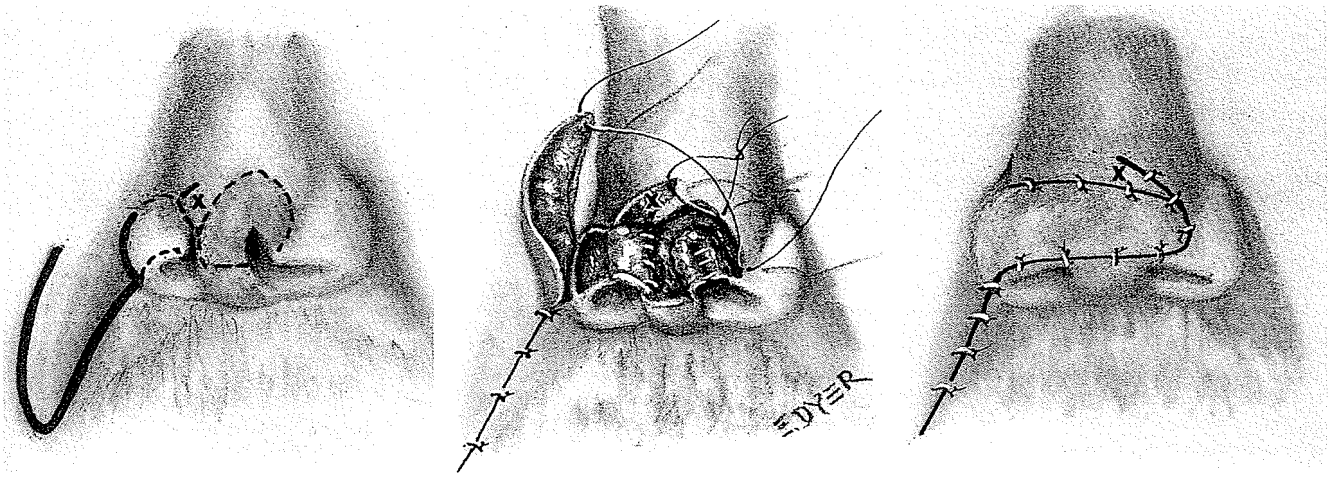


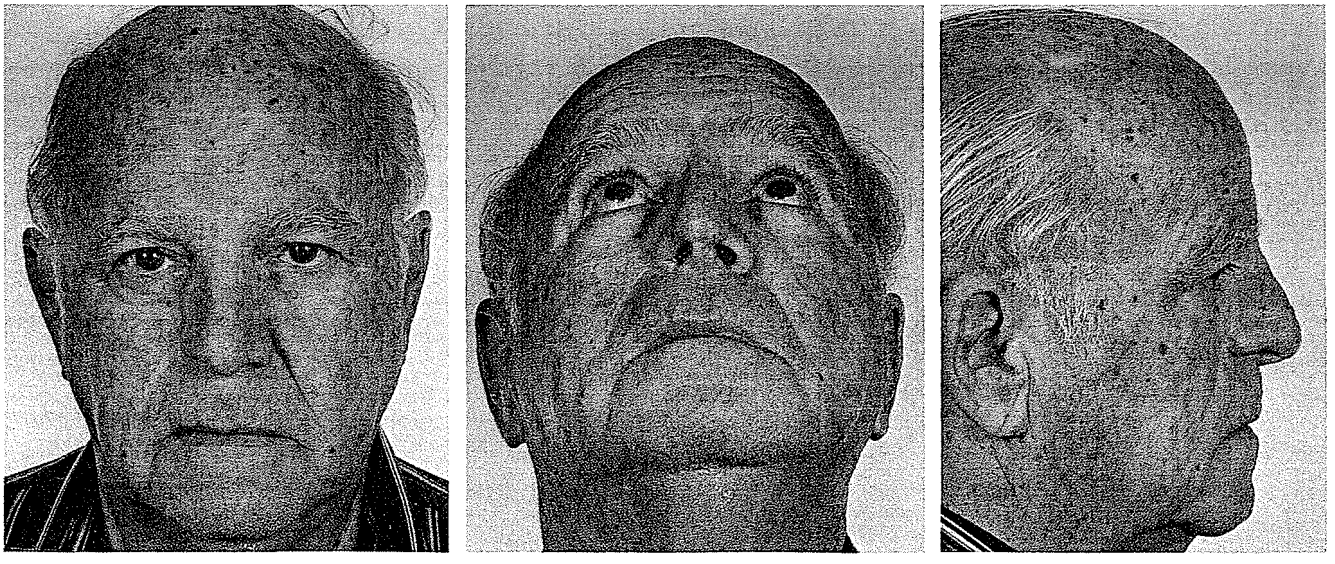
NASOLABIAL FLAP

This 68-year-old Cuban male had had multiple excisions of basal cell carcinoma of the nasal tip, leaving full thickness losses through both alae along with distortion and loss of tip projection. Turnover flaps of the right and left alae and the tip

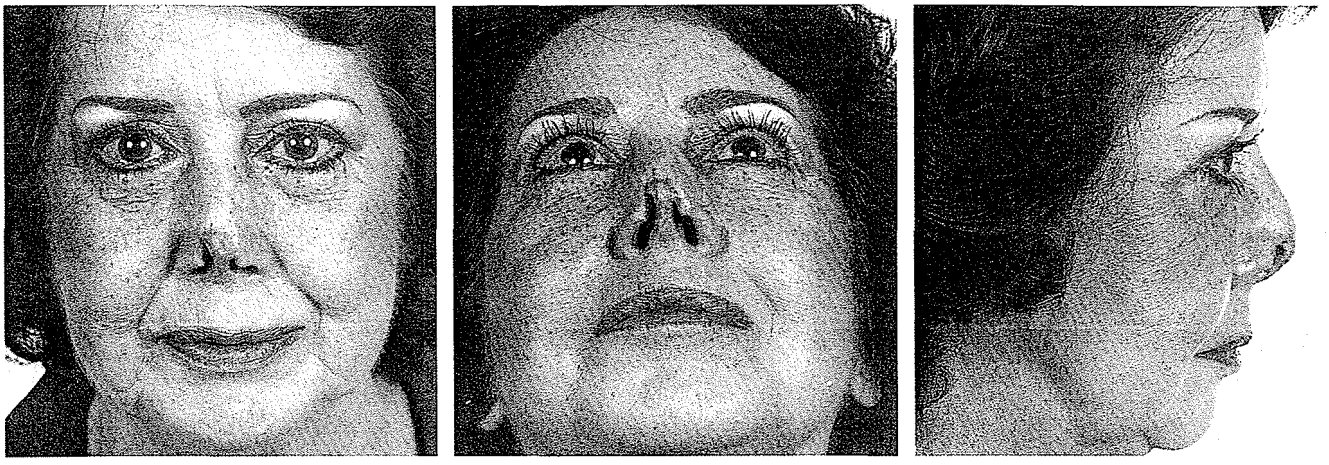


provided lining for all losses. Then a nasolabial flap was transposed as cover of the alar and tip units which camouflaged the reconstruction.

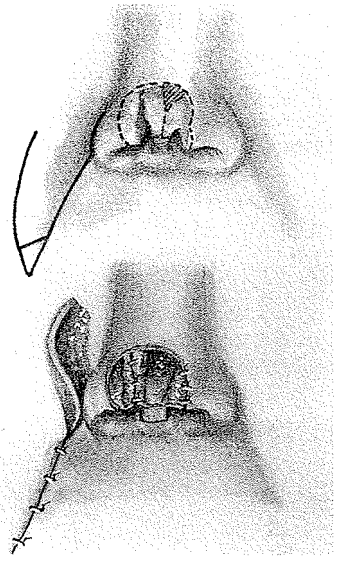




A 63-year-old female with basal cell carcinoma of the nasal tip had been treated with Mohs excisional surgery. The defect revealed skin and contour loss of the tip with scarring, full thickness loss of varying amounts of the medial portion of both alar rims, presenting bilateral notching and contour loss of the upper portion of the columella.

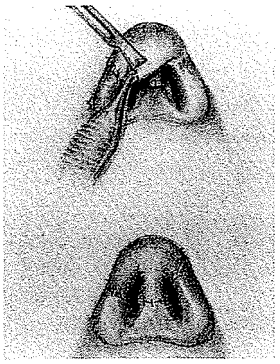


In this case a nasolabial flap was considered for cover of the entire defect with a small distal flap to be cut off its inferior edge for transposition into the upper columella defect. Unfortunately this required the main flap to be too wide to camouflage its theft from the nasolabial area.



The skin and scar around the periphery of the alar notches were turned in for lining. Then a nasolabial flap, measured by pattern, was cut and tailored at the end. It was thinned specifically in the alar areas but left slightly thicker at the tip and sutured as cover. The amputated tip of the flap was used as a full thickness graft to the columella defect. This graft failed, leaving a deficient upper columella still demanding attention.

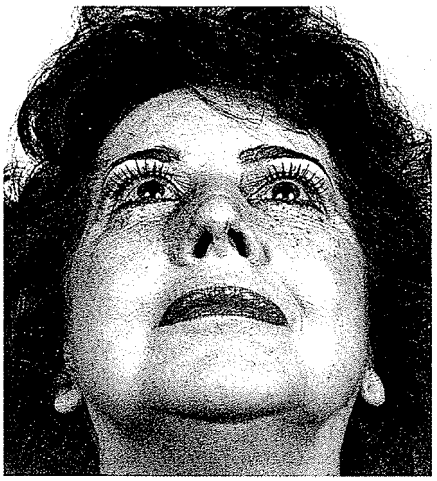






At the second stage, division of the pedicle and revision of the upper donor area was accomplished. Then a reevaluated diagnosis of the contours of the alae, tip, and columella called for adjustments. The flap was left attached to the main upper portion of the tip and left side for blood supply. The remaining flap was freed, thinned, and advanced, being let into the defect from posterior forward. This developed a distal overhang of excess skin which required trimming to match the lining along the right ala. Here was the excess needed! The trimmed portion was left attached as a flap based at the nasal tip. This little flap off the main flap was maneuvered 90 degrees. The columella defect, prepared by out-turning of small bilateral flaps of scar, received the tiny transposition flap. The "bleed" of the tip into the columella afforded a perfect camouflage.

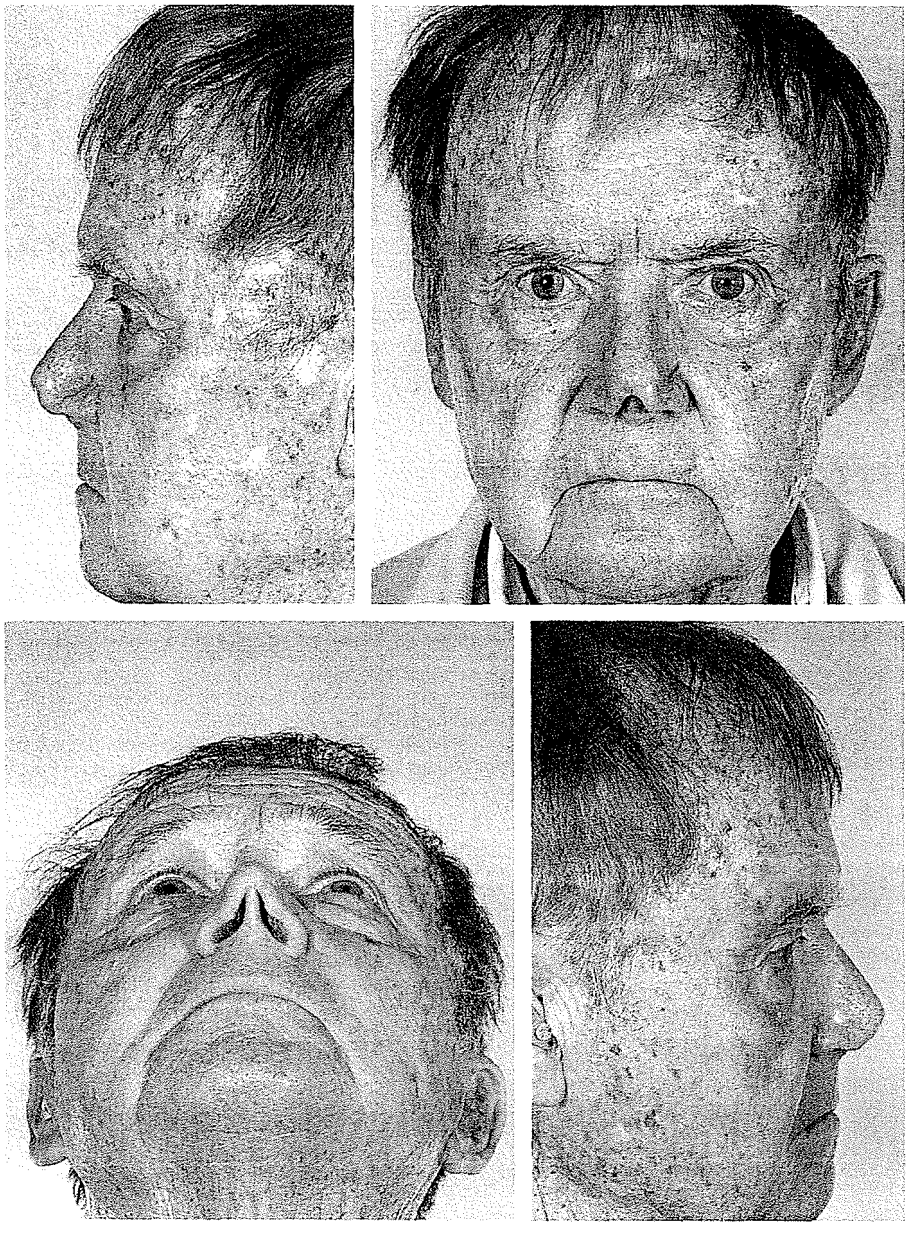


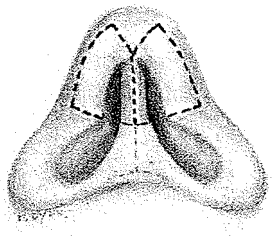


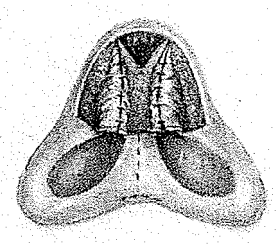


MORE THAN A TIP

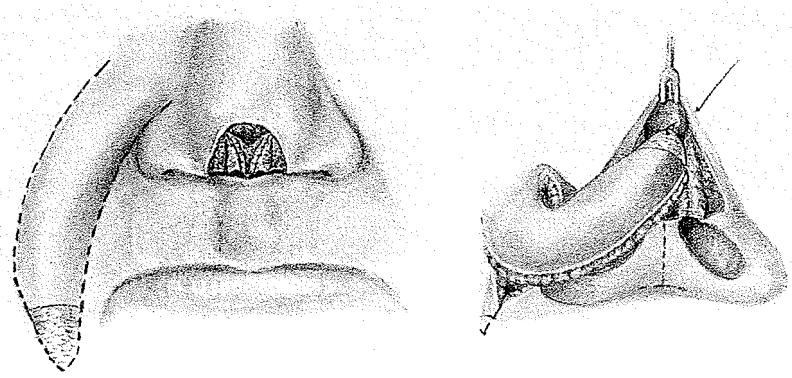
This 81-year-old male lost the nasal tip, bilateral medial alae, and anterior columella during cancer ablation.



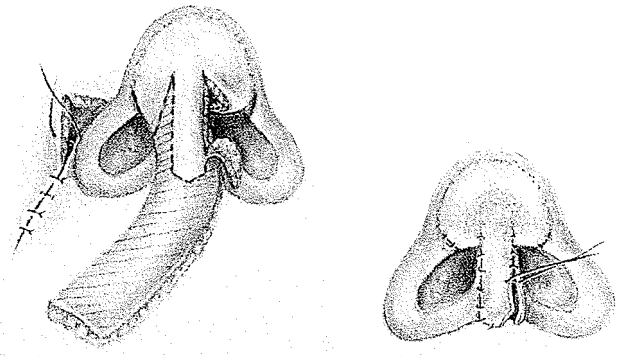




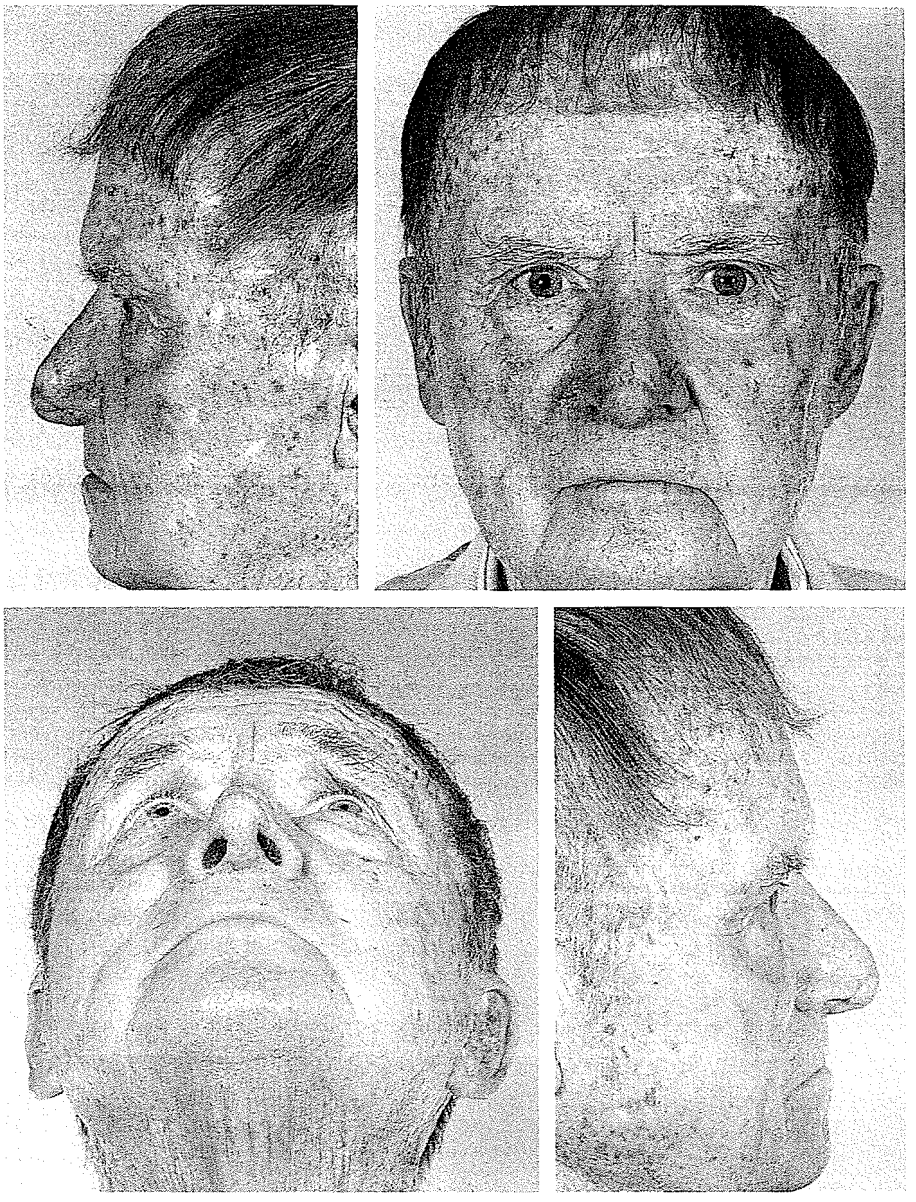
Alar lining was turned over on each side and sutured to the split skin of the upper columella to create the lining of the alar vault bilaterally. As the patient had a more generous nasolabial fold on the right, a 1.5-cm-wide superiorly based, right nasolabial flap was elevated and the donor area closed carefully. The distal end of the nasolabial flap was denuded of epithelium. It was then introduced by a deep suture under the skin of the dorsal tip, and as it was drawn in the flap filled the tip and also covered the alar vault lining. Due to the potentially precarious blood supply of this flap in the aged, skin sutures were placed but not tied until the following day.

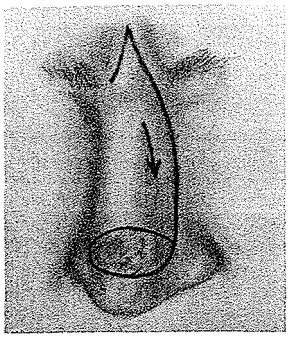


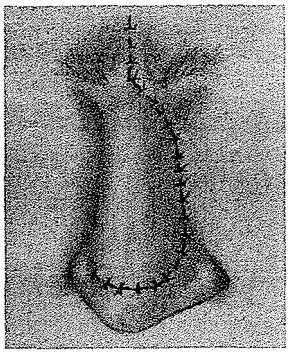
The flap was left in this position for three weeks. It was then divided from the cheek, thinned, and specifically tailored to reconstruct this 3-D defect. Small flaps were pared off the sides of the proximal flap to be folded under to reconstruct the margin of both medial alae. The remaining flap was then tailored to fold as tip and let in along a midline vertical splitting incision in the deficient columella.



This 2-stage procedure produced a 3-D reconstruction, but the eventual minor scar refinements will be too late for inclusion in this book.







MORE HARM THAN GOOD

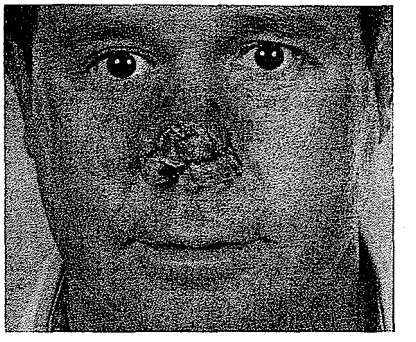
There was a period in the late 1980s when dermatologists were being taught to reconstruct cancer defects of the nasal tip with local flaps! There are several reasons that this was and is unwise. The skin of the nasal tip fits like a glove and cannot spare flaps of any size. In fact, the lack of extra skin makes local flaps of the tip difficult to create and often presents unacceptable scarring. As an experienced plastic surgeon I avoid these flaps and suggest that dermatologists, without true surgical training, do the same. There is, however, one flap of the nose which was used by H. D. Gillies in World War I that rotates the skin of the upper nasal bridge, with the aid of a back-cut in the glabella area, to defects of the distal bridge and tip. This flap can occasionally be useful and is re-invented every decade.

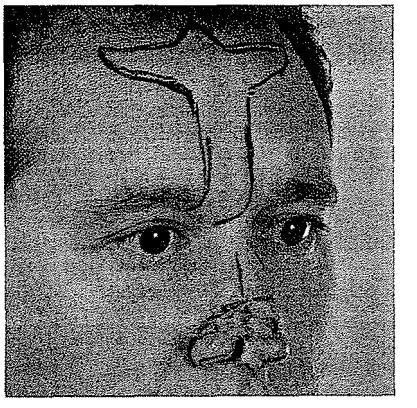
There is another factor in the ablation-reconstruction equation. When the dermatologist is doing the ablative surgery, his first responsibility is to excise all tumor and cure the patient. If he also has the responsibility for reconstruction there is a tendency to be conservative in the ablation to ease the difficulty of the repair. This is "throwing out the baby with the bath water." It is far better, particularly in the recurrent basal cell carcinomas of the nasal tip, for the dermatologist with his microsurgical excision to develop a clear margin and leave the reconstruction to the reconstructive plastic surgeon. Here is a graphic example.

This 40-year-old male had multiple basal cell carcinomas of the nasal tip which were inadequately excised and reconstructed by a dermatologist, first with a local rotation flap and, after recurrence, with a right nasolabial flap which necrosed. The healed result distorted his nasal tip, deflected his columella, retracted his alae, and flattened his profile grotesquely.



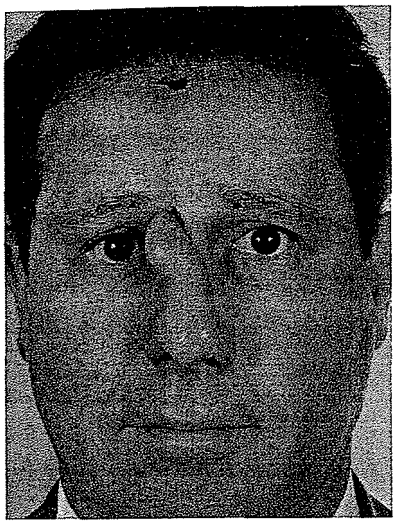
DEFECT REQUIRES FOREHEAD FLAP





First stage of reconstruction involved excision of all nasal tip scars and other questionable areas which were sent for frozen sections. Once the entire area was clear a split thickness skin graft was applied to the raw area. This presented a defect involving associated units and subunits which included three partially affected units of right ala, columella and tip, and the adjacent uninvolved unit of the left ala. To camouflage this complex defect the reconstruction was required to provide one-piece coverage of the involved and uninvolved units of the entire complex.

A week later a vertical midline seagull forehead flap, with the columella extension extending to the hairline based on the right supratrochlear vessels, was delayed by incisions. Thirteen days later a portion of the normal right ala skin was turned over for lining and excess bridge septal cartilage was



turned down for tip support. The remaining skin and skin graft of the tip and alae were excised and sent for frozen sections. Once reported clear the seagull flap was brought down to cover the defect and join the upper columella. The forehead defect was closed after wide freeing. Just over three weeks later the forehead pedicle was divided and replaced in the brow area. The upper pedicle was let into the nasal bridge to camouflage the flap inset by blending along the bridge unit. Thus the flap did not merely sit as a bulge in the tip but blended out into both alae, down into the columella and up along a good portion of the bridge. Six months later flap thinning and minor revisions were followed with scar revisions in another six months.



This 54-year-old female had reduction rhinoplasty nine years previously. She developed basal cell carcinoma of the tip of her nose which after four operations had Mohs surgery. She then had two attempts at postauricular skin grafts that failed, as did one graft from her arm. Without knowledge of previous grafts I applied one composite graft to the nasal defect which was only partially successful and thus unacceptable. The area was cleared and covered with a thin split thickness graft to achieve healing in preparation for a flap.



Three months later local lining flaps and a vertical short falcon-winged seagull forehead flap were delayed by surgical incisions. One month later the flap was transposed to the nasal defect and the forehead donor area closed. One month later the pedicle was divided and reset in the brow. Three months later scar revision of the nose and forehead and subsequent other minor revisions of scars and margins produced a reasonable result.

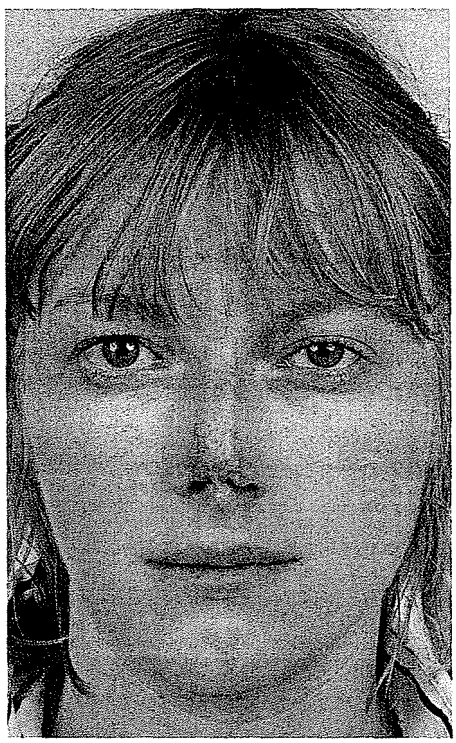


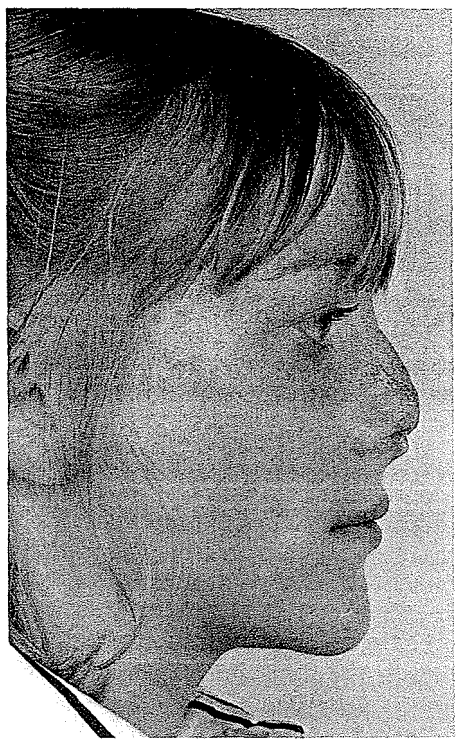
This 23-year-old female suffered the avulsion of the skin of her columella tip, alae, and bridge. An attempt to replace the avulsed skin evidently failed. She healed with contracted scar-

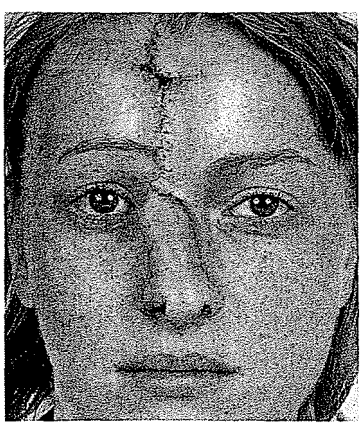




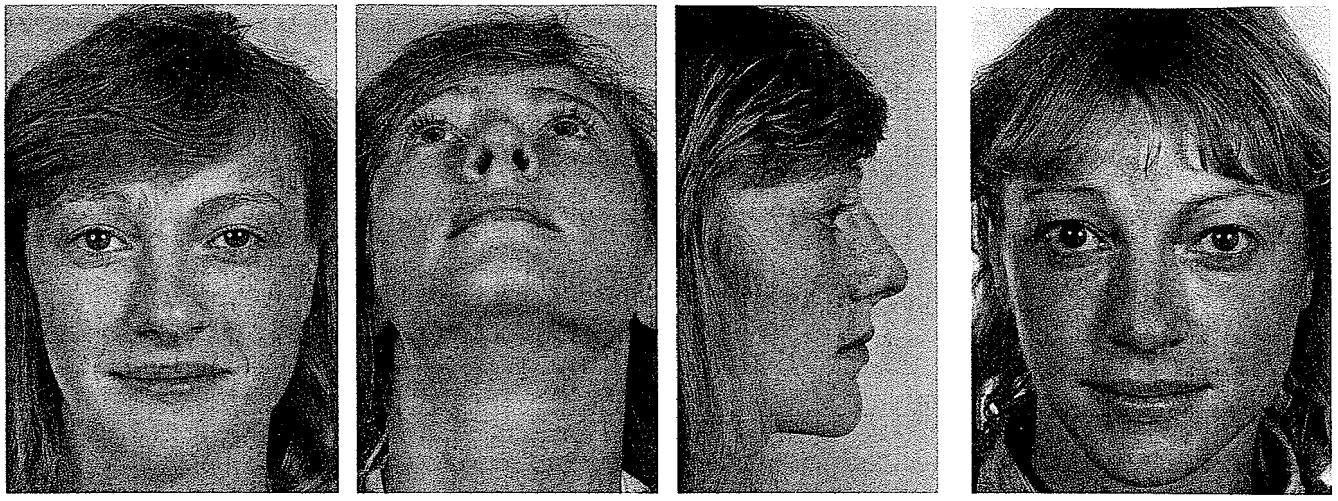
ring of the injured area. A midline vertical forehead flap of



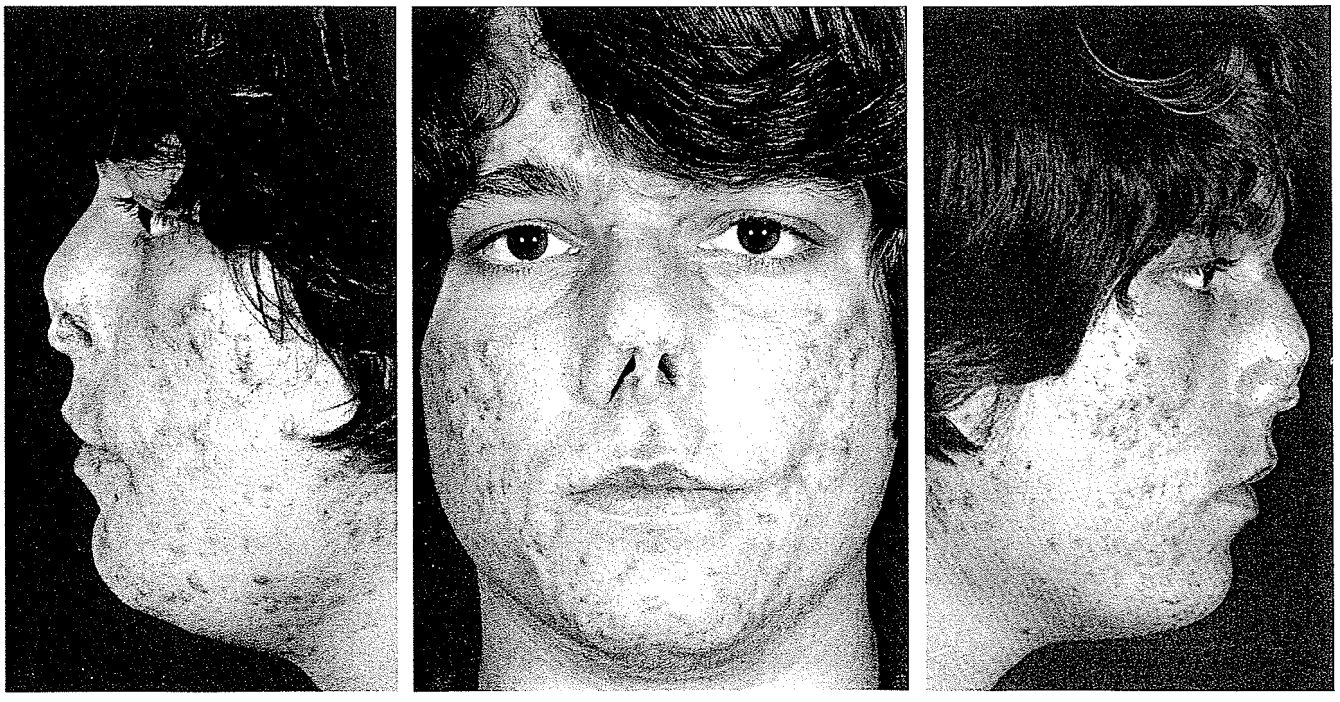




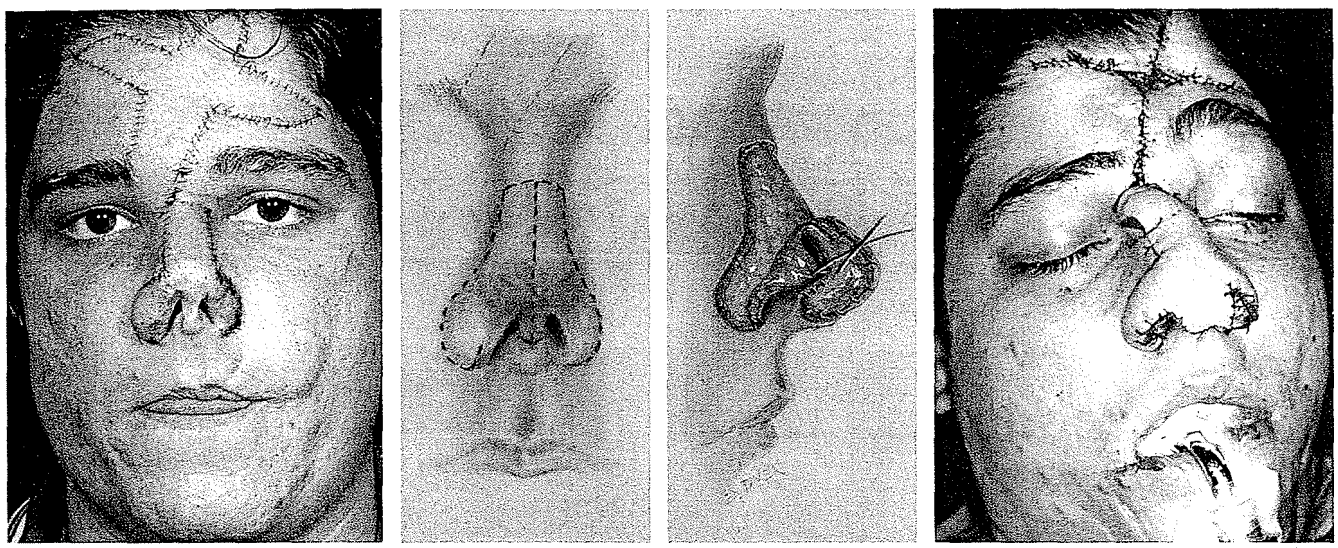
seagull shape with short falcon wings and based on the right supratrochlear vessels was delayed along with delay of the future lining. One month later the lining was turned down, the forehead flap transposed to cover the defect, and the donor area closed. Two months later the pedicle was divided and the base replaced in the brow area. Subsequent thinning of the flap and insertion of auricular cartilage for tip definition completed the reconstruction. She is seen 6 months and 7 years after surgery.



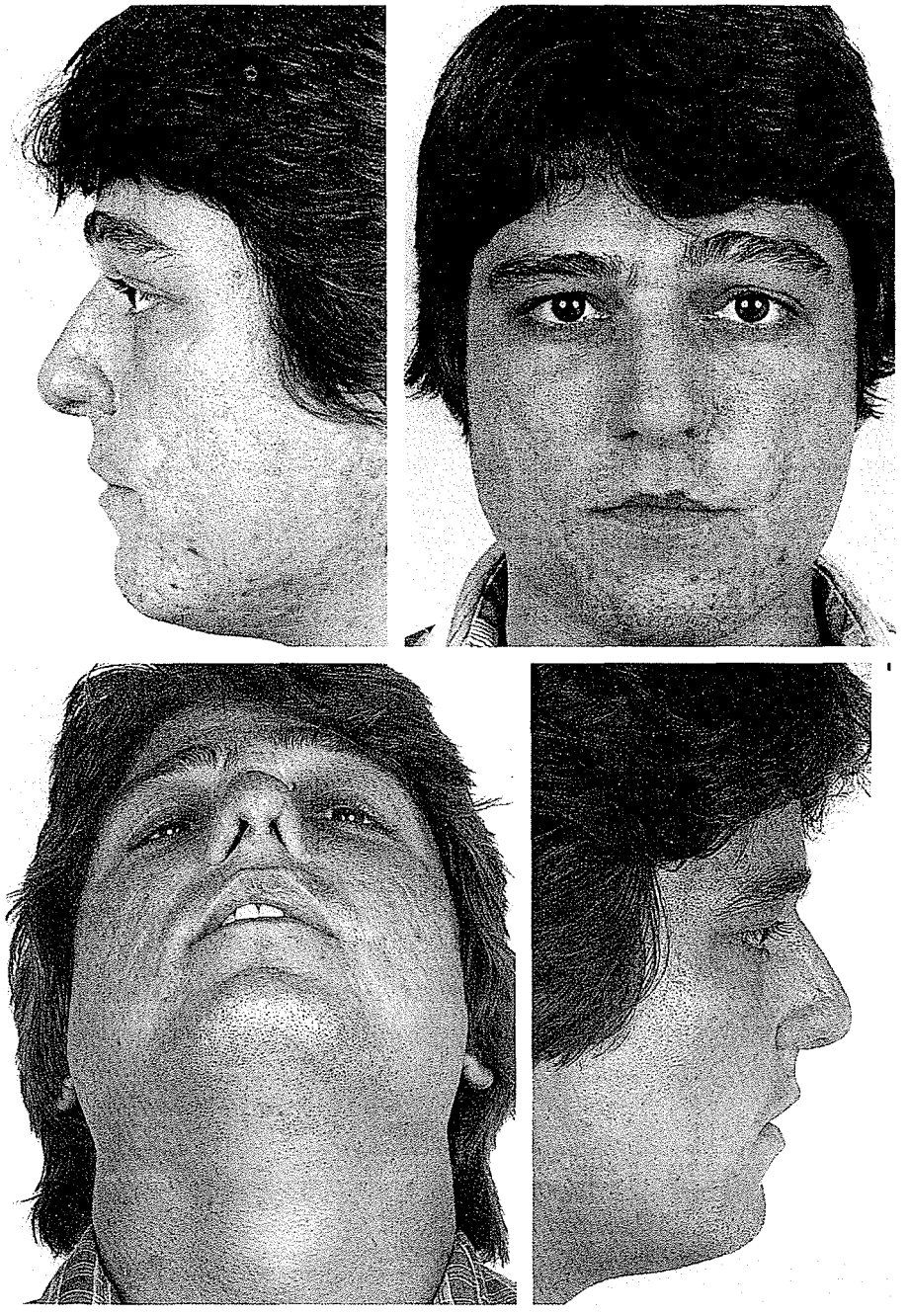
This 16-year-old high school football player suffered avulsion of his distal nose by broken windshield glass during an auto accident in Tampa. When first seen he had a healed wound of the left cheek and lip and loss of his nasal tip. Anterior septum along with portions of his alae and only a nubbin of columella were left. He also had a severe active acne on his face and forehead. To add to the complexity of the problem he had a narrow forehead.



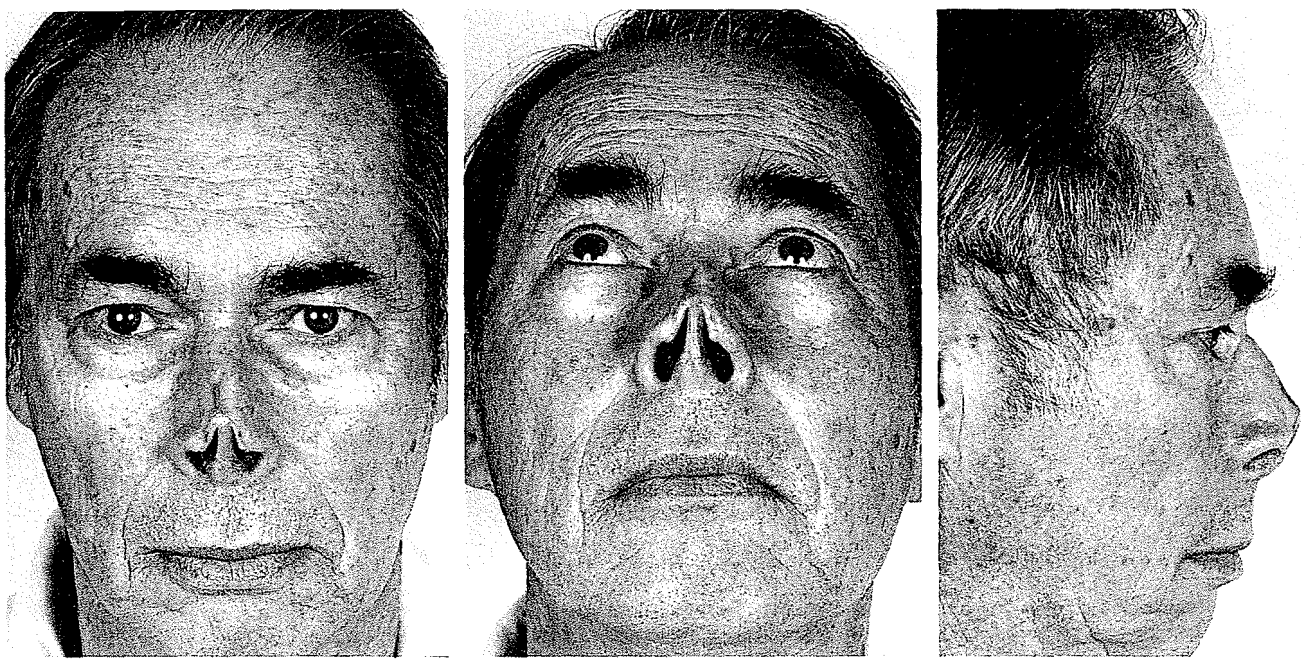
First he was referred to a dermatologist who treated his acne. Due to the narrow forehead it was necessary to design an oblique seagull shaped forehead flap which was delayed by incisions. Three weeks later the skin around the margins of the defect and part of the bridge were turned down for lining and fashioned as diagrammed. The seagull flap was used to cover the lower bridge, alae, tip, and columella. The pedicle was



later divided and returned to the glabella area. Several revisions with thinning of the flap created a reasonable result which was camouflaged by the flaps' conformity to units.

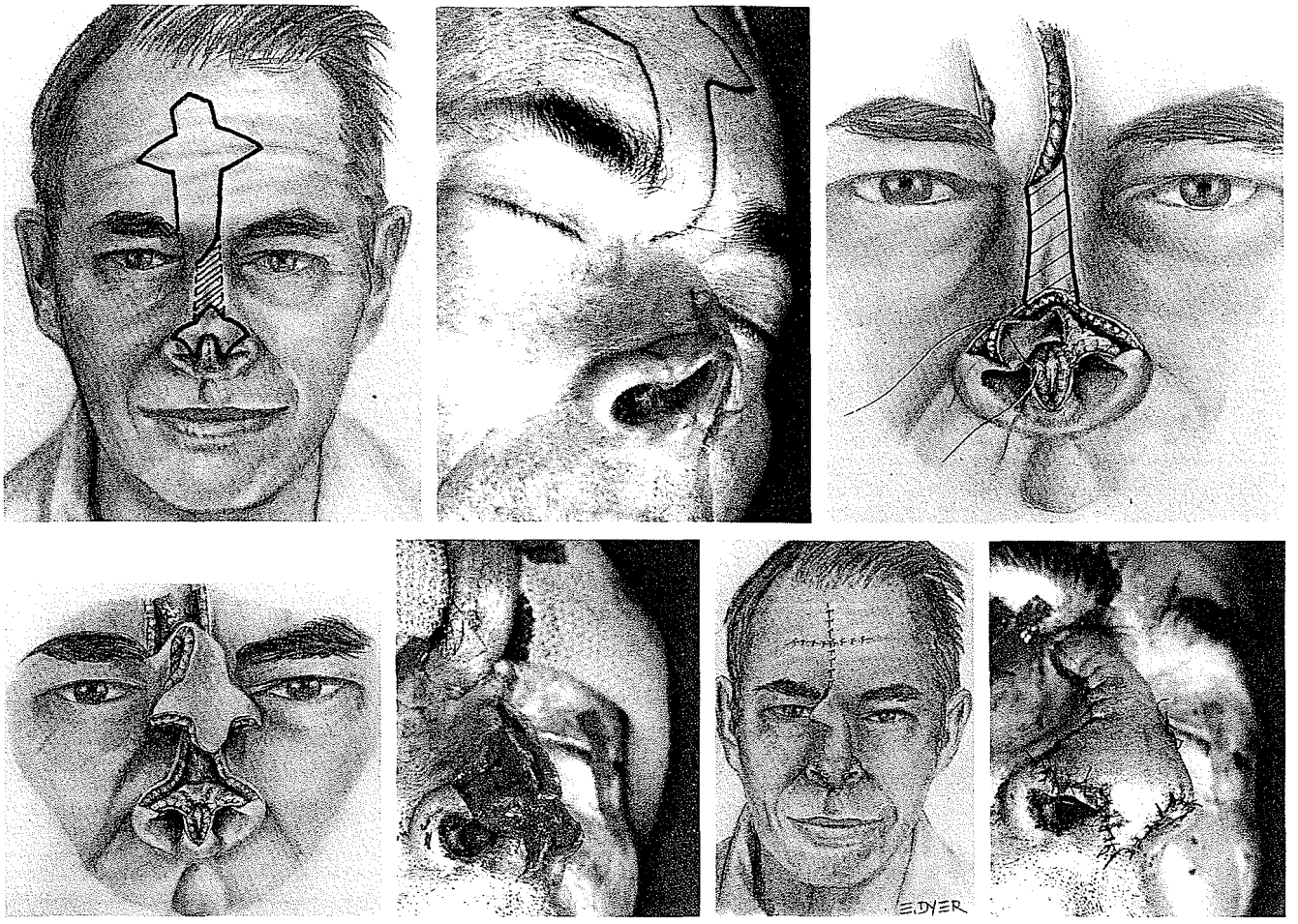


This 71-year-old man presented a nasal tip defect following chemosurgery for basal cell carcinoma. Besides a loss of the tip and columella, there were through-and-through defects of both medial alar rims and a scar of the nasal bridge. Turnover of alar skin could provide lining for the anterior vestibule.

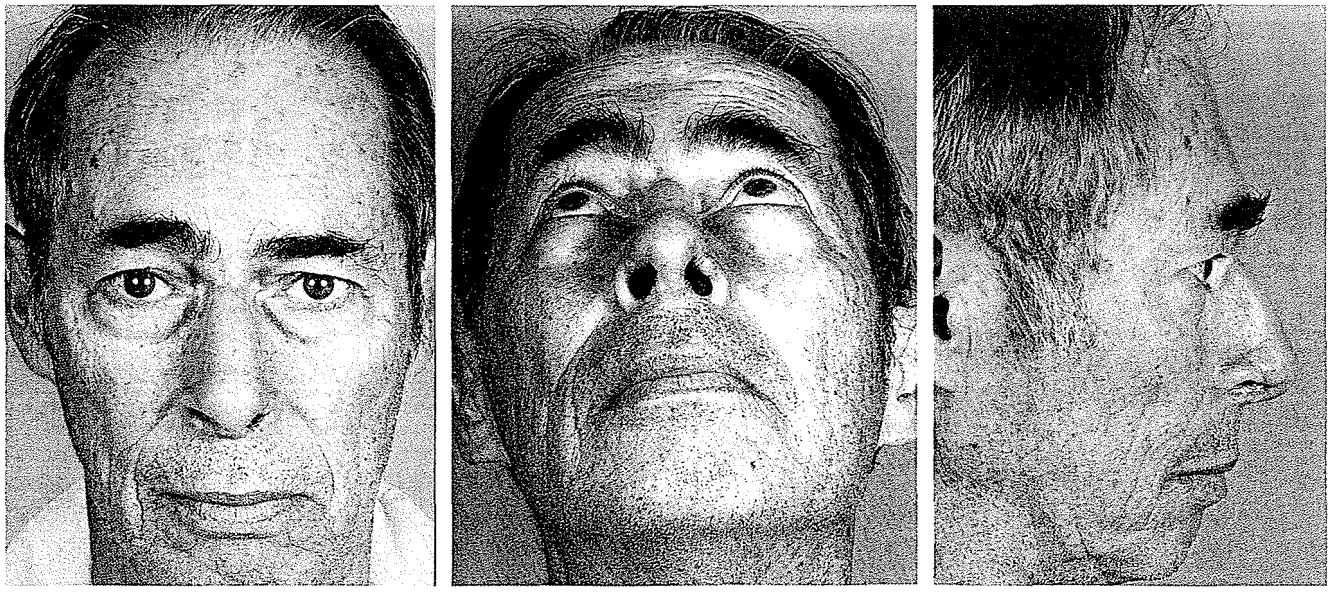


A composite antitragal graft shaped like a tricornered hat was considered because of the simplicity, lack of scarring, and previous success with the method.

More critical observation revealed a loss of tip projection of well over 1 cm which rendered the free composite graft slightly hazardous. Thus, with the tip and ala skin flipped over for lining and sutured to the skin of the split columella along with excision of the bridge scar, a suitable bed was presented. A safer but more elaborate solution for cover was found in a mini-seagull forehead flap brought in as a bridge tip—half ala, columella unit. This camouflaged the recon-



struction and produced a normal tip projection. The excess pedicle was excised and the bridge portion of the pedicle thinned for gentle inset. The midvertical and transverse forehead scars soon healed to near invisibility.



NASAL ALAR RECONSTRUCTION

In 1902 König described the use of an auricular composite free graft to the margin of the nasal ala. In the 1950s J. B. Brown advocated this graft for alar margin defects. The composite graft is white the first day, turning bluish after the second day, and when successful was a happy pink by the fifth to the sixth postoperative day. I remember Brown let me in to the treatment room in his private office in St. Louis several times when he unveiled the grafts on their fifth day of pinkness.

This auricular composite graft is as close to similar tissue in kind for a nose as can be found. It is suitable in color, texture, shape and in layers (skin, cartilage and skin). Brown limited the graft to 1 cm thickness and J. Szlazak later demonstrated survival of grafts of up to 1½ cm.

In 1957 Gillies and Millard advocated auricular composite grafts included on the edge of a larger full thickness skin graft to line the forehead flap ala. This is the principle that D. Baker has advocated for large marginal alar defects. Baker prepares the recipient site for his graft by cutting a flap from the skin adjacent to the defect and turning it over for lining. This exposes a large raw area to accept his large full thickness auricular skin graft with its 1 cm composite edge for the alar margin. Baker advocates an anterior upper helix full thickness edge of composite tissue attached to a large preauricular full thickness skin graft. This graft fits the defect well and gives Baker excellent results. The preauricular donor area is easily closed by a mini–face lift, but the anterior auricular helix offers a problem. I have used a postauricular flap to imitate the anterior helix.

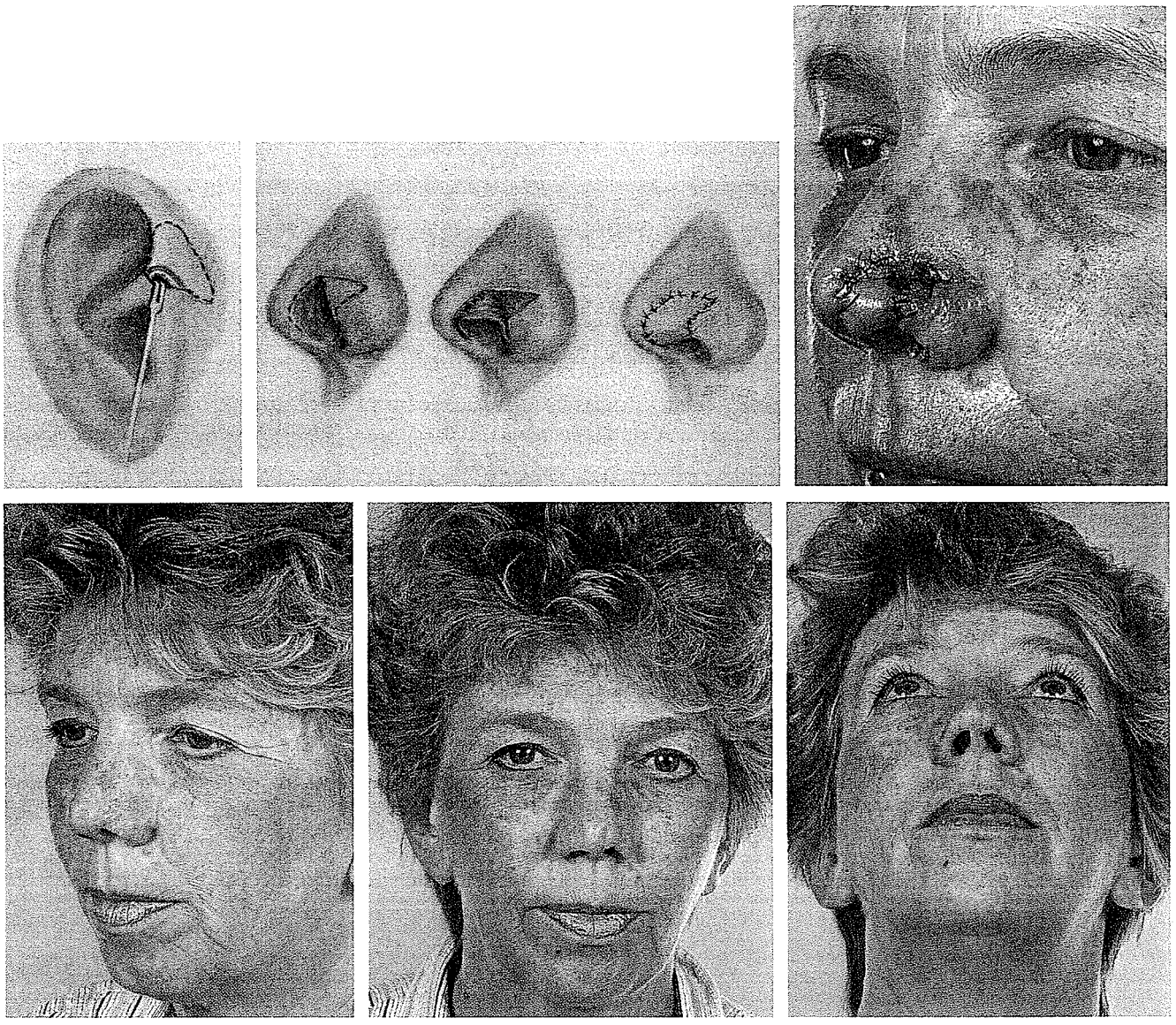
Except for marginal alar defects of 1 cm or less in thickness I prefer flaps over free grafts. Then, too, a large free graft of skin on the side of the nose and the noticeable anterior helix defect have been deterrents for me. Nevertheless, Baker's design is sound and I use it occasionally in modified form.

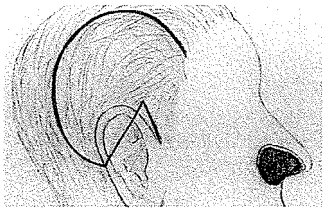
This 50-year-old female developed a basal cell carcinoma on the left side of her nose which was excised by a dermatologist and reconstructed with a nasolabial flap. It was found that there was still carcinoma present so Mohs surgery was used to clear the area. Again there are two reasons why dermatologists should not try to reconstruct. He who ablates often tries to save tissue to ease repair and leaves carcinoma in the area. Attempts at reconstruction by those not trained in plastic surgical technique often cause more damage than good.

This patient ended up with a left alar and tip defect, a scarred, swollen alar base, and a nasolabial scar. Specific modifications of the Baker design turned a lining flap to open more area for graft attachment. A composite anterior helix wedge with extension of preauricular skin provided replacement of missing tissue. The graft was successful and the depressed area along the upper border of the graft was enhanced by alar cartilage taken from the normal side, just a year after the grafting.



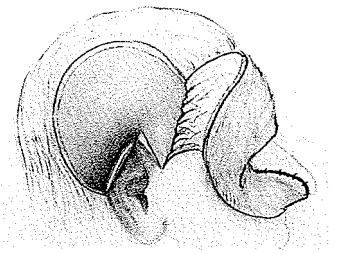




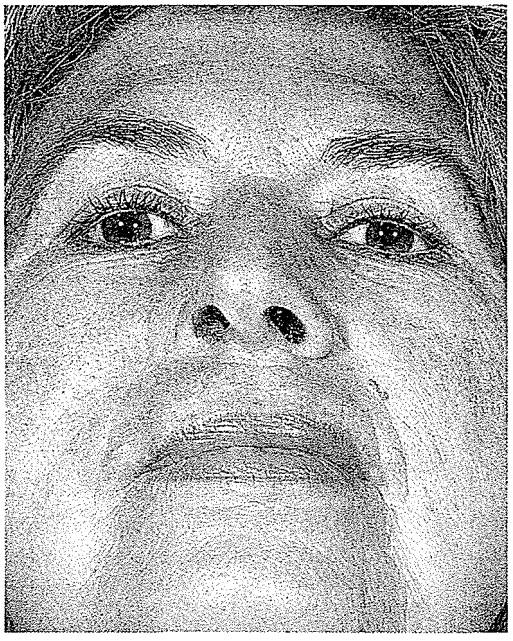


When a large portion of the auricle is required in nasal repair than can be safely free grafted, a flap vector can serve well. In 1967 A. Washio designed a semicircular scalp flap based anteriorly on the temporal vessels, which reached

around to incorporate whatever auricular skin and composite tissue were needed. The flap carrying the auricular tissue was unfolded and extended forward to the nose. Once the nasal attachment was sound, the pedicle was divided and the scalp portion returned to its original donor area.



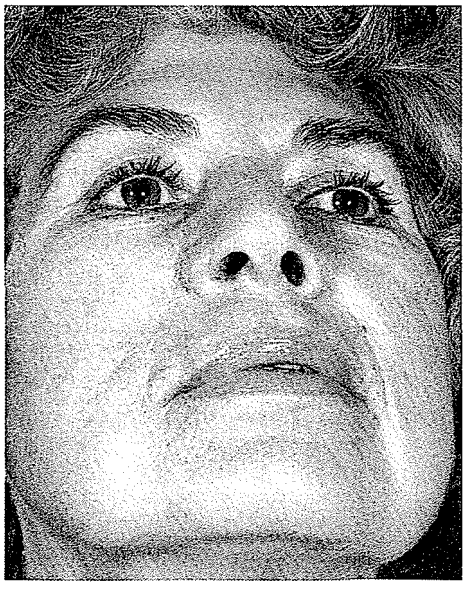
Occasionally defects involving the alar base and a portion of the ala can be reconstructed by a rotation incision around the alar base and completely through the lining with good release. The excess membranous septum can give up a chondromucosal flap which can be transposed into the lateral alar lining releasing gap. This gives better balance to the alae.



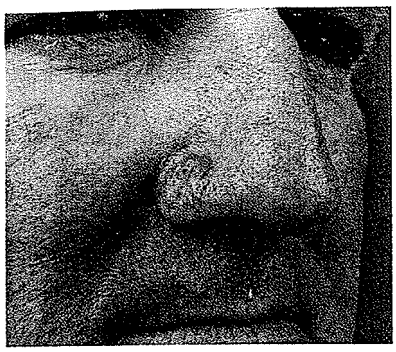




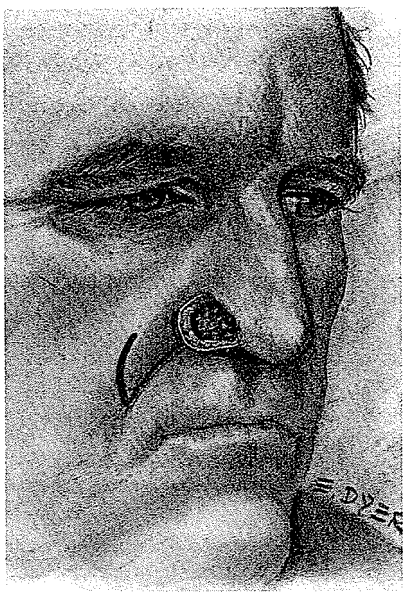


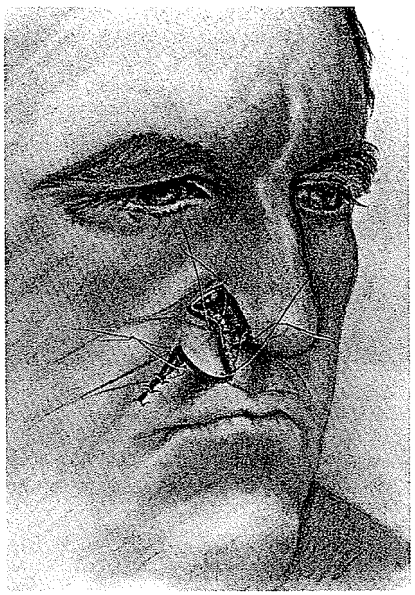


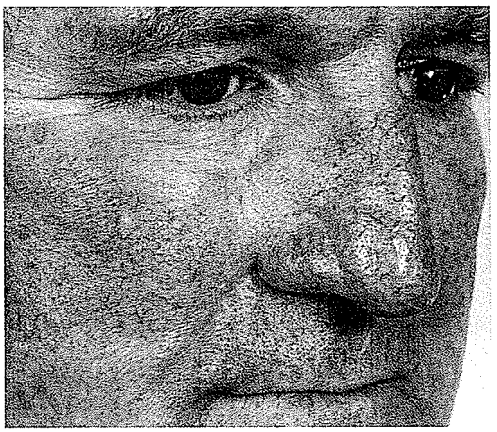




When the defect involves one complete unit or subunit, an aesthetic repair of that unit is straightforward. This 45-year-old Irish male with a basal cell carcinoma involving the skin of the right ala base required excision down to lining. The depth and location of the defect was perfect for a small flap taken from the adjacent nasolabial fold. When based superiorly the flap transposition required only one stage. The flap completed an alar subunit as it blended into the tip. The donor area of course closed along natural lines.

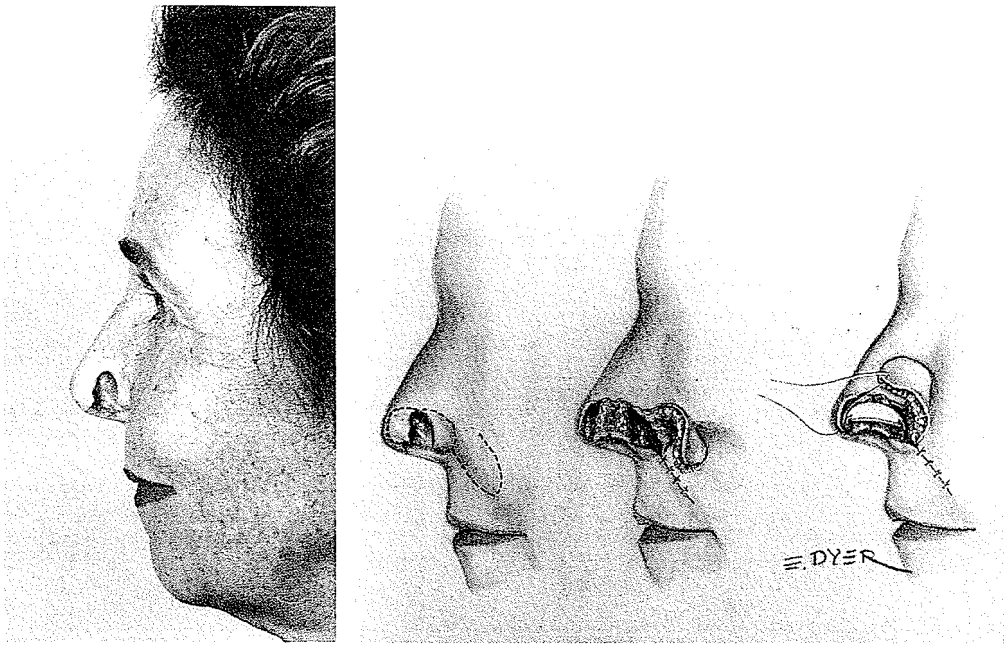






If the defect involves a major portion of a unit or subunit, the defect should be extended to include the total unit or subunit. The flow of a complete unit effects camouflage as the borders offer a hidden sanctuary for joining scars.

This patient had a basal cell carcinoma of the ala seven years before and had worn a Band-Aid over her full thickness loss all those years. As the defect was slightly large for a safe patching with an auricular composite graft, a three-flap repair was used. This required a surgical delay of the lining flaps. The central alar defect was made into a total alar surface defect by the in-turning of adjacent alar skin for lining. This was splinted with a strip of auricular cartilage and covered with a superiorly based nasolabial flap which extended from nasal tip to alar base as one unit. This blending by "bleeding"



of the ala into the tip avoids an interruption and hoodwinks the eye to the advantage of the camouflage.

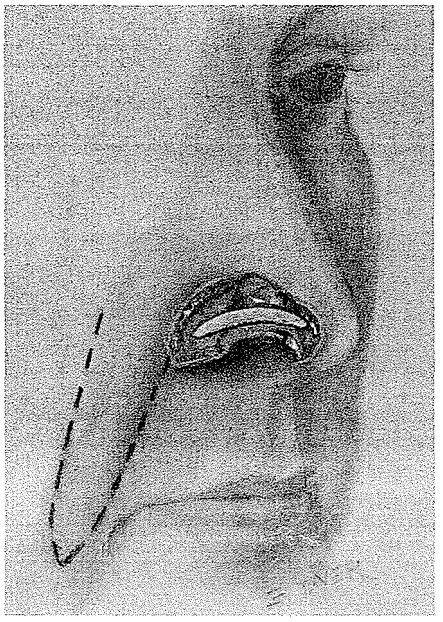


This 73-year-old female developed basal cell carcinoma of her right ala. It was treated first by a dermatologist with radiation and excision. The recurrence was treated by a plastic surgeon by excision with clear margins. A healing phase of six months was respected.



Due to the history of radiation treatment and as the lining flaps were to be based on scar, precautionary circumscribed incisions provided a delay. These were designed on a line to fulfill a unit. The long nasolabial flap was also delayed. Two weeks later the skin edges of the alar defect were turned over and sutured to each other to create the lining. A septal cartilage strip was fixed over the lining. Then the nasolabial flap was transposed for cover with its base positioned in its final destination. The nasolabial flap became congested at the tip but eventually survived.







Subsequent revisions involved thinning and shaping the alar margin and thinning the nasolabial flap along the alar crease to create a natural aesthetic contour.





The use of a nasolabial flap as lining and then twisting it for cover of an alar defect was described by S. Spear. It requires secondary revision but has merit.

Alar Defect as Only Part of the Reconstruction

When the alar defect is only part of the total deformity, the alar portion of these reconstructions is still important. The standard approach for years has been, as in simple alar defects, the in-turning of adjacent skin for lining splinted with a strip of autogenous cartilage. In the more extensive defects cover is supplied by a forehead flap. G. C. Burget and E. J. Menick reaffirmed approval of this approach with minor refinements in 1986.

In 1942 H. D. Gillies advocated the auricular chondrocutaneous graft to line and support the ala in a forehead rhinoplasty. I first used this method in England in 1952 and continued to use composite grafts for years with reasonable success. In the last 10 years I have altered this method to advantage. For reconstruction of one or both alae, the nasal tip and columella, or a portion of each, when possible, a forehead flap should be involved. When the tip, columella, and both alae are missing, then the vertical seagull-shaped forehead flap as described in 1974 is the design of choice for cover, not only because the wing tips form nostril sills, but the double-axis forehead donor area closes more easily along natural lines. When the vertical height of the forehead is narrow, the base of the flap can be brought down through one brow to lengthen the pedicle. For extra length the pedicle can be slanted toward a bay. If only portions of this total tip-alae unit are absent, then the gull design can be modified to reconstruct specifically the units and subunits that are missing.

Prefabricating the Alar Unit

During a surgical delay of the forehead flap, gull-shaped or modified, incisions along the future alar margins should be cut on the bias, leaving a thinned distal edge of about 1 cm in width before becoming full-thickness forehead skin. Just proximal to this thinned edge but parallel to it, a narrow tun-

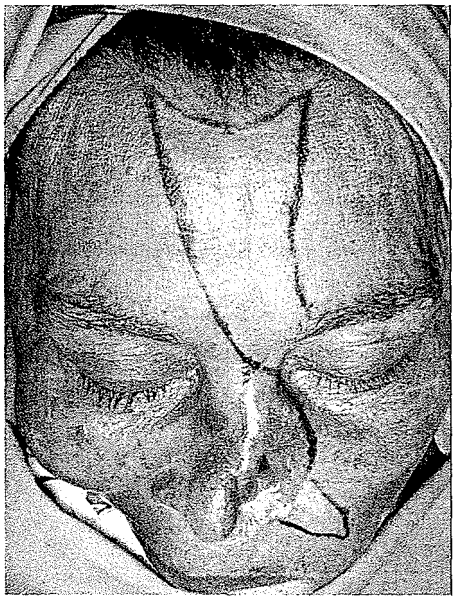
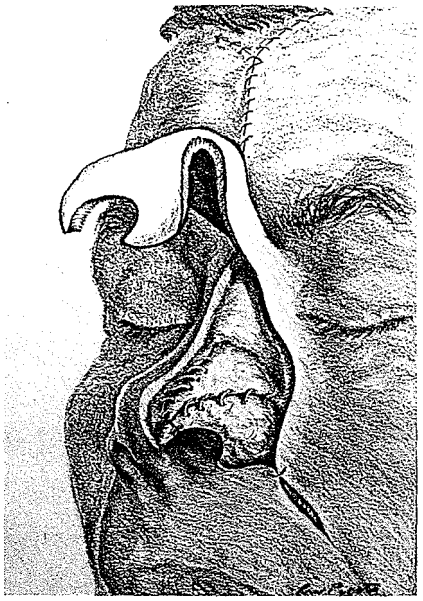
nel is burrowed just under the forehead skin. Into this tunnel is inserted a strip of cartilage, septal or auricular, shaped to give not only support but the rolling swell of a natural ala. It is important that this cartilage be placed not at the rim, but more proximal, where alar cartilages normally sit. The distal 2 cm of the future alae are lined with free skin grafts preferably of postauricular skin. The raw area on the forehead can be covered temporarily with thin thigh skin. The ear skin graft adherent to the sharp edge of the forehead flap will be visible as the delicate edge of a natural ala and the more proximal cartilage strip will provide the support and contour, leaving the rest of the forehead its natural thickness for safer vascularity. This design avoids the bulkiness and hazards of composite grafts. It ensures established lining to a thin edge and separate support to the alae in continuity with the forehead covering flap prior to transport, thus eliminating the need for bulkier and more vascular flap lining all the way to the edge or hazardous thinning of the forehead flap. One note of warning: Let the skin graft become established in its new blood supply for at least three to four weeks before transporting the forehead flap unit to its nasal destination. This technique is also described with diagrams and cases in the section on the losses of the distal nose.

HEMIRHINOPLASTY

Hemirhinoplasty refers to reconstruction of half a nose. The septum is usually intact and the missing parts are the skin, cartilage, bone, and mucosa of one side. I first became involved with reconstruction of this deformity in 1965 and published "Hemirhinoplasty" in *Plastic and Reconstructive Surgery* in 1967. At that time I noted that reconstruction of half a nose poses less than half the difficulties of a total reconstruction because the supporting septum is usually intact. Yet the aesthetic requirements of hemirhinoplasty are *uncompromising because the normal half stands forth disdainfully demanding comparison.*

Over the past 30 years I have had the opportunity to carry out a number of hemirhinoplasties. Not all posed pure hemidefects, some slightly less, some definitely more. Yet they all required the judicious shifting of tissues to supply lining, support, and cover for the missing parts with as similar tissue in kind as possible and with the least cost to the donor areas.

My first example of a hemi-hemirhinoplasty was repaired in 1966–1967. It had been a rare and extensive basal cell carcinoma in a Black that had been excised by S. Williams of Jamaica and the skin sutured to mucous membrane around the margins of the defect in preparation for reconstruction. The nasal bone was intact, so its covering skin was available to turn down as lining. Only the lining of the alar rim and base was lacking, and this was supplied by a nasolabial flap cut reasonably thin except at its base. The distal end of this flap was sutured to a small turndown flap from the columella at the nasal tip. On to this three-flap lining was sutured a specially designed midvertical forehead flap with distal lateral extensions. One extension crossed the alar arch to blend into the columella at the tip. The other curved around the alar base, extending toward the nasal floor as a nostril sill. It was fashioned to match the normal side. Undermining and advancement facilitated direct forehead donor closure.

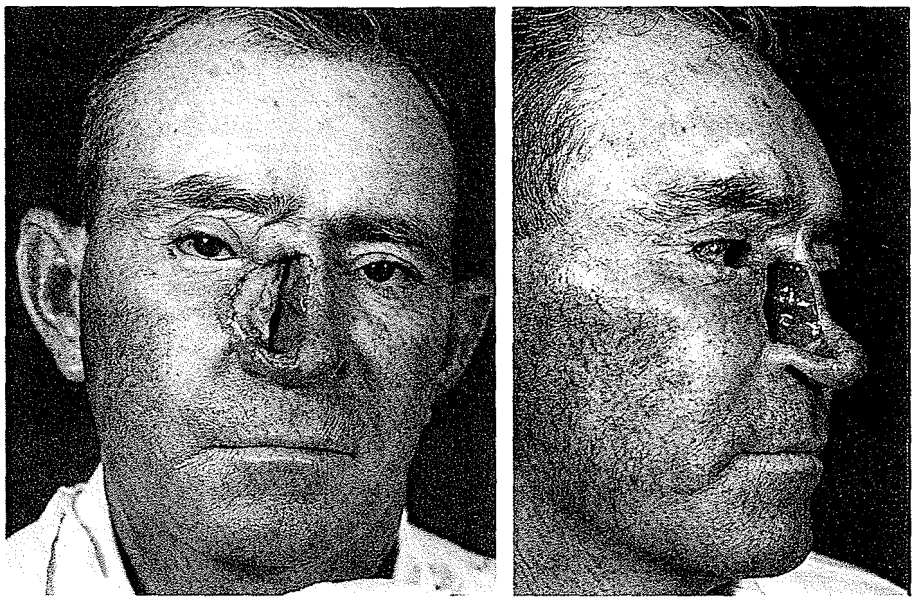




The formation of an alar crease, essential to a natural effect, was achieved by designing the covering flap slightly in excess. Then when the subcutaneous tissues were thinned in the area of the future crease, the excess skin was available for the indentation of the crease. Buried sutures ensured the permanency of this crease, as shown in a postoperative photograph taken several years later after a half day search in the mountains north of Kingston, Jamaica, to find the patient.

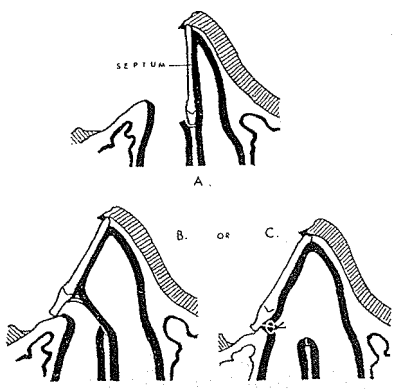


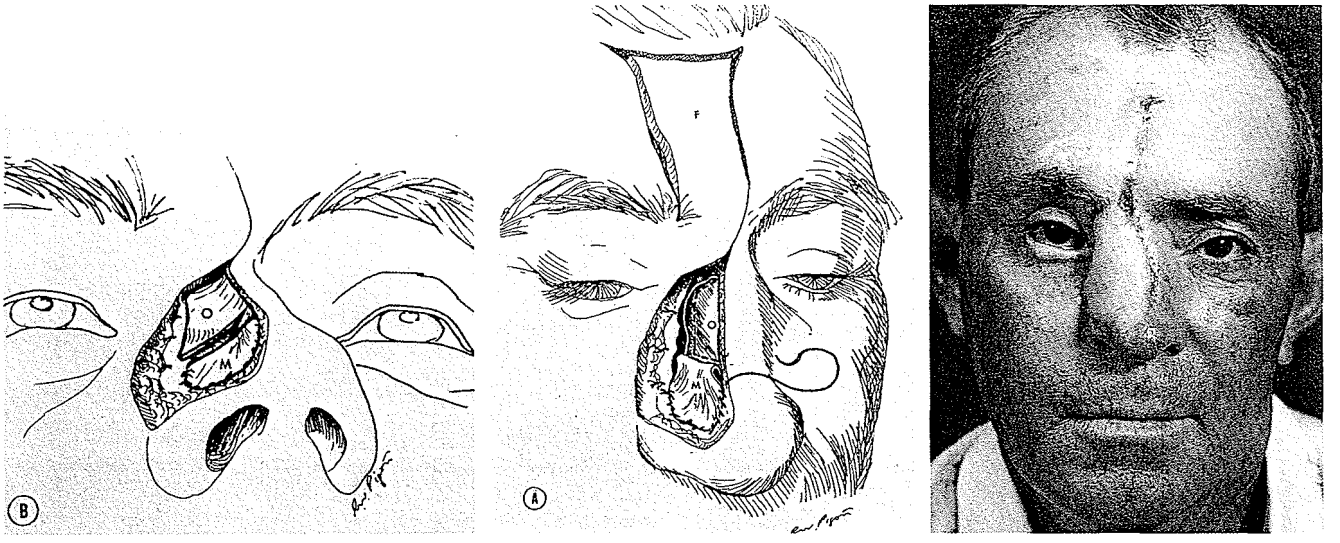


My second 1967 example was more extensive. Excision of the basal cell carcinoma removed the full thickness right half of the nose except for a small piece of skin at the root and a thick alar rim. Again the Robin Hood principle of shifting



tissues was invoked. The mucoperiosteum of the upper septum (M) was turned down on an inferior base to line the missing lateral wall. The exposed osteochondral tissue (O), marked with an interrupted line, was cut as a hinge flap carrying the mucosa attached to its opposite left side. This septal osteochondromucosal flap (O) was swung out to rest on the maxilla at the edge of the nasal aperture. The cross-section design of the mechanics of this hinge flap simplifies its complexity and presents its effectiveness in reconstruction and airway maintenance. A midline vertical forehead flap based on the right supratrochlear vessels supplied the cover. After three weeks





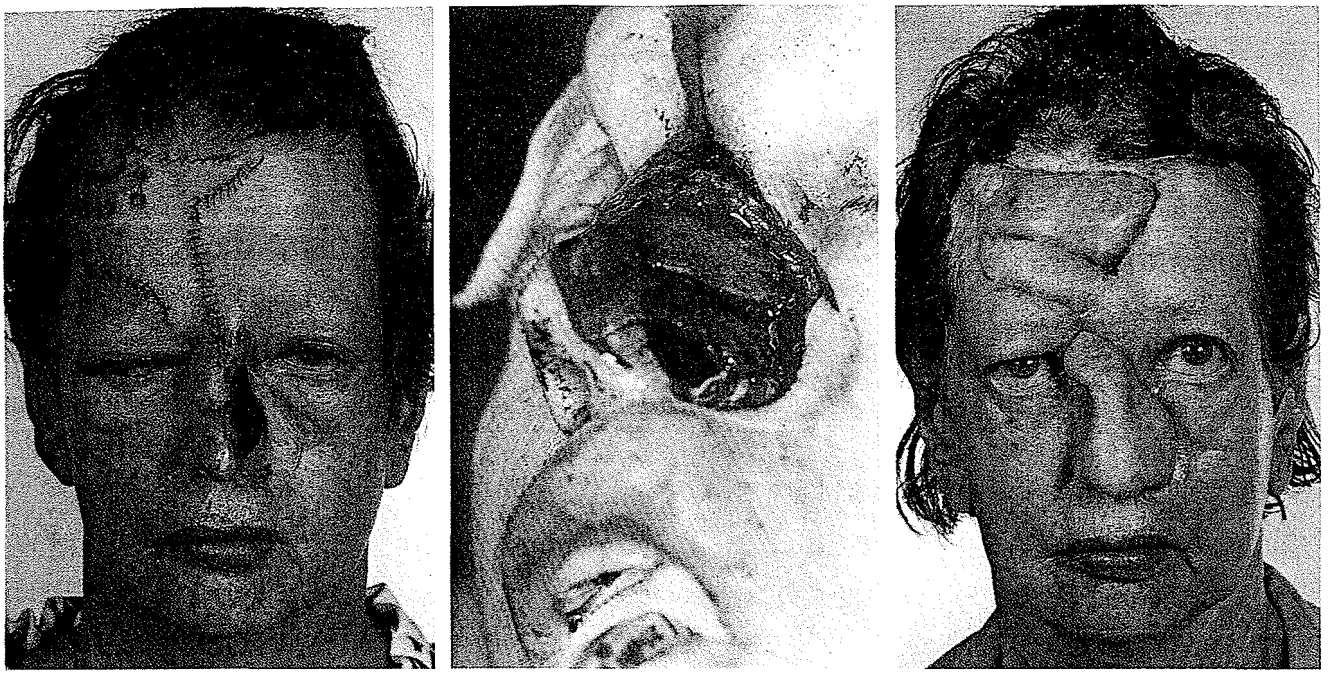
the pedicle was divided and replaced in the glabella area. This reconstruction served the patient well for 20 years.





A variation of this hemirhinoplasty design was demonstrated again in this 74-year-old female wig-wearer who had Mohs chemosurgery for basal cell carcinoma of the left nose and part of her maxilla. The marked asymmetry of the platform rendered the septal osteochondromucosal swing-out flap essential for skeletal balance. First, S. A. Wolfe transposed a temporal muscle flap to bolster the maxillary defect and covered it with a skin graft to present a better lateral platform.

In the first stage, a bizarre forehead flap was designed for unit reconstructive cover of a portion of the right ala, tip, columella, and entire left side extending into the cheek defect. The flap was delayed by incisions and the left ala was splinted by a cartilage strip and lined by a thick split graft. Three weeks later the exposed left proximal septal mucosa (M) based distally was turned down to provide lining for the side wall. This main lining flap was sutured along the septal bridge and laterally to an incision along the edge of the pyriform opening. It was then anchored anteriorly to a small turn-over skin flap at the nasal tip and another triangular turn-up skin flap at the alar base. With the left side mucosal lining turned off, the exposed ethmoid plate (o) and septal cartilage (c), backed by the natural mucosal coverage on the right side, which also offered vascularity, were cut as a trapdoor with its base along the bridge kept intact to maintain the L support. This osteochondromucosal flap was swung out laterally to the left to rest on the maxilla with mucosa sutured to mucosa to seal lining. This provided a stable nasal side in spite of the maxillary platform deficiency. Then the previously prepared forehead flap was brought in for cover with its skin grafted alar lining being sutured to the septal turn-down mucosal flap to complete this stage of repair. A midline vertical forehead flap based inferiorly was transposed across the lower portion of the forehead defect to present better contour and texture. Here her trusty wig covered the upper skin graft on the donor area.



Two months later the forehead skin pedicle was divided, salvaging the neurovascular bundle. Only minor revision and flap thinning at the alar crease were necessary.

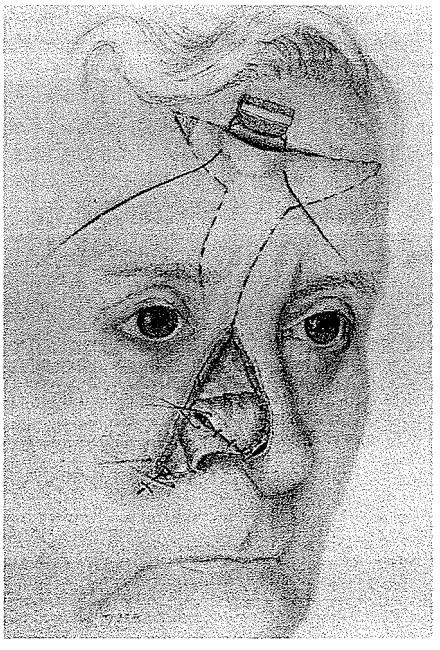


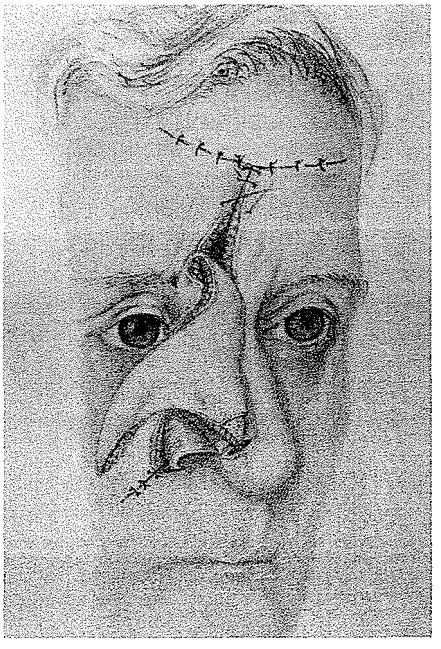
This 60-year-old male had Mohs surgery for basal cell carcinoma of the right side of nose and cheek. The raw defect was covered with a skin graft.



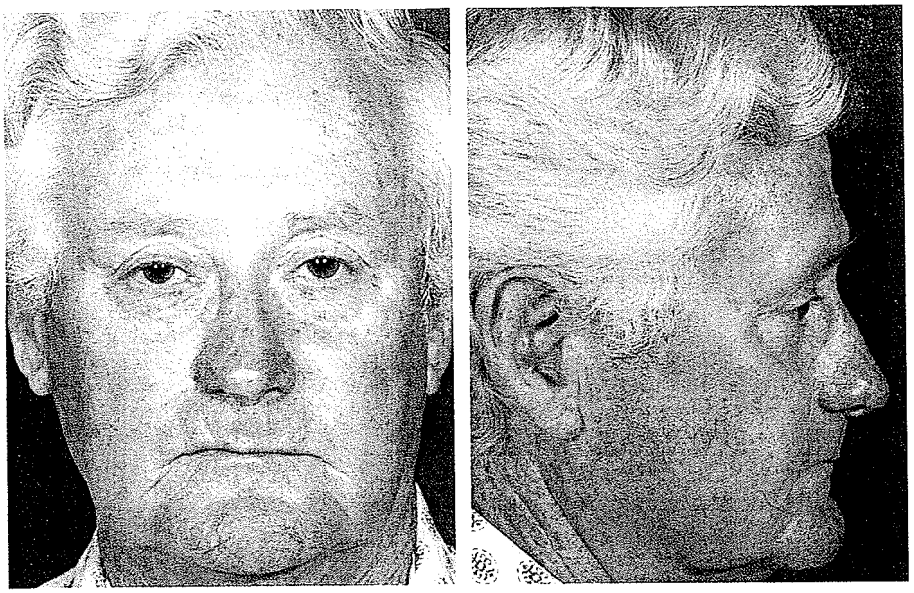
Four months later a pattern of the planned defect, including the inturning of adjacent skin for the main nasal lining, was marked on the forehead as a half seagull on a midline vertical pedicle based on the right supratrochlear vessels. This flap had to be placed between the scars of the excision of other basal cell carcinoma lesions.

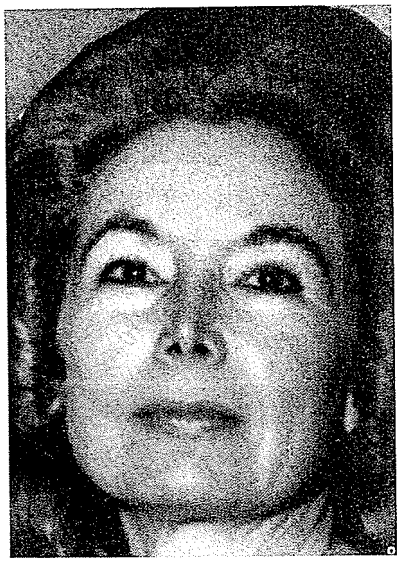
The upper edge of the flap, as the future alar margin, was incised on the bias to present a thin edge under which was grafted a chondrocutaneous graft from the ear. The lined and supported ala was allowed to establish a blood supply for five weeks. Then the skin edges of the nasal defect were turned in for lining and the prepared forehead was brought down for cover. The lateral alar wing swung into the nostril floor to recreate a natural alar base. The other extremity of the alar margin was denuded of epithelium and inserted into the nasal tip to blend the join as a subunit. The forehead defect was closed by advancement. The flap was left in this position for several months and then divided and the base returned to the glabella area. Several minor revisions over the next year to blend the flap joins to the nose were successful.











This 65-year-old female, five years earlier, had had almost half her nose removed for carcinoma along with bilateral neck dissections. A pre-ablative photograph revealed a nose that has undergone radical reduction rhinoplasty years before, resulting in a pinched tip, retracted alae, and general deficiency of nasal tissue. This specific circumstance rendered the hemi-rhinoplasty more difficult because flap repair of the missing half to simulate a normal opposite side would be more gratifying than trying to imitate a semi-deformed half. A compromised plan was adopted to reconstruct the missing half unit as similar as possible to the remaining side and then improve the pinched opposite side.



As the nasal bone was intact simplification of the design was possible. Delay by incisions prepared three skin flaps: a nasolabial flap for lining of the ala, an upper right half nasal bridge flap for lining the sidewall, and a modified midvertical hemi-gull-shaped forehead flap to cover both subunits in one general hemi-nasal unit. The upper turndown lining flap opened the way for the forehead flap to come in as a one-piece unit, and the extensions of the forehead flap allowed its blending and "bleeding" into the tip and its swing-around as an alar base into the nostril sill. Closure of the forehead donor area was achieved by direct advancement. Return of the base of the forehead flap released the brow.

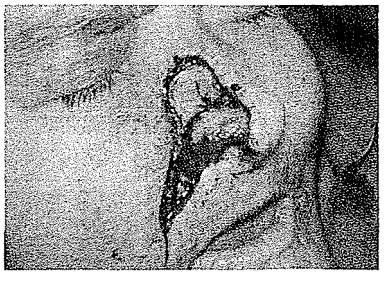


Scooping out the subcutaneous tissue in the alar crease area divided the subunits. Thinning the flapped margins allowed near symmetry with the opposite side. Then a cartilage graft was inserted into the pinched normal alar crease for closer bilateral balance.

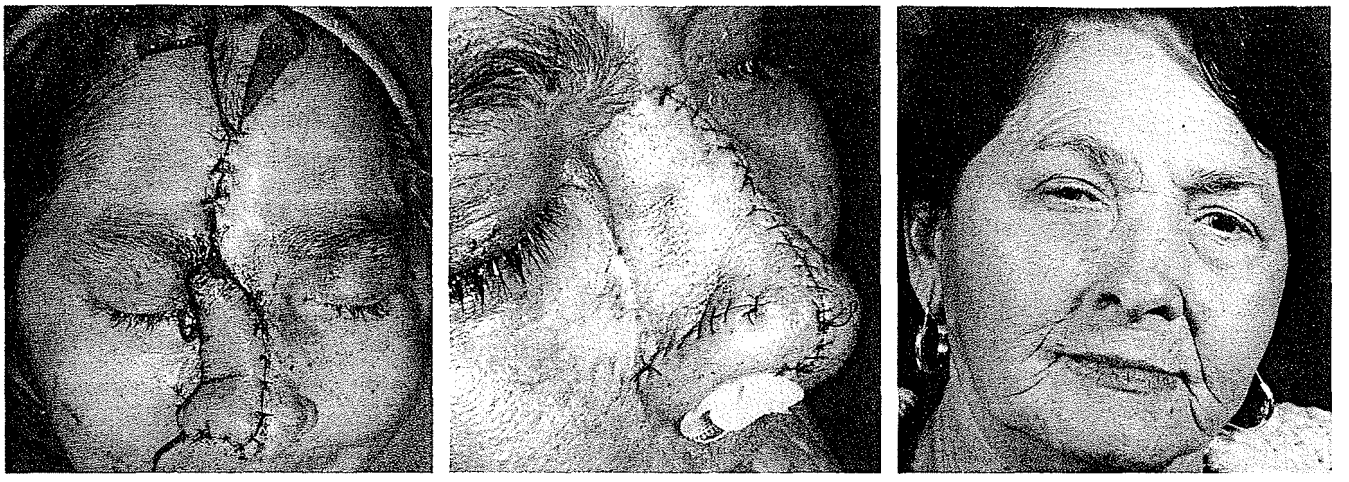


Extensive basal cell carcinoma involved the right side of the nose of this Latin female. Excision of the lesion with free margins presented a defect that required a hemirhinoplasty.



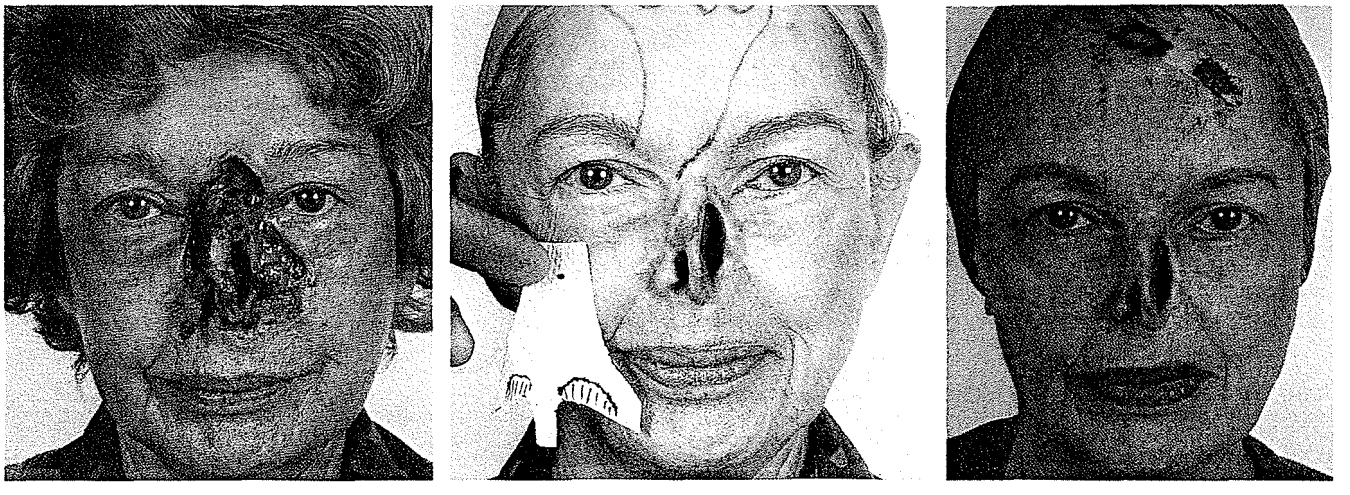


Lining was supplied by turndown of adjacent skin and turnup of a nasolabial flap for the ala. A forehead flap supplied cover and the donor area was closed directly, aided by a transposed scalp flap to form a widow's peak. This peak was reduced when the pedicle was divided and replaced. A final thinning of the flap achieved natural contour.

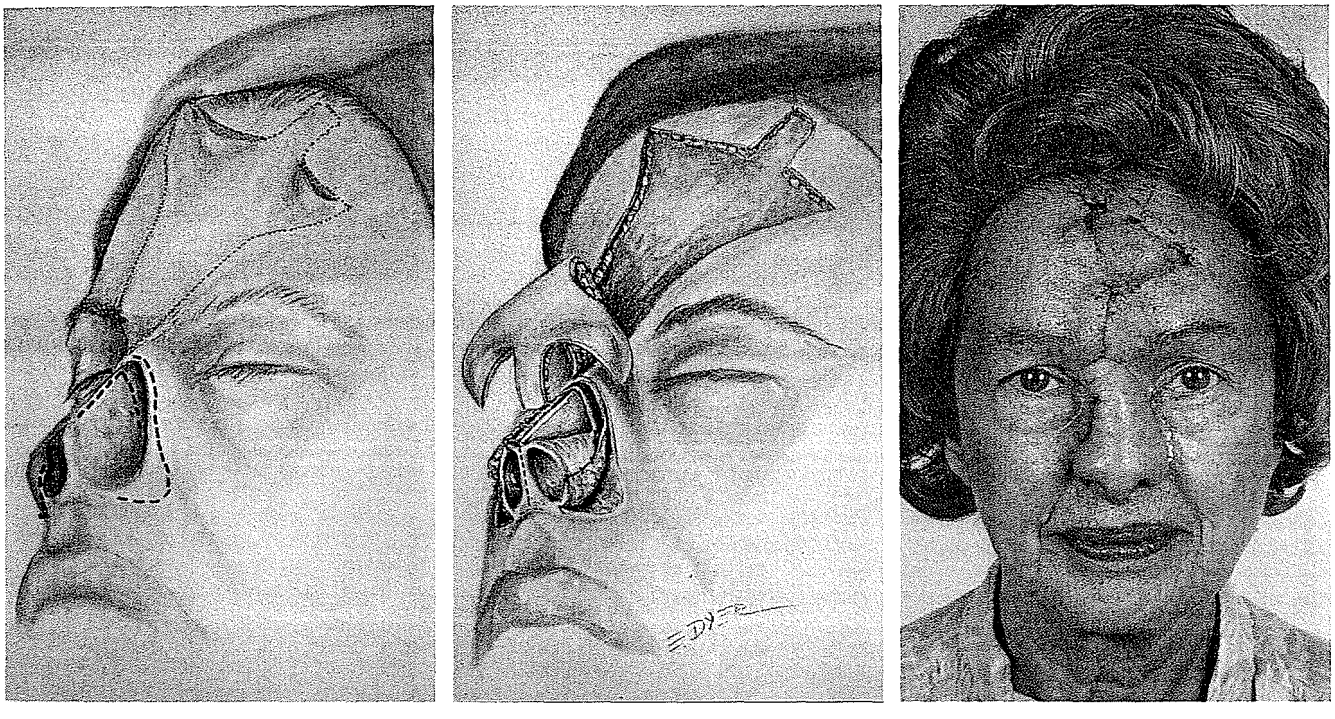


This 60-year-old female had a basal cell carcinoma of the nose for over five years which eventually required extensive ablation by Mohs surgery. Dermatologist H. Menn accompanied the referred patient with a map of a few residual areas still involved. These were cleared, a skin graft cover was applied, and observation and biopsies were carried out over a 9-month period.

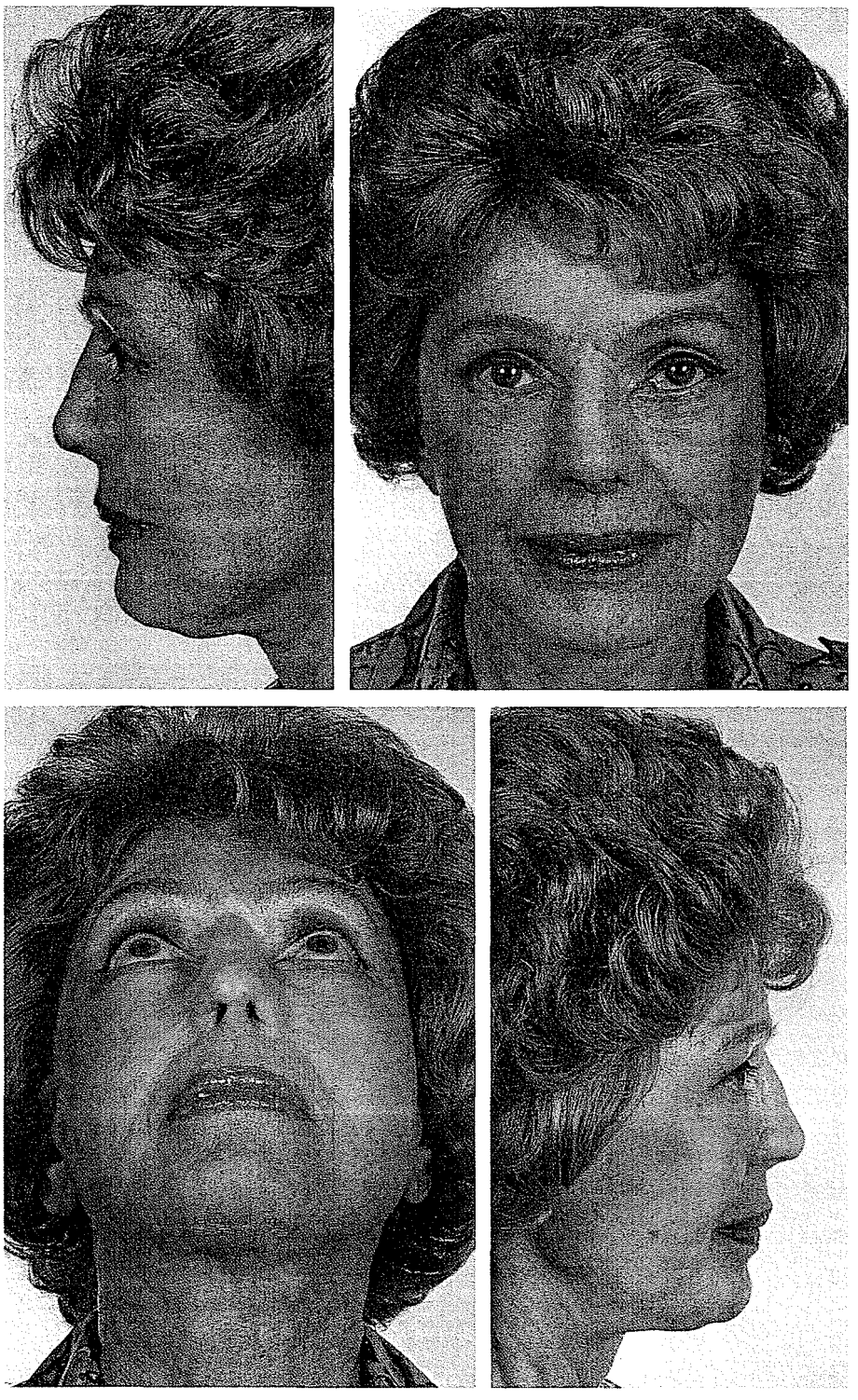
Since a good portion of columella and all the tip and the entire left ala and sidewalls, along with a good portion of the right ala, had been destroyed, a seagull forehead flap was planned. When the gull flap was delayed, both alae were supported by strips of cartilage and lined by skin grafts as previously described. A small cartilage graft was inserted just under the forehead skin at the future nasal tip for a *touch of class.* At the same time, the left cheek was advanced medially after excision of scar and skin grafts to define cheek and nasal units.

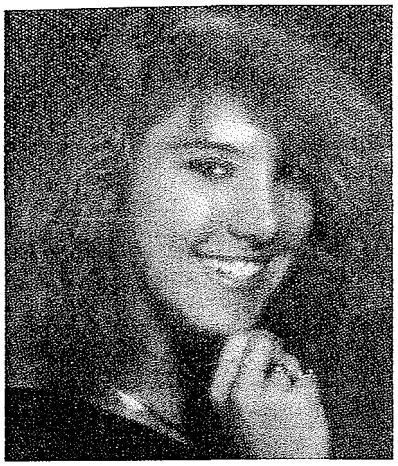


Three weeks later at the second stage, the septal mucosa was turned down in the usual manner to line the left distal sidewall and was sutured to turn-over edge flaps. A skin flap of residual alar base was turned up for lining on the right side. This patient had had a slender nose and did not require the septal osteochondromucosal hinge flap to swing out for support and contour of the upper left nose. Rather, the previously prepared gull-shaped forehead flap was transposed over the prepared base with the septum standing gallantly intact. The forehead donor area was closed except for a small full thickness graft which healed to near invisibility.



Two months later the skin of the pedicle was divided and replaced, saving the neurovascular bundle. One month later, minor revisions were performed, including subcutaneous scooping for the alar creases and a postauricular skin graft to the left lower eyelid for correction of the ectropion. This was only seven months from the start of the repair and in another three months the patient requested and received a face lift along with upper and modified lower lid blepharoplasty.

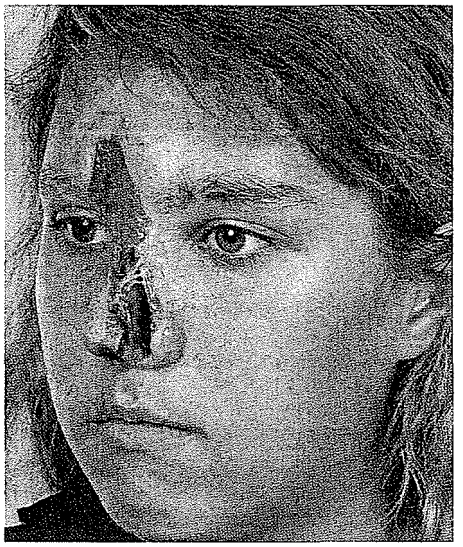




During an automobile collision this 17-year-old female, in the passenger seat without a seat belt, suffered avulsive injuries to her face. Attempts at replacement of the full thickness skin avulsions of the nose and forehead failed. When seen the patient revealed a raw area over the root of the nose extending into the glabella area and the right side of the lower forehead. She was missing the important part of the left side of her nose. She had the alar base and a residual ridge running toward the medial canthus and a scarred nubbing of the nasal tip without the anterior columella.



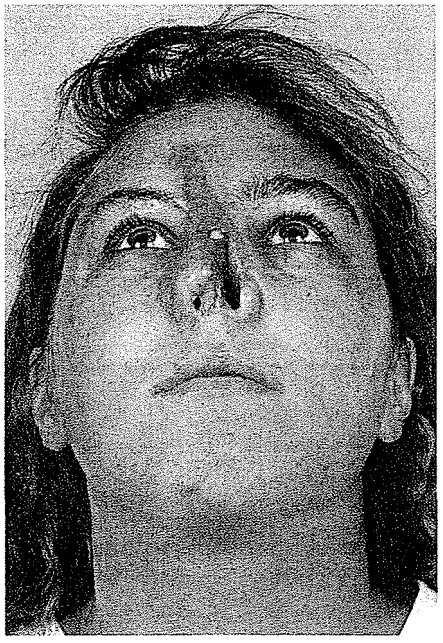


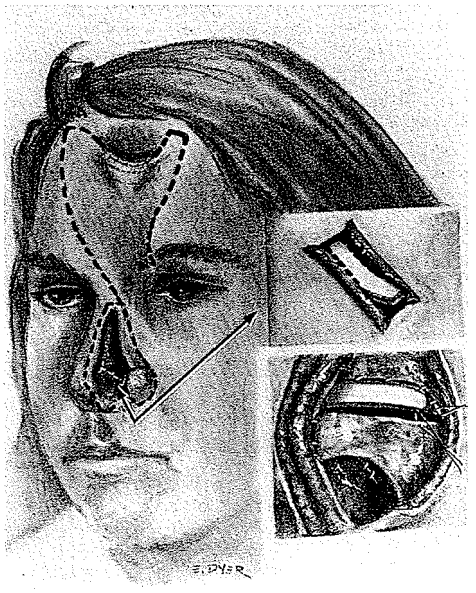


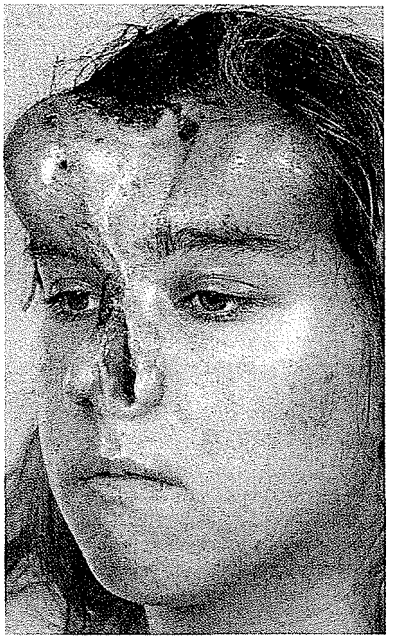
The surgeon who treated her original injury was requested to apply thin split grafts to the remaining raw areas of the forehead and nose to give time for better healing.

Two months later the contracted left nostril was released and lined with a mucosal flap from the upper buccal sulcus. A small local flap was transposed to cover the exposed nasal bone. Then the design for the cover of a hemirhinoplasty was marked and incised on the forehead based on the left supratrochlear vessels. The design included an extension for a col-

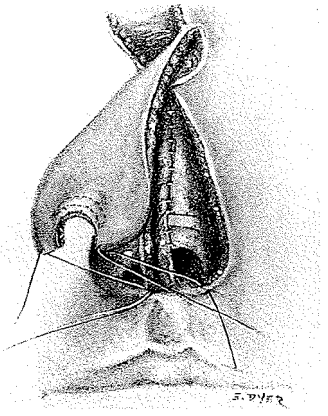
umella. The alar portion of the flap was incised on the bias as previously described and then supported by insertion of a strip of auricular cartilage in a subcutaneous pocket. The future ala was then lined with a thick split skin graft which was tucked into the alar pocket and applied also to the raw area under the forehead flap. Two 50-cc expanders were inserted under the remaining forehead on each side.

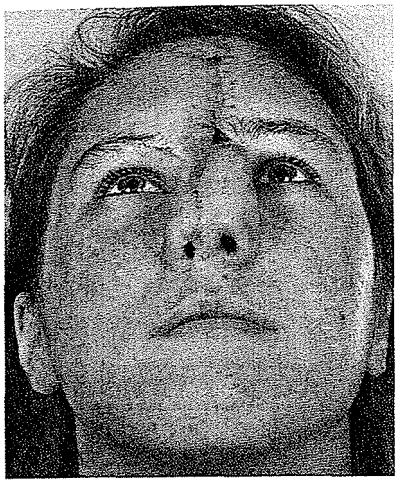






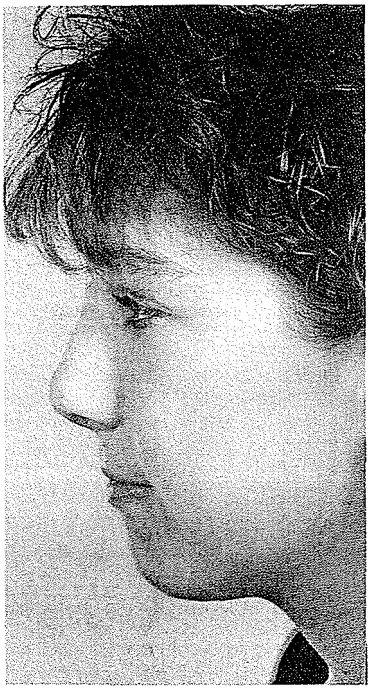
One month later the edges of the defect were incised to allow turnover for lining closure in the upper area. The turnover of alar skin supplied intermediate lining. Then a septal chondromucosal flap was developed to complete the lining and support the new sidewall, acting as a flap "spreader" for airway maintenance. This flap was created through a vertical slit in the exposed septal mucoperichondrium. Through this aperture, a chondromucosal flap based above, including septal cartilage and adherent right mucosa, was swung through the

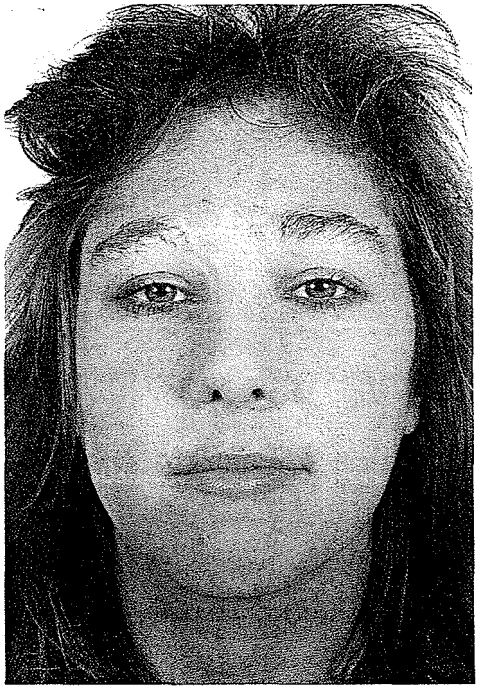


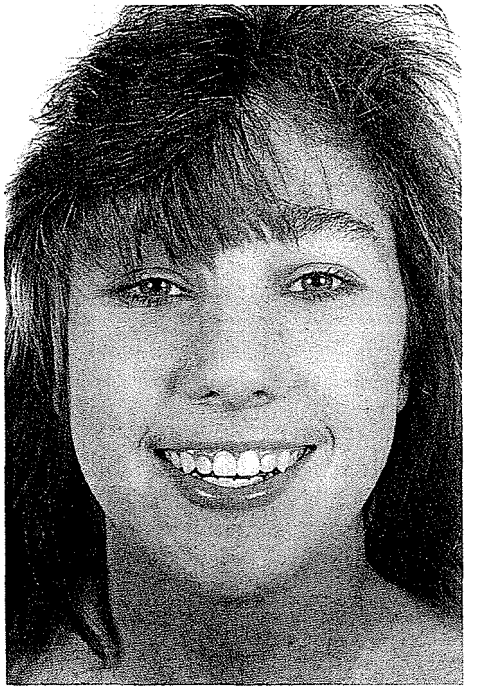


slit to enforce the lining of the reconstruction. It interdigitated between the turndown lining and the distal grafted ala of the forehead flap. The slit in the septal mucosa was sutured to prevent septal perforation. Onto this carefully prepared lining the prepared forehead flap was transposed to reconstruct the left side of the nose, including the tip, columella, and ala. The forehead implants were removed, the skin graft in the glabella area excised, and the forehead defect closed.

Three months later the forehead pedicle was divided and its base reinserted in the glabella area to release the brow. The forehead flap was thinned and let into the left upper side of the nose. Over the next year minor thinning procedures to the nose and scar revisions completed her repair. She became engaged to be married.

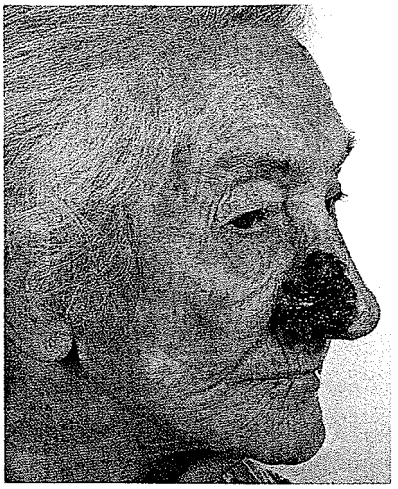






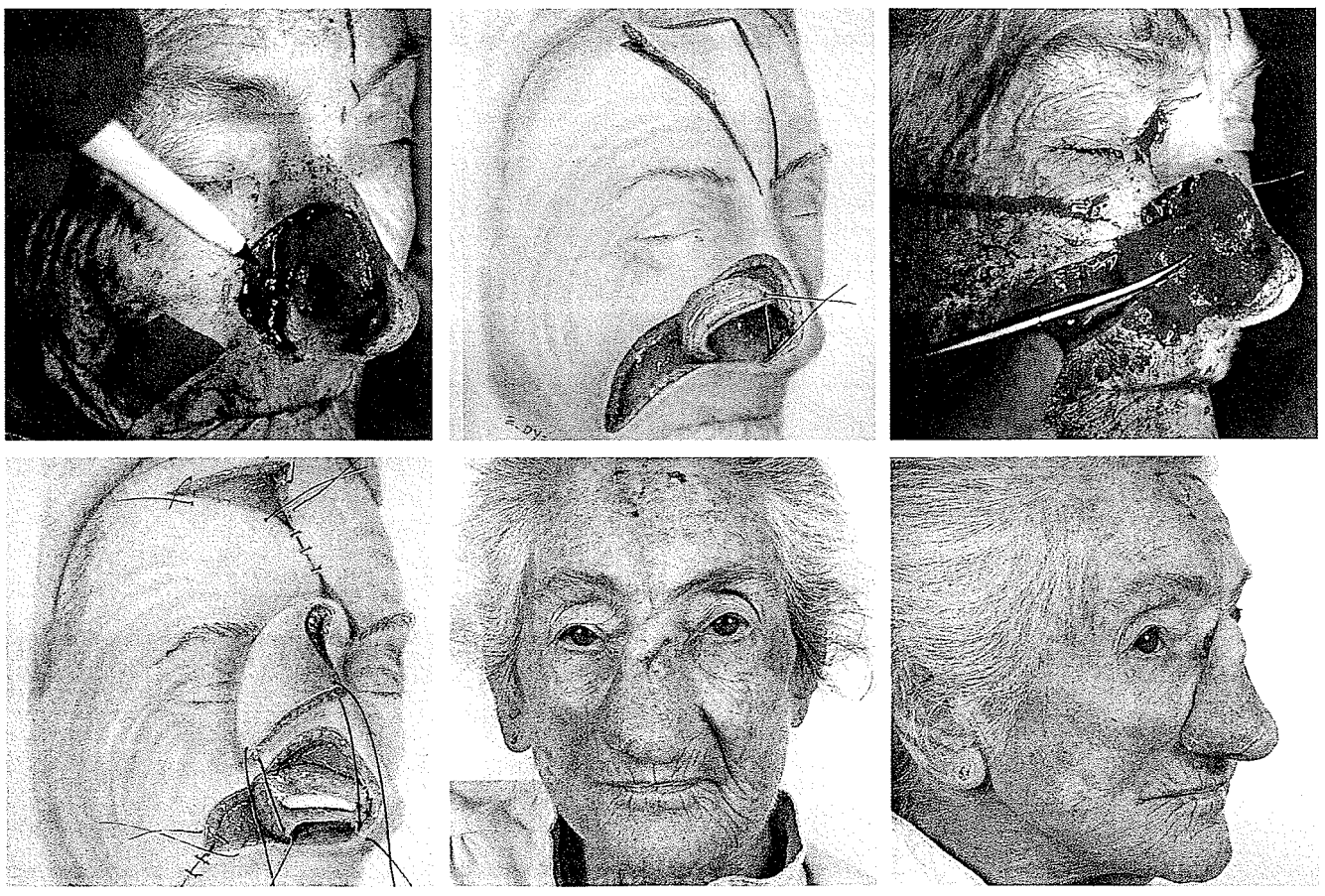
The goal of reconstructive surgery is not only to replace what is missing in the return to normal but to attempt aesthetic improvement, when possible, even beyond what would have ever been. Before her injury this patient presented a generous nose with a high bridge, bulbous tip, and hanging sidewalls. Her reconstruction gained aesthetic advances that blend better with her facial features.

Expedience over Aesthetics



This 91-year-old widow had had many basal carcinomas of her face and neck treated. Yet the one on her nose had been neglected for many years until it involved most of the left side. At the consultation she was advised to have the fungating lesion excised, followed by an immediate reconstruction.

Under general anesthesia the lesion was excised full thickness and the margins reported clear by frozen section. A nasolabial flap marked by a pattern 3 cm wide and based at the right nasal alar base was turned up to fill the lining defect. The cheek skin was easily advanced to close this defect along the nasolabial line. The accessible cartilage of the exposed septum was taken as a thin 3-cm strut to support the alar rim. It was scored on its outer surface to curl the cartilage to fit the ala. Then a midline vertical forehead flap based on the left supratrochlear vessels and patterned to fit the defect was brought down for cover. The forehead donor area was closed by advancement except for a small triangle which was covered with a postauricular graft.



Five weeks later the pedicle was divided and its base let into the glabella area to release the brow. The flap to be implanted was thinned and let in to the upper right side of the nose. Two and a half months later thinning along the alar margin join of the two flaps improved contour and airway.



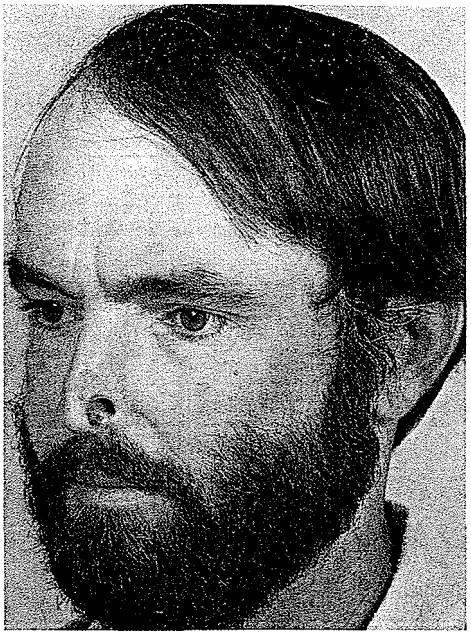
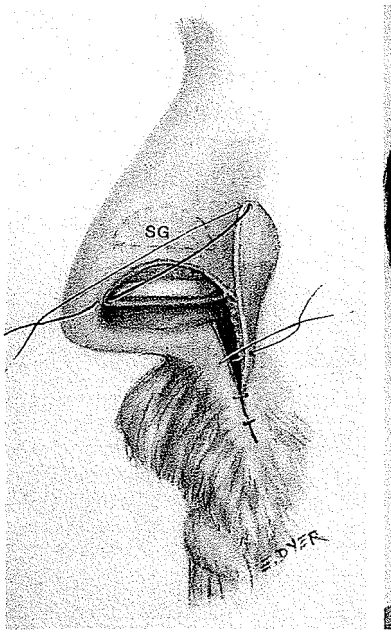
Due to the patient's advanced age and lack of aesthetic interest an expedient two-flap reconstruction without the trimmings was the choice. If she were younger I would have reduced her remaining nose and reconstructed the defect for an improvement of her nasal aesthetics. At the age of 94, after three years, she and her new nose are doing well.

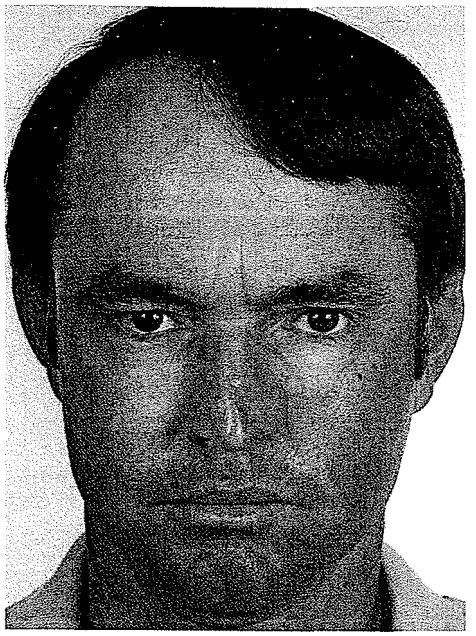
A hemirhinoplasty may be associated with adjacent problems and when this involves nasal platform then this portion of the defect warrants priority.

Hemirhinoplasty Associated with a Cheek and Maxillary Defect

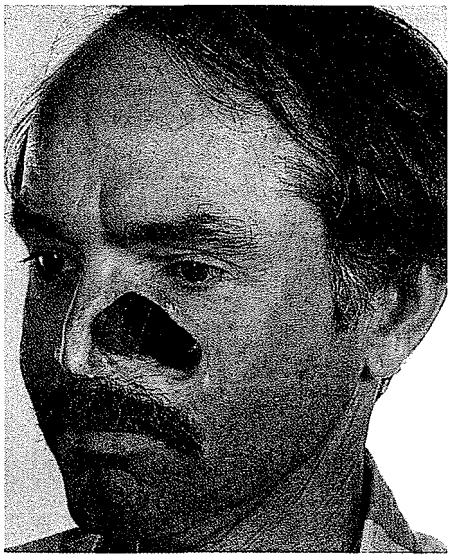
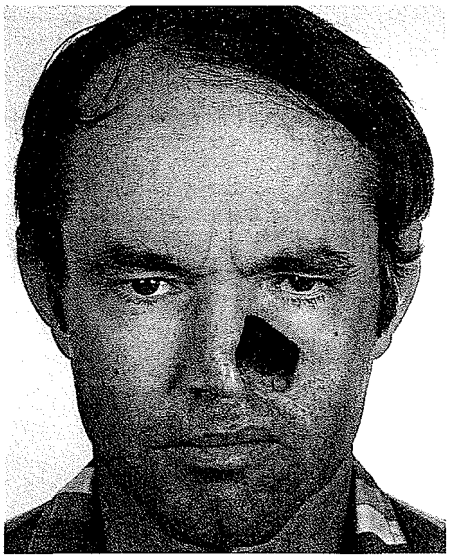
This 33-year-old male came to me after Mohs surgery for a squamous cell carcinoma of the left nasal ala 1½ years before.

An incision along the alar margin defect allowed freeing of the nasal lining with some upper lateral cartilage which was released by a parallel relaxing incision in the vestibule. This defect was grafted with thigh skin. The raw surface of the advanced lining was covered with a superiorly based nasolabial flap. When seen two years later the patient had a suspicious lesion in the ala area which proved to be recurrent carcinoma.



He was referred to A. Ketcham for complete ablation, which involved almost half the nose but also a good portion of the left maxilla, lip, and cheek.

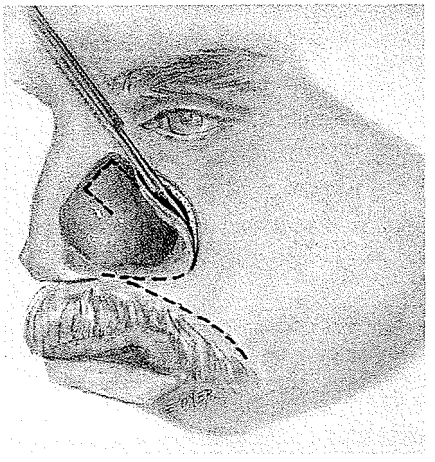



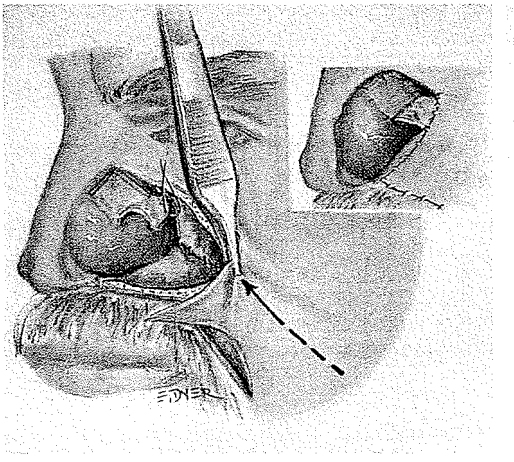
Six months later the patient was found to have Bowen's disease of the skin of two-thirds of the penile shaft. Excision and thick split skin graft cover healed with an excellent functional and aesthetic result. The patient was fitted with a nasal prosthesis and allowed to heal for two years.

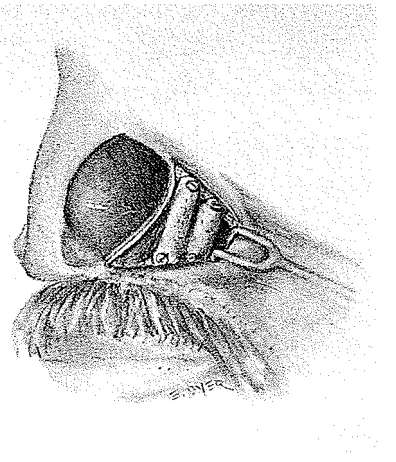
Hemirhinoplasty, as already described, is a standard procedure but the associated defect of maxilla, cheek, and lip changed the order of priorities. Before the half nose could be



reconstructed it was necessary to reconstruct the platform and delineate the cheek and nasal units. An expander was inserted under the left cheek and as soon as the stretch of cheek skin had been achieved a lining flap was developed along the maxillary margin and advanced medially and attached to a septal chondromucosal flap turned over to aid in the closure. The septal defect was covered with a skin graft. The expander was removed and the excess cheek skin advanced to cover the cheek defect up to the nasolabial line. One month later the cheek flap was reelevated and two split rib bone grafts were screwed into position across the maxillary defect from the infraorbital ridge to the lower edge of the maxillary defect. The





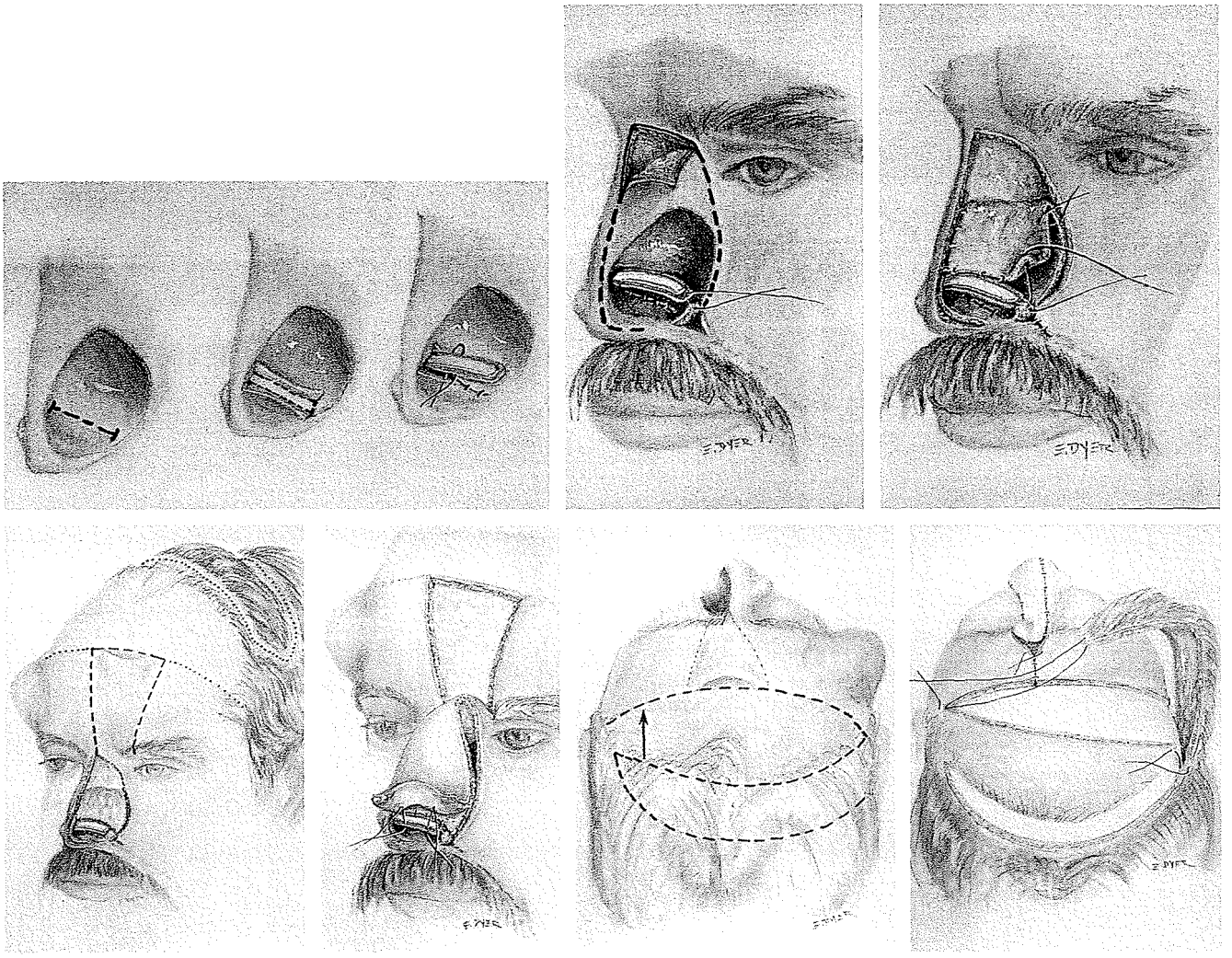


cheek flap was replaced. A vertical hemi–gull-shaped forehead flap was delayed by incisions and the alar margin prefabricated. An auricular cartilage strip was threaded into a subcutaneous tunnel proximal to the alar margin. Then a 2 cm × 4 cm thinned postauricular graft lined the ala, and split skin from the thigh covered the forehead defect temporarily. Bilateral 50-cc expanders were inserted under the uninvolved forehead skin on each side through the delay incisions. The patient was allowed to heal for six months which gave time for observation of the nasal area.

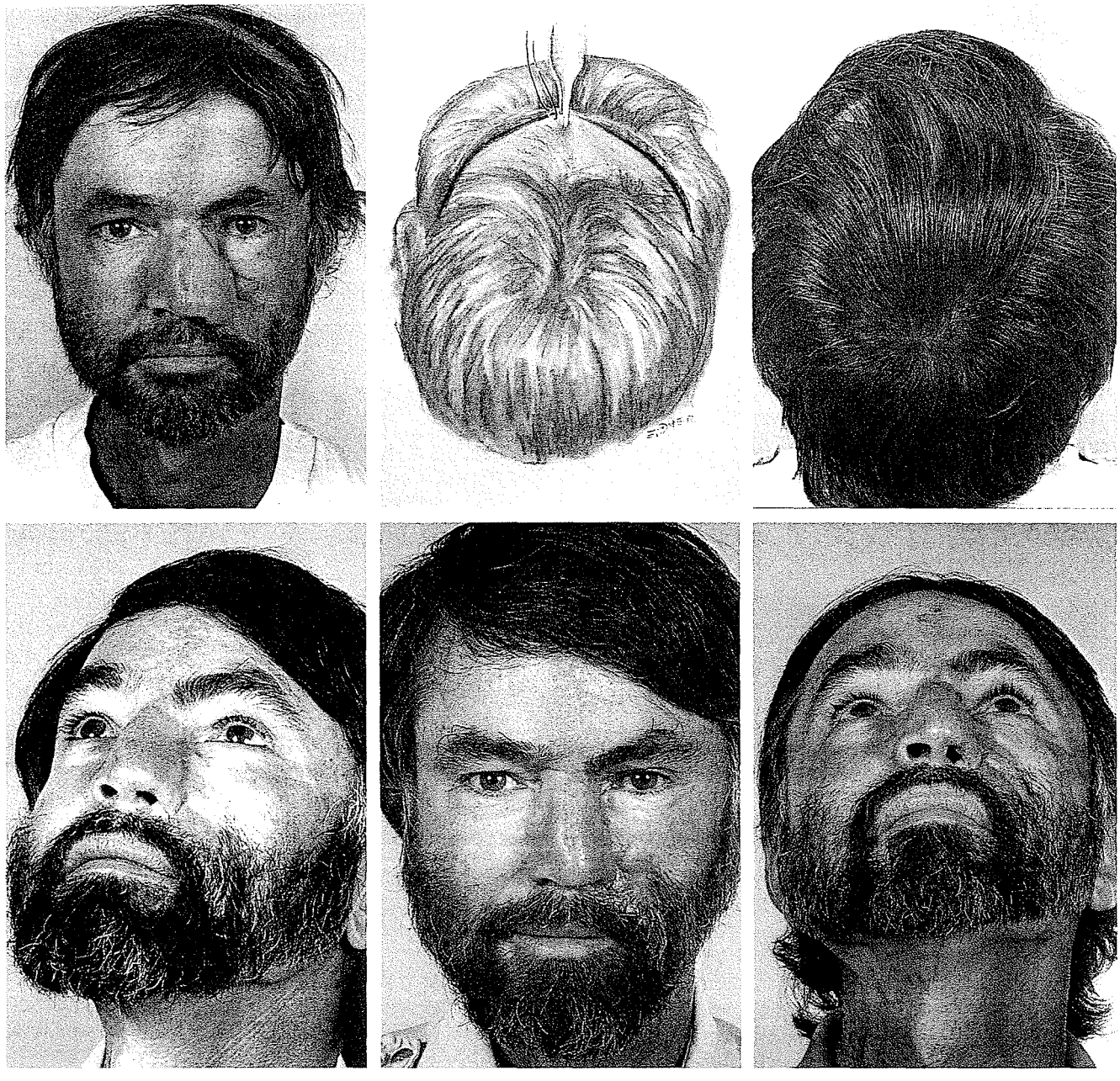
Cognizant of what this patient had been through with two assaults on his nose and one on his penis, and appreciative of his tenacity to be reconstructed, I asked him if he had any special requests. He informed me that he despised his reced-

ing hairline. So during one of the minor procedures a posterior hairbearing scalp flap was delayed.

In June 1989 the expanders were removed and all the flaps were shifted. The local lining flaps were turned, the septal chondromucosal spreader flap was swung out to line and support the distal ala, the prefabricated hemi-nose on the forehead was brought down, and the hairbearing scalp flap was



transposed forward to advance his hairline. Three months later an expander was inserted under posterior bald scalp at the same time the forehead pedicle was divided and replaced in the glabella area. Three weeks later the expander was removed and much of the alopecia excised. Refinement of the forehead flap with thinning along the alar crease completed the repair. He is well after six years.

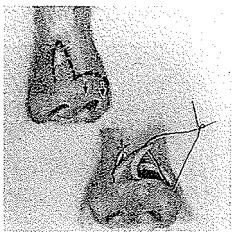




THE SHORT NOSE

The short nose, following over-enthusiastic corrective rhinoplasty and/or postoperative complications, is usually of limited degree and is discussed in the secondary surgery section.

When the shortness is unilateral and not excessive, local flaps may be of benefit. This 51-year-old female had excision of a basal cell carcinoma of her left tip and bridge inadequately repaired with a nasolabial flap. The shortness of skin hiked the tip up and out, opening the left nostril grotesquely. A vertical transposition of excess skin on the right inserted into a releasing incision on the left, along with bridge straightening, relieved the lifted tip and symmetrized the nostrils.





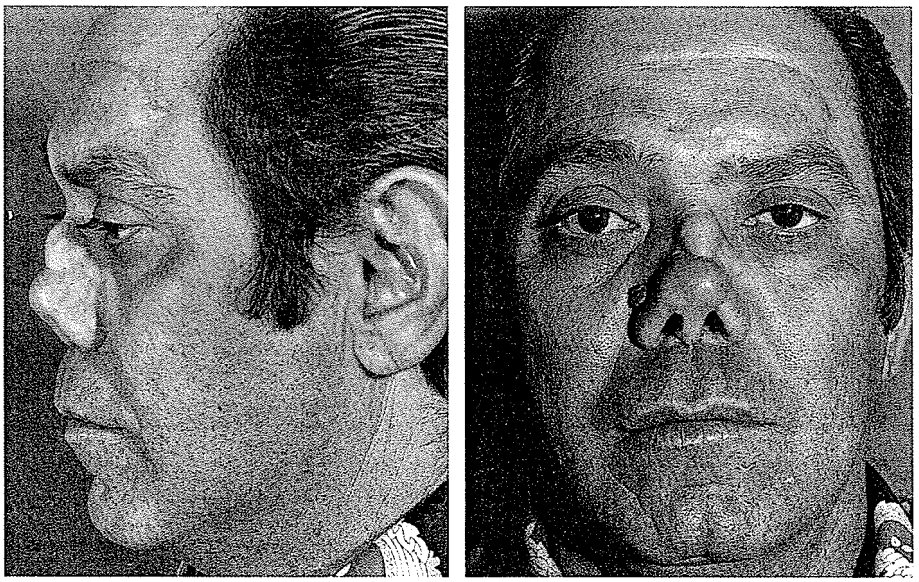
The Severely Short Nose

The pathologically short nose which resembles a pig's snout is eye-catching. Most short noses are missing central tissue, which causes normal structures to be drawn up out of place. The anterior tripod, columella, tip, and alae are usually intact but displaced upward out of normal position exposing the nostril entrances to direct view. The key to correction of this deformity is the release of the anterior tripod, swinging it back down into normal position and filling the gap to retain the correction.

Here are two short noses with different etiologies requiring variation in treatment but ending with similar results.

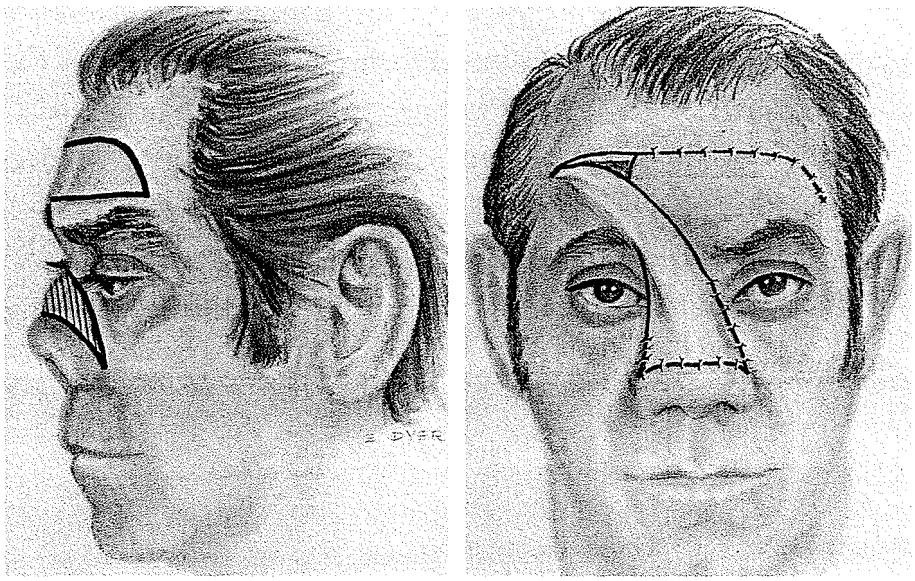
Surgery and Infection

This patient had a submucous resection of the septum at age 17 years in Cuba. He suffered infection resulting in skin loss and tip retraction. He had one unsuccessful attempt at forehead flap reconstruction. When seen at the age of 43 the patient presented severely snubbed nose with a blob of forehead skin on the bridge and scars on the forehead.

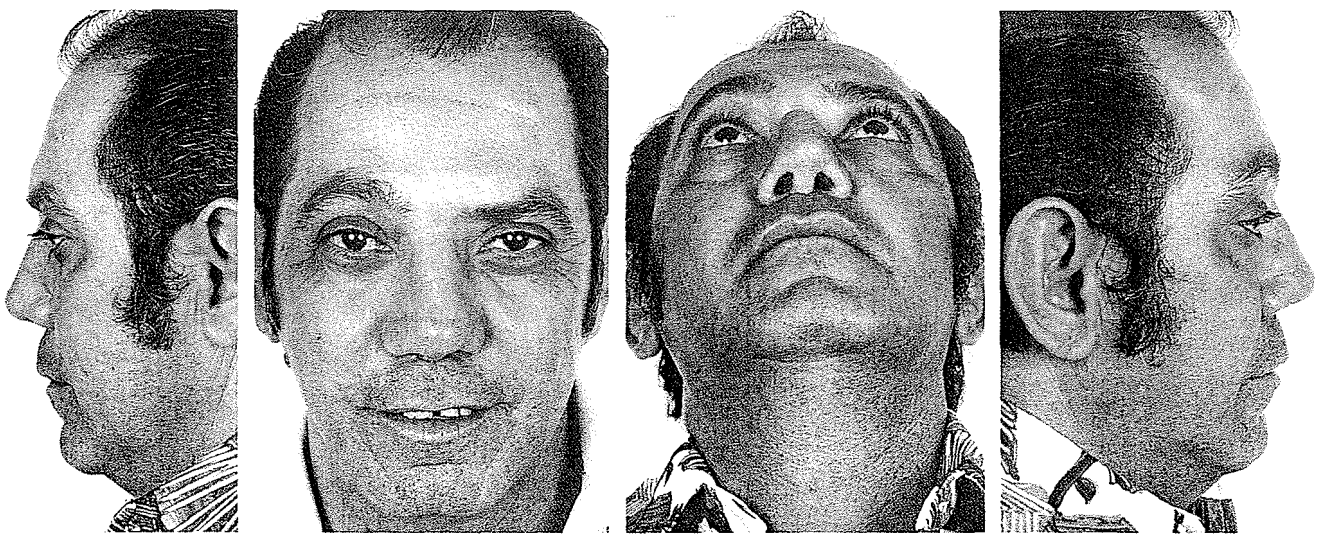


A horseshoe-shaped incision just proximal to the tip, from alar base to alar base, through skin, subcutaneous tissue, and scar, allowed the nasal tip to turn down without need to di-

vide the lining. The residual forehead flap hump, scar, and bone graft were excised as seen in the cross-hatching. The previous forehead flap was re-elevated on the right frontal and supratrochlear vessels and transposed into the cover defect and the donor area closed directly. After three weeks the pedi-

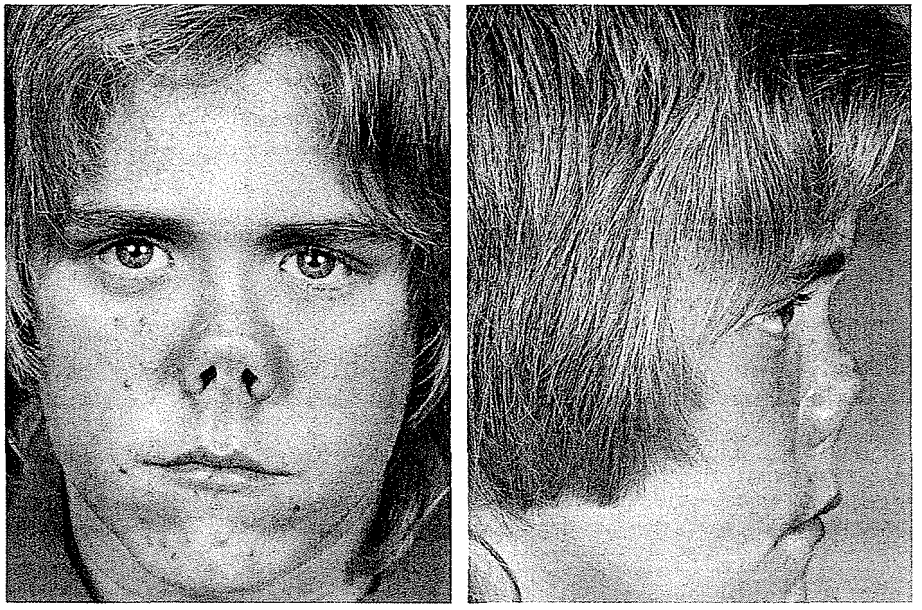


cle was divided and at six months costal cartilage struts were inserted along the bridge and into the columella. Scar revisions completed the reconstruction.

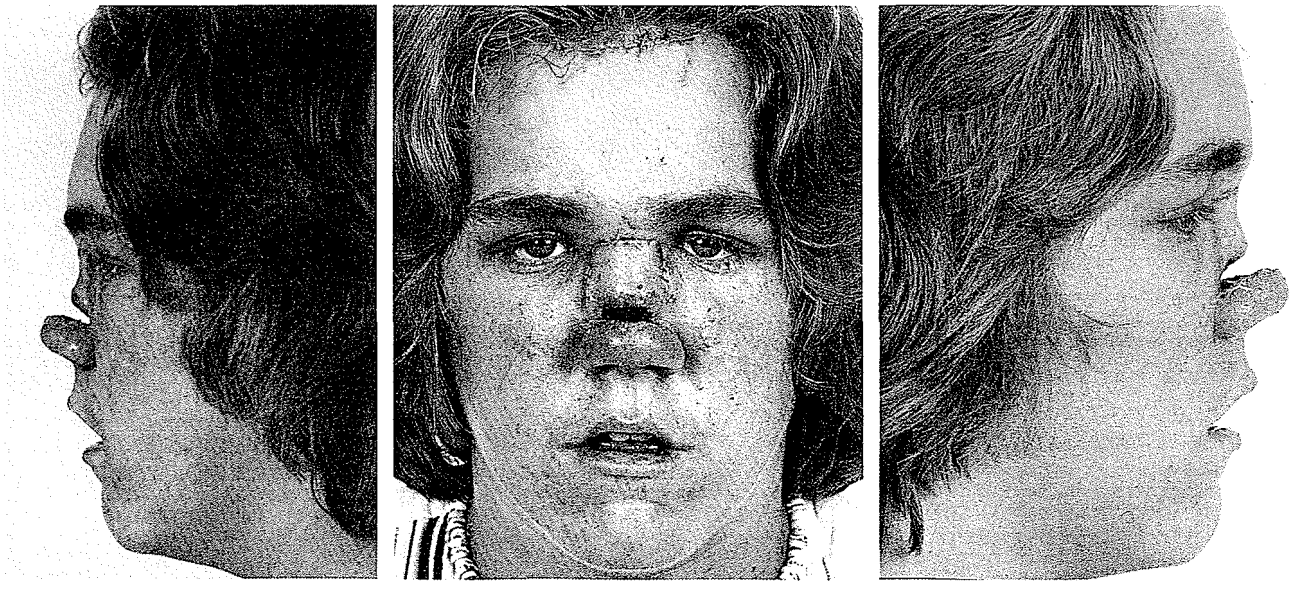


Blunt Trauma

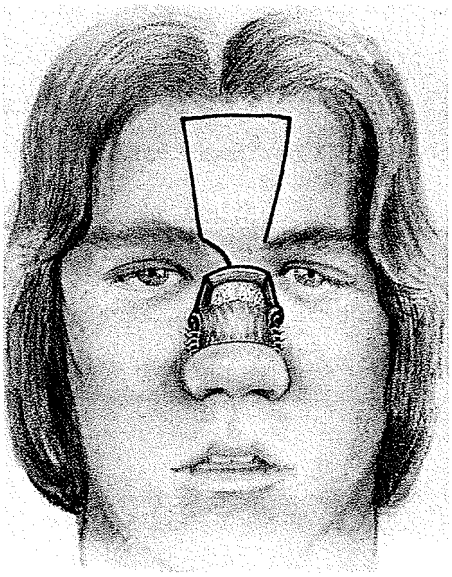
This male at the age of two years was in an automobile collision in which his nose was smashed flat, shattering his nasal bones and septum. This early injury affected his nasal growth so that at the age of 13 years he had the face and body of a man but the nose of an infant. Lack of growth in the nasal bridge allowed the nasal tip to be severely snubbed and the shortness of tissue was in all layers, cover, support, and lining.

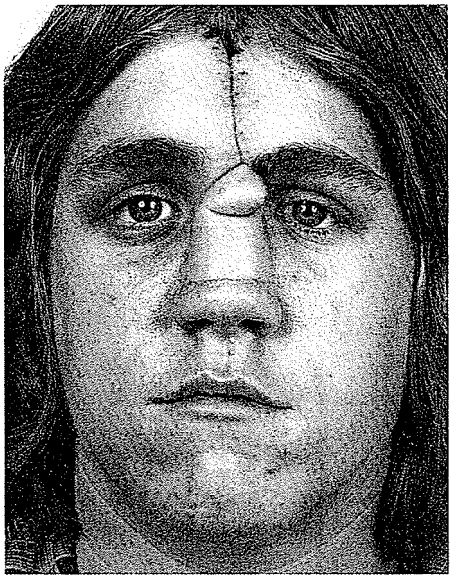


A total release, like a guillotine chop, just proximal to the nasal tip, carried through all the three layers and including the distal septum, which allowed a strut of septal cartilage to



remain with the tip section, released the retracted tip. Skin was sutured to mucous membrane around the margins of both sides of the defect. The residual dorsal nasal skin was outlined with incisions as a surgical delay for lining turndown. One month later the lining was indeed turned down and attached to the released tip. A costal cartilage strut was set on the bridge and a midline forehead flap was transposed for cover of the midsection of the nose. One month later the pedicle was





divided and replaced in the glabella area. Several minor flap and scar revisions completed the reconstruction, achieving an adult nose for this young man.



CENTRAL OR UPPER TWO-THIRDS DEFECTS

In major full thickness losses of the center or even the upper two-thirds of the nose, which maintains a supported tip in front of the defect, the reconstruction should be less complicated. It requires lining and a supporting strut of cartilage or bone to span the bridge gap from the tip tripod to any remaining nasal bone or to the frontal bone itself and skin cover. This defect is a double subunit extending from its join with the alar creases anterior to the join with the nasal base or frontal bone posteriorly. This section, nestling between the tip and the head, is reasonably well camouflaged purely by its position. It will even accept skin cover other than forehead.

HEMICENTRAL DEFECT





This 48-year-old female with basal cell carcinoma of the right nose and medial canthus was treated with Mohs surgery resulting in loss of the right central nose, tear system, and deformity of her medial canthus.

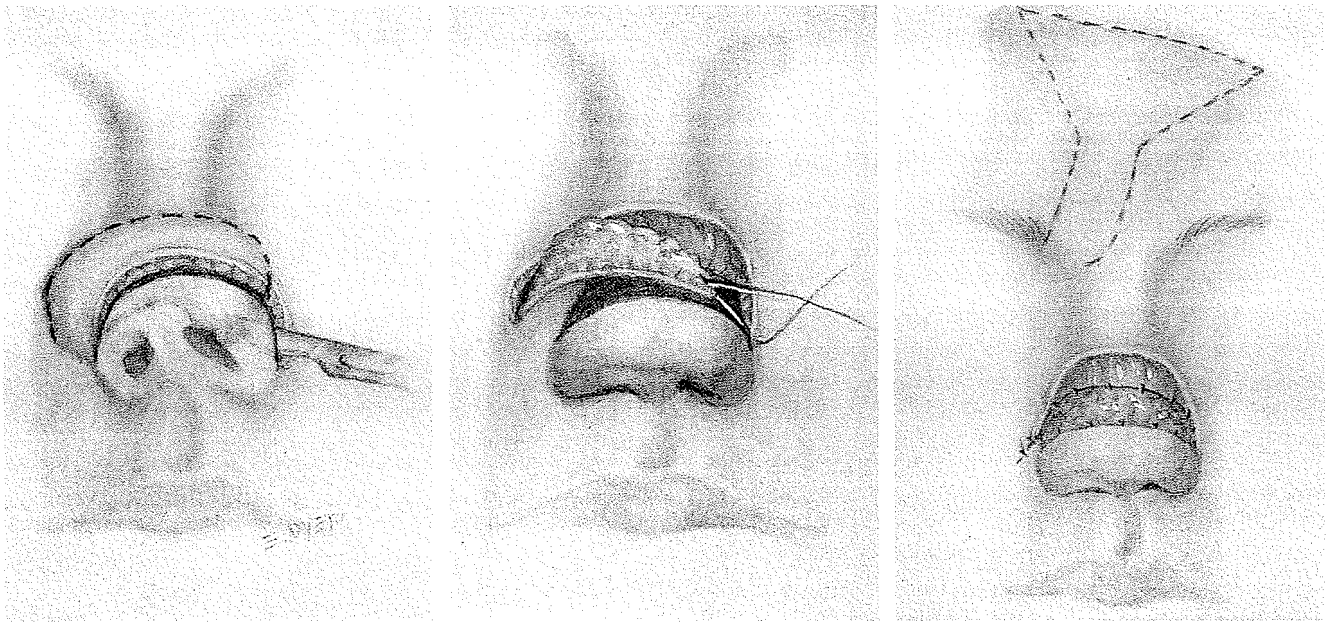
A year after ablation a probe was passed through her lower lid puncta out to the skin so that a skin flap continuous with a puncta could be cut and rolled on itself and sutured with 5–0 catgut to create an inverted skin tube. A hole was drilled through the frontal process of the maxilla and the skin tube passed through the bone and into the nasal cavity so that tears could flow normally. The medial lower eyelid was freed, lifted and fixed at the canthus. Lining was later turned across the nasal defect and a vertical forehead flap based on the left supratrochlear vessels was transposed to cover the nasal defect. Split rib grafts replaced the lost bone in a final stage.

A CENTRAL TRAUMA LOSS

This 31-year-old female suffered a crushing facial injury in an auto crash. She lost her left eye along with avulsion of the right tip and center of her nose. There were also multiple fractures of her maxilla. She had been treated with a right nasolabial flap transposed inartistically across the bridge and tip of her nose which did not deter the tip retraction.



The nasolabial flap was split longitudinally, leaving the lower third on the tip. Along this cut the usual transverse U-shaped chop through all layers released the retracted tip into normal position. Then the remaining upper two-thirds of the nasolabial flap was re-elevated on its original base and turned over to fill the lining defect left in the wake of the release. A



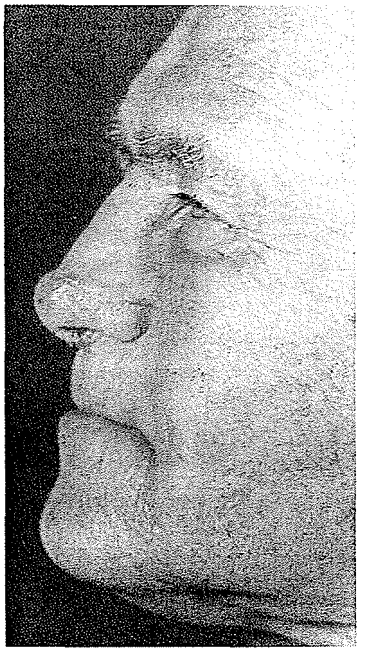
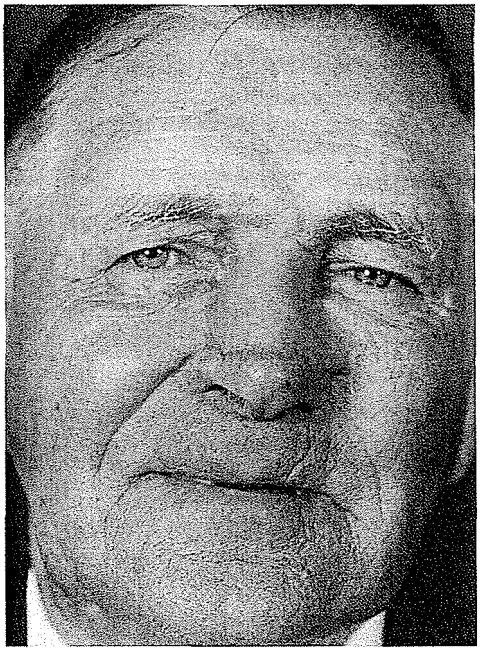
bridge rib graft was placed on the lining in the midline and a vertical forehead flap based on the right supratrochlear vessels was brought down for cover. Iliac bone onlay grafts applied to the maxilla improved contour and an artificial eye was of ben-





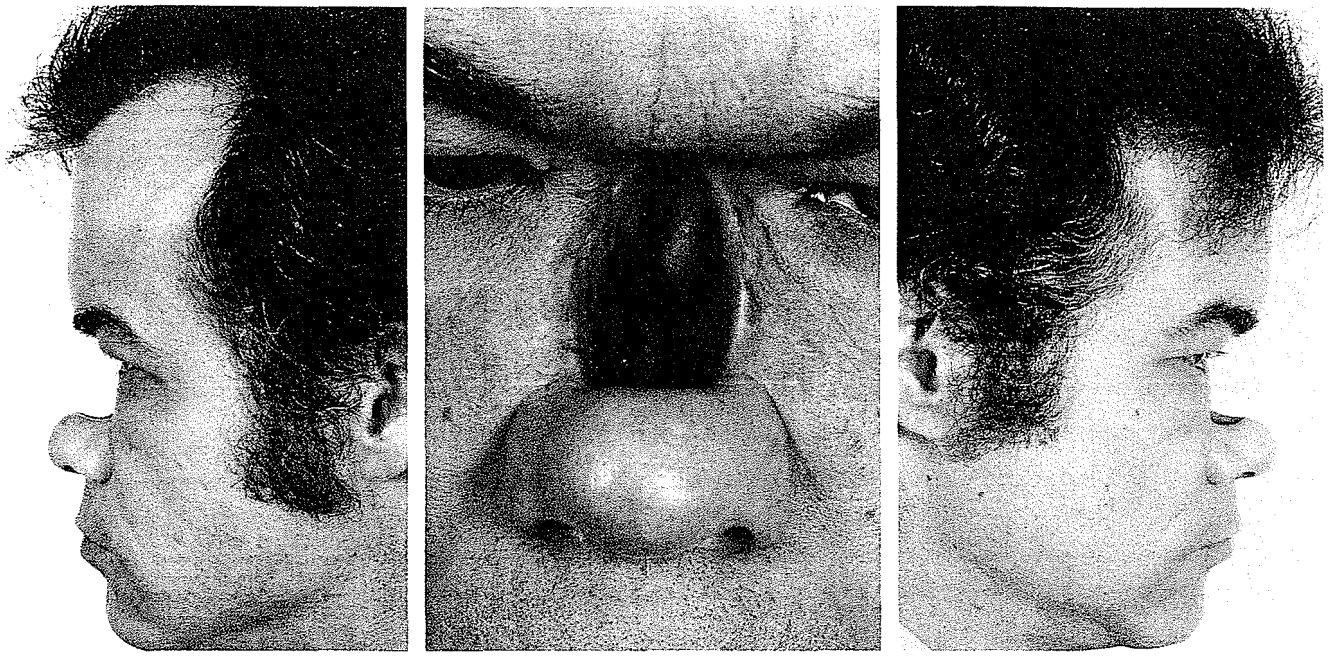


efit. Another middle-third loss from carcinoma ablation was treated by a turndown of lining followed by a forehead flap for cover.

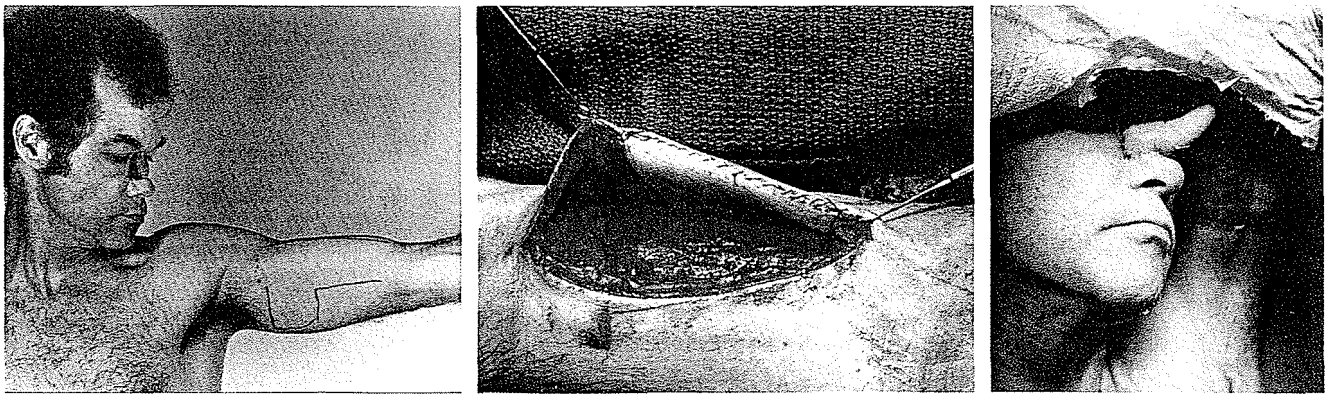




TOTAL UPPER TWO-THIRDS LOSS

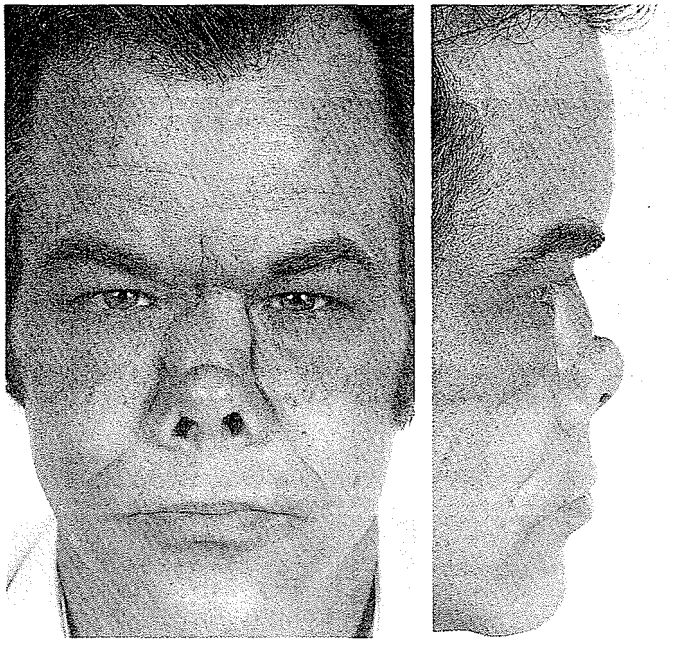
This 36-year-old male had an en bloc resection of the total central upper two-thirds of the nose and septum for squamous cell carcinoma. This was followed with radiation treatment and chemotherapy. Two years later he was without recurrence.



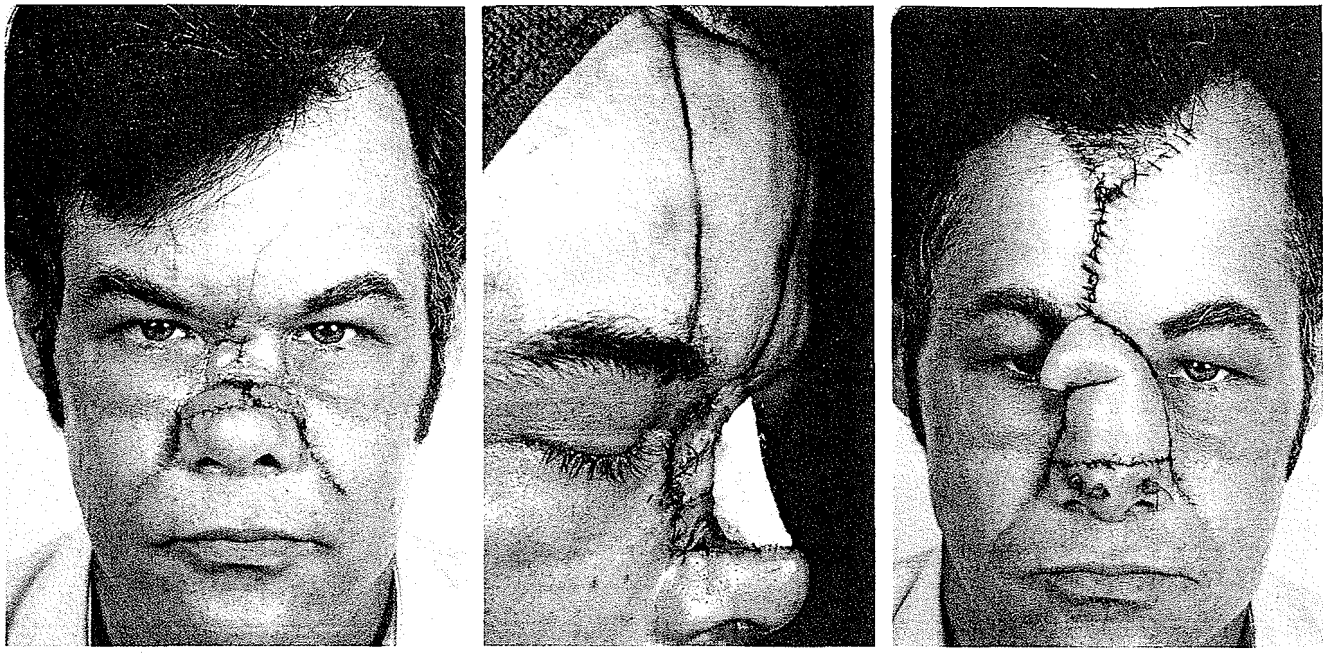
To supply both cover and lining for this defect would have destroyed his forehead. Thus a flap, designed on his left upper arm, was tubed distally and lined proximally with an inturned flap while the donor area was covered with a split skin graft. Seven weeks later the edges of the nasal defect were freshened and incisions around three edges of the folded skin paddle made it possible to plunk the lined flap into the nasal defect and suture the three sides in two layers. Twenty days



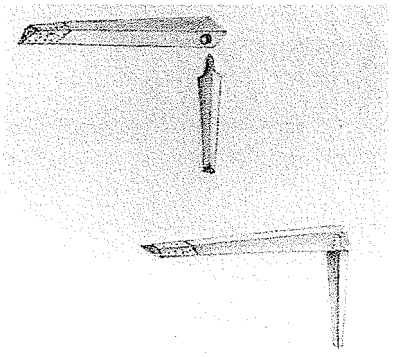
later the pedicle was divided releasing the arm and the free end of the pedicle was inset. It was evident by the multiple tiny fistulas around the join of the flap to the nose that healing had not been vigorous, probably due to the avascularity of the recipient bed following radiation. These fistulas were closed but the lined arm flap, being totally dependent on its blood supply from the radiated edge of the defect, was in question. Two months later a costal cartilage graft was inserted for bridge support but, probably due to poor blood supply, became infected and had to be removed. This was followed by contracture. It was then necessary to release the re-

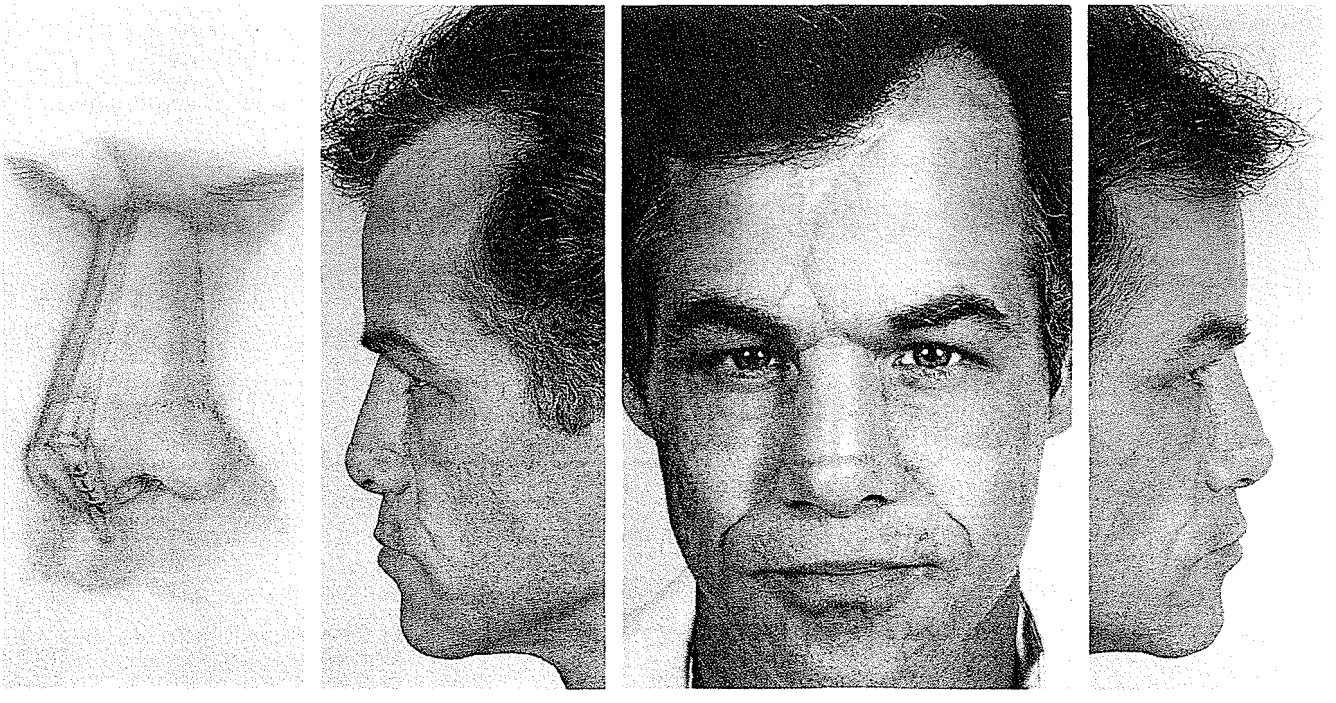


tracted nasal tip, and turn down the arm covering skin for extra lining. Bilateral nasolabial flaps were used to help to cover this lining flap and stabilize the tip release. A midline forehead flap was delayed. After two months of stabilization of the tip position, a cartilage graft for the bridge was fixed in position and covered with the forehead flap which brought in its own blood supply. The healing was without incident. Five weeks later the skin pedicle was divided and replaced but the supratrochlear vessels were kept intact to maintain adequate blood supply to the area. Later a two-piece costal cartilage was inserted through a columella splitting incision and mortised tip under tip to enhance the bridge and tip support.



Ten years later I received a letter from the patient stating, "The reconstruction of my nose is about the only thing that has not changed over the years. A year ago bone cancer was found in my left maxilla which required removal of my cheek bone and half of my palate. They followed this with neutron radiation therapy and fitted me with a prosthesis which allows me to eat and talk."





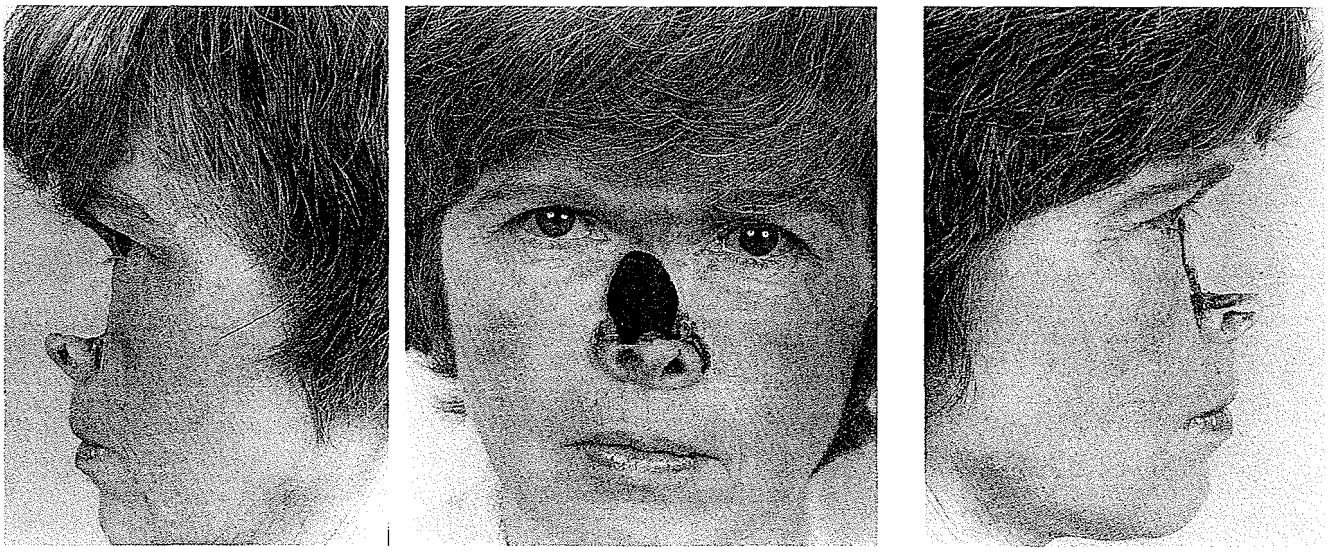
A MORE THAN UPPER TWO-THIRDS LOSS AND A LESSON

This 45-year-old female had had radical excision of almost her entire nose and septum. There was a residual of columella, a sliver of septum, and thin alar rims which had retracted back

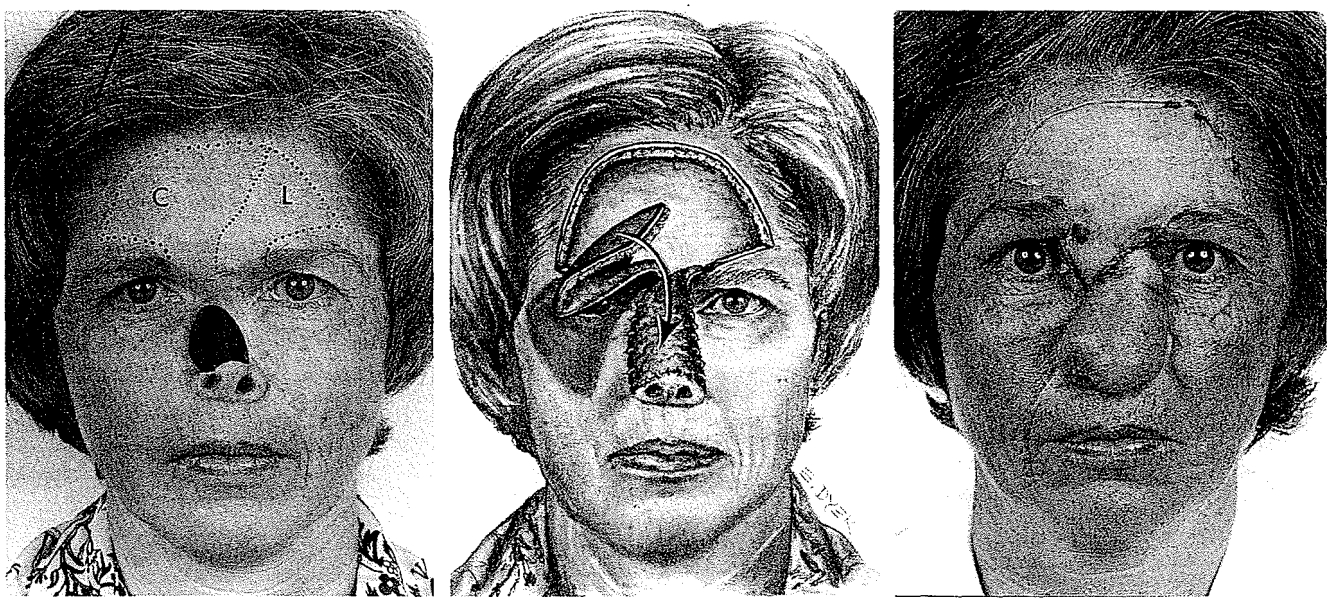


into the defect. The ablation surgeon declared the patient ready for reconstruction after one year.

The first step in reconstruction was to bring the residual columella and alae out and down into normal position taking excess mucosa from the vestibule to wrap around as a closed unit. Skin grafts were applied to the raw areas in the vestibule.



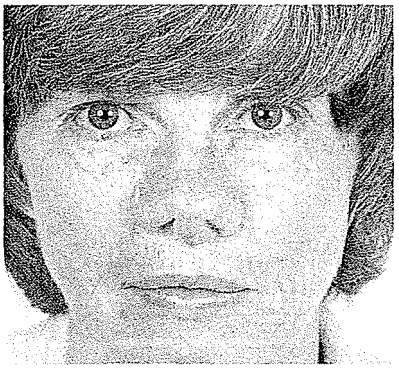
The forehead, being too small to supply either lining or cover and get primary closure, was divided into two flaps by surgical delay. Two months later the lining was brought down on the left supratrochlear vessels and sutured to turned up edges around the nose hole and to the superior edge of the residual tip. This flap was then covered with a right forehead flap based on the right supratrochlear vessels. The total forehead was covered with a one-piece skin graft as a single regional unit. Two months later a rib cartilage graft was



inserted for bridge support, but infection forced its removal. Eight months later a second rib graft also failed due to infection. Following these complications the nasal lining began to shrink and the shrinkage caused shortening of the nose and contracture of the covering flap, creating severe irregularities and some collapse. There was no more forehead available for a second try so I stalled for time.



By eight more months the tissues had softened. It was then possible to lift the covering flap, stretch it smooth, turn up nasolabial flaps to lengthen the edge of the contracted lining, and bring the covering flap back down in corrected position. Ten months later a new cartilage graft to the bridge seemed to be successful. The alae were rotated medially with a cinch procedure and the nose tailored by alar margin excisions and thinning of the alar crease areas.





A Residual Tragedy

Three years after completion of her nasal reconstruction recurrence was found which was diagnosed again as morphia-like basal cell carcinoma of the nasopharynx and oropharynx. On November 25, 1985, resection of the reconstructed nose, both nasolabial folds, a portion of the left upper lip, and, through a left Caldwell-Luc procedure, sinus mucosa of the left maxillary antrum was removed. All margins were free by frozen section. Permanent sections revealed residual tumor, so on February 26, 1986 resection of the right posterior 2 mm of alveolar ridge was followed by maxillary resection and application of a skin graft to the partially excised upper lip.

The patient healed well, was fitted with a three-piece prosthesis that closed her palate hole to make speech and eating possible, and was covered with a nasal prosthesis which provided reasonable camouflage of her deformity.

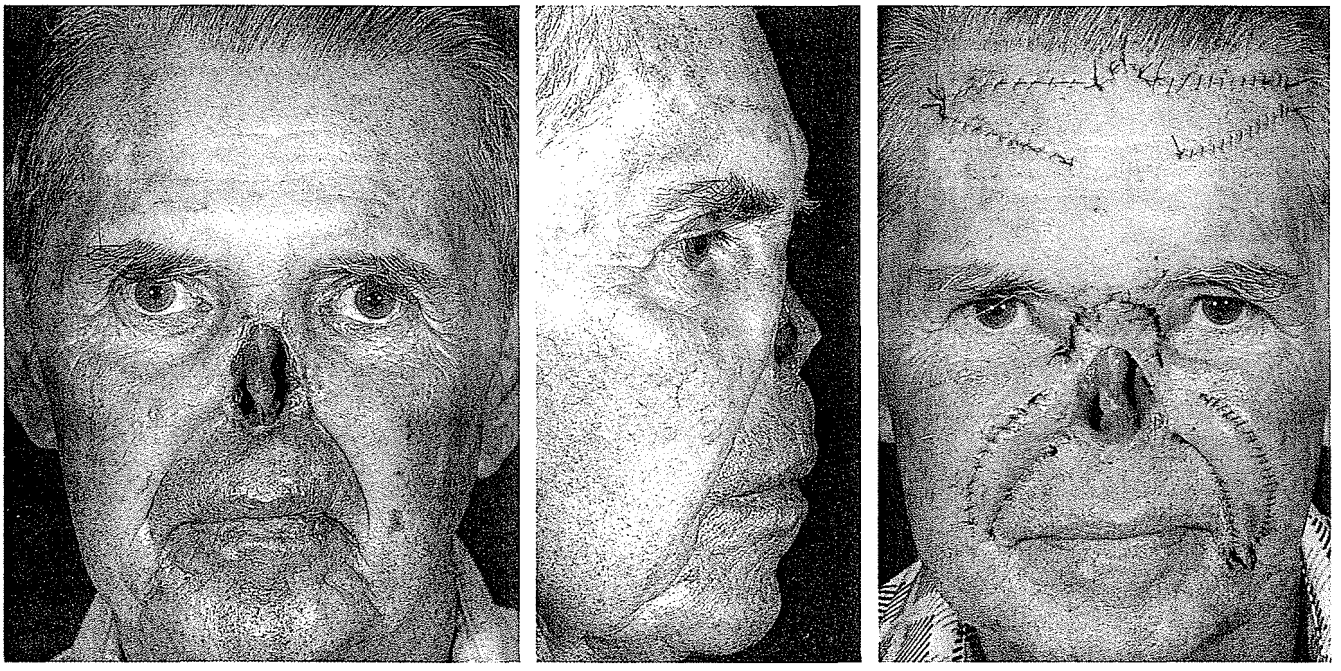
Oncologic surgeon D. S. Robinson in retrospect feels that the green light might have been given too soon for reconstruction. He prefers to observe this type of case for at least two years after resection before reconstruction is begun.



LOSSES OF THE DISTAL NOSE

In losses of the distal nose where the tip, columella, alae, and anterior septum are missing, the key to reconstruction lies in the anterior septum. It is in great part responsible for tip and alar support. When there is loss of anterior septum with only inadequate residual septum remaining, then support must be introduced into the columella and even the alae. This requires the old method of double flaps, lining and cover, having struts of cartilage inserted into the center of the various sandwiches. The obvious bulk of these layers prevents simulation of the aesthetic slimness of a normal columella and alae.

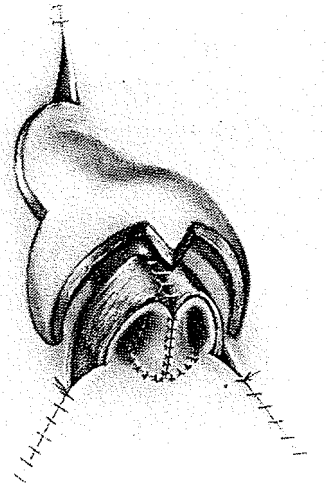
Here is an example of this approach which only after several thinning procedures presented an acceptable aesthetics. This 69-year-old male had a 40-year history of recurrent basal cell carcinoma of his nose treated by radiation, cautery, and local excisions. Wide local excision to clear margins removed two-thirds of his distal nose including most of his septum.

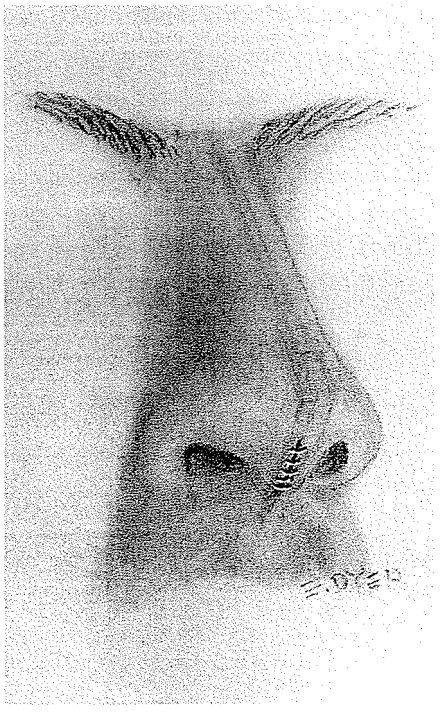
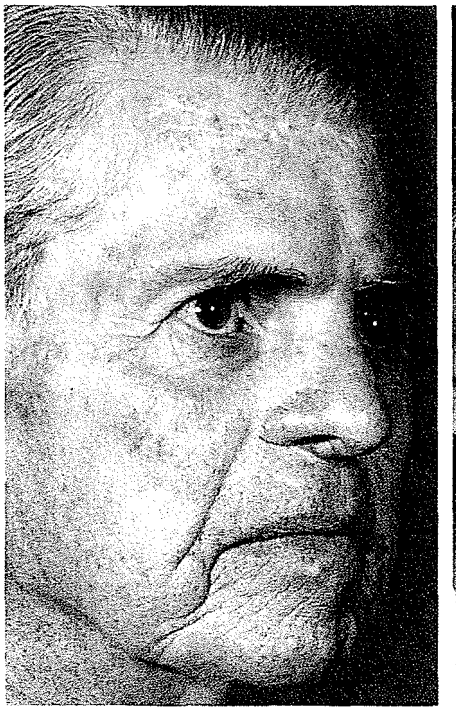
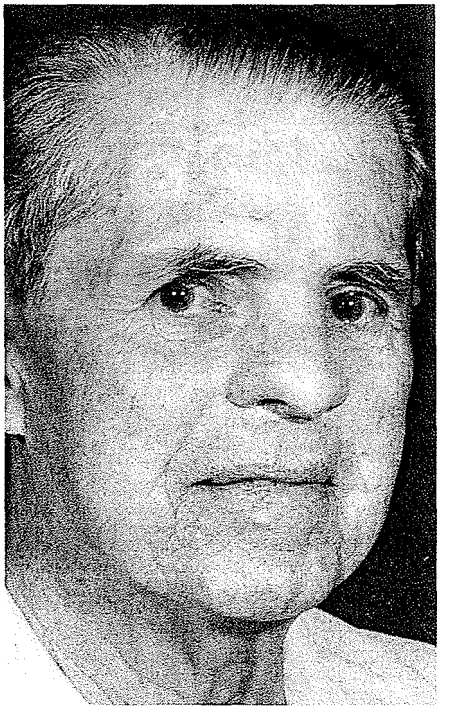


After 6 months' healing, a local upper bridge skin flap, bilateral nasolabial flaps, and a headless gull-shaped forehead flap were delayed with incisions. Two months later, the local lining was turned down, the nasolabial flaps were turned over

into a back-bend to form a columella, and the pointed-neck gull-shaped forehead flap was brought down for cover blending the tip into the columella. The forehead donor area was closed by direct advancement.

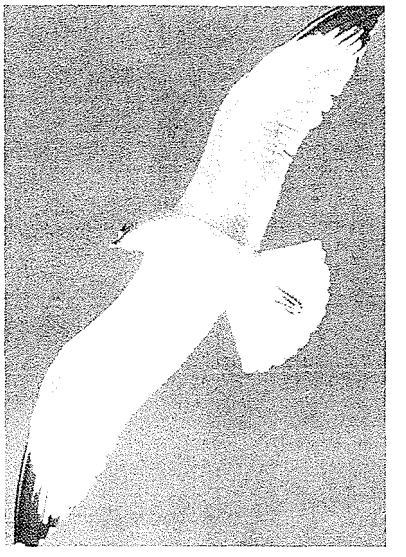
Four months later the forehead skin pedicle was divided while preserving the neurovascular bundle. Later a costal chondroperichondrial hinge graft was inserted to give a finer bridge and better tip support. It required several sidewall thinning procedures through marginal incisions to shape the nose and open the airways.

The Seagull Flap

In 1974, in *Plastic and Reconstructive Surgery,* I first presented the seagull-shaped forehead flap which is reminiscent of earlier flaps but the subtle variations make the difference. When the height of the forehead is near three inches and the size of the defect is less than the total nose, a forehead flap design can be made in a shape and with aspirations not unlike Jonathan Livingston Seagull. The svelte body usually little more than one inch (but can be wider) is poised in the vertical axis with its tail based on the medial aspect of one brow to include the supratrochlear vessels. The wings are spread out along the natural transverse lines of the forehead, tapered at each end, and shaped wide enough to construct alae and long enough to curl as alar bases across the anterior nasal floors as nostril sills. The neck-head-beak end is destined for the tip and columella. At the first operation this flap is delayed by interrupted incisions circumscribing the gull.



This specific gull pattern supplies ideal cover in regional units for the bridge, tip, alae, and columella. Designing the flap both in the horizontal and the vertical axis reduced the amount of forehead taken in any one plane; this facilitates primary closure in an inconspicuous midline "T" scar.

Lest you get sucked into the routine of cutting all seagull flaps with cookie cutter identical similarity, remember the spirit of Jonathan Livingston Seagull: Any old Miami Beach seagull can glide gracefully under the sun. The discontent Jonathan, with persistence and adaptability, achieved the impossible in gull speed by varying with trimming the width of the wing spread to the shorter, faster falcon proportions.

Bach's words are still inspirational:

> He climbed two thousand feet above the black sea . . . brought his forewings tightly to his body . . . and fell with a vertical dive . . . The wing-strain now at a hundred and forty miles per hour wasn't nearly as hard as it had been at seventy and with the faintest twist of his wingtips, he eased out of the dive and shot above the waves, a gray cannonball under the moon.

In other words, fit the pattern of the gull shape to the specific nasal defect—half a gull for a hemi-nose, short falcon wings for reduced alar coverage requirements, and other variations for the specific deficiencies.

The forehead flap is usually incised through full thickness and then peeled off the galea leaving the cranial periosteum intact. If a thin flap is desired for a special cover the galea and a thin layer of adipose tissue can be shaved from the undersurface. Remember that the main vessels run just under the dermis and thus are safe.

OTHER PEDICLE ADAPTATIONS. When the forehead is narrower than ideal to supply a vertical seagull flap, then it may be necessary to slant the axis of the flap toward a bald bay. This donor area loses the value of a midline vertical axis and causes some asymmetry to the height of the brows, but careful juggling at the forehead closure and combing the hair forward often renders the sacrifice justifiable.

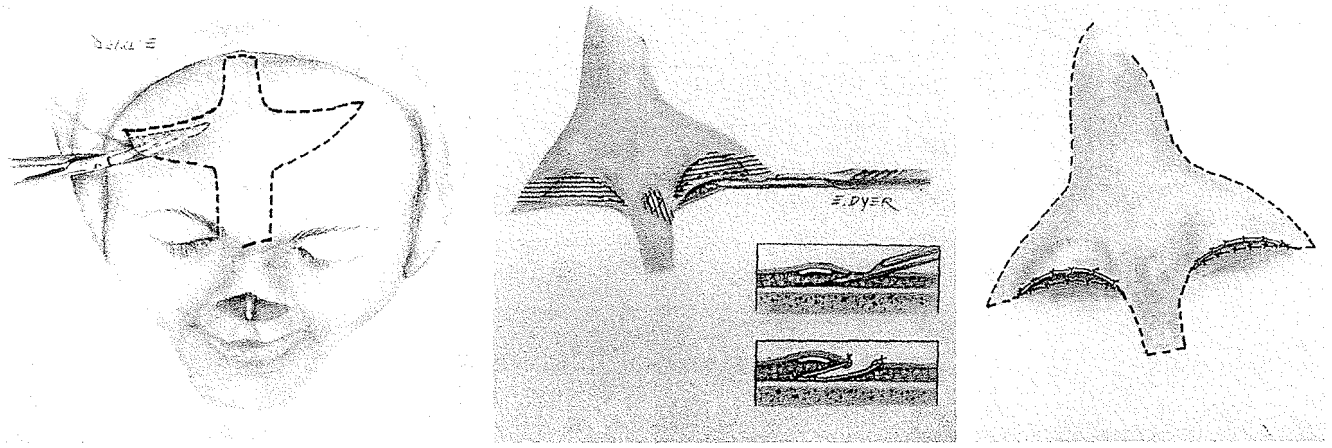
It is also important to know that it is possible to get an extra inch or more of maneuverability by extending the base of the flap down through the eyebrow, making certain to preserve the supratrochlear vessels safely in the base. It is far better to extend the flap and ease the tension than force a too short flap tight against the kink of its turn. Understanding this one principle can make the difference in the success of your forehead or any other flap transfer.

As G. C. Burget was a plastic surgery resident at the University of Miami while I was developing the seagull forehead flap, he was taught how to plan a forehead flap, shape it, thin it, implant it, and revise it. F. J. Menick was a fellow at the University of Miami, and their book *Aesthetic Reconstructive Rhinoplasty* teaches sound principle and careful detail.

Alar Prefabrication

When one or both alae are part of the deformity, then special need to achieve splinted, lined alar rims calls for prefabrication. In 1943 H. D. Gillies advocated auricular chondrocuta-

neous grafts to line and support the future alar rims on the forehead flap. I first used this procedure in 1953 and continued with it for many years. In 1988 I published a modification which increased the effectiveness and safety of alar reconstruction. During surgical delay of the forehead flap, gull-shaped or modified, incisions along the future alar margins should be cut on the bias, leaving a sharp distal edge slightly under 1 cm in depth. Just proximal to this thinned edge, but parallel to it, a narrow tunnel is burrowed just under the forehead skin. Into this tunnel is inserted a strip of cartilage, septal or auricular, shaped to give the effect of the narrow roll of the alar rim and alar base. The distal 1.5 to 2 cm of the future alae are lined with free grafts, preferably of postauricular skin. The skin graft adherent to the sharp edge of the forehead flap will be visible as the delicate rim of a natural ala, and more proximal cartilage strip will provide the support and contour, leaving the rest of the forehead its natural thickness for safer vascularity. A split skin graft from arm or thigh is used to cover temporarily the forehead raw area to reduce infection. This new design avoids the bulk and the



hazards of a perfect take with the thick composite grafts and reduces the need for thinning the distal forehead flap to dangerous proportions.

Expanders

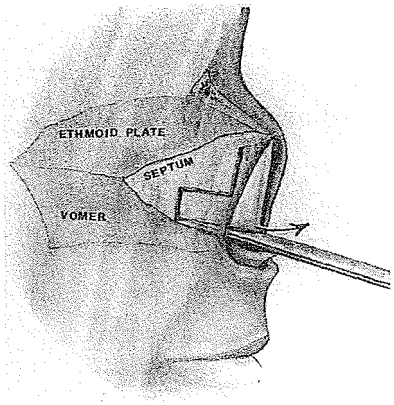
At the time of forehead flap delay, the lateral forehead on each side of the flap is elevated and a 50-cc expander inserted.

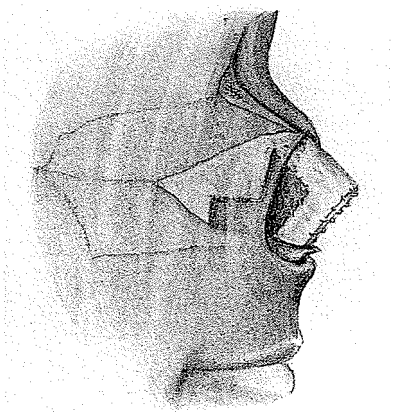
It is well to leave the lined flap 3 to 4 weeks for the skin graft to become well vascularized before transporting it to its final destination. This also allows time for adequate expansion on forehead skin.

THE L-SHAPED SEPTAL CHONDROMUCOSAL FLAP

In distal nasal losses with absence of the anterior septum the ideal reconstructive goal is to erect a septal-like scaffold for tip support. The normal septum is composed of strong, thin cartilage covered snugly on each side with thin mucous membrane, presenting a slender, compact but sturdy framework. It is impossible to duplicate the intricate structure of a septum; but if enough septum remains in a case at least it can be used.

Since in many cases much of the septum is still present, getting a tip support similar in kind to the normal, in principle, calls for moving what septum there is out into a new, normal position and maintaining it there. Thus the remaining septum often can be advanced out of the nasal cavity as an L-shaped superiorly based chondromucosal flap so that its inferior limb can be set up on the nasal spine area. The inferior edge of the septum destined to be the anterior strut of the L is incised along the mucosa on both sides and then freed from the vomer with a chisel. The rest of the L is cut through and through the septum to create the right angle.





This method was first published in 1974. It is important to keep the L more than 1 cm wide along the bridge base and around its right angle to ensure vascularity of the distal chondromucosal flap. Cartilage can be trimmed along the cut edges to allow closure of mucosa of the underside without tension. Careful subperichondrial release, which cuts the cartilage at the upper base in a "back-cut," is usually necessary to facilitate the delivery of the L-shaped flap out of the vestibule so that its distal prow can be planted firmly up on the nasal spine and the raw front area of the prow is temporarily skin grafted.

It is indeed remarkable that septal flaps have not been used more in reconstructive rhinoplasty. In 1917 J. L. Amyard, a crafty surgeon in Gillies' unit in World War I, described an anteriorly based straight septal flap which had no support at its free end and thus was ineffective. H. D. Gillies described a small septal flap based at the nasal spine which offered only modest value. M. Orticochea in 1975 presented a similar flap for expedient lengthening of the columella in bilateral clefts. This radical interruption of the septal bridge and perforation and isolation of a large portion of the septum on the nasal spine in the growing nose pose major hazards to growth and development. G. C. Burget and F. J. Menick in 1986 and again in 1993 presented a huge septal flap based distally at the nasal spine, which, after discarding much of the septal cartilage, was used for distal support.

There may be a rare instance where a distally based septal flap offers an advantage. I have used it on occasion. Yet in my experience, the simpler proximal base is superior: It is less awkward and more dependable, has better vascularity, and enjoys the engineering efficiency of a propped cantilever capable of carrying a substantial weight. The only problem I have encountered with this flap has been when previous surgeries have violated the septum in the area of the proximal base, although this is quite rare.

Local Lining

Simultaneous with the outward advancement of the L-shaped septal flap, preparation of local lining flaps is indicated. Turn-over of local skin for lining should be designed to present raw areas along natural nasal units. As these skin flaps must be based on scar they deserve a delay by specific surgical incisions. When the skin of the nasal bridge is turned down it opens a direct path for the covering flap to ascend along the bridge into the tip and columella. Turn-up of alar skin or the use of nasolabial flaps for lateral lining presents raw area units easily covered by the wings of the seagull. By design it is not necessary for the lining flaps to reach to the margin edge of

the alae. The skin grafted margins of the forehead flap extend slightly ahead of the lining flaps for aesthetically chiseled sharpness.

A WARNING. When using adjacent skin for local lining, make certain in the carcinoma cases that this skin is clear. Biopsy questionable areas, excise lesions, and skin graft the defect. Once the area has healed it can be used as an inturned flap for lining. If this precaution is not taken after the lining is turned in and covered by the forehead, potential carcinoma of the lining skin can progress undetected and eventually could cost the patient loss of his new nose or even his life.

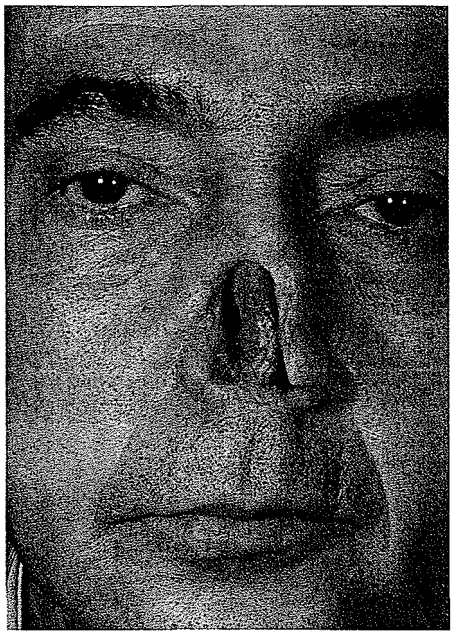
Layer Assembly

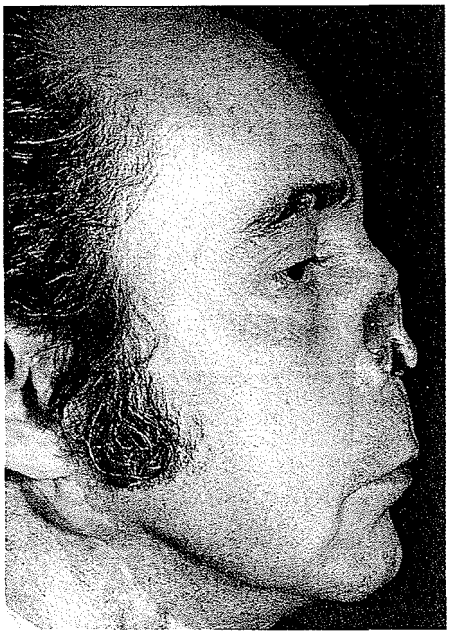
Once the septal flap is established in its forward position, the lining flaps have been delayed and the skin grafted lining of the alae of the delayed forehead flap have become well vascularized, it is time to assemble the reconstruction. This usually takes three weeks.

The mucosa along the entire peripheral edge of the septal L flap is incised and the edges turned out. The lining flaps are turned over and sutured to the mucosal edges of the septal bridge. Then the prefabricated forehead flap is brought down to cover the septum and lining. The upper edges of the alar skin grafts are sutured to the lining flaps. The wings of the forehead flap cover the alae, swinging around the alar bases and creating the nostril sills. The distal projection of the forehead flap flows over the tip and is sutured to the septal prop to form the columella. The expanders are removed and the forehead donor area closed by simple advancement. After three weeks the skin pedicle is divided and the neurovascular bundle preserved. The triangle base is re-implanted in the glabella area to realign the brow. The flap is thinned and inset in the bridge.

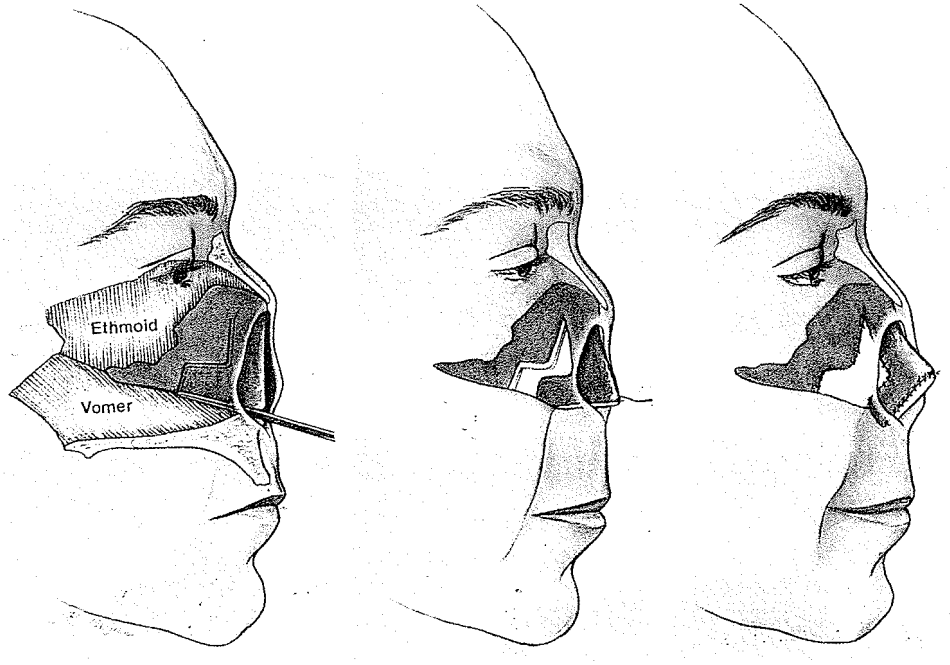
The first case in which I used a seagull-shaped forehead flap and an L-shaped septal chondromucosal flap was a 49-year-old Cuban tailor. His nasal squamous cell carcinoma

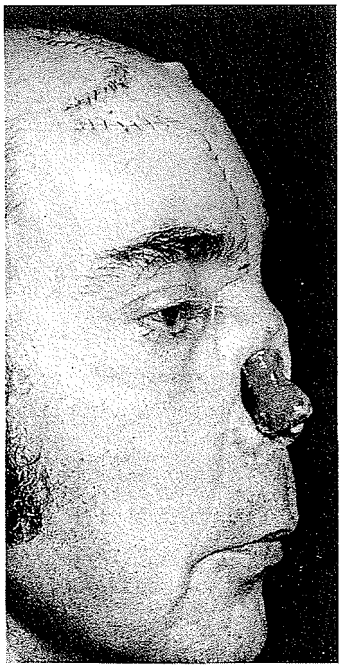
involving the tip, columella, anterior septum, and right vestibule was radically excised by J. J. Zavertnik in 1969, followed by a radical right neck dissection for positive nodes in 1970. One and a half years later the patient was referred to me for reconstruction.



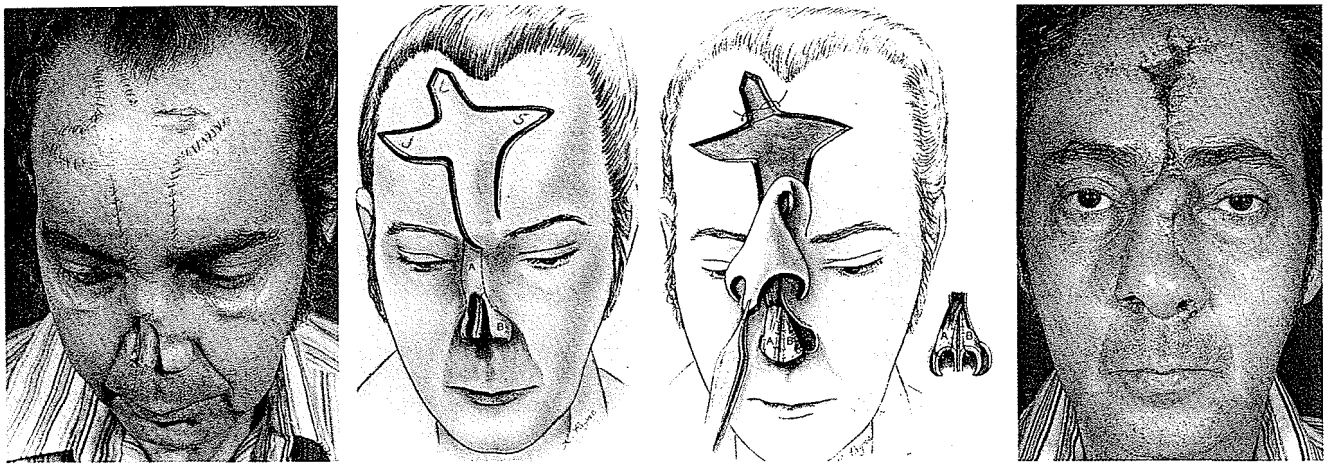


A paper model of the proposed septal flap was used in the dress rehearsal. In April 1972 an L-shaped septal flap was lifted out and wired to the nasal spine. As soon as the septal

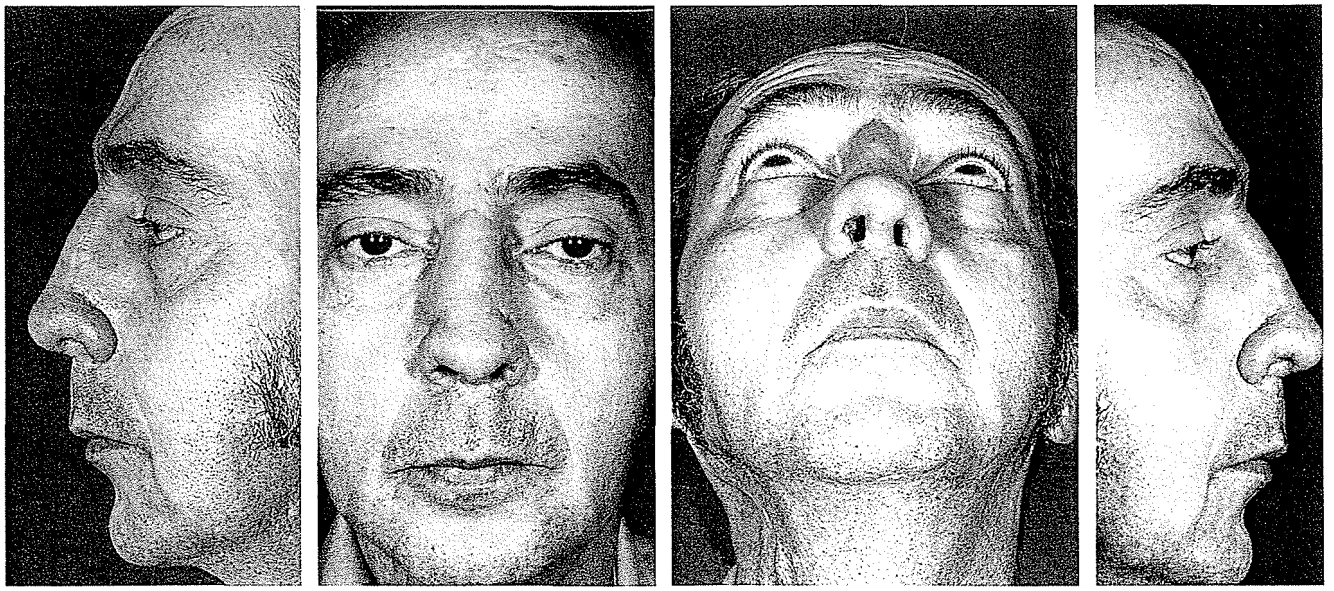




flap was well established in its new position, the seagull-shaped forehead flap was delayed. An auricular chondrocutaneous graft was used to line the future right alar rim, and a small piece of septal cartilage was inserted under the skin of the future tip. The local lining was also delayed. After three weeks the lining flaps were turned up and attached to the septal scaffold. The prefabricated forehead was brought down for cover.



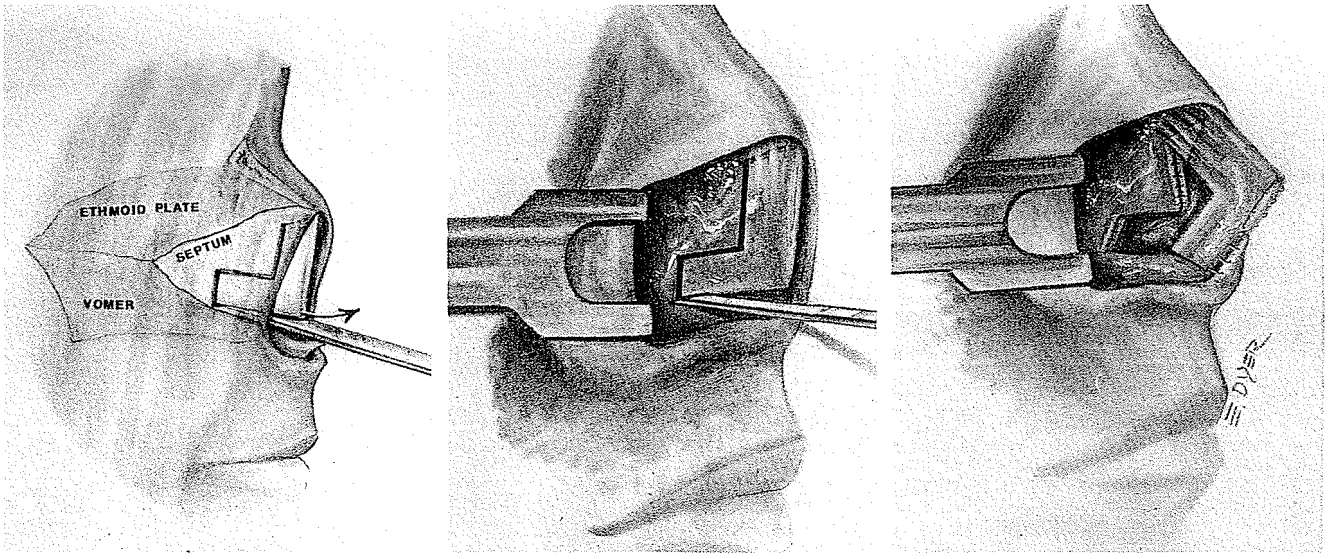
After a month the skin of the pedicle was divided and replaced in the glabella area, preserving the vascular bundle. Three months later the tip and alae were thinned. He is seen one year after repair with excellent profile and airway.



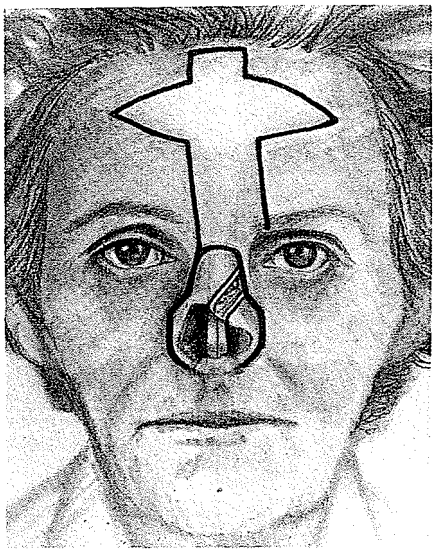
This 47-year-old female, who had radiation treatment for acne at 18, developed basal cell carcinoma of her nose. This was treated with Mohs chemosurgery. There was absence of the distal half of the nose on the right, distal third on the left, upper two-thirds of the columella, as well as loss of anterior septum and a septal perforation.



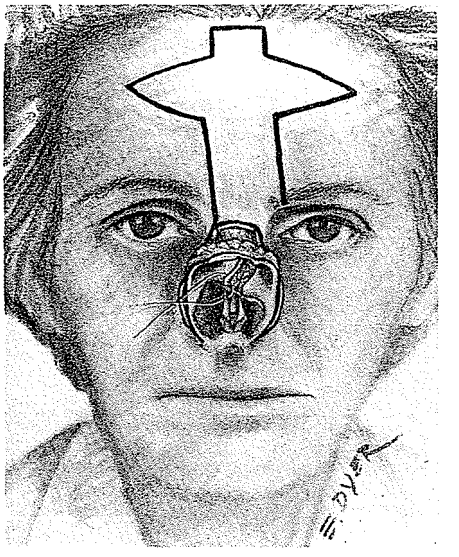
The remaining septum was advanced out of the nasal cavity as an L-shaped chondromucosal flap so that its distal limb could be set up on the nasal spine. A careful subperiosteal release cuts the stiff cartilage of the upper base to allow the L-flap to step up on the nasal spine. It is wise to advance the septal flap prior to reconstruction so that it stabilizes safely in its position as the keystone of the tip scaffold.



Simultaneous with advancement of the septal flap, the lining and covering flaps should be prepared by surgical incisions. Lining flaps should be designed along unit lines, and the covering flap should be a modified vertical seagull shape.

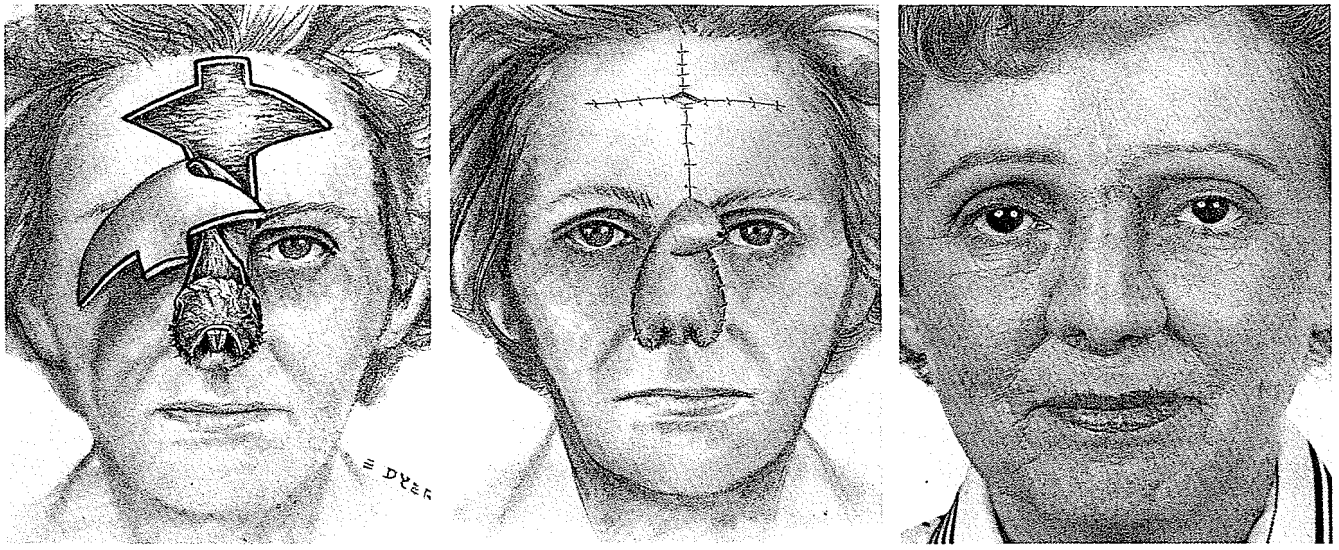






Two months later an incision was made down the center of the dorsal bridge of the septal flap extending over the tip and along the front of the anterior prow of the septal L, so that small mucosal flaps could be turned out on either side to receive the lining. In order to portion more skin for the lining on the right than the left, an oblique strip was denuded of epithelium across the lining flap. As the lining flap was turned down, its raw strip was approximated to the raw area prepared along the septal bridge. It is important that the vestibular lining be reconstructed in natural, symmetrical, sweeping webs at the tip from alae across to columella. The seagull flap then glides over to cover the entire raw area with its wings curling under to create nostril sills. The forehead donor area was closed in a T with improvement on its original wrinkling.

Two months later the skin portion of the base of the forehead pedicle was divided at an angle, leaving the neurovascular bundle intact. The nose portion was set in the upper bridge and the original base was returned to the glabella area to re-separate the eyebrows. Six months later refinements in-



cluded shaving the bony bridge straight and sculpturing the alar creases after augmenting the alar rims and tip with auricular cartilage strips.

The patient is seen three years after reconstruction showing natural-looking and functioning nose.

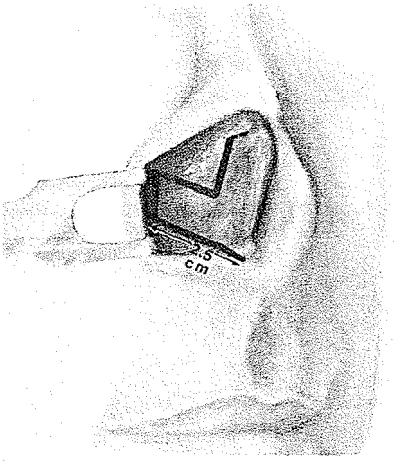


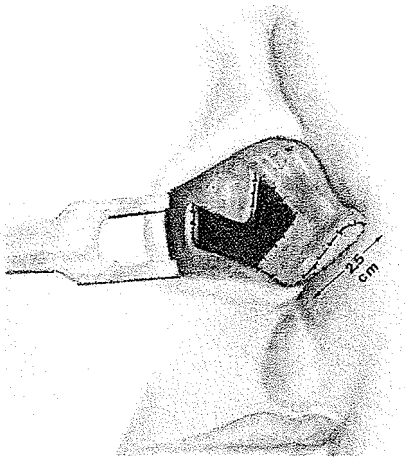
LOSS OF DISTAL TWO-THIRDS OF THE NOSE

Basal cell carcinoma in this 49-year-old female required excision of the distal two-thirds of her nose, leaving the septum flush with the pyriform opening. All that was left besides the posterior septum were the nasal bones and their covering skin. The key to this reconstruction was tip support and this case offered a true test of the method.



During the initial reconstructive stage, the proximally based L-shaped septal chondromucosal flap was advanced up and out of the vestibule. This required the subperichondrial nicking of the rigid cartilage at the base of the rotation. The slight excess cartilage along the underbelly of the L was trimmed to allow easy suture of the mucosa for a closed unit. The front limb of the L was placed and fixed on the nasal spine as a propped cantilever. The advancement of the L flap, of course, leaves a septal defect which is large enough to avoid whistling but of no further significance except as an aid to the airway. The ENT specialist consulted mentioned that crusting could be a postoperative problem. After the first few weeks of healing this has not occurred.



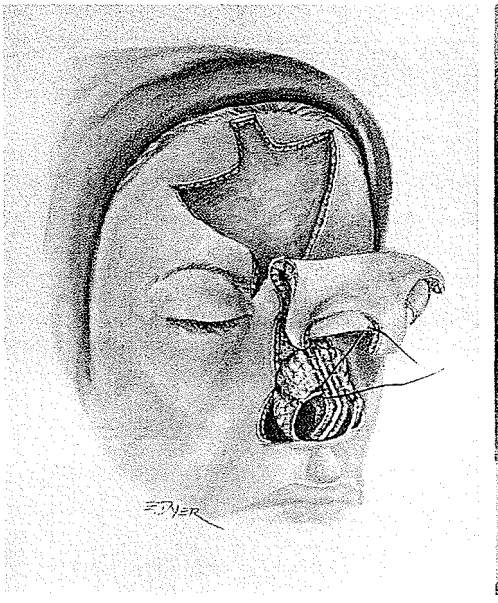




The seagull forehead flap was delayed, as was the future lining. The tip and alae were prefabricated on the forehead. The alar margins were sliced on the bias and these thinned alae were lined with skin and supported with auricular cartilage strips threaded subcutaneously just proximal to the future alar edges. The future nasal tip was defined with a small diamond-shaped cartilage graft. A month later, the mucosa of the septal flap along the periphery of the L, bridge, and front prow was incised and the edges turned out bilaterally. Then two turnover skin flaps from the upper bridge, based distally, were used for lining, being sutured to the flaps along the L and to the inside of an incision along pyriform aperture, as well as to a small triangular turn-up flap at each alar base. The prepared gull-shaped flap was brought down and set in for cover of the entire raw area, including the columella along the front end of the septal L. The forehead defect was closed under tension by undermining and advancement.





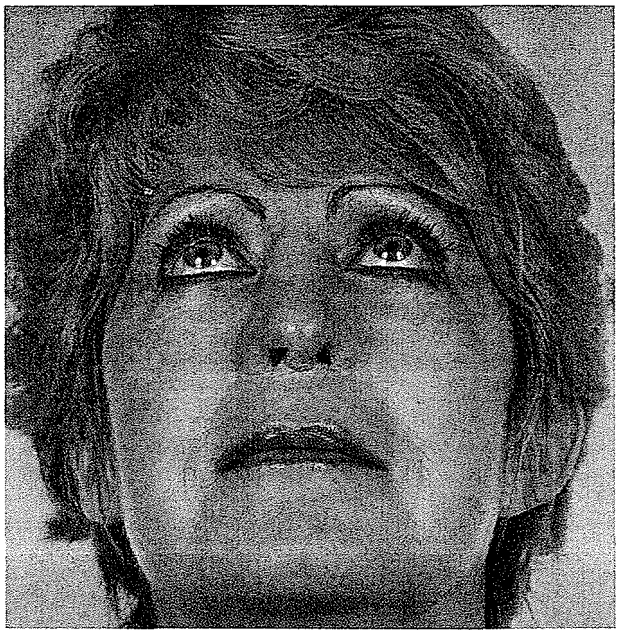






After two months, the proximal skin pedicle was divided and replaced, preserving the neurovascular bundle. Minor revisions for flap thinning and alar crease contouring completed the nasal repair. The forehead scar was unacceptable, so two 50-cc expanders were inserted on each side and after three weeks they were removed. The scar was revised and the skin approximated without tension, producing an excellent scar.





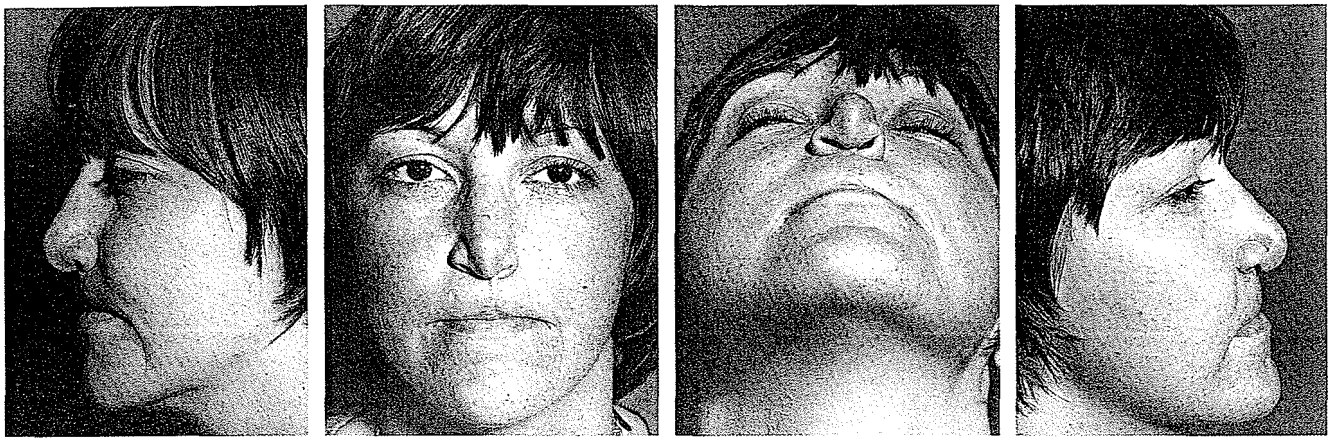


Following this case it has been routine to insert 50-cc expanders at the time of forehead delay under unused forehead skin on both sides. This is important only if the flap is over an inch wide in its body. While the delayed forehead flap is healing the forehead skin is stretched. This eases the execution on "D" day.

Near the end of this patient's reconstruction she volunteered that her new nose was better than her original one and then requested and received upper and lower lid blepheroplasty.

A SEVERE DEFECT OF NOSE, SEPTUM, AND LIP

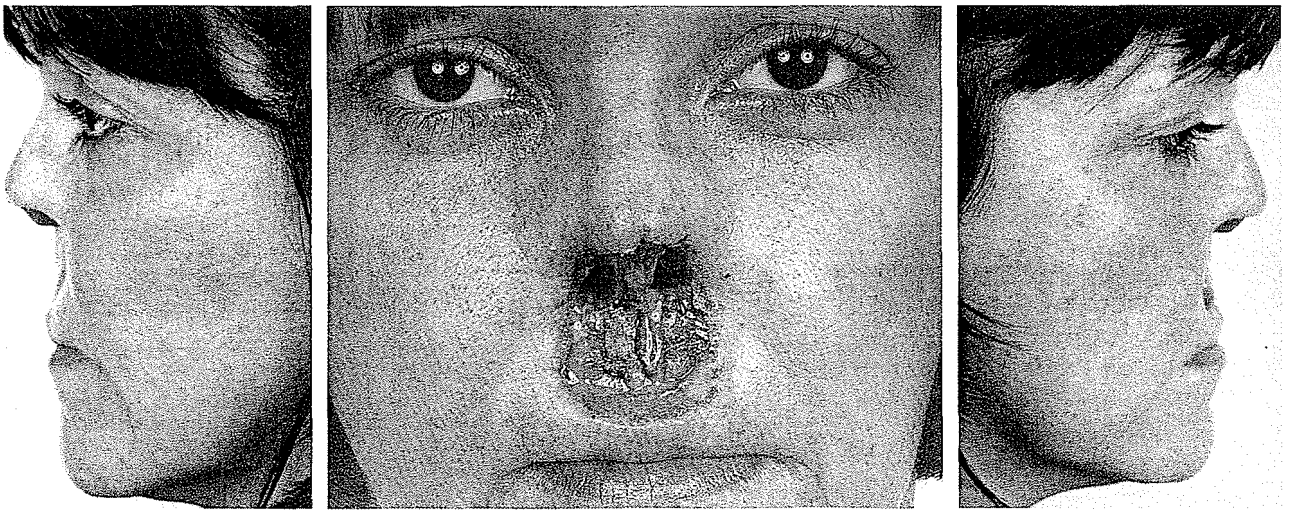
A 31-year-old female had a history of trichoepithelioma of the upper lip at the columella base. She had had Mohs chemosurgery and one surgical reconstruction. She had a depressed nasal tip, absence of columella, and tight upper lip. Release of



the nasal tip developed the true columella defect which was filled with an auricular composite free graft. The philtrum-less tight upper lip was released with a shield-shaped lower lip-switch flap. Two years later on a follow-up visit, the patient was noted to have a firmness in her nasal tip and upper



lip. Biopsy revealed residual trichoepithelioma. A. S. Ketcham carried out a wide resection of the distal half of the nose, septum, and upper half of the upper lip. When the margins were clear, skin was sutured to mucous membrane around the margins of the defect and any residual raw areas were covered with split skin grafts.



Re-evaluation of the defect revealed loss of the distal half of the nose and septum with only the nasal bones and dorsal skin covering left. The upper half of the upper lip was missing along with loss of the upper half of the lip-switch flap. Bilateral nasolabial flaps were transposed to fill the upper lip defect. The remaining dorsal nasal skin was available for lining and the forehead offered a potential seagull covering flap. There was not enough remaining septum to develop an L-shaped chondromucosal flap advancement. Yet some septum was present deep in the vestibule and its ideal qualities and proven assets served as a challenge. This sparked the use of the "crane" approach to get the L-shaped septal support.

L Septal Flap on Crane

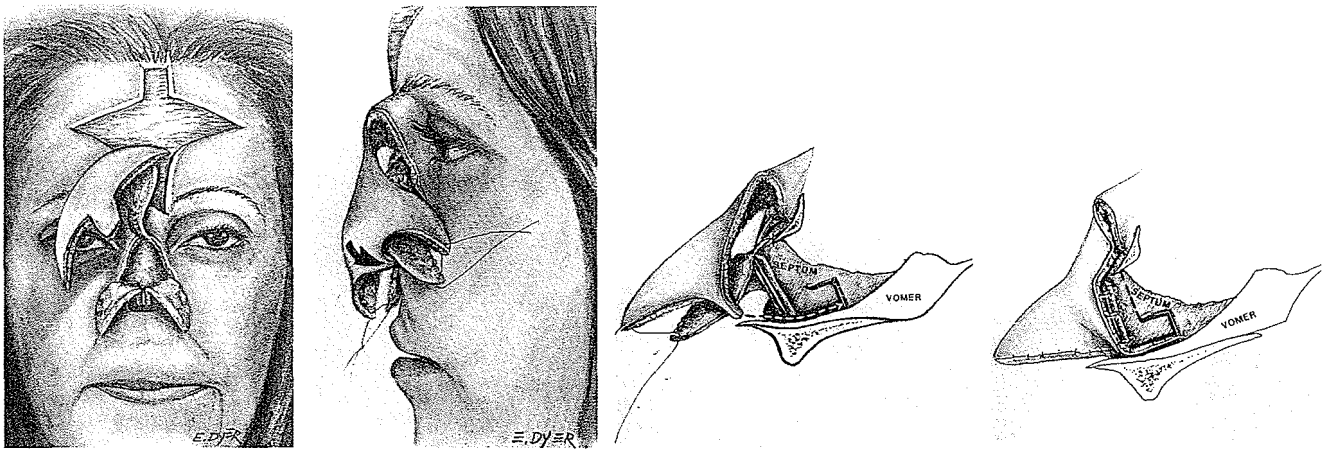


Nine months after resection, a trough under the septum the thickness of a forehead flap was resected along the vomer and a portion of the L-shaped septal chondromucosal flap was delayed by through-and-through incisions. The nasal dorsal skin was delayed for lining. A seagull pattern was fitted in the standard midvertical position on the forehead and delayed by incisions. It was essential to plan the pedicle long enough to allow the flap to enter deep into the vestibule with the distal columella portion sliding into the groove above the vomer, turning at an angle at the future nasal tip and coming in apposition to the anterior cut edges of the septum. This maneuver was planned to give enough forehead flap attachment to the desired L-shaped chondromucosal component to vascularize the unit and allow its usual base to be cut free. Then the L-septal component could be carried on the forehead crane up into normal nasal bridge and tip supporting position.

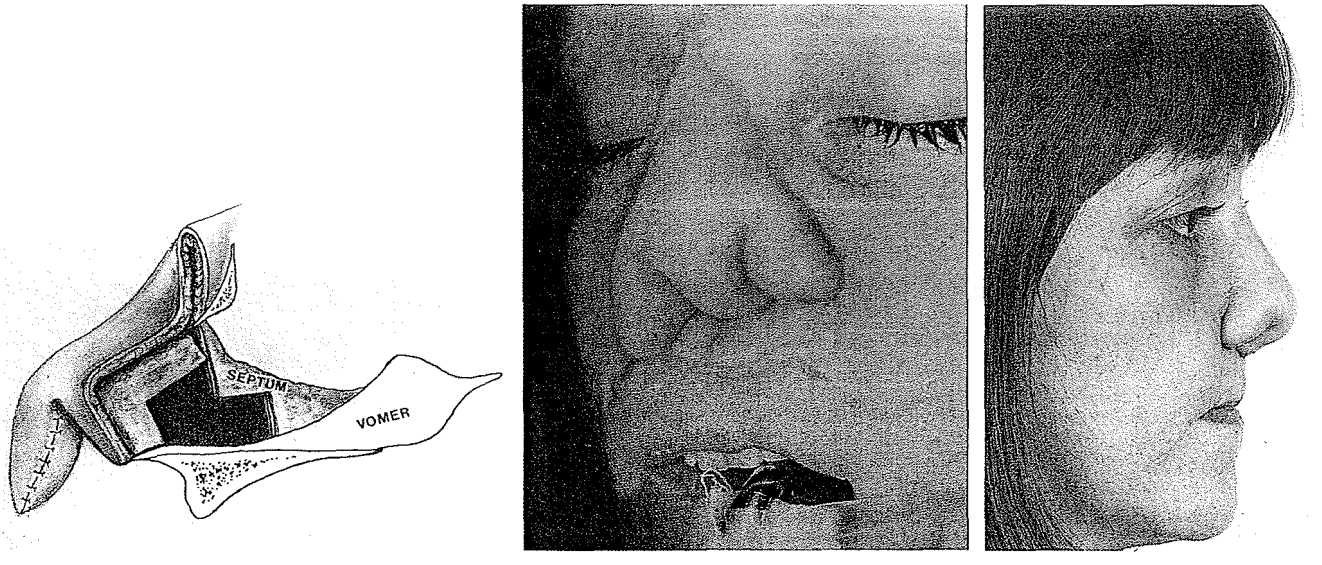
Flap Calisthenics

Three weeks later the dorsal skin cover was turned down; two flaps were used to line the raw undersurface of the forehead gull wings, while the columella tip was guided by a suture

back along the vomer and the forehead flap was approximated to all the other raw septal edges.



In two months the forehead flap had attached itself to the septum so that it could be cut free from all its posterior attachments, be craned out into the desired position, and have its front prow implanted on sturdy ground at the nasal spine. The bulky lined alar wings were whirled in toward the nostril sills.



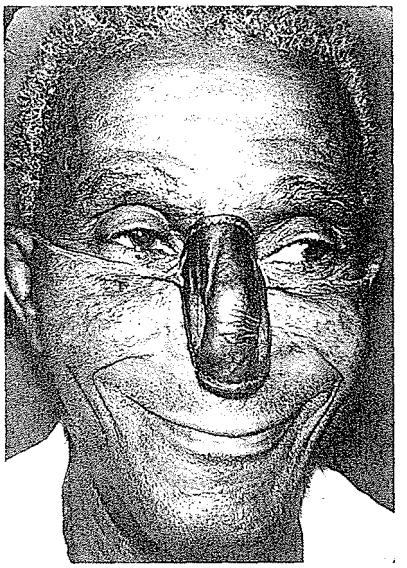
In another month the forehead skin pedicle was divided, retaining the vascular bundle, and returned to the glabella and brow area. Thinning the sidewalls by radical marginal

wedge excisions opened the airways and improved the aesthetic effect. Midvertical thinning of the columella achieved similar sculpturing. The forehead, in spite of the generous size of the flap it donated, healed with reasonable scars easily covered by her hairstyle.

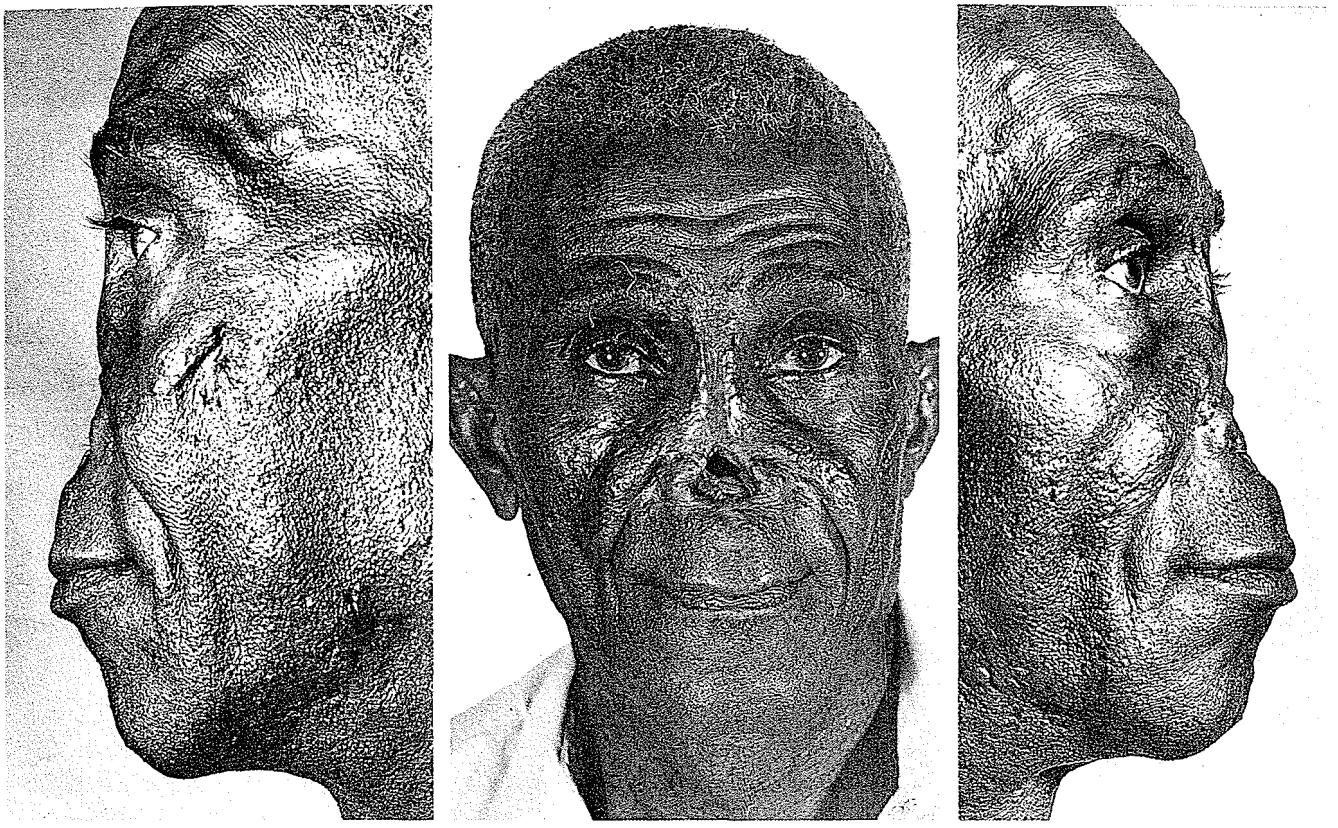


SUBTOTAL NASAL LOSS

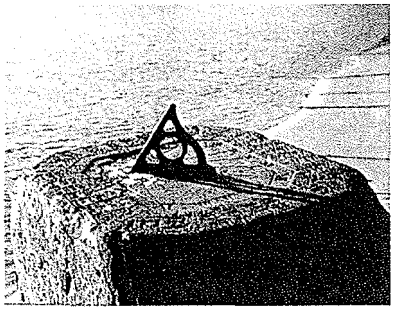
A subtotal nasal loss is one that has at least some part of the nose remaining. When the nasal bones are still present, they can serve as a fulcrum in which to wire a bony cantilever. This is fairly efficient except at the distal nasal tip. A semblance of a nose can be created over the cantilever with a forehead flap which, if infolded at the distal end, can form alae and columella. This infolding was first advocated by Petrali as described by Calderini in 1892. This method was still popular with J. Joseph in 1931 and J. B. Brown in 1951. The infolding technique by its very nature (double-thickness forehead) tends to produce a bulky entrance to the nose. Even when the folded flap is thinned severely, if support must be added, there is encroachment on the airways.

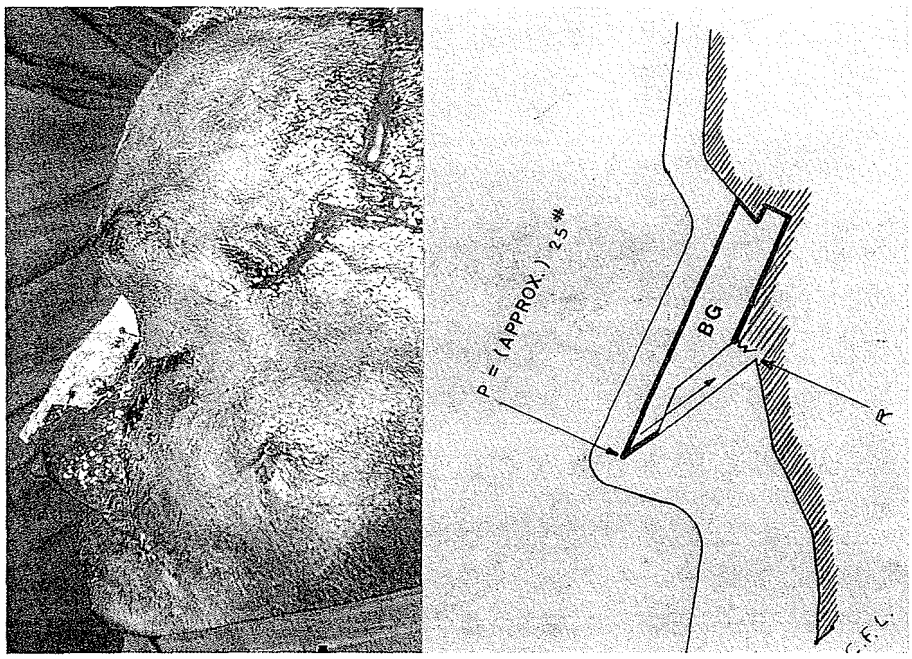


This 65-year-old Jamaican cultivator had suffered subtotal nasal destruction and facial scarring from yaws. For years he had worn a black leather nose cap attached with strings to his ears, fashioned by his shoemaker. At Kingston Public Hospital I offered him a real nose.



First the airway was improved by scar excision and closure. The standard method of cantilever and fulcrum design for primary support in the subtotal nasal repair involves autogenous bony rib fitted with a notch in the frontal bone and resting in a slot between the remaining nasal bones and fixed with wires. By calculations the tip of this cantilever can support a 9.95 pound load. A specific modification in this case increased the efficiency of the cantilever principle with the nasal bones still used as the fulcrum. To lengthen this fulcrum, a turn-down flap of nasal skin was used, incorporating a portion of the nasal bones on the flap with a greenstick fracture near the distal end. This created an oblique prop for the cantilever not unlike the propped cantilever seen on this sundial marking time on a Scotland cove. By fixing the rib graft into the frontal bone and lashing it with wire to the frontal processes of the maxilla, as well as the nasal bones, a truly formidable cantilever beam was produced, capable of supporting approximately 25 pounds at the tip.

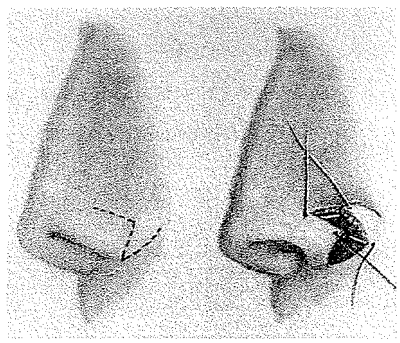




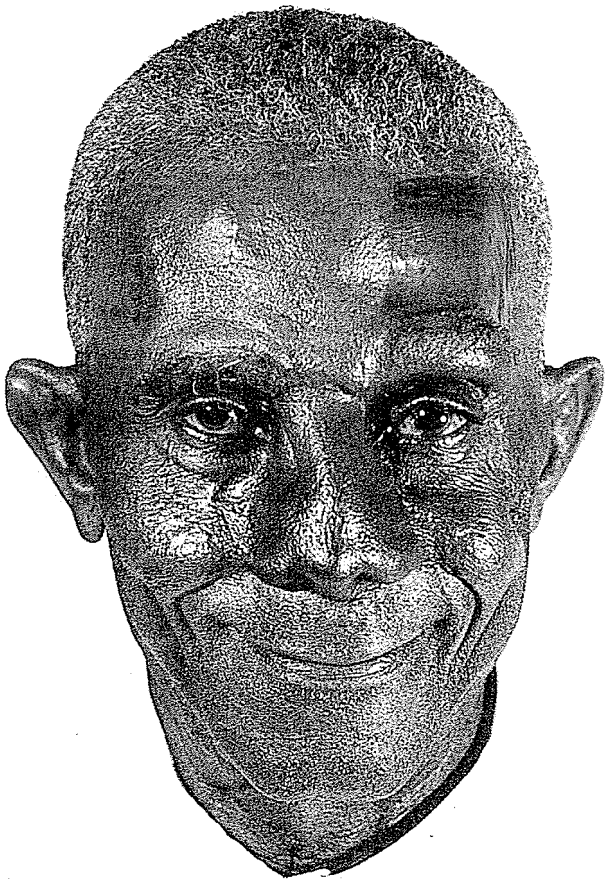
The extensive facial scarring by the treponoma of yaws and the resultant laxity of skin after nasal support loss allowed nasolabial flaps to be turned up for lateral lining. These were turned in and sutured to the flap attached to the underbelly of the nasal bone prop. A flap with the columella cut to pattern took the entire left forehead with its base on the opposite supratrochlear vessels. This flap draped across the bony gnomon. A profile xray through the flap of the bony framework a year later revealed the oblique prop formed by the turn-down nasal bones and the onlay rib cantilever.

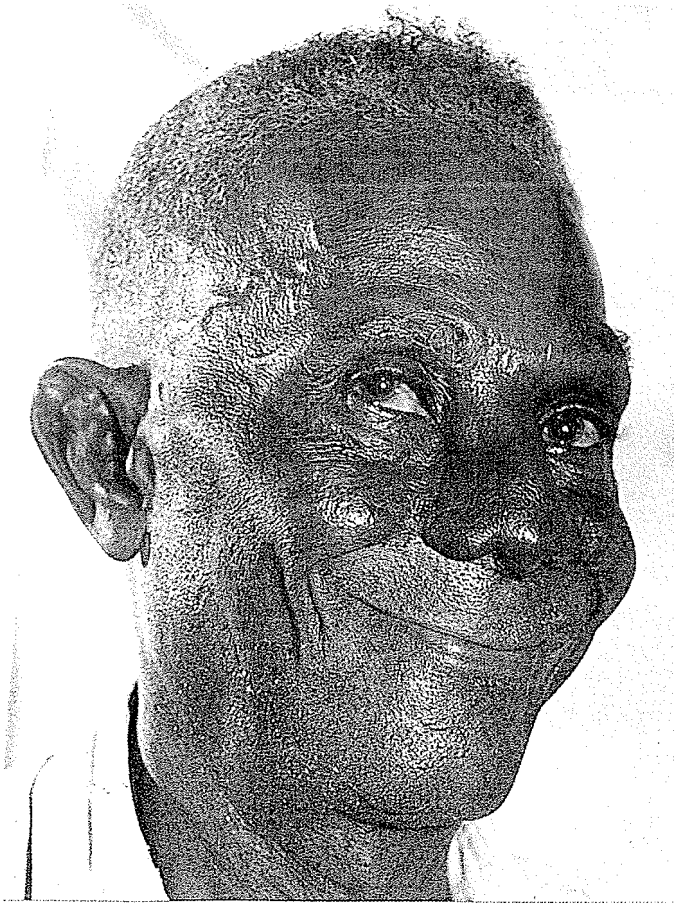
Supported by the thin rigid bridge beam this nose could have been thinned to almost any desired degree, but the shape achieved initially seems best fashioned to fit his face and race.

A method of creating an alar crease used a triangle flap from the cheek adjacent to the alar bases on each side. These little flaps were transposed into releasing incisions on the flat new nose at the usual position of the crease. Note that the color of the skin graft on the forehead was darker than his normal black skin. This is usual in the black race.









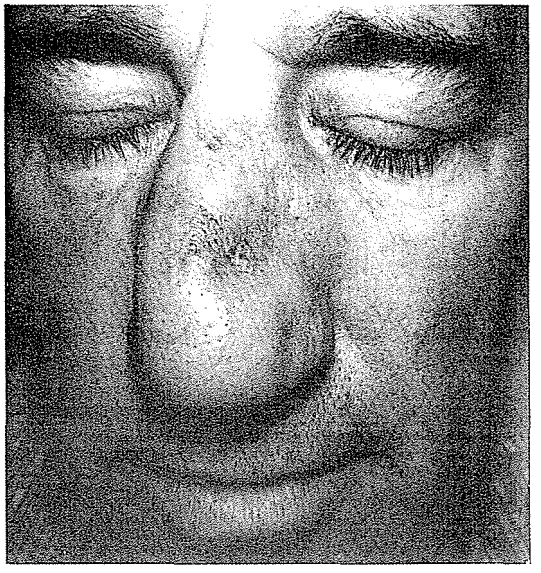
A TRUE TOTAL LOSS

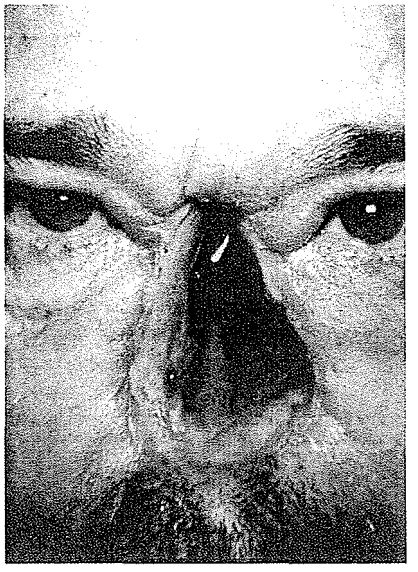
A true total loss of the nose which refers to loss of the entire nasal structure flush with the pyriform opening in the maxilla, including all septum into the depths of the nasal cavity. Total nasal losses fortunately are rather rare. Reconstruction of the total nose, if the goal is a normal appearance and function, is one of the great challenges in reconstructive surgery.

A thorough investigation of the world literature in 1965 revealed relatively few total or near total nasal reconstructions. V. P. Blair in his 1925 comprehensive review gave the forehead flap priority for nasal cover with local flaps for lining and cartilage for framework. Yet when it came to reconstructing the true total nasal loss, he side-stepped by using a vulcanite prosthesis! In 1931 J. Joseph presented two near total losses which still had the skin and bone of the radix. In both cases local lining and the German oblique forehead flap were used. In one, no support was supplied; in the other, an ineffective cantilever of ivory was inserted secondarily to fill out the bridge. Both nasal reconstructions achieved adequate profile by mere bulk of the soft tissue, but in the absence of all effective framework, the alae collapsed, rendering the airway inadequate. F. Smith in 1950 wrote, "Certain extensive losses of supporting bony structure and soft parts of the nose may preclude a satisfactory reconstruction. A permanent prosthesis is supplied in these cases." Other near total loss cases published, including those by W. W. Carter in 1913, H. D. Gillies in 1920, K. Schuchardt in 1955, and H. D. Gillies and D. R. Millard in 1957, although an improvement over the original condition, fell short of ideal in color, shape, or form and especially in patency of the airway. G. C. Burget and F. J. Menick in their 1993 book labelled one small chapter "Total and Subtotal Nasal Reconstruction," but by no figment of the imagination could the one case presented be labelled a total loss. The American Board of Otolaryngology in one of their recent exams had a question on the treatment of total nasal loss. Their correct answer was: a nasal prosthesis. This is a good thing.

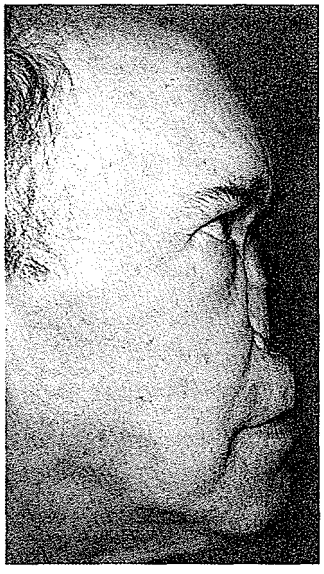
In the true total nasal loss the absence of the bony radix removes the chance of this fulcrum for a cantilever. Thus the construction of a fulcrum in these defects could supply the missing link. How this can be accomplished depends on the case.

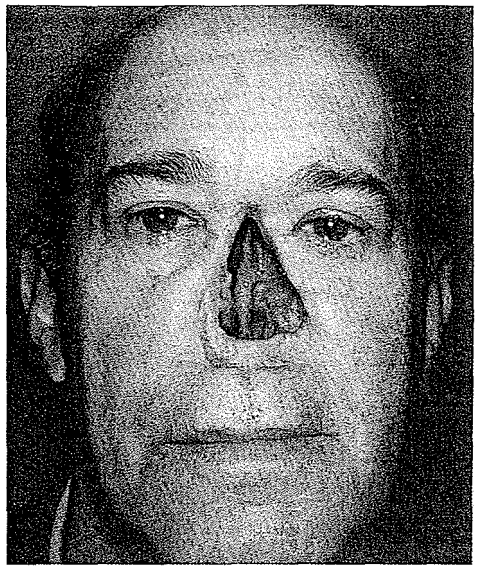
In *Plastic and Reconstructive Surgery* in 1966 "Total Reconstruction Rhinoplasty and the Missing Link" was presented. The key case was a 62-year-old elevator operator who developed extensive basal cell carcinoma of the nose. The lesion required excision (by J. Zavertnik) of the entire nose, septum, medial wall of the left antrum, ethmoid sinus, and portions of the cheek and upper lip along with a radical neck dissection that revealed negative nodes. He was then fitted with an arti-



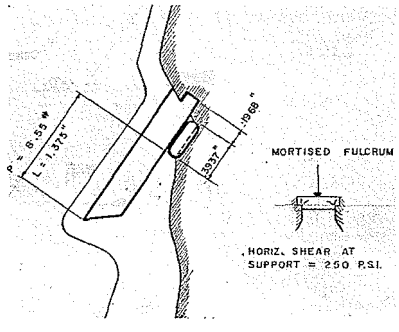


ficial nose attached to lensless spectacles and left for observation for one and a half years. After this time with a prosthesis the patient expressed willingness to undergo reconstruction. This was not a "no sooner said than done" event. A plan and preparation were essential.



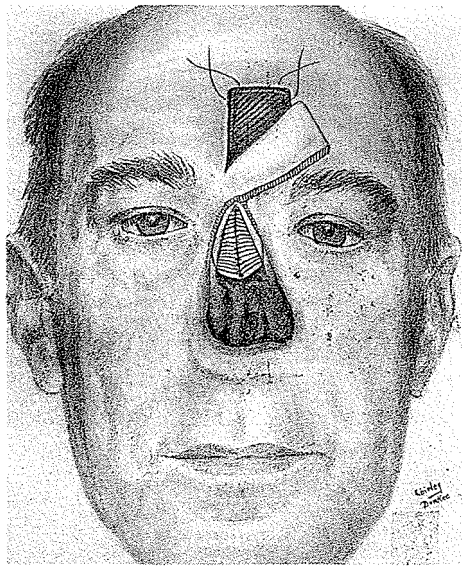


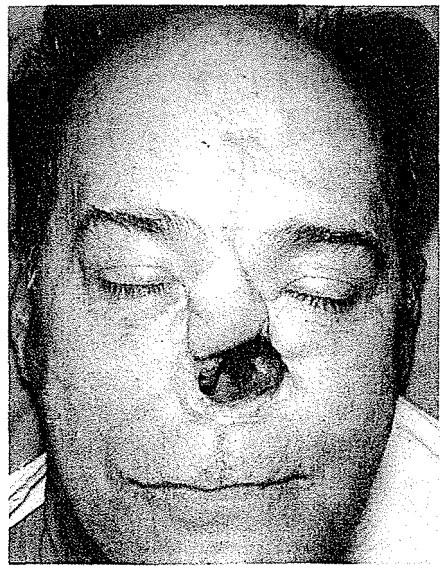
Specimens of the human bony rib were tested under bending stress in the laboratory to determine by calculation the strength of three variations of the cantilever fulcrum system. By supporting the bridge and tip, this framework ensured a proud profile and slender shape with the potential for thin alar rims and columella as well as a patent airway. Yet there could be no cantilever without a fulcrum.



Constructing a Fulcrum

Mucosal flaps turned in from the side of the upper bony vault were sutured together to provide lining for the fulcrum. A small vertical forehead flap was transposed over this lining temporarily, the plan being to use it for future distal nasal lining.





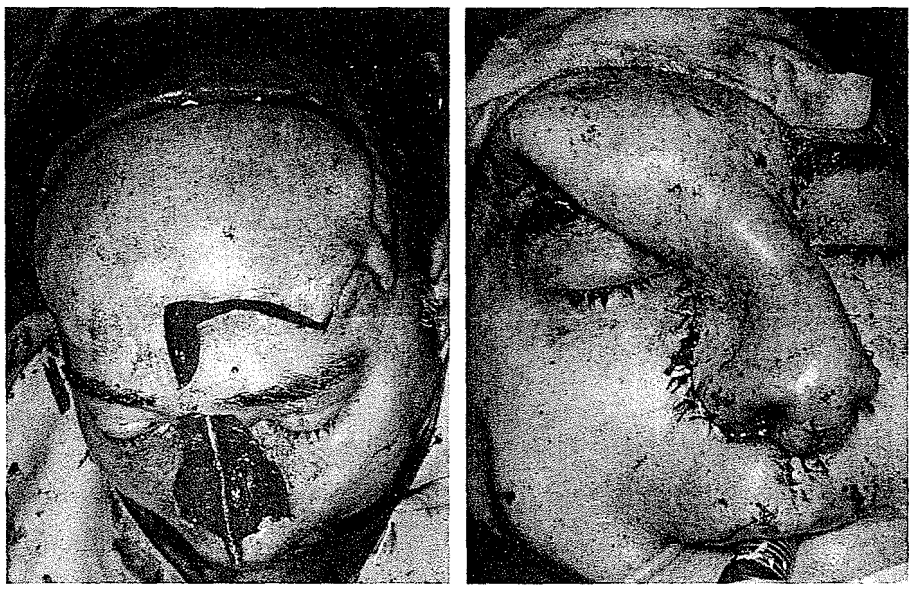
Two months later the pedicle of the flap was divided and the flap turned down to allow the mortising of a strut of bony split rib across the upper vault fixed by wires to the maxilla on either side. The flap was returned temporarily to cover the fulcrum. The future alae and columella were lined with thick split grafts on the forehead.

Insertion of Cantilever

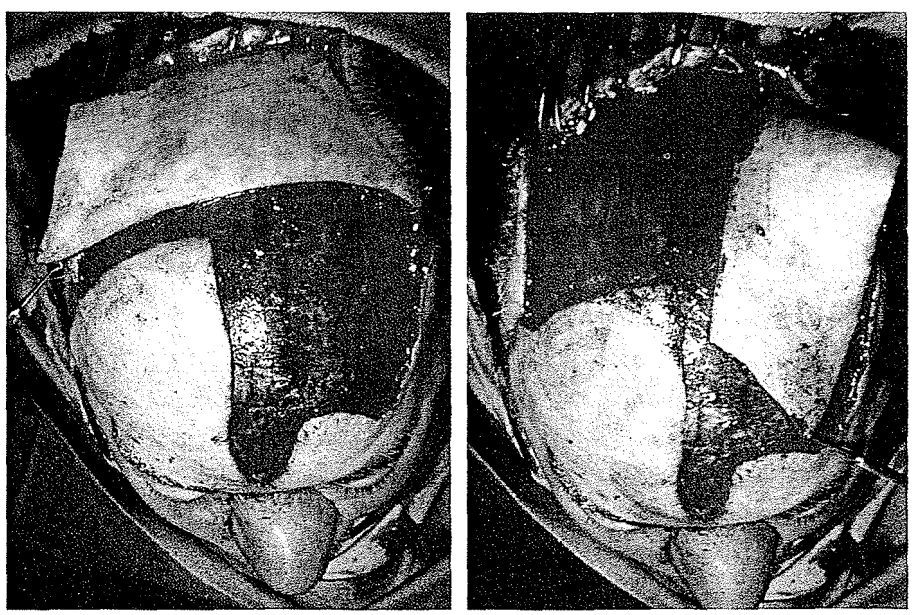
Two months later the small forehead flap was turned back down into lining position, exposing the bony fulcrum. Being impressed by J. J. Longacre's advocacy of split rib encouraged my use of it for the entire fulcrum and cantilever. The remaining bony rib banked under the chest skin after the previous rib resection was fashioned as a cantilever, fitted into a notch in the frontal bone, set at a suitable angle to produce a fine profile, and wired with No. 28 stainless steel to the bony fulcrum. Confidence in this maneuver was enhanced by R. Mowlem's 1941 report that the bone graft superimposed on another bone graft will acquire bony union with it. The support thus produced was calculated to withstand 8.55 pounds at the tip. The forehead flap hanging under the bony platform and cantilever was hoisted snugly to the undersurface of the rib gnomon with sutures looped over the cantilever. To this lining flap was sutured turnover edge flaps from the sides of the nasal vault to seal off the support by lining.

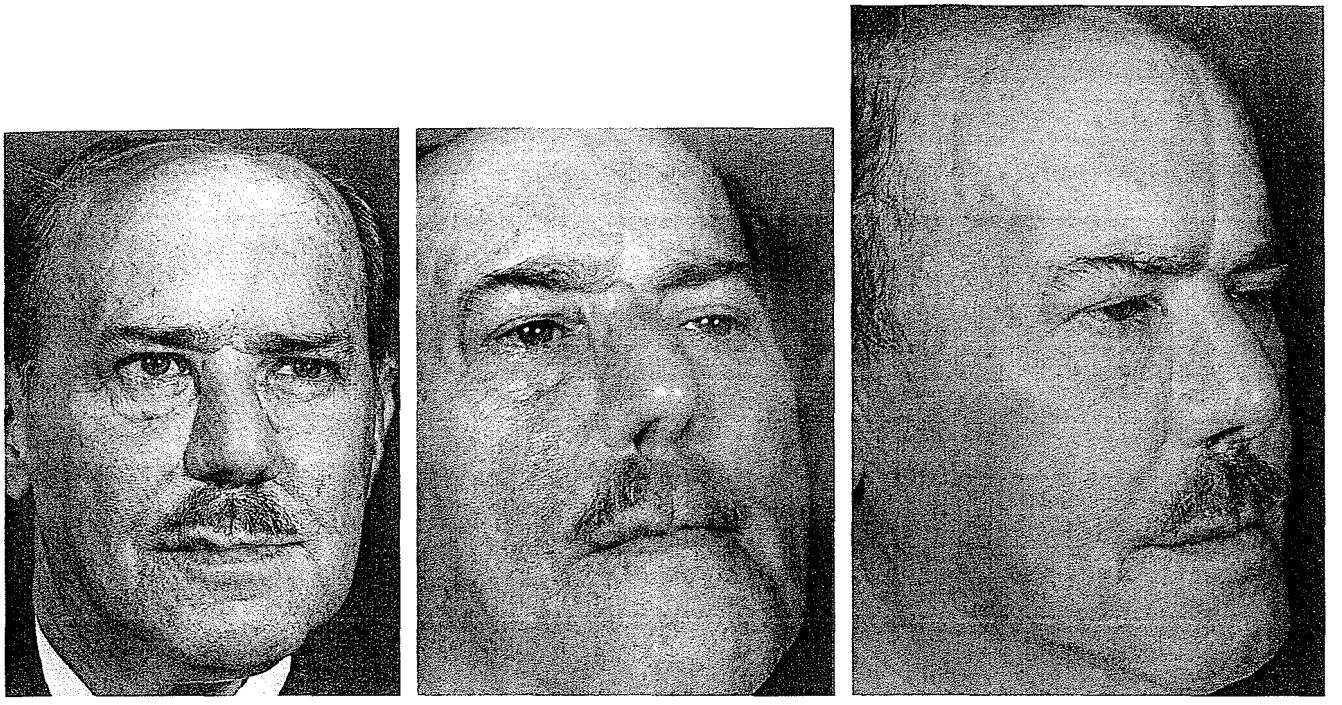


Onto this lined framework was draped a forehead flap with its alar rims and columella previously lined with skin. The flap was pivoted on the right supraorbital base, taking the entire left forehead. A mucosal flap from the upper labial sulcus was brought through a midline buttonhole in the upper lip to help receive the raw backside of the columella tip.



DONOR CLOSURE. At the time of the return of the base of the forehead flap, a bald scalp flap was transposed into the residual forehead defect to supply like tissue in a visible area while a split graft was supplied to its donor area more or less out of view on top of the head.





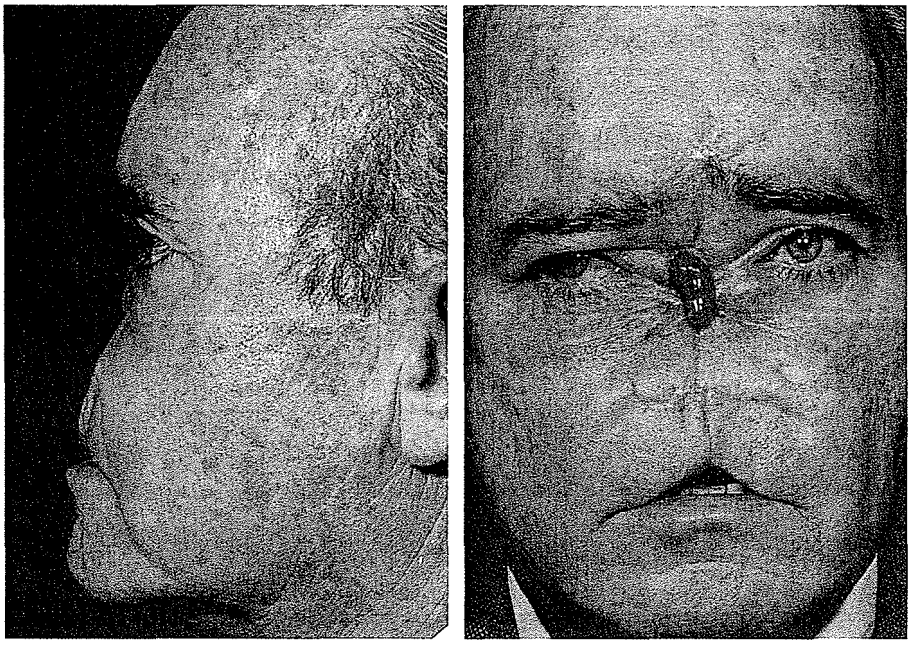
Challenged by a Flaw

This method of reconstructing the total nose created and maintained a good profile with reasonable thinness and grace of shape, and a generous airway capable of blowing smoke rings. The long-term follow-up of this "fulcrum and cantilevered" total nose continued to be encouraging over 15 years, except in one point—the nasal tip. In time the tip of the bony cantilever, probably more by absorption than contracture, allowed the nasal tip to round over into a slight curve, which, although not displeasing to the patient, bothered the surgeon. This eventually led to the conception and development of the advancement of the L-septal flap for tip support in all but the total nasal loss.

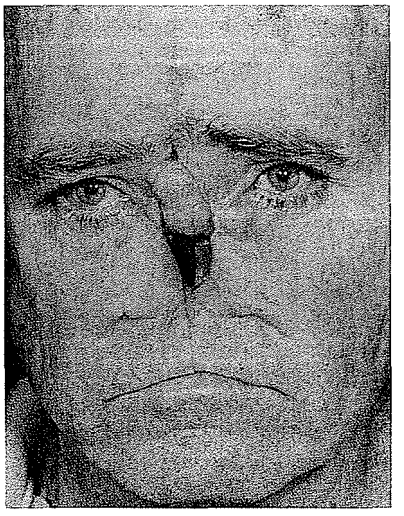
Since the first total nose, I have had the opportunity to take part in two other total losses. Both defects were the result of suicide attempts, and besides the total nasal loss there were other associated facial losses. One was a case involving an indigent patient treated by the residents. A fulcrum and cantilever resulted in an excellent profile but follow-up has been nearly impossible. The second case was under my direct care and is interesting.

A 46-year-old depressed maritime lawyer inflicted on himself a shotgun blowout of his mid–upper lip, entire nose, anterior maxilla and glabella area while also blinding his right eye. Emergency surgery included closing the severe facial defect. Lithium improved his state of mind to the point of requesting reconstruction.



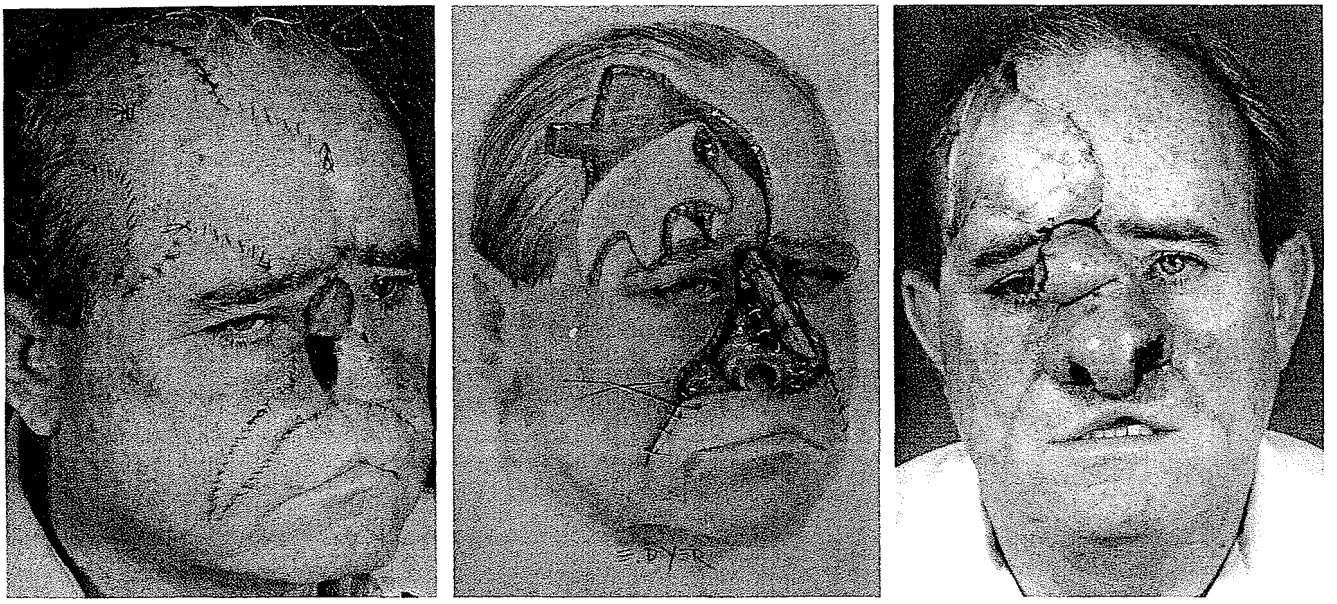


The first step in reconstruction, as developed by H. D. Gillies in World War I, was opening the defect to replace what normal tissues were present into their normal position and retaining them there while maintaining an airway by suturing skin to mucous membrane around the margins of the defect. During this process the granulation tissue was excised, exposing bone at the nasal base, and over this area the previously described (1965) glabella flap was transposed. Unfortunately, due to the original extent of the trauma, the glabella flap was taken smaller than ideal and eventually was not sufficient to effectively line the distal nose.

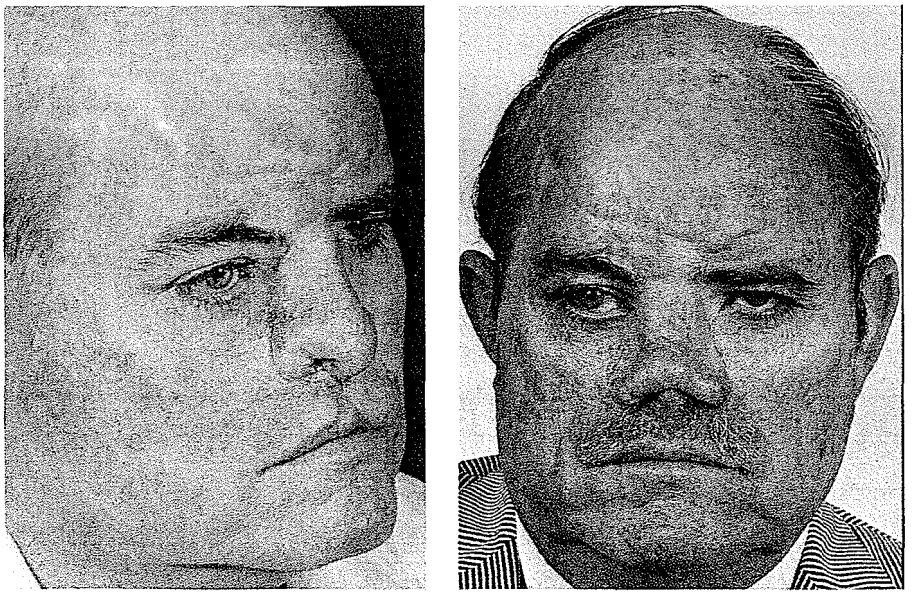


After four months the glabella flap was delayed and elevated so a portion of rib bone graft could be wired across the defect to create a fulcrum. The nasolabial flaps and a right seagull forehead flap were delayed by incisions. One month later the banked autogenous rib graft was split and wired as a

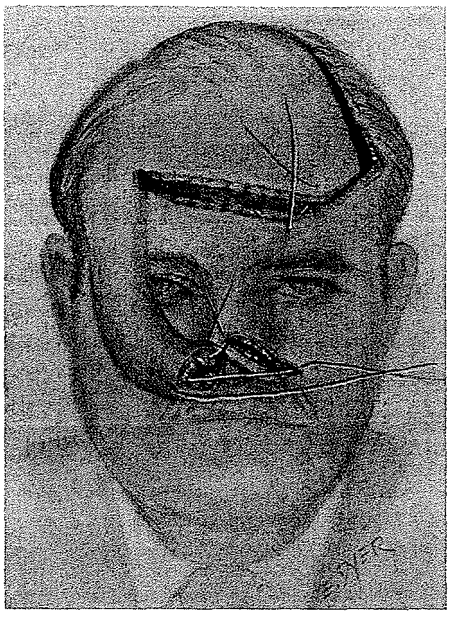
cantilever to the fulcrum. The nasolabial lining flaps were turned up and sutured to each other to form lining of the alae and backing for the columella. The forehead flap was brought down to cover the reconstruction and the forehead defect was temporarily skin grafted. Eventually the forehead donor area

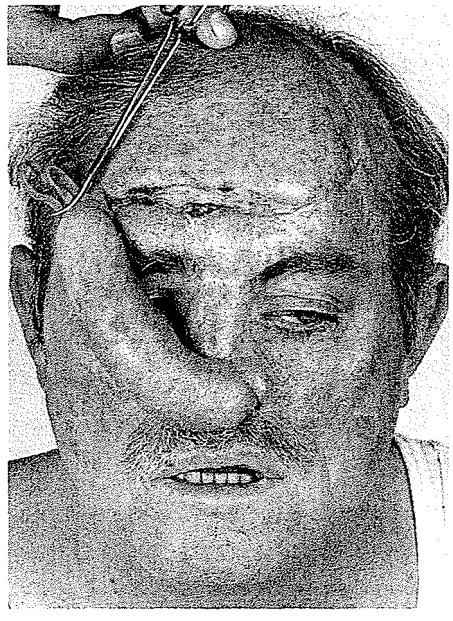


was closed with a left based scalp rotation flap. When the forehead pedicle was divided, a satisfactory nose was created; but eventually the shortness of distal lining under the tip led to exposure of the bone graft, infection, and loss of tip support.

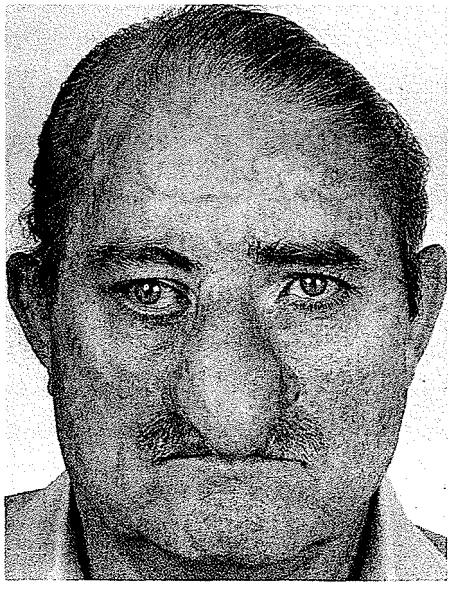


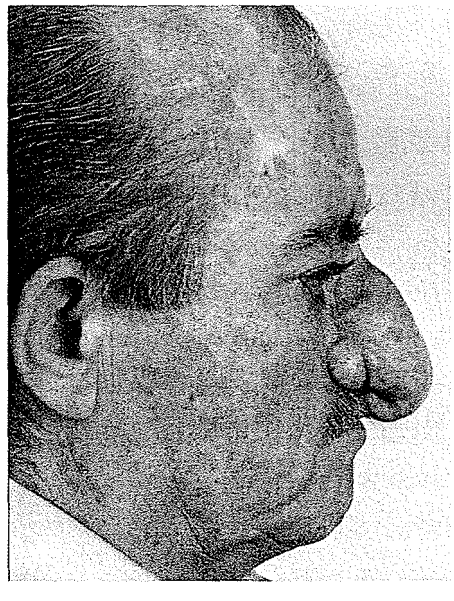
This required a further reconstruction. A delayed horizontal forehead flap based on the right was tubed, swung down, and attached to the nasal base. The scalp was advanced into the defect with skin grafts to the releasing area. Six weeks

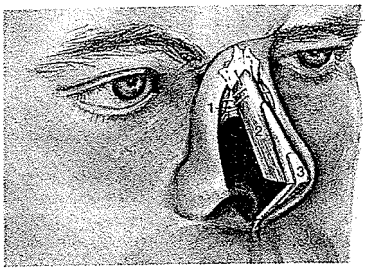




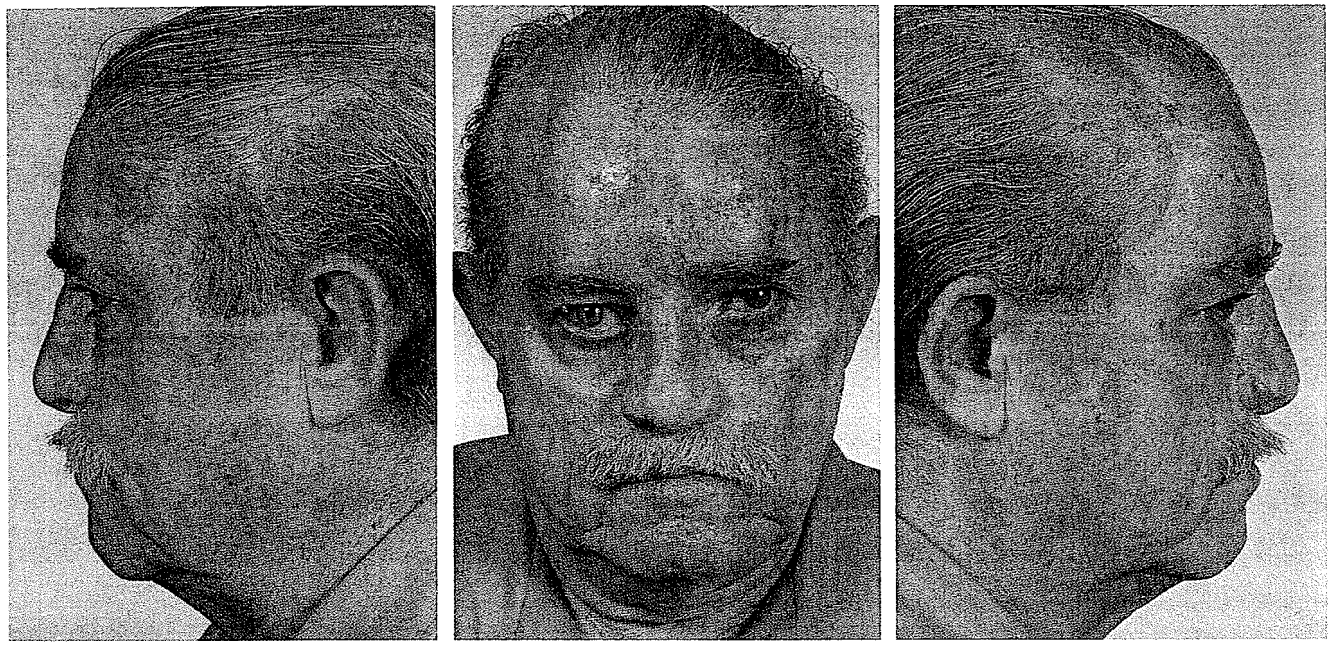
later the proximal end of the forehead tube pedicle was divided, opened, and let in over the nose to the glabella area. The patient had continued to work and his office staff followed his progress with cheer-leader enthusiasm. They saw his nose shrink with infection and later rebuilt into the largest nose in the state!







Through it all the patient, with the aid of Lithium, remained undaunted. When the nose was reduced to reasonable proportion and a cartilage hinge graft was inserted as an adjunct for tip support over the bony cantilever. The office proclaimed it a miracle. Finally revisions in the columella and alae provided airway and aesthetics.



Years later the patient died of a coronary thrombosis. He left a request that in lieu of flowers, donations be sent to our Plastic Surgery Trust Fund.

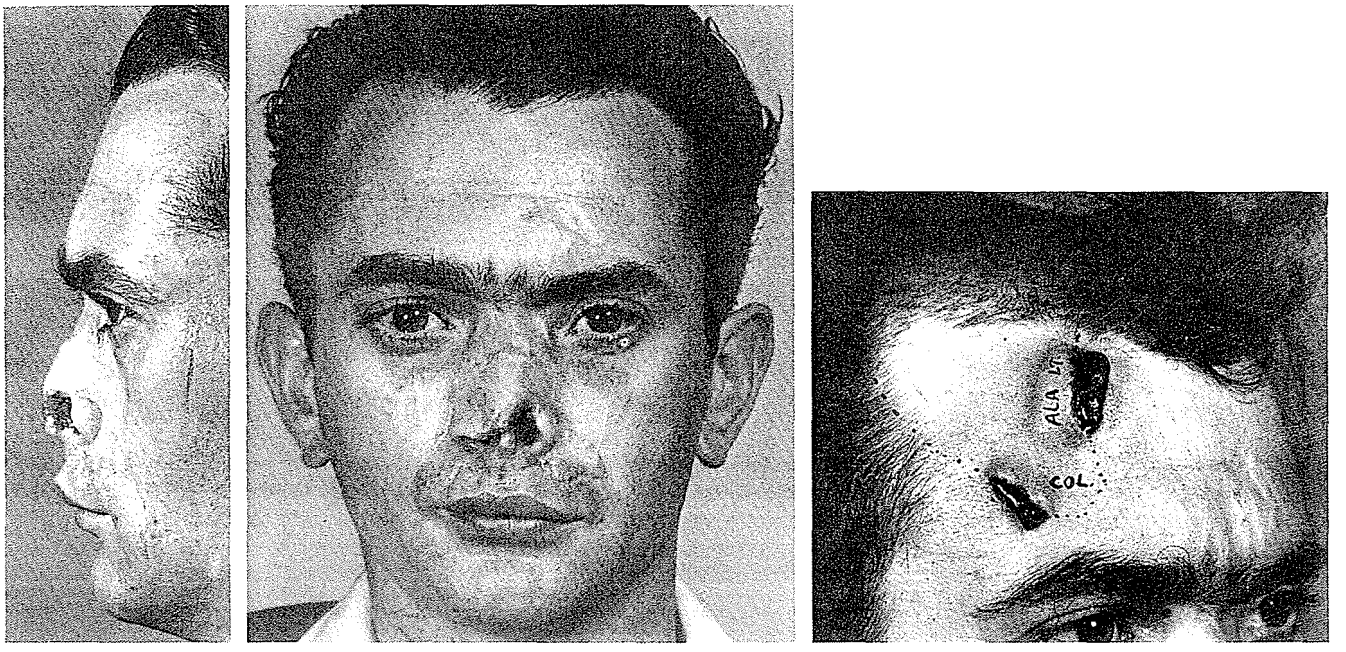
A NOTE ON FLAP CRAFTSMANSHIP

The technique for shaping a huge nose made of flaps has many similarities to thinning the usual thick nose except that it is vital to respect the established areas of blood supply to the flap. In general, in the large flap nose it is wise to leave the original pedicle intact and reduce and shape the distal nose with the aid of this more robust blood supply. When the original pedicle has been divided, areas that have been implanted for a month or two will develop a new blood supply that will allow distal areas of full thickness skin with a thin layer of subcutaneous tissue to be elevated, thinned of scar and excess subcutaneous tissue. Most of these thinning proce-

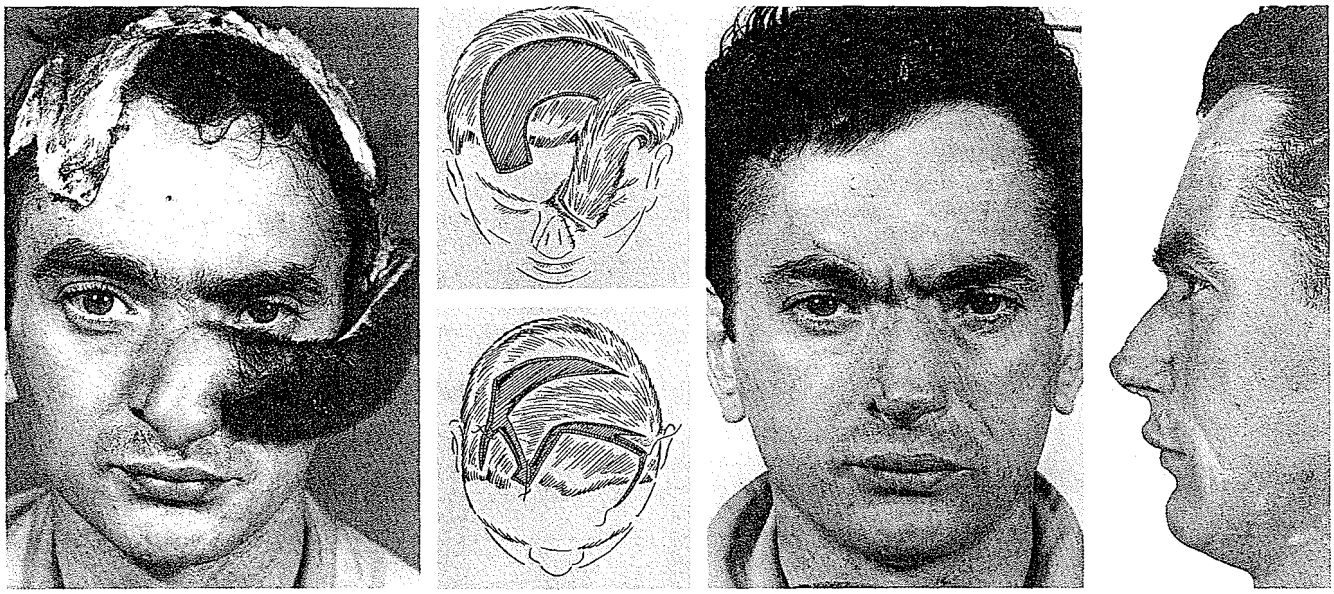
dures can be carried out through alar margin incisions. Access is also possible through the flap join to the cheek. Here the scooping out of excess subcutaneous tissue in the alar crease area will sculpture this region to a remarkably natural contour. When the original pedicle is divided and let back into the glabella area to realign the brows, it is important to thin the remaining flap still attached to the nose so that its final inset will blend and further camouflage the reconstruction.

FOREHEAD FLAPS BASED ON SUPERFICIAL TEMPORAL VESSELS

A British navy casualty from Tokyo arrived with nasal injuries at Rooksdown House in England in 1953 and was admitted on H. D. Gillies' service. I designed a forehead flap to take the right bay on a scalp flap based on the left superficial temporal vessels. Prefabrication of the left ala and half the right ala was achieved by introducing auricular composite grafts under the forehead skin in the future alae sites.

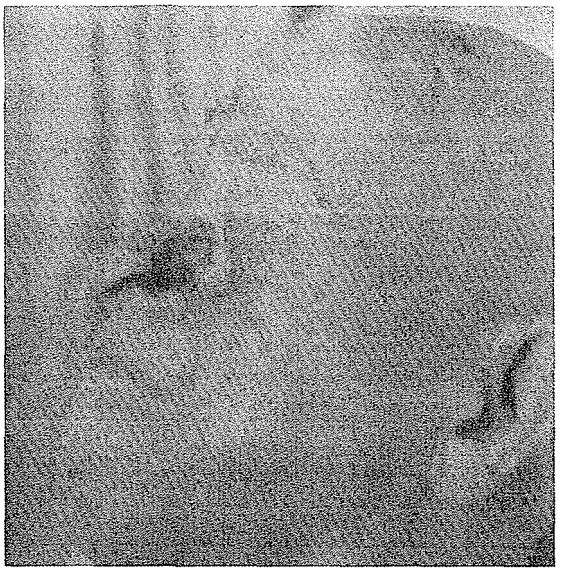


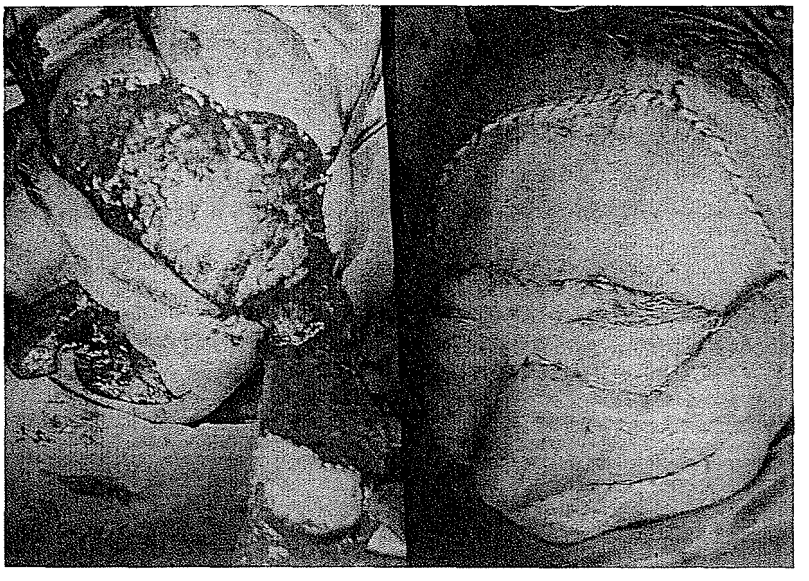
After attachment of the flap to the nose and later division of the pedicle, the forehead skin was rotated to close the donor area and the scalp flap reintroduced to cover the remaining defect.

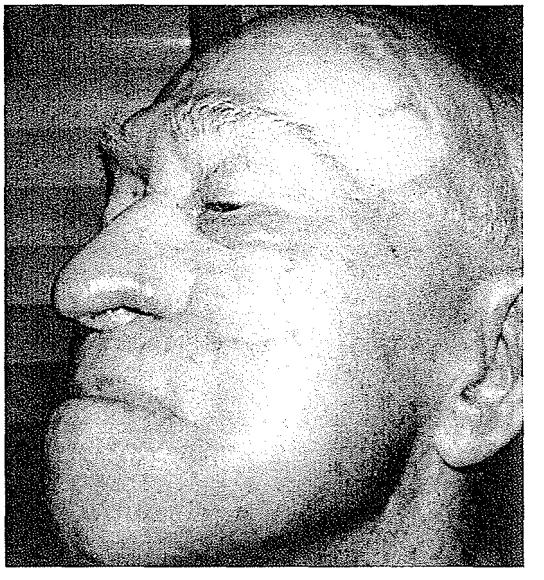


In the 1960s I was by-passing the Andy Gump mandibular deformity, caused by carcinoma ablation, with immediate bone grafts covered with a forehead flap. I found that I could take the total forehead skin as a flap on a unilateral pedicle without surgical delay when the superficial temporal and postauricular vessels were included in the base. For this reason most of my forehead scalp flaps included both vessels.

Here is a 70-year-old male with loss of more than half his nose but with septum intact. A large transverse forehead flap based on the left superficial temporal vessels was partially lined with a split skin graft. It was brought down to reconstruct the nose. The total forehead, as a donor area, was covered with a one-piece split skin graft which as a single unit was well camouflaged. The temple portion of the flap was replaced to complete the repair.

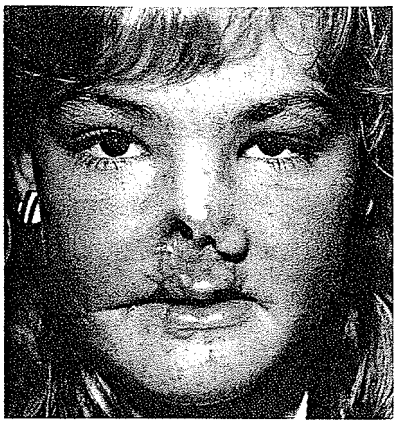


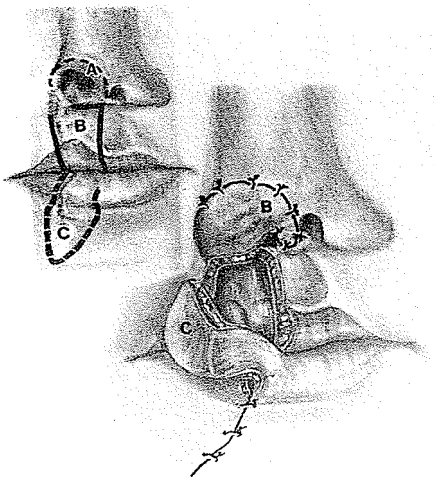


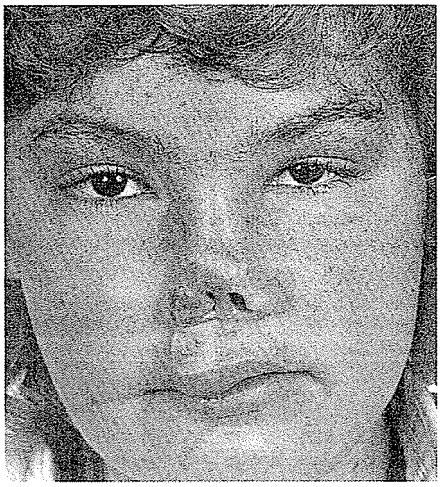


When, for whatever reason, a midvertical forehead scar is undesirable, or not feasible, it is possible to design the use of forehead skin in a high horizontal flap to be based laterally on the superficial temporal and posterior auricular vessels. This horizontal flap, bordered above by the hairline and incorporating the upper half of the forehead skin, leaves the lower expressive forehead and brow unscarred. A split skin graft to the donor area can be covered by the hair especially in the female and even in the male. This long horizontal flap can supply enough tissue to cover a heminasal defect and other areas if indicated.

This 16-year-old schoolgirl's nose was lacerated and avulsed in an auto accident. She was seen six months after injury revealing absence and scarring of the entire right ala, anterior columella and septum, and the medial portion of the left ala. There was loss of the nasal tip projection and support. The avulsion of one-third of the skin of the right upper lip, which had been grafted, presented firm, hypertrophic scar with lip contracture. The cheek scar had multiple Z plasties. The reconstruction plan was formulated with a domino effect. The scarred right lip was turned as a flap with the mucosa inside to line the right nasal defect. A lower lip-switch flap was transposed to reconstruct the upper lip. The remaining septum was advanced forward as an L-shaped chondromucosal flap for tip support.

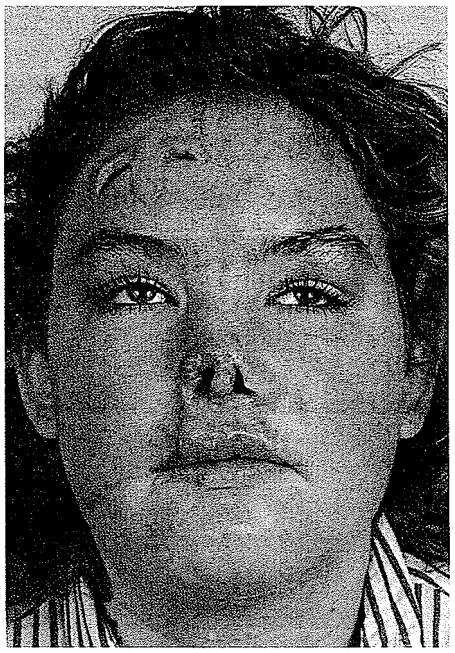








As the young patient's natural hairstyle left her central brow exposed, and because of her tendency toward hypertrophic scarring, a midline vertical forehead flap was bypassed. It was kinder, even if more complicated, to use the upper forehead easily covered with her hair. The nose was prefabricated high on the right forehead, with cartilage to the alar rims and skin graft to line the alae. This component was delayed on a scalp flap based (Doppler) on the left superficial





temporal and postauricular vessels. Two and a half weeks later the local lining was turned and the forehead scalp flap attached to the nose. Three weeks later the pedicle was divided

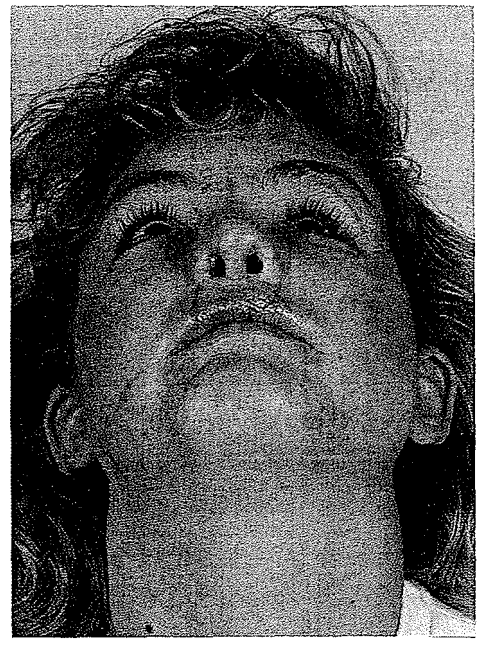








and replaced. Further revisions and sculpturing produced a reasonably good result and her hair covered the donor area well.


Another High Horizontal Forehead Flap

When the defect involves several planes, a transverse forehead flap can better supply the varied cover.

This 55-year-old female developed basal cell carcinoma of the right nasal ala which eventually involved the surrounding upper lip and cheek. This ala-cheek area is notoriously dangerous for invading deep and must be treated radically. Expert dermatologist M. Iriondo cleared the carcinoma with Mohs surgery. He referred the fresh wound so that a skin graft could be applied for early healing.

The high horizontal forehead flap was delayed by incisions to incorporate the right superficial temporal and the posterior auricular vessels. During the delay a branch of the superficial temporal artery was divided, which raised the flag for caution. The distal end of the forehead flap was prefabricated for alar reconstruction by inserting an auricular cartilage strip to support the future alar rim, and the distal flap was lined with a skin graft which also covered the raw donor area on the forehead.





One month later the 30 × 5 cm lined forehead flap was brought down and attached to the nasal defect. At this time an attempt to tube the temporal portion of the flap threatened to endanger the blood supply so that only a loose tube was constructed.

From my experience it was obvious that this flap did not contain an important vessel; thus progress was cautious. Finally an elastic band was used to constrict the pedicle at the site of planned division. When the nasal attachment revealed adequate blood supply, all hairless forehead flap was divided along the constricted line. The temporal pedicle was unrolled and the temporary temporal skin graft was removed so that the pedicle could be replaced in the original site. The extended pedicle, attached to the nose, was unfolded on its end. The retracted right upper lip was released and brought down into normal position, and the forehead flap inset to maintain this correction. After two months the bent pedicle was divided to leave enough flap attached to the nose to complete the repair. The remaining forehead flap, attached to the lip, was advanced up into the cheek defect. After a two-month delay the edematous pedicle in the lip-cheek area was elevated, thinned, and let into its final cheek and lip destination. A month later the nasal portion was thinned and inset.

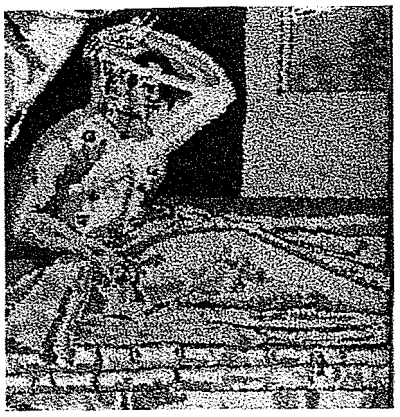




This reconstruction will require time to settle, and then, about the time this book is published, there will be another revision and thinning procedure.

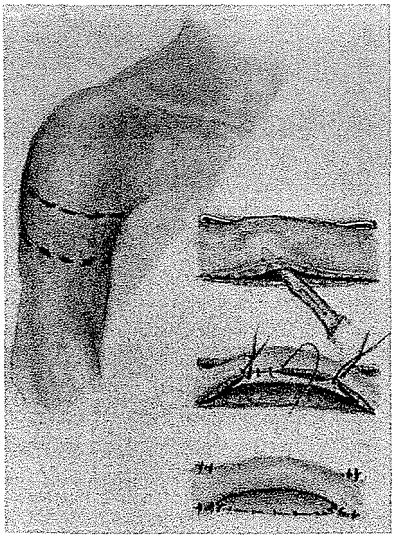
OTHER COVER. There are circumstances where a forehead flap may not be the first choice for nasal cover. This is rare but does occur. In a burned face the forehead may be scarred too severely to be used or it may have been the only expressive area on the face that survived unscarred. Then it is needed more for expression than nasal cover. In such cases the skin tube pedicle from the upper arm may be extremely useful.

THE ARM FLAP



In the fifteenth century in Sicily, Antonio Branca used flaps from the arm in his attempts to reconstruct the nose. By late in the sixteenth century an Italian, Gasparo Tagliocozzi, had written a book on arm flap rhinoplasty. He fixed the arm to the head for the implantation stage, as shown in this tapestry created for me by my brother, Hamilton. It is interesting how plastic surgery came into disrepute about this time. Nobles of the royal court were losing the tips of their noses during sword play or in more serious losses from the late result of syphilis. As there was no anesthesia these royal patients conceived the plan to let their slaves supply the arm flap for their nose. This necessitated the master to go for several weeks attached to his slave with what was left of his nose in his slave's axilla. Consequently when the flap was divided the master immediately sold the slave. Of course upon severance of the pedicle the flap attached to the nose turned white, cold, and soon dropped off. It is reported that the masters sent messengers to find their slaves and discovered that the slaves had died on the same day the flap necrosed. Of course the truth of the matter is that full thickness skin could not then and still cannot be cross-grafted. These failures aroused suspicion about plastic surgery which caused it to suffer neglect and ridicule for over two centuries.

SKIN TUBE PEDICLE



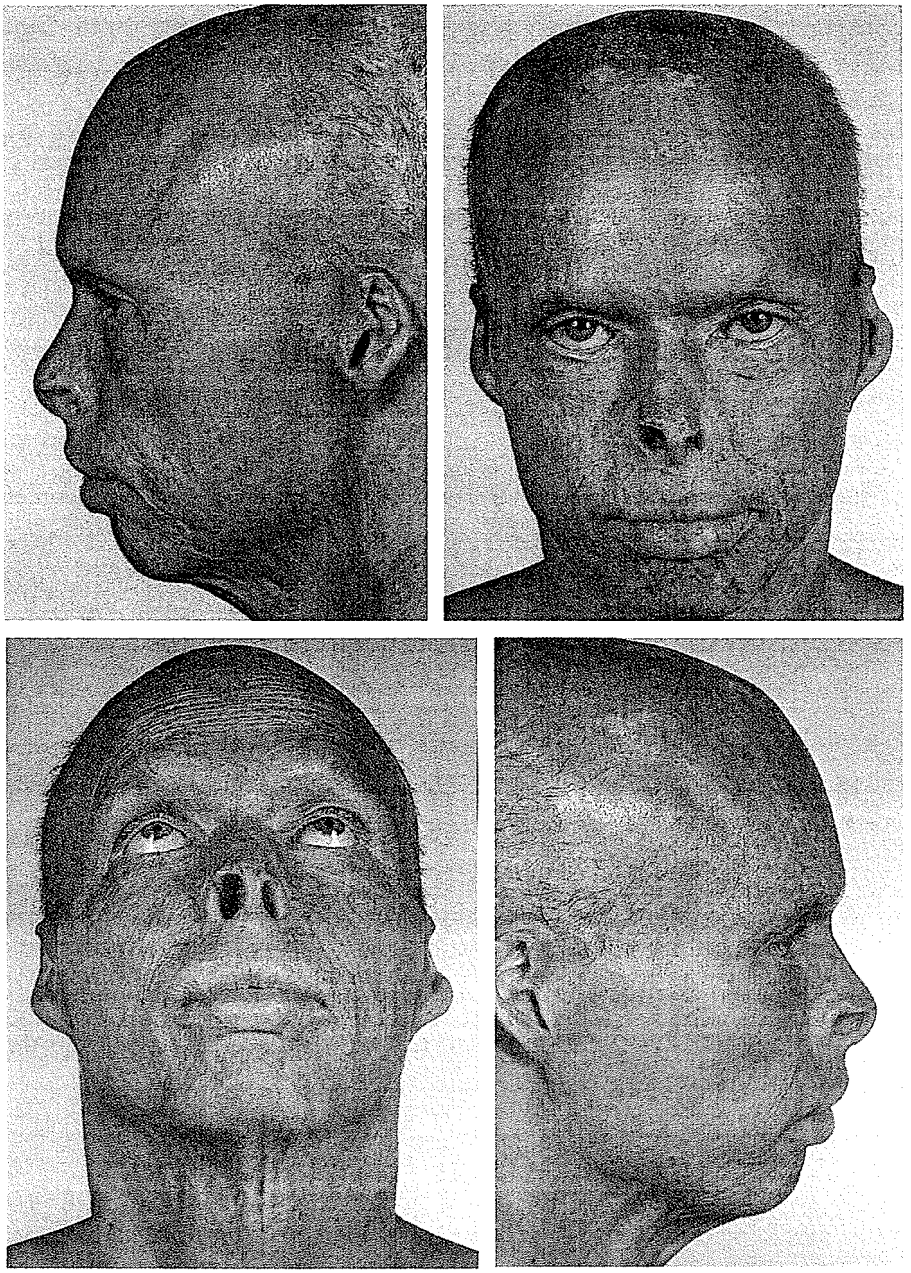
Although the musculocutaneous flaps and microvascular anastomosis have reduced the need for the cumbersome tube pedicle, there are definitely occasions when the skin tube is the best choice. It is interesting that three surgeons conceived the skin tubing principle independently and almost simultaneously. So often the state of art reaches a point where the next step is inevitable. F. Burian in the Balkan War, Frumpkin in 1916, and H. D. Gillies in 1917 all used skin tubes. Gillies proceeded to develop the technique and popularized it. He certainly taught it to me.

Two parallel longitudinal incisions in the skin and subcutaneous tissues, where the vessels run more or less in random direction, define the pedicle. Elevation of this strap carrying subcutaneous tissue on its underbelly allows tubing of the flap with sutures into a closed skin unit. This reduced drainage, infection, and increased mobility. The flap was designed with the future pedicle base strategically positioned to enable transfer of the distal end to the site of a carrier or the final recipient area.

There are certain circumstances in nasal reconstruction where microvascular anastomosis can be used to transfer a bulk of tissue to the area, later to be shaped into a nose. This is seldom aesthetically successful. In similar situations the tube pedicle can be used to advantage. It requires a couple of weeks of awkward attachment of pedicle to the nasal area but this can be made reasonably comfortable with a headcap fixed to an arm splint.

A Burned Nose

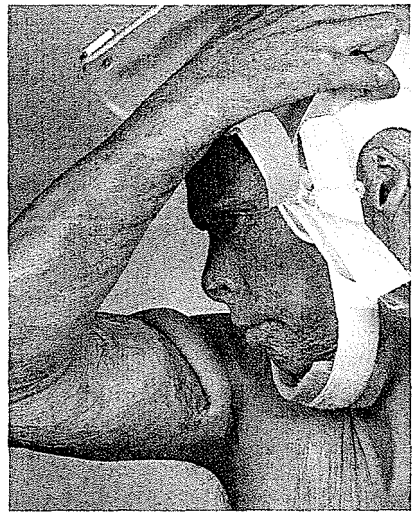
This 44-year-old male received burns on 70% of his face, body, and upper extremities in a 1966 airplane crash. He received multiple skin grafts which served reasonably well. In 1985 his presenting condition revealed healed burns of his forehead with baldness, except for hair in the postauricular areas, absence of eyebrows, ectropion of his lower lids, skeletelization of his nose with asymmetric retraction of his alae, neck and upper and lower lip scarring, and loss of the circumferential areas of his auricles.

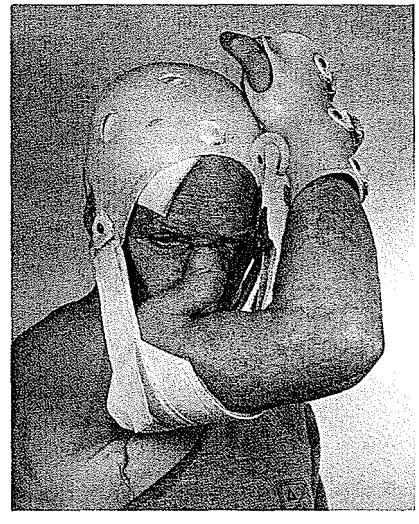


This type of injury was quite common in World War II, as this was the war of burns. My experience at Rooksdown House at Basingstoke, England in 1948, helping to rehabilitate the war wounded, had prepared me for such a case. As this patient's forehead, although partially burned, was one of his most normal features I decided not to scar it with a forehead flap. Rather I created a transverse 14 cm × 14 cm tube pedicle on his right upper arm and split skin grafted the donor area. At the same time he had postauricular hairy scalp

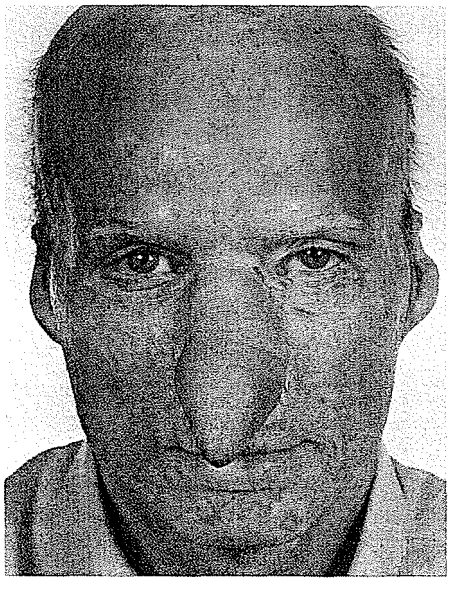
grafts applied to his brows, full thickness skin grafts to his lower lids, and a thick 15 cm × 5 cm graft to his submental neck area. One month later the scarred skin above the alae was turned down for lining and the remaining scar cover of the nose was excised. The medial end of the tube pedicle was divided from the arm, opened up, and thinned of excess fat. It was then attached to the nose and the arm fixed to a special headcap.

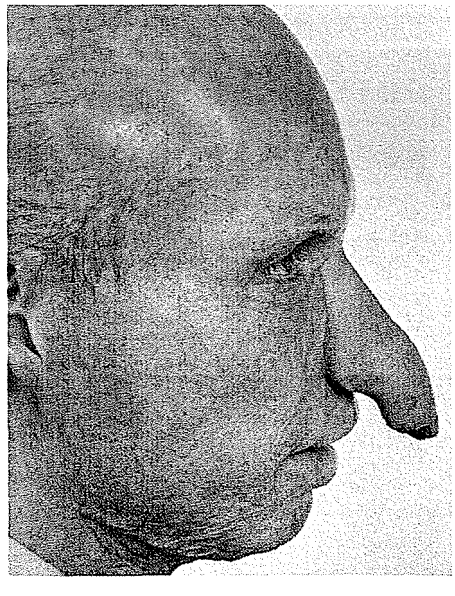






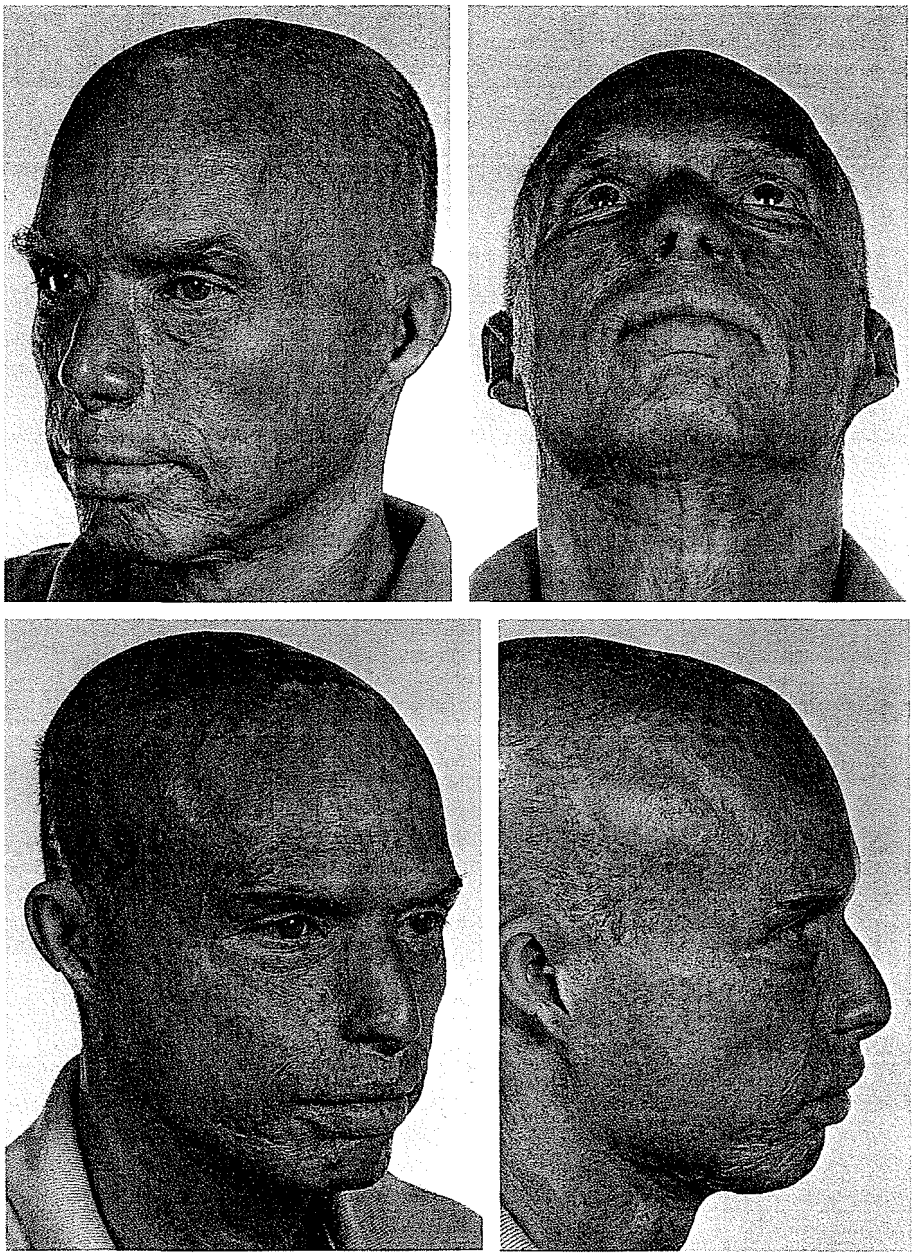
After three weeks the pedicle was divided to set his arm free and the excess pedicle was left dangling to delineate the blood supply of the distal pedicle for future tip and columella reconstruction.



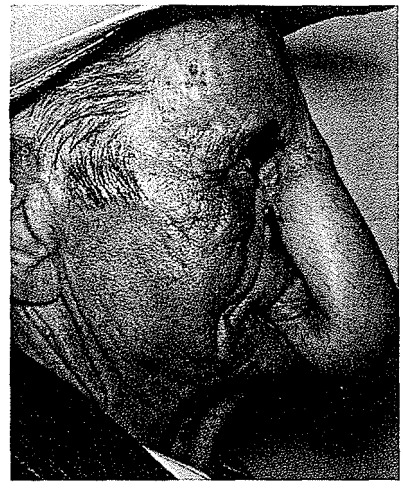


In between stages of the nose reconstruction the patient was sent to Burt Brent for consultation about bilateral ear reconstruction, but it was decided liabilities outweighed assets with surgery in this case and artificial ears were used.

After three weeks of dangling, the distal pedicle was trimmed, thinned, and let into the nasal tip, adjoining alae and the columella. Subsequent thinning of the flap and creation of alar creases were coordinated with skin grafts to the upper and lower lips.



This case is reminiscent of a patient named George, treated by H. D. Gillies during World War I. George had had a pedicle attached to his nose. Word came from the front that a battle was brewing and 200 casualties were expected at the Plastic and Jaw Center at Sidcup, England. All ambulatory patients were discharged temporarily to make room for the new casualties. George's pedicle was divided from his arm and left dangling from his nose. He was told to return after the acute cases had been treated. Instead of 200 there were 2000 face casualties from the Battle of the Somme, and George was forgotten. Fifteen years later George drove up to Gillies' plastic surgery center in a fine car and strolled into the clinic. Gillies recognized the fellow as his elongated tubed nose swung from side to side. "George!" he asked, "where have you been all these years?" Whereupon George explained, "Sir, I have been an elephant man in a sideshow in the circus, have made my packet and would like to retire now with a fine little nose." No sooner said than done.



An Extensive Burn

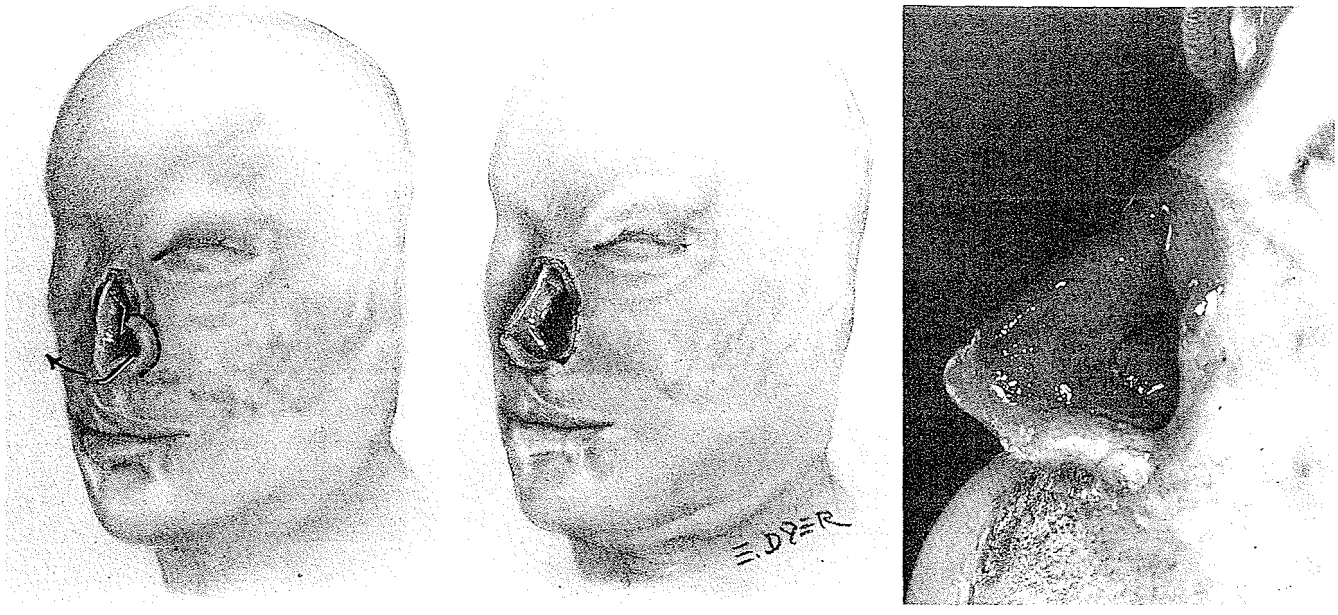
This 39-year-old male was pinned under his burning pickup truck for an extended period, resulting in third degree burns to 45% of his body surface, including the total forehead, scalp, face, nose, auricles, right eye, left eyelids, entire right arm dessicated, neck circumference, anterior chest, abdomen, and thighs. When he arrived in Miami he was well grafted in all areas. He specifically requested nasal reconstruction and was referred to our microsurgical team for a possible one-stage transfer of soft tissue to the nasal area. They referred him back to me!



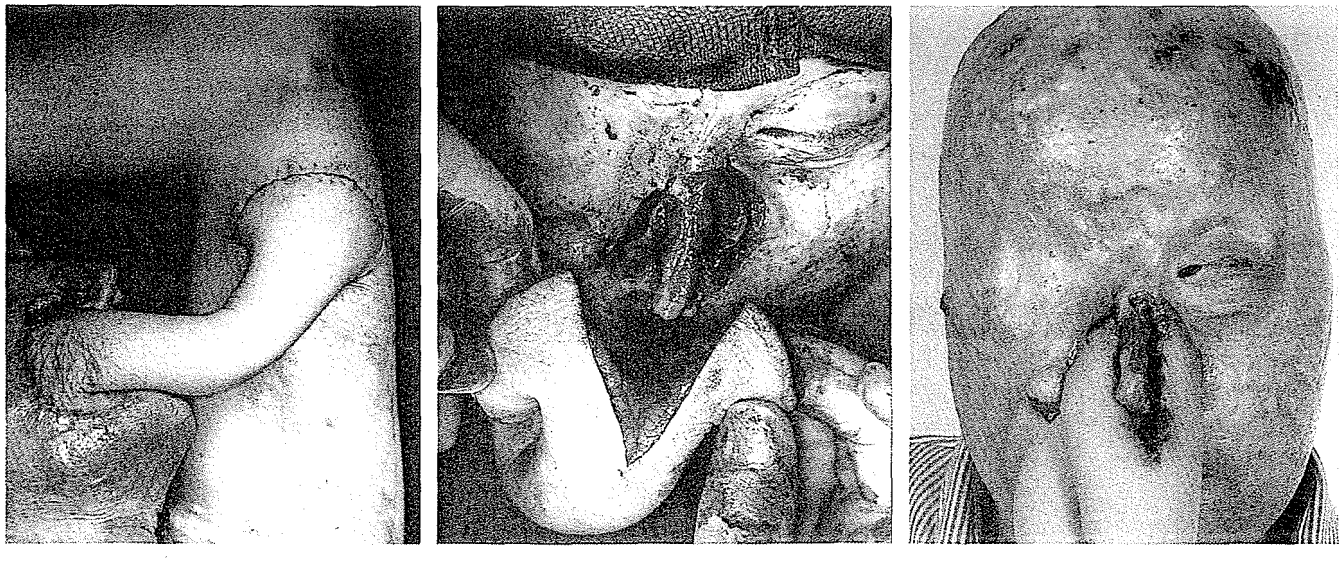
The remaining septum was the ace in the hole, an oasis in a desert of skin grafts and scar. The only easily transferable soft tissue was the skin of the left arm. Since the area around the nose was mostly skin grafts adherent to bone, the only practical area for first attachment was the lip, which had just enough contracture from the skin grafts to warrant replacement with a flap.

A tube pedicle was made on the inside of the left upper arm and the defect grafted. The L-shaped chondromucosal flap of the remaining septum was brought out and its front prow fixed to the nasal spine area, presenting an impressive scaffold for a nose. The left contracted ala was used to cover the raw area of the front prow.

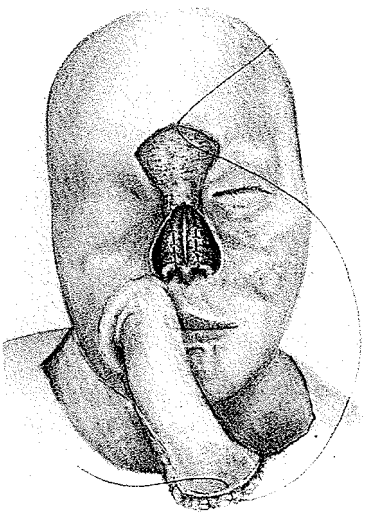
After a rest of several months the superior hairy axillary end of the tubed flap was used to replace the skin of the right subunits of the upper and lower lips.

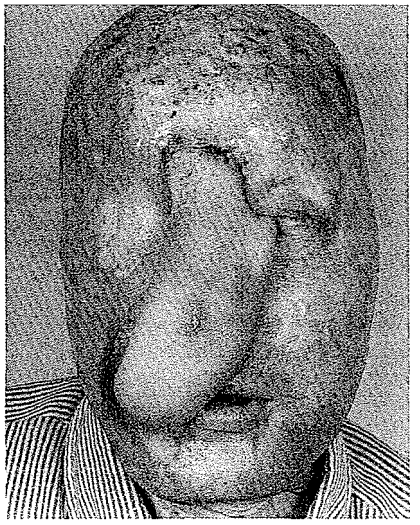


The standard area for attachment of the opposite end of the arm pedicle would have been the glabella area but this was mostly skin grafts over frontal sinus and bone with little chance of adequate blood supply. Also, nasal lining was needed. Three weeks after the lip inset and one week after delay of the base, the remaining arm attachment was divided, its distal end split like a lobster claw, and attached on either side of the septum down to the freed lateral mucosa of the vestibule. Seven weeks later the pedicle was divided, leaving enough lining attachment to be unfolded, and turned up and sutured to the upper edge of the septum bilaterally. The glabella was denuded of skin graft to increase the area for



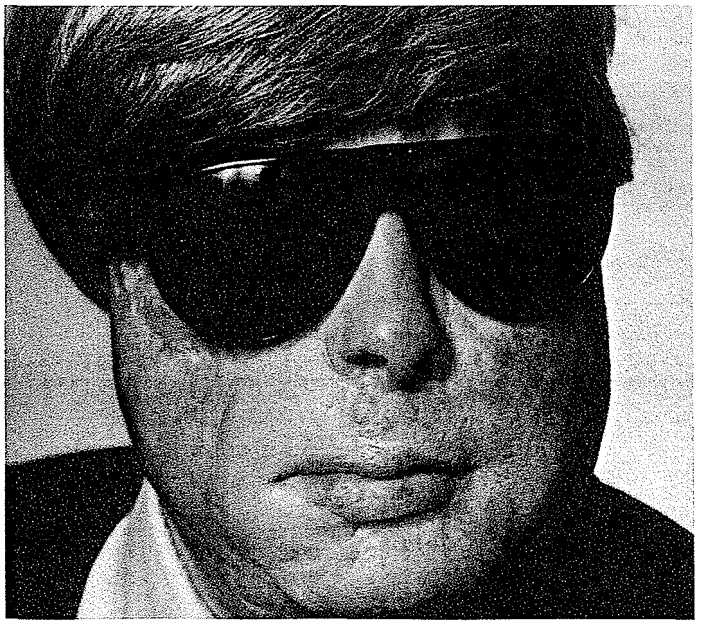
pedicle attachment. The freed end of the pedicle was opened, thinned, and inset in the frontal area but also allowed to encompass the entire lined septal scaffold. One month later the







tube was divided from the lip attachment and trimmed so that the cover could join the nasal lining on each side to form alar margins and advance as nostril sills to open the airway, leaving an excess at the tip for columella. Subsequently the excess tip was fashioned as a columella and marginal thinning and alar crease sculpturing completed the nose. A skin graft released the tight left upper lip to set the stage for a corneal graft. Here he is today ten years later. His tube pedicle nose supports glasses and a wig covers the bald scalp.



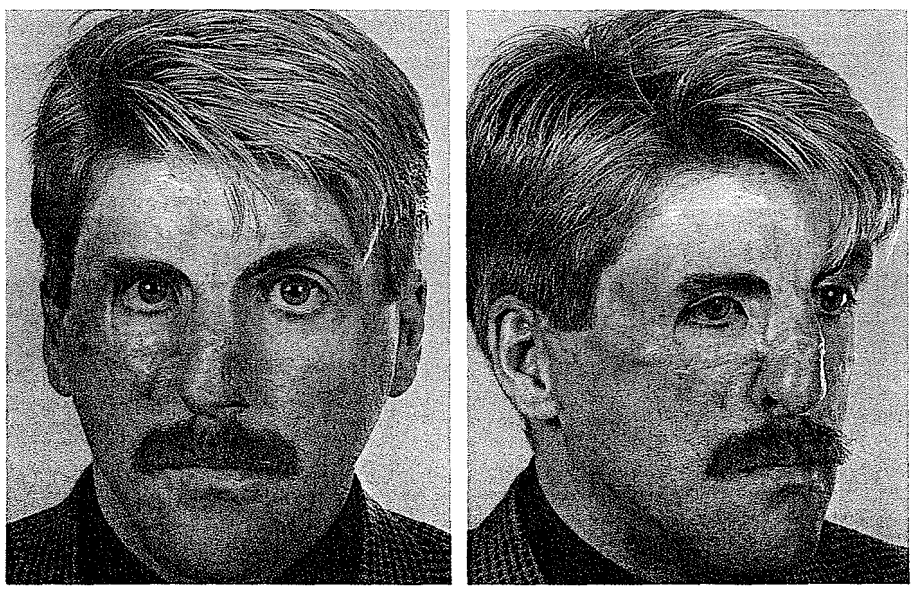
SKIN GRAFTS

During the Battle of Britain, in the heat of an air fight, the British pilots, against regulations, would pull off their gloves and shove their goggles up on top of their heads in order to see and work more efficiently. When their plane was hit and burst into flames, there were a lot of burned hands and faces. A. McIndoe at East Grinstead Plastic and Jaw Unit in England favored expedient free skin grafts for coverage of the nose, face, and hands.

There are circumstances where, although the burn was third degree and the scar deforming, excision of the scar can be satisfactorily repaired with a thick split skin graft. Here is an example.

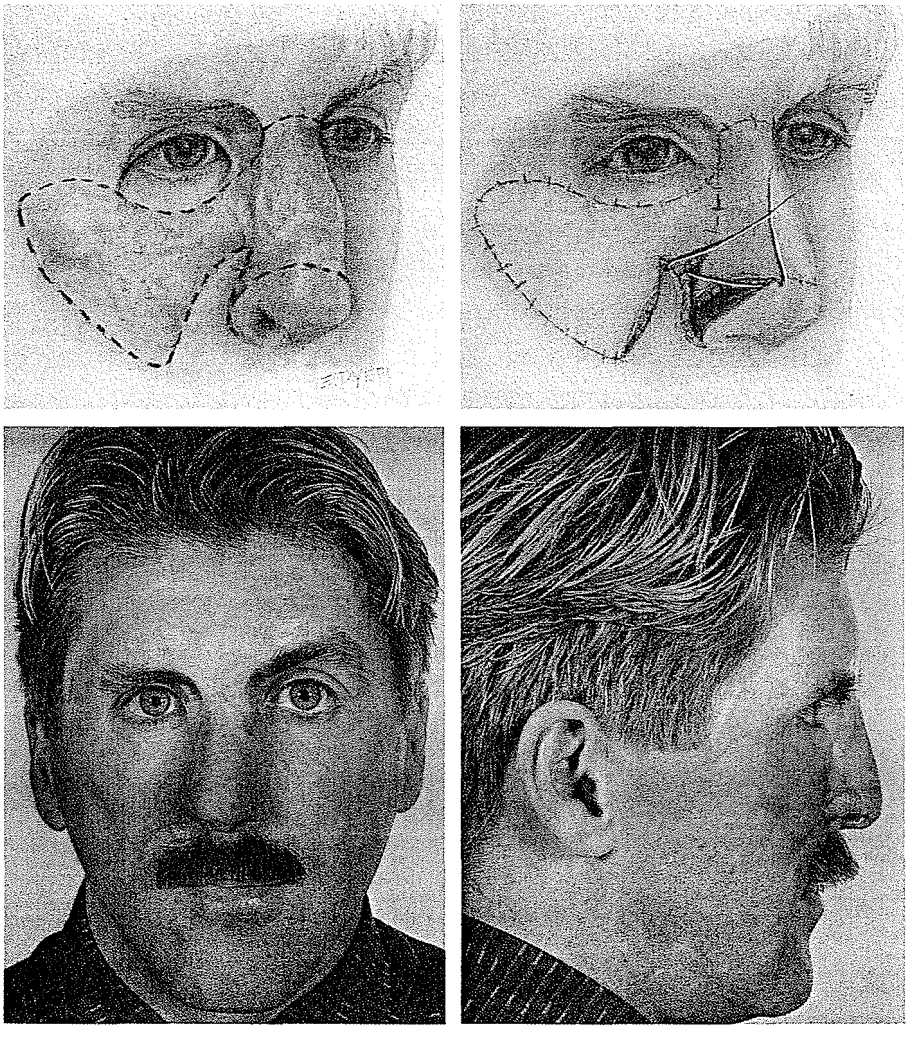
Secondary Skin Grafts to Burn Contractures

This 33-year-old male had suffered deep burns on his right cheek and the right side of his nose. The heavy scarring around his orbit rucked the skin into bands and webs but left the lower eyelid unaffected. The right side of the nose was severely scarred and retracted, causing deviation of the septum and a snarling retraction of the ala.



The reconstruction was divided into two unit parts, as the patient was a Jehovah's Witness and blood replacement was unacceptable. Excision of the cheek scar with release of the contractures allowed replacement with a thick split skin graft

from the right hairless supraclavicular area. After a healing phase, the scarred skin of the right side and dorsum of the nose were excised, and the retracted right ala released and the deviated septum corrected with submucous septal resection and cartilage scoring. The remaining unburned skin of the right nasolabial area supplied a flap to the alar release and the remaining nasal defect was covered with a thick split skin graft from the left supraclavicular area. The swell of the nasolabial flap imitating the alar contour pleasantly interrupted the flat expanse of the skin graft.



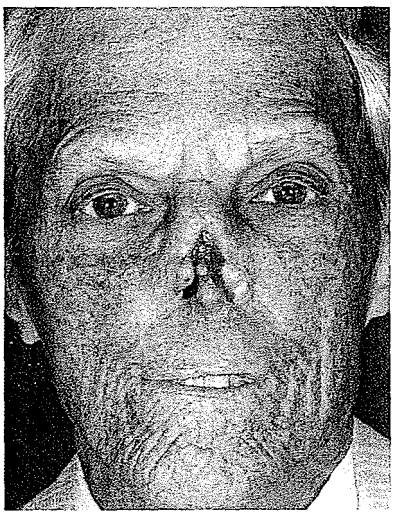
RADIATION

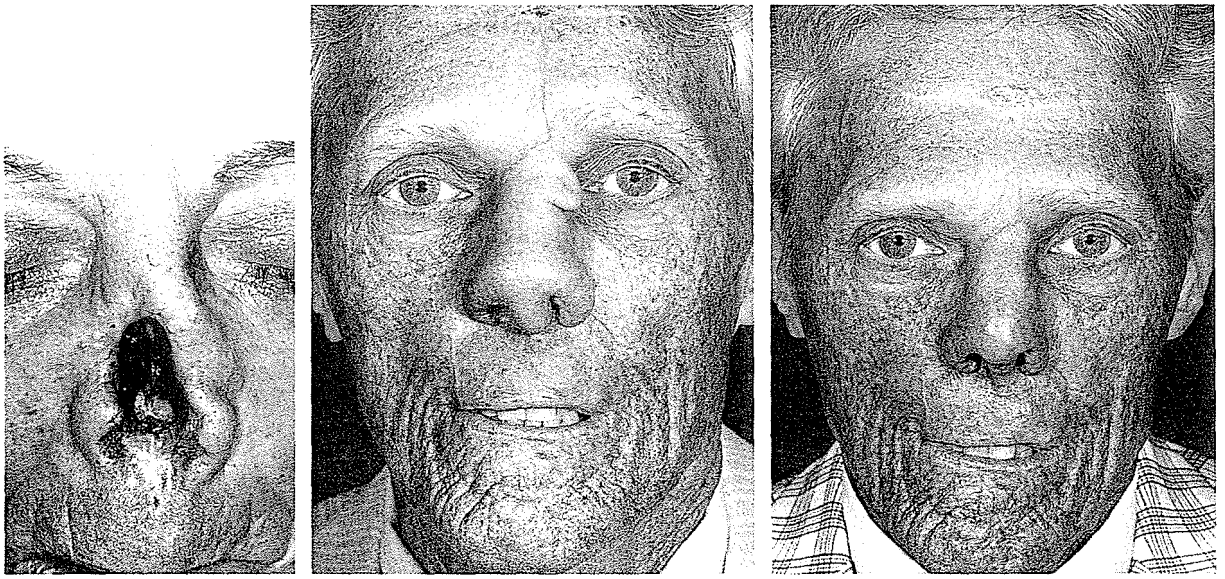
Patients who have suffered severe irradiation burns of the facial skin have a long-term problem. The injury causes insidious, persistent, and progressive breakdown of the skin, eventually becoming basal and squamous cell carcinoma. These

cases deserve early excision and skin replacement. Fortunately such cases are rare today. There are still occasional cases, however, due to exposure to radiation 20 years ago. During this exposure the prominent nose received the most damage and became a common area for the occurrence of carcinoma. I have treated several of these patients.

Double Disintegration of a Radiated Nose

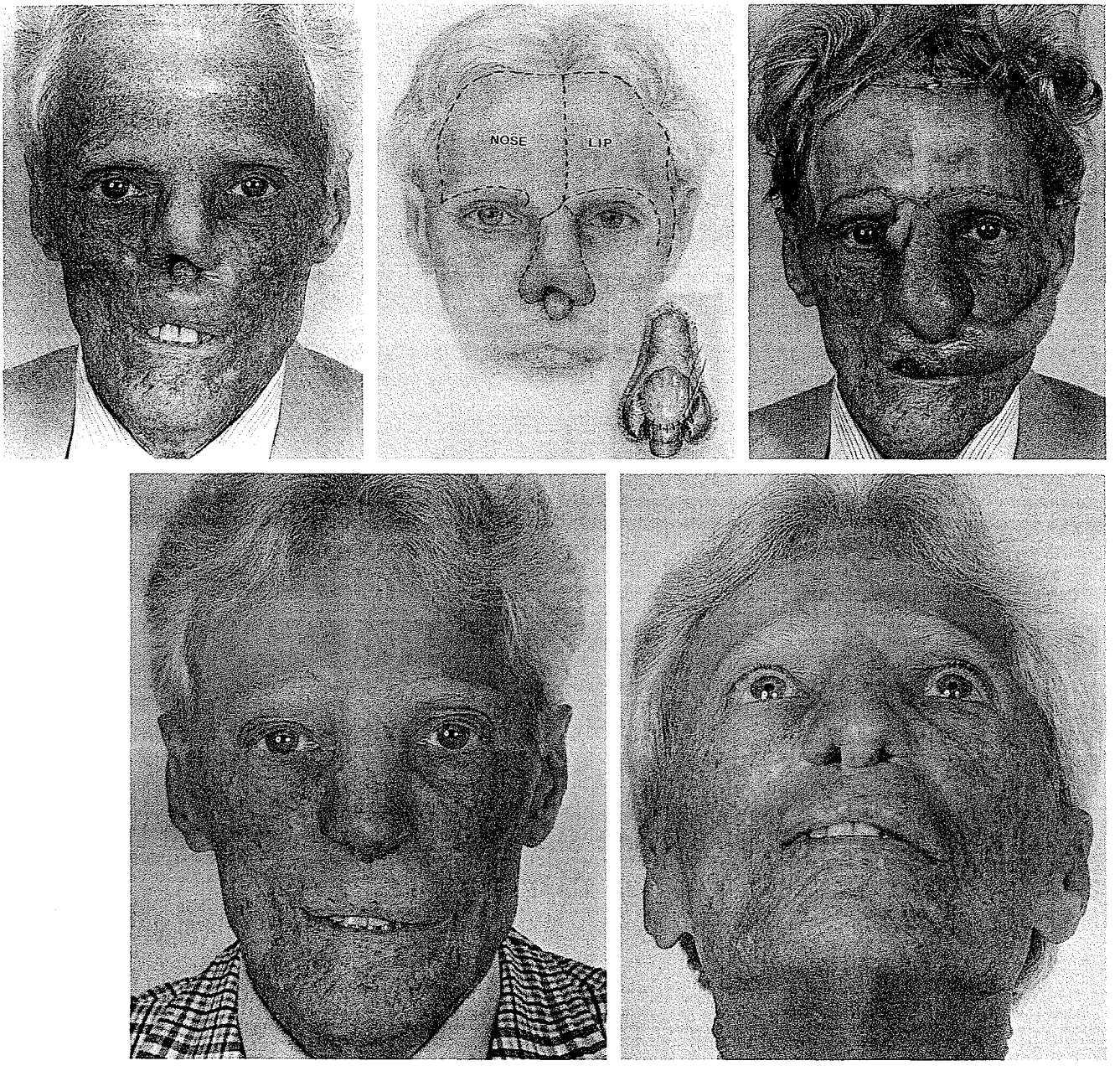
This 67-year-old male had had radiation treatment for acne of the face at the age of 20. The ensuing radiation changes were eventually exaggerated by exposure to strong sunlight. The patient began developing basal cell carcinomas which were first treated by a dermatologist with excision and later by a plastic surgeon with skin grafts. Eventually the excisions removed full thickness areas of the nose and septum. He was then referred for reconstruction. The remaining healthy nasal dorsal skin was turned down for lining of the tip and columella. This was covered by a midvertical forehead flap based on the left supratrochlear vessels.





This nose served well for 9 years but eventually revealed basal cell carcinoma of the distal nose and upper lip. This required wide excision. For reconstruction a double forehead flap was planned on either side of the midvertical scar. The right pedicle based on the right supratrochlear vessels was used to cover the nose after the previous residual forehead flap

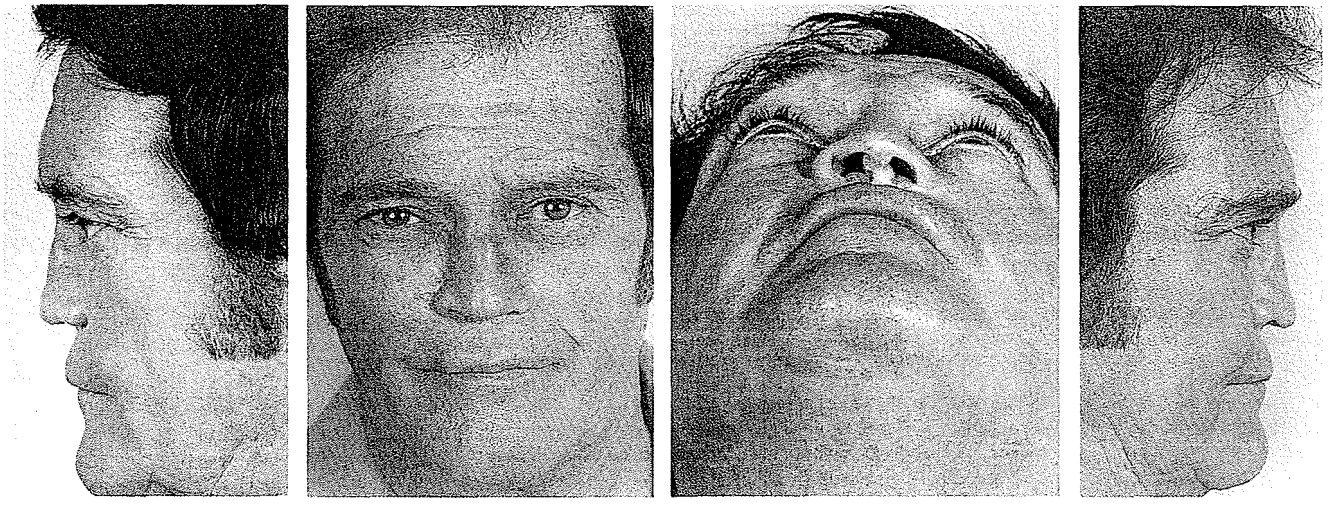
on the bridge was turned down for lining. The remaining left forehead was transferred as a tube pedicle based on the left superficial temporal vessels to supply new cover to his lip. The forehead was covered with a one-piece split skin graft as a total forehead unit. The forehead flap was thinned to reasonable proportion during several revisions. This patient went on to



develop other areas of basal and squamous cell carcinomas of the irradiated skin of his face which were treated by excision and even radiation. He is 91 years old and functioning reasonably well.

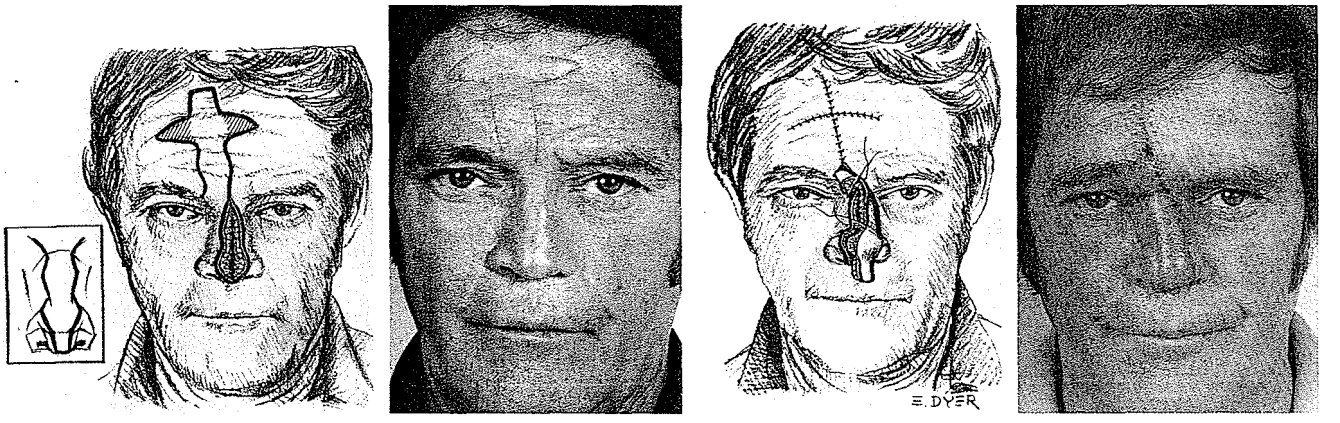
A Retracted Radiated Nose

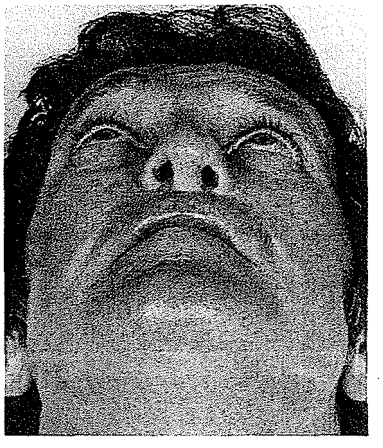
This 50-year-old male had had 5,500 rads radiation for an inverting papilloma of the nose. Over 12 years later multiple surgical procedures were carried out, including nasolabial flaps as well as columella and dorsal bridge grafts. The thin, atrophic, tight nasal skin was stretched over a bone graft, presenting lack of profile and substance, an inadequate retracted columella, and a reentrant nasolabial angle. When the physical findings were matched against the history of radiation and multiple surgeries, a diagnosis was evident. The tight skin stretched tautly over the bone offered no chance of profile enhancement by simply shoving in more bone. The tight skin begged release. The flat profile needed elevation by soft tissue inset because the atrophic tissues demanded more substance.

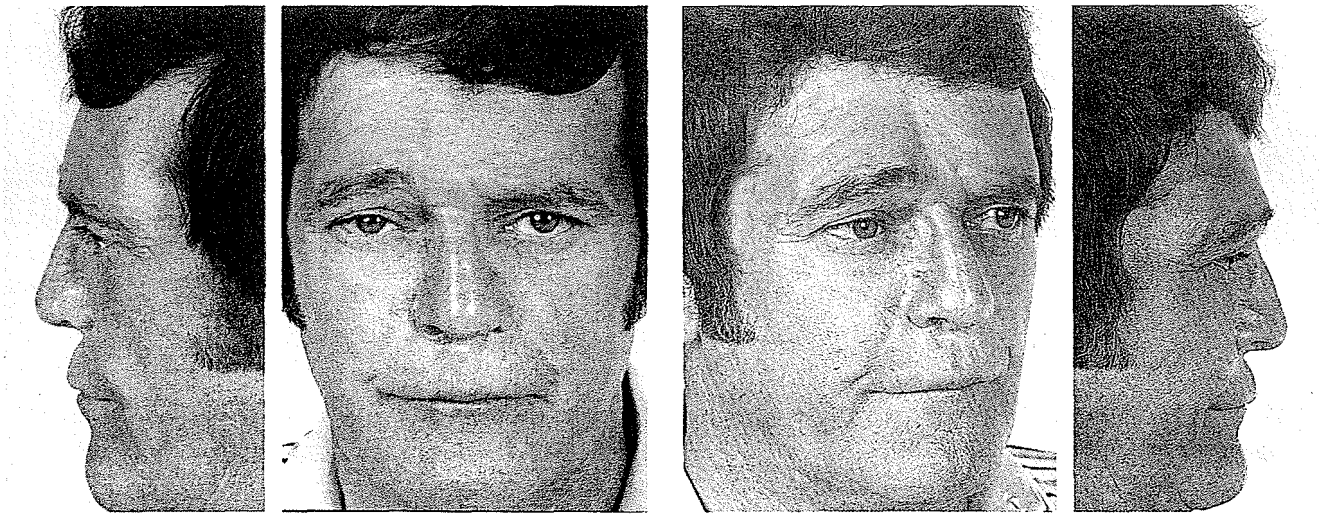


As the forehead was wrinkled and scarred, it could be improved by giving up a modest seagull-shaped flap. When an artist roughly sketches the front view outline of a nose, the highlights of the bridge stand out as an angulated double line running in continuity from the root along the bridge to the ball at the tip and dipping over into the columella. This is a central, longitudinal series of subunits forming one long unit. The forehead flap was incised for delay in a pattern to fit the desired central inset. The seagull wings were incorporated not only because of the ease of donor closures but because when denuded they could be used to add to alar substance in this

atrophic nose. Three weeks after delay, the flap was let into the midline release along the nasal dorsum with the de-epithelialized wings tunneled into the alae and the tip extension used to onlay the retracted columella. The pedicle was divided at one month and the donor area revised.







SPECIFIC RECONSTRUCTION OF DESTRUCTION BY DISEASE

Through the ages diseases have selectively chosen to attack the nose. Long before Christ's time leprosy was a disease with nasal destruction as one of its sequellae. In Christopher Columbus' time, syphilis began to appear in Europe and one of the sequellae of its third stage was nasal destruction. It has been said that Columbus' men brought the disease back to the royal courts of Europe from the New World. There are others who suggest it was vice versa.

Whether the blood supply of the nasal mucosa lining the vestibule and covering the septal cartilage is destroyed by the bacillus of leprosy, the spirochite of syphilis, the treponema of yaws, the leishmania braziliansis of leishmaniasis, or crystals of cocaine, the result can show the same devastation. Destruction of the mucous membrane exposes the cartilage framework and the resultant chondritis melts the cartilage and eventually even the bone.

In spite of all his experience with mutilated noses during World War I, H. D. Gillies admitted being baffled by the luetic nose. There was obvious loss of bone and cartilage but the nasal skin was intact. Attempts by surgeons to implant bone and cartilage had failed. After further investigation Gillies discovered there was complete loss of mucous membrane lining which, with loss of skeletal support, allowed nasal collapse with the skin becoming adherent to the bony rim of the pyriform opening. This prevented the alar base from being pulled forward normally if tested by the finger and thumb. This nostril test has become applicable in diagnosis of nasal lesions which destroy the mucosal lining. Replacement of the lining was the first step in reconstruction.

Skin Graft Lining in the 1930s

J. F. S. Esser used the split graft inlay to line the labial sulcus. Gillies adopted its use as a postnasal epithelial inlay in the syphilitic nose.

Through an upper buccal incision from one canine fossa to the other, with the scalpel hugging the bone, the skin and soft tissues were freed from the bony attachments. The crumpled nose will then pull out like a concertina into normal position. A split thickness skin graft was applied to the raw undersurface of the nasal skin and eventually the dental surgeon made small removable cap splints for the upper teeth onto which was attached an upright wire. Impinged on the wire was a gutta percha mould which fitted up under the skin graft to apply pressure and support. Once the graft had taken, the mould was replaced by a nasal prosthesis which could be changed at will for cleaning. In some cases after several months a cartilage graft was inserted between the skin graft and the skin for bridge support and the prosthesis discarded. This was not the usual occurrence.

It was predicted that intranasal skin grafts would be advantageous in other conditions such as lupus vulgaris, yaws, and leprosy.

Leprosy

N. Antia of Bombay adapted the skin graft inlay supported by a simple acrylic prosthesis for the similar nasal deformity in leprosy.

Forehead Flap

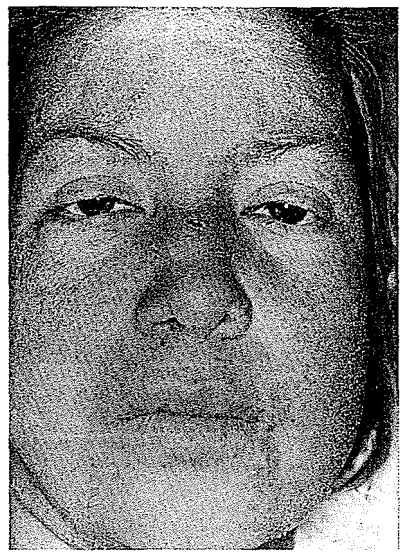
Although it seems a shame to use valuable forehead skin for nasal lining as it is out of sight, the results may justify the action. A vertical forehead flap based inferiorly is tucked under the nasal skin to provide lining destroyed by disease. R. Farina, in 1957, used forehead for nasal lining in leprosy. Several Chinese surgeons have also used forehead on an island flap for lining. The latest in 1993 were Zhou Liyun, M.D., Shi Chongming, M.D., and Hu Gunyin, M.D.

THE NASOLABIAL FLAP

I was primarily stimulated to find an alternate method to the skin graft which required a nasal prosthesis. Not only was

there a problem with constant need for cleaning the epithelial pocket, but many of these patients neglected or lost their prosthesis, allowing the pocket to contract irreversibly.

When the skeletal support of the nose is withdrawn, the normal nasal tenting flattens and the nasal skin spreads out into the cheeks, exaggerating the nasolabial folds. In a Robin Hood maneuver I began using nasolabial flaps to supply lining to nasal deformities of leprosy and syphilis. This not only provided thicker, more vascular lining enabling easier insertion of cartilaginous support, but at the same time produced a desirable nasolabial face lift. I believe N. Antia was also using a nasolabial flap in some leprosy cases.



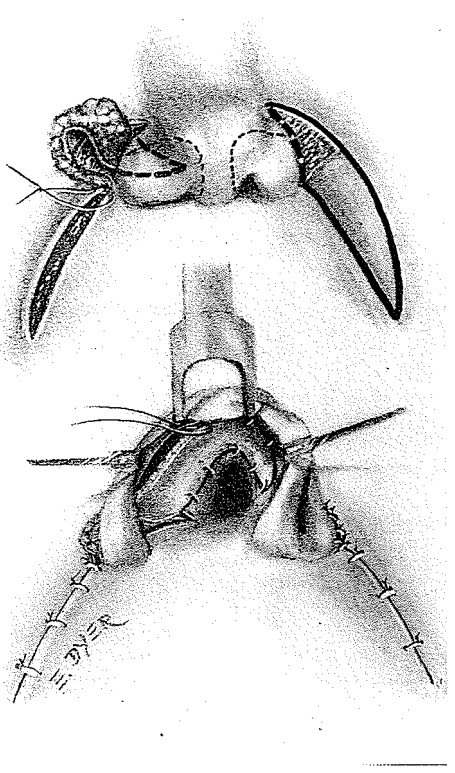
Leprosy

This 48-year-old female developed Hansen's disease in Cuba. She is seen in the early stage of the disease. Gradually there was loss of her nasal lining which was followed by destruction of the supporting structures of her nose. She was treated with Cortisone and later with Dapson and Prednisone. She was

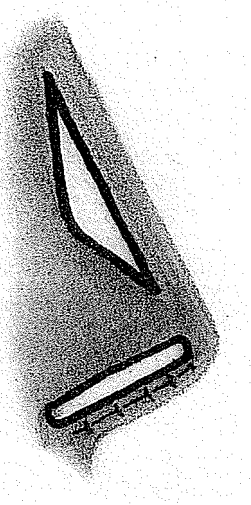


pronounced under control by her dermatologist, N. Zais, who continued her treatment. The difficulties encountered with skin graft inlays stimulated me independently to turn to na-

solabial flaps. First, bilateral vestibular incisions in the constricted lining followed by skin undermining released the nasal skin contracture. Then bilateral nasolabial flaps based at the sides of the alae were denuded of epithelium for 1 cm at the base. They were tunneled under the sidewall into the lining defect on each side and carried forward to back the raw surface of the released columella. The nasolabial donor areas were easily closed along natural lines, removing the ugly stigmata of leprosy. After 3 months a two-piece interlocking autogenous cartilage graft was inserted through a columella splitting incision. Steroid dependency with depression of the immune system caused infection in spite of oral antibiotics. The cartilage grafts had to be removed. After three months, with the aid of prophylactic antibiotics, banked autogenous costal cartilage was fashioned as two pieces, one to support the bridge and the other to strut the columella, each in its own separate pocket to improve the odds of success. The healing was uneventful.







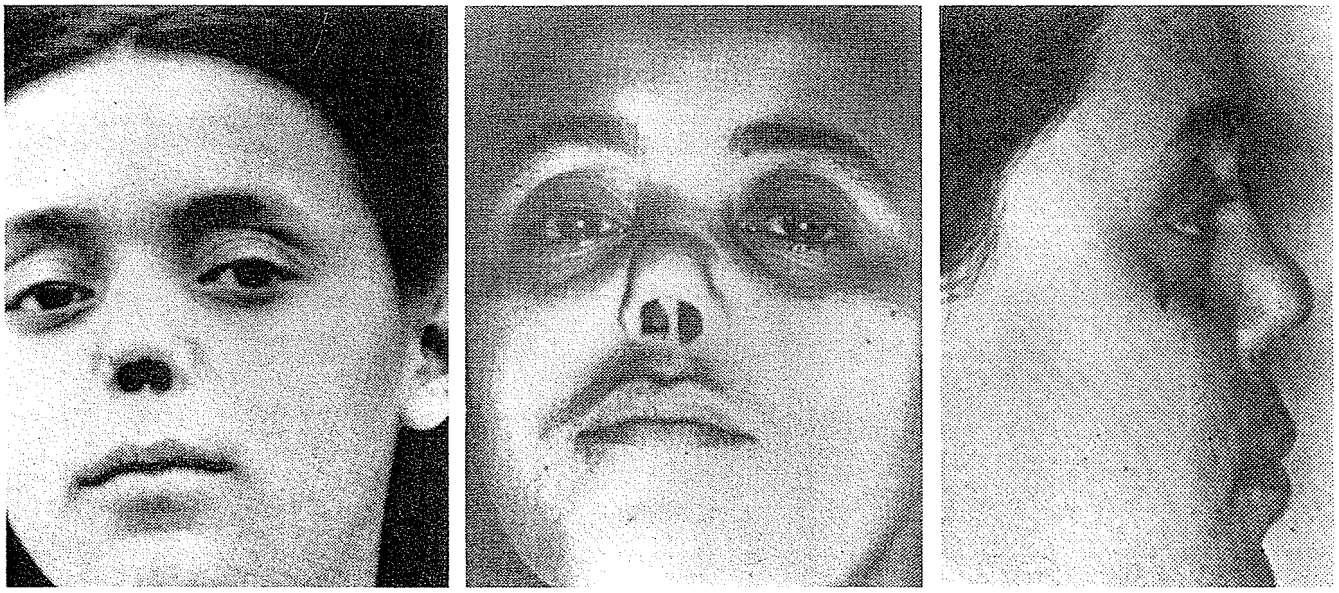






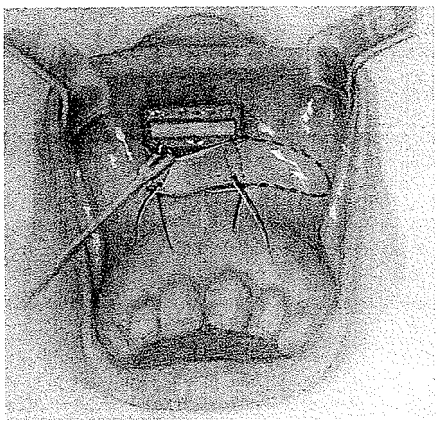
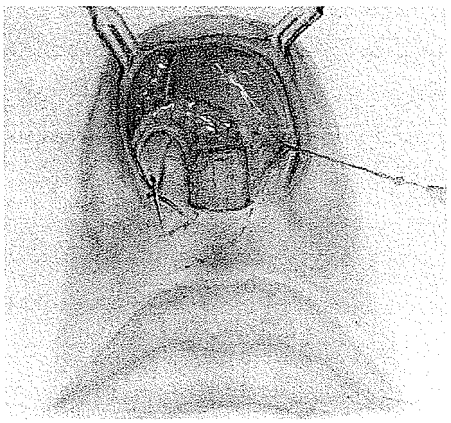
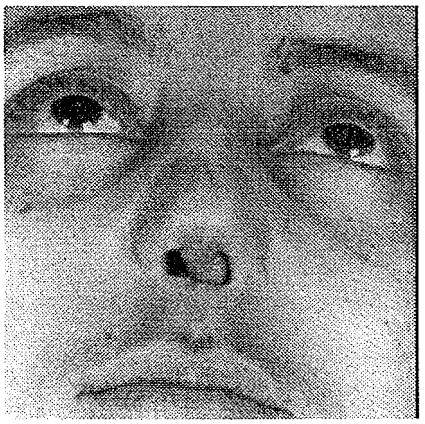
Leishmaniasis

This young female from Brazil had suffered with leishmaniasis which destroyed her columella and septum, along with loss of nasal lining, resulting in contracture of the distal nose. The shortness of this nose was shocking, yet elaborate methods to lengthen it were eliminated one by one, for scars from forehead and nasolabial flaps seemed quite undesirable in this young woman. A mucosal strap flap in the upper buccal sul-

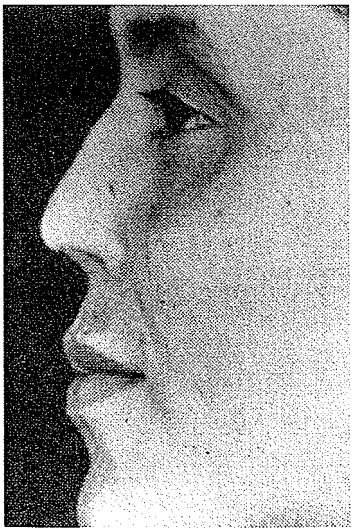


cus was lined with a chondrocutaneous graft from the postauricular area. As a second stage the distal end of this flap was delayed. When the mucous membrane flap was ready for

transport, the nasal skin was freed from its tight nasal lining by wide undermining and the bulbous alar cartilages were reduced. This allowed the nasal skin to advance one-half inch beyond the lining. The lining was then incised along the right side and rotated forward and to the left to maintain nasal length on the left. This presented a lining defect on the right. The distal end of the mucous membrane pull-through flap was let into this lining defect. A uniform lengthening of the entire nose had been achieved but at the cost of insetting the columella off center. It was merely reset at another stage

and finally the base of the new columella was set into the lip. Thus the nose had been lengthened by shifting the old lining and adding new lining, as well as reconstructing a columella—and all from lip mucosa and postauricular skin and cartilage without a single visible facial scar. A small cartilage strut was inserted along the bridge.




Here is the patient 35 years later. She reported that her reconstruction enabled her to marry and enjoy a normal life.



Yaws

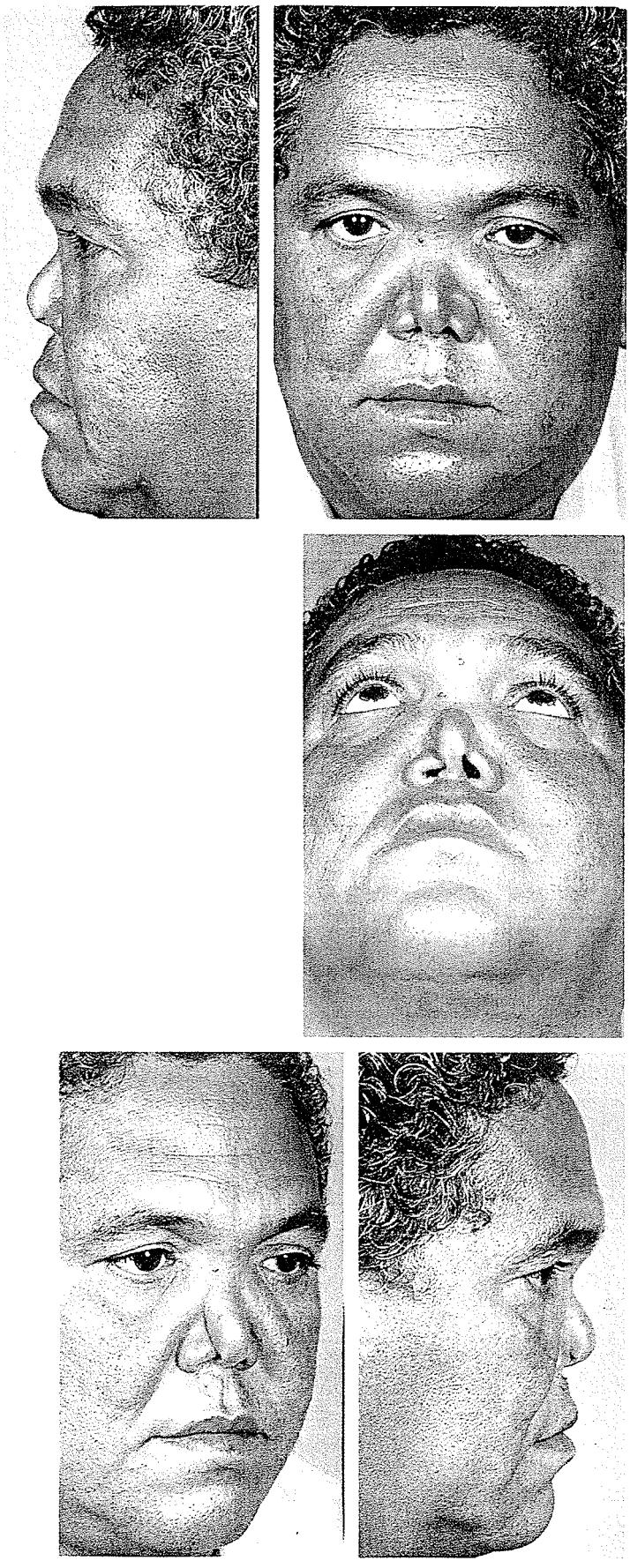
My experience with the nasal deformity of yaws is limited to only a very few cases in the Caribbean area, and in these cases the skin of the nose was also attacked.

One entire island which had a great number of cases was reportedly cleared of the disease with house-to-house calls with a syringe of penicillin.

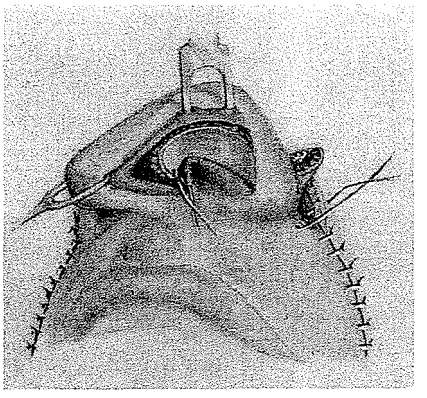
An example of reconstruction following yaws is presented in the subtotal nasal reconstruction section.

Syphilis

This 52-year-old Latin male presented the late stage of a luetic nasal deformity. The usual exaggerated nasolabial folds were taken as flaps with their base at the ala on each side. A 1½ cm denuding of the epithelium of the base prepared each flap to pass into a through-and-through incision under the alar base. An incision in the vestibule on each side at about where the intercartilaginous line used to be and carried forward into a through-and-through membranous septal incision not only allowed freeing of the nasal skin from the bone, but enabled advancement of the nose out and forward. Into these bilateral vestibular lining releasing incisions the nasolabial flaps were introduced, joining each other in the membranous septal incision behind the columella. Of course the thickness of these flaps and the postoperative edema caused the nose to swell.

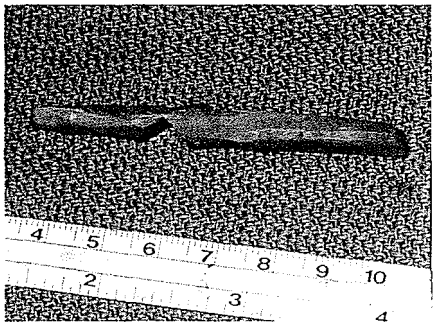


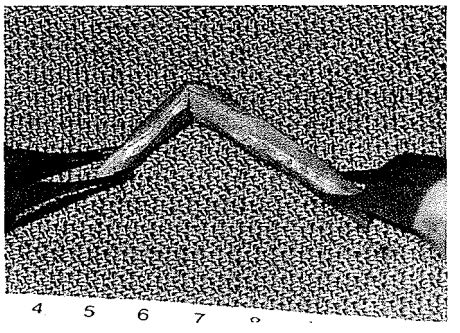






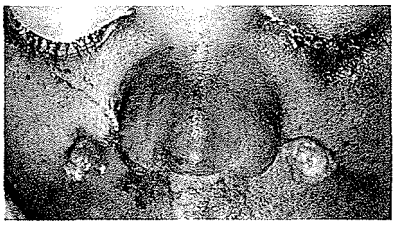
Eventually the swelling subsided, presenting the opportunity of fashioning and introducing a costal cartilage hinge graft for nasal support.

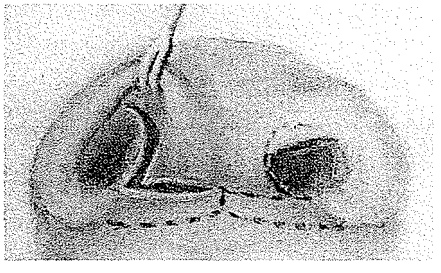


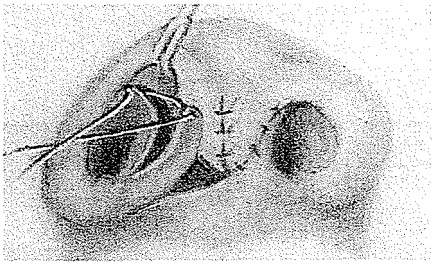


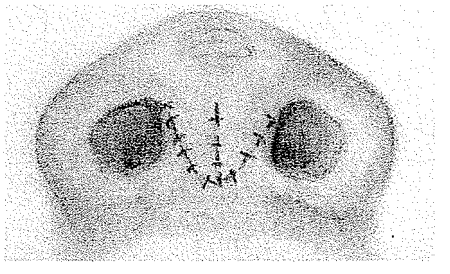


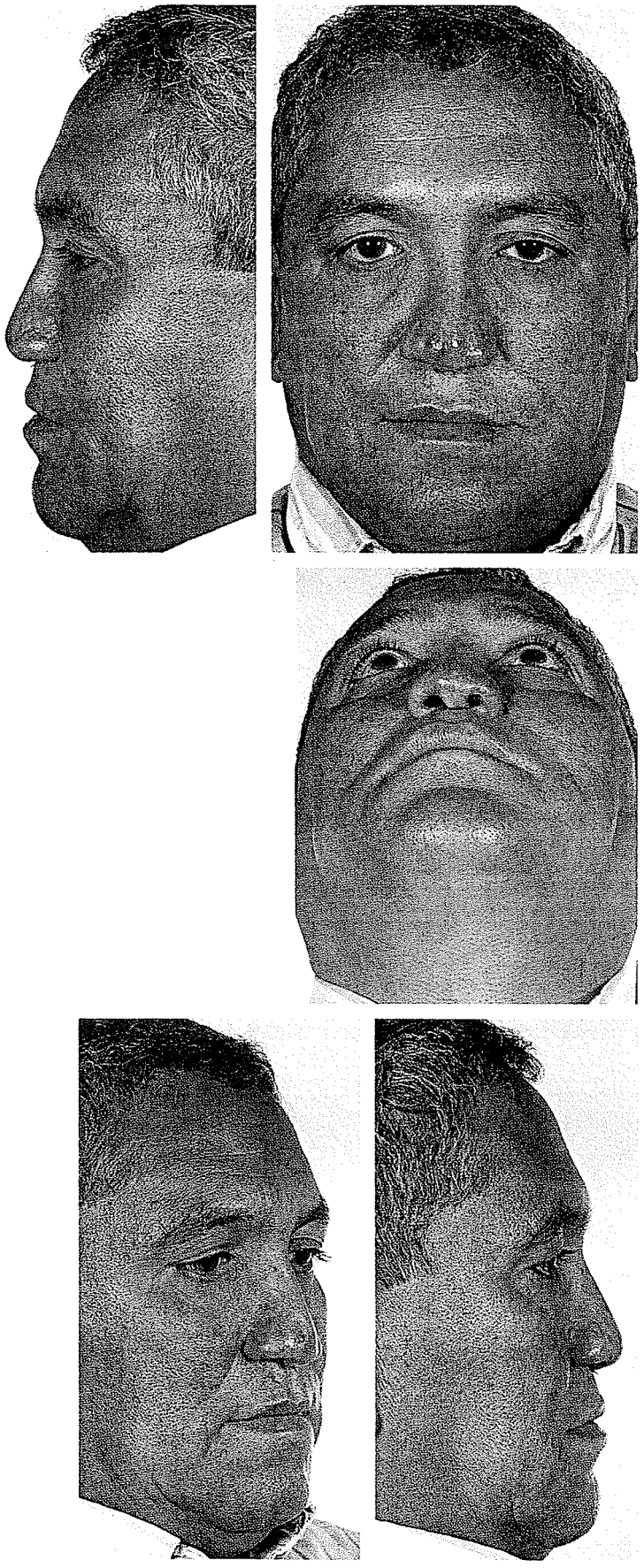
Later, through vestibular incisions, the excess subcutaneous tissue was excised which allowed a better airway. Finally advancement of the columella and transposition of lip flaps into membranous septal releasing incisions tailored and lifted the tip.











The Cocaine Nose

By stretching the term *disease,* but more because the ultimate nasal result is the same, the cocaine nose will be presented in this section. Introduction of cocaine powder into the nostrils is the latest scourge aimed at the nose. When cocaine is snorted repeatedly it causes constriction of the blood vessels of the lining mucosa, evidenced by severe blanching. If this is continued for any length of time the mucosa dies permanently, exposing the cartilage of the septum which serves as the central partition and supporting structure of the distal two-thirds of the nose. When the septal cartilage is exposed it soon becomes infected and the subsequent chondritis, if left untreated, will eat a hole through the septum, leaving a perforation of varying sizes. This is a common finding in cocaine snorters.

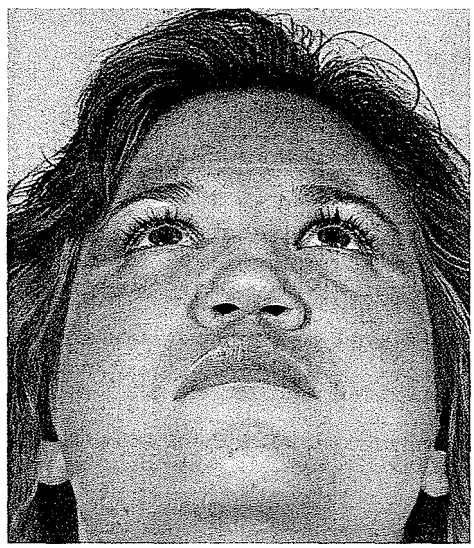
FIRST DEGREE COCAINE NOSE DEFORMITY. When the perforation is small and anterior it can cause a disconcerting whistle with breathing. A one-sided mucosal rotation flap can be advanced to close this hole and stop the music. When the hole is larger and more posterior, as in most cases, if the use of cocaine is discontinued the hole probably will not cause a problem. Use of larger local mucosal flaps or even flaps from the labial sulcus are available, but they are usually more trouble than they are worth.

If cocaine abuse is continued, it will gradually destroy all the septal cartilage. Like pulling the front center pole from a tent, the nose will collapse and contract into the face. Thus the nasal ravages of cocaine can vary from a pinhole perforation to varying degrees of mucous membrane lining ulceration with destruction of septal cartilage and even nasal bone destruction. I have had to reconstruct various cocaine noses: the flat depressed nose, the asymmetric collapsed and constricted nose, and the actual sunken, shrivelled, retracted nose, as seen in the worst deformities of syphilis and leprosy.



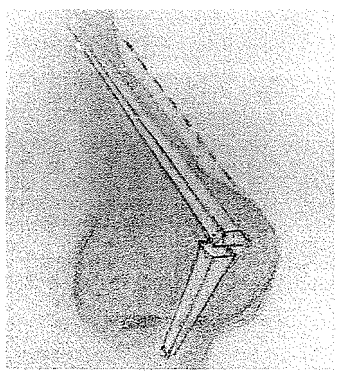
SECOND DEGREE COCAINE NASAL DEFORMITY. This 25-year-old female reveals the importance of the septum of the nose in serene beauty. Cocaine use over a three-year period caused the formation of a huge septal perforation and the subsequent chondritis allowed the gradual flattening and spreading of the nose. In her case the ulceration extended from the nose into the palate and pharynx, causing loss of a portion of her soft palate with destruction of her speech. This rare deformity caused by cocaine was reported by H. Deutsch and D. R. Millard in 1989.

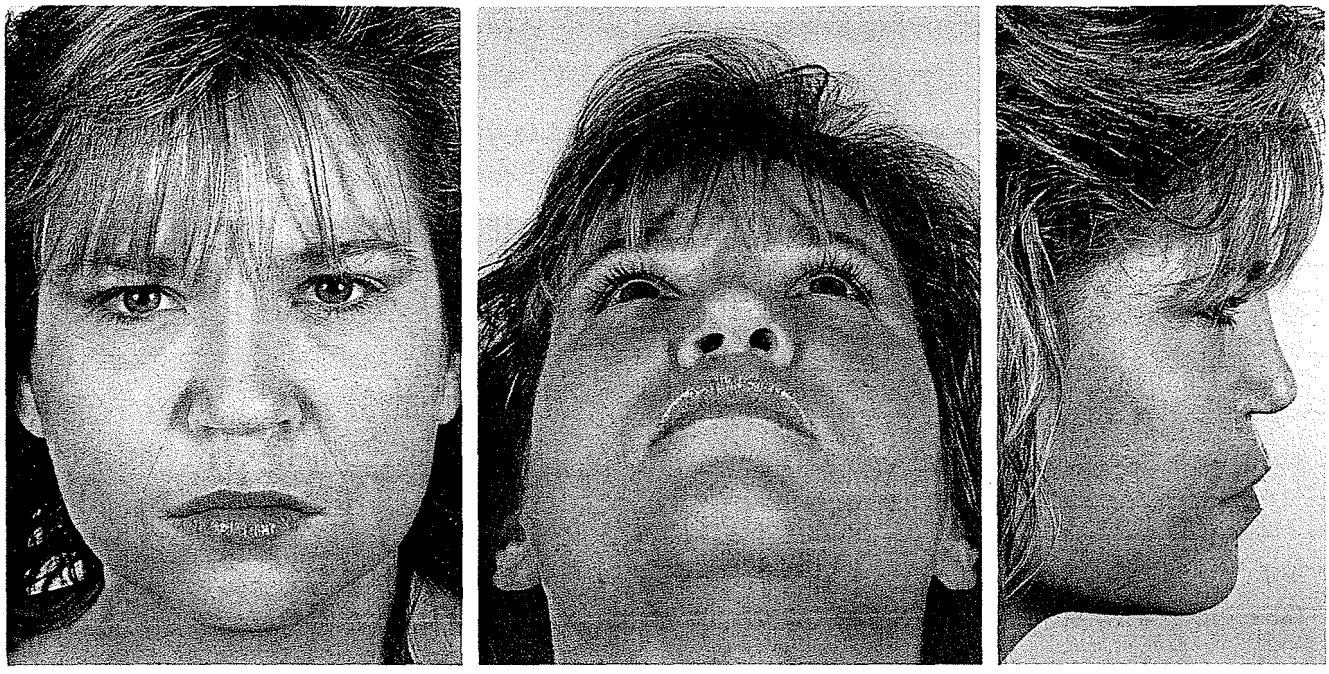






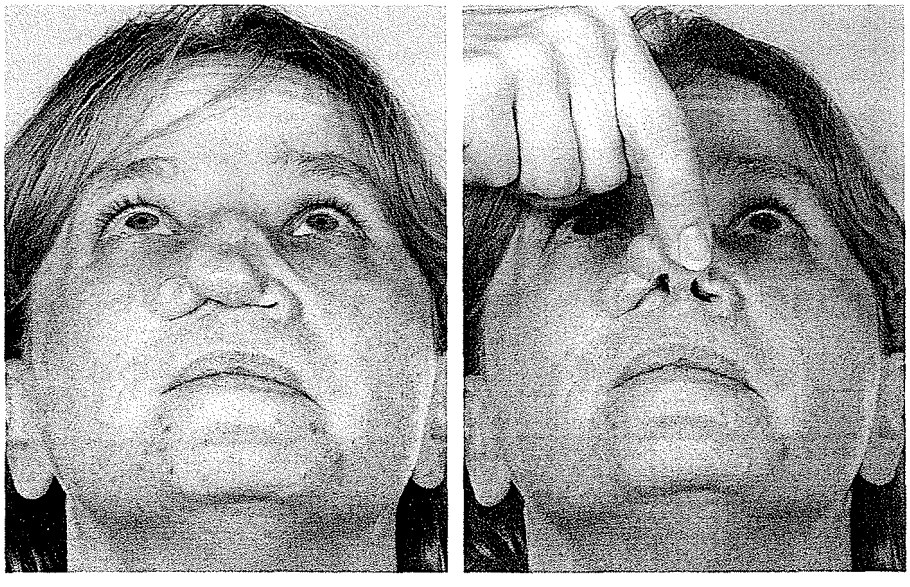
The patient was allowed to heal her ulceration for two years. A corrective rhinoplasty then included alar cartilage reduction and bilateral osteotomies with in-fracture. The membranous septal incision was carried bilaterally, releasing the contractures in these areas. Flaps of upper labial sulcus mucosa were transposed into the defects. Nine months later, through a columella splitting incision, a two-piece costal cartilage graft consisting of a 5-cm bridge support with a hole under its distal point was fitted into a pointed 3½-cm columella strut.



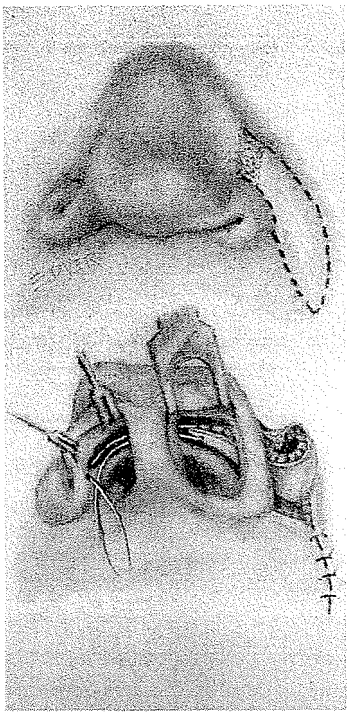


A superiorly based pharyngeal flap filled the soft palate cleft resulting in correction of speech.

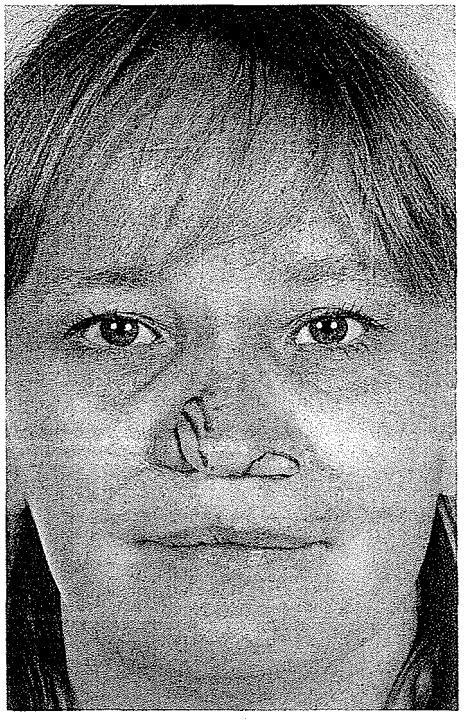
THIRD DEGREE COCAINE DEFORMITY. This 36-year-old female had destroyed the skeletal support and lining of her nose with cocaine, which resulted in tip collapse and contracture of the lining and airways. She had had a right nasolabial flap applied as an alar blob.



The patient was severely lacking in nasal lining. Nasal vestibular incisions allowed freeing of the nasal skin attachment to the bone in the area of both alae and the columella base. This opened a wide defect which was filled with a left unilateral nasolabial flap denuded of epithelium at the base as previously described, but extended to touch three bases. This flap was tunneled into a through-and-through incision under the base of the flap on the left which came out in the vestibular defect. The flap was sutured into position to free the left ala and then across the back of the columella base, and even to release the constriction inside the right ala.





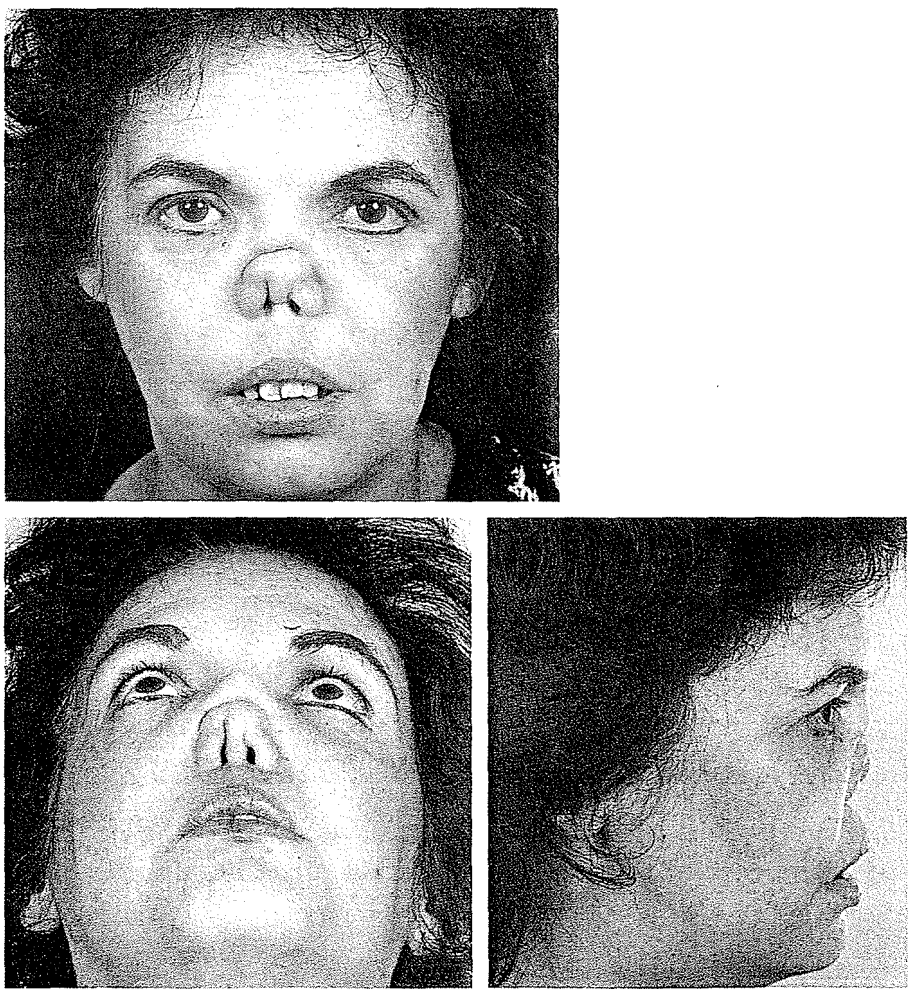


Five months after the lining had thus been reconstructed and through a columella splitting procedure, an osteochondrial perichondrial hinge graft was inserted to support the bridge, tip, and columella.

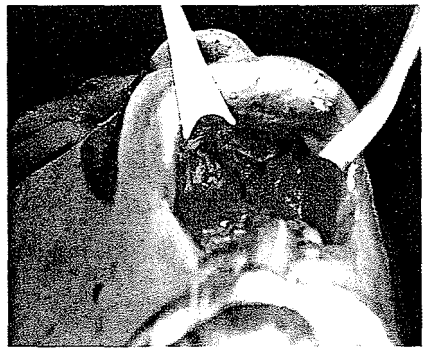
Subsequent alar margin trimming bilaterally, along with a right alar base transposition and vestibular Z plasties to open the airways, created a reasonable aesthetic and functional result.



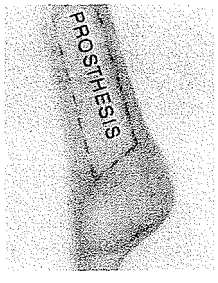
FOURTH DEGREE COCAINE NOSE DEFORMITY. This 44-year-old female had a history of cocaine use which had resulted in destruction of her nasal framework and contracture of her nasal lining until the nose had shrunk and retracted severely. Her deformity was strikingly reminiscent of those seen in syphilis and leprosy.



The Gillies approach through the upper buccal sulcus allowed the skin of the nose to be dissected off its tenacious attachments to what bone was left.

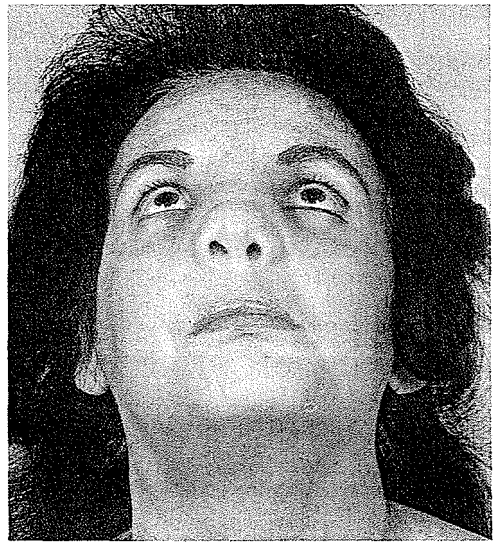






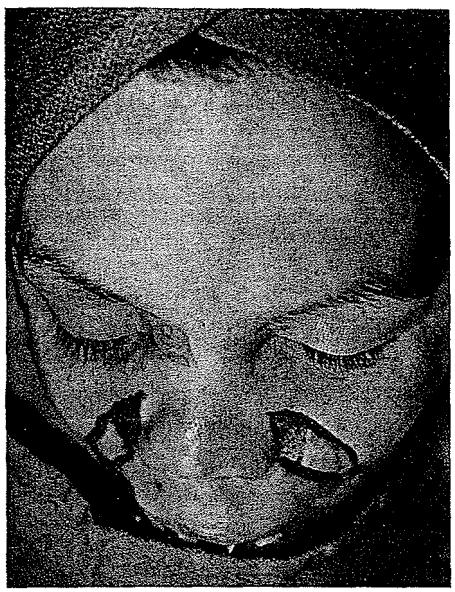
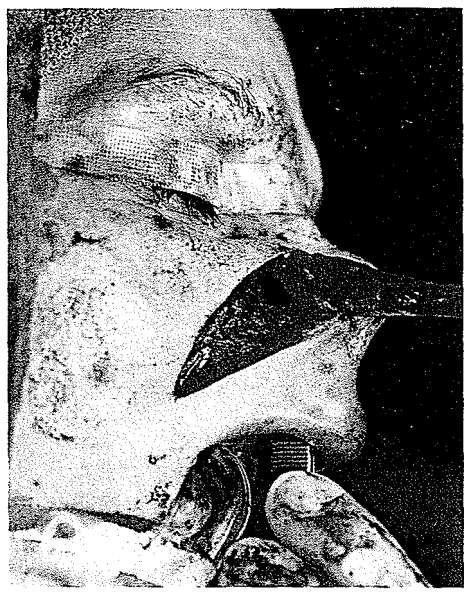
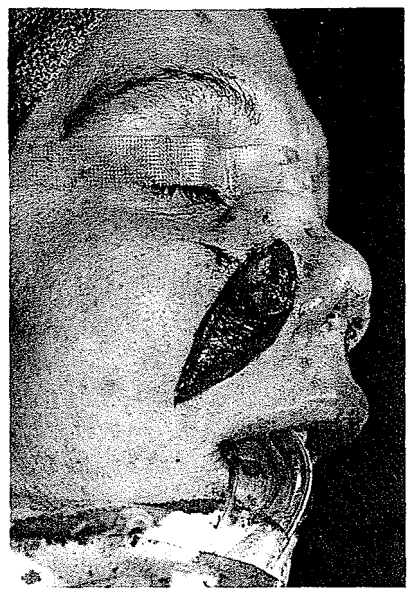
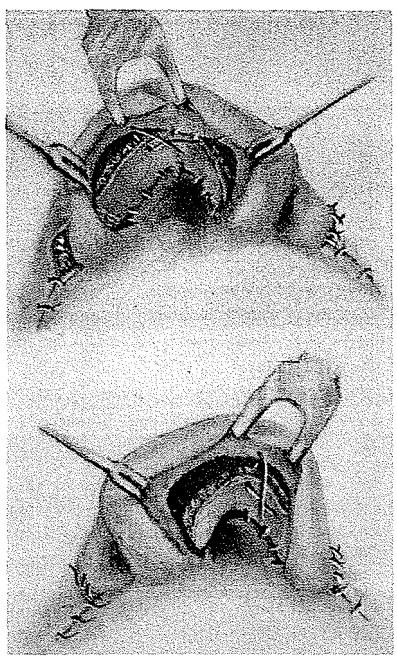
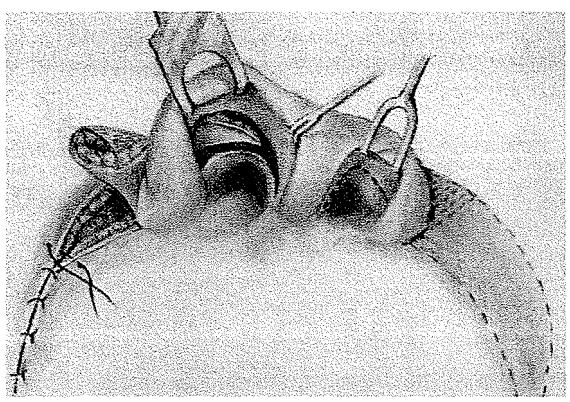
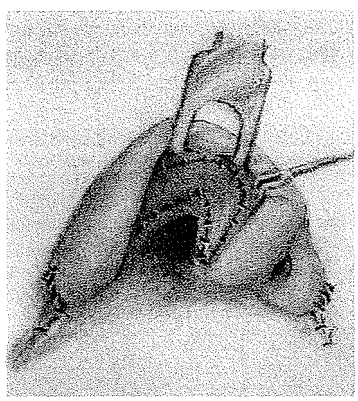
A skin graft was inserted up under the raw surface of the nasal skin and the pocket was maintained by a methylmethacrylate prosthesis which expanded the nasal area and produced a profile.



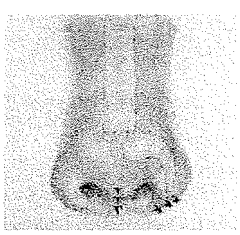


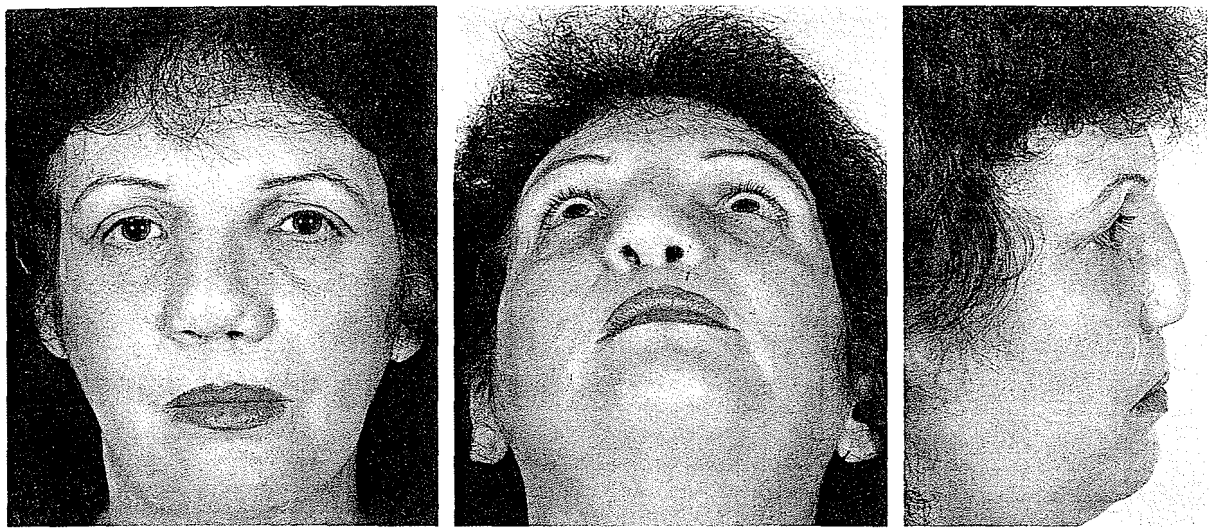


The patient was lost to follow-up; when found again the prosthesis was out and the nose shrunken. At this point it was decided that bilateral nasolabial flaps introduced into releasing incisions in the lateral sidewalls and brought together behind the released columella would eventually supply lining that could cover rib grafts.

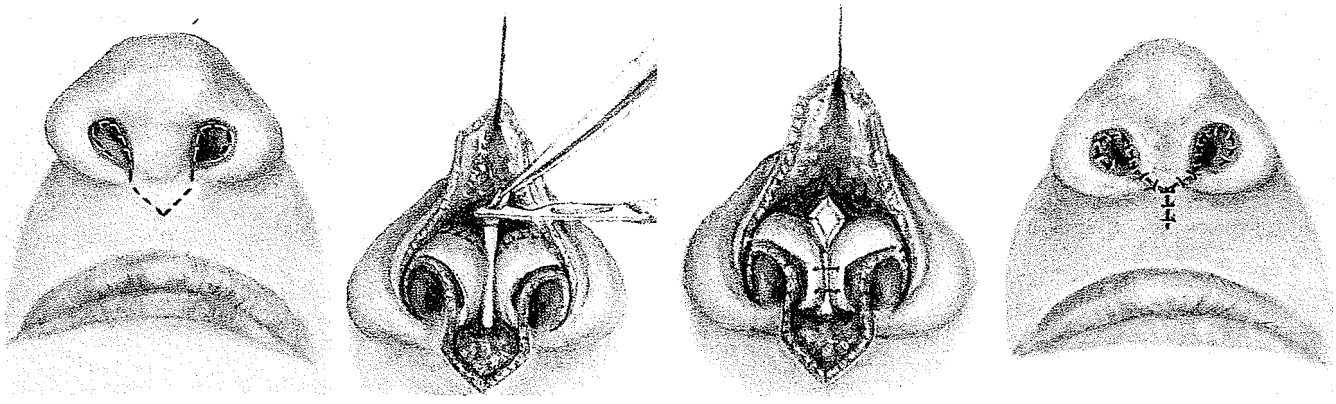







Finally a 4-cm costal cartilage was grafted onto the bridge extending into the tip, and a second angled costal cartilage graft was inserted obliquely in the slumped left ala to balance the tip and alae. The buried framework should eliminate a need for a prosthesis.





The contracted nasal tip exaggerated by the excess height of the bridge was finally corrected by an open rhinoplasty approach which extended 3/4 cm into the mid-upper lip to give length to the columella. The open exposure allowed shaping of the excess costal cartilage in the tip and on the bridge. Then a special tip graft of this excess cartilage was constructed for raising the tip and this was accomodated by the modest advancement of the columella out of the lip in a V-Y fashion.

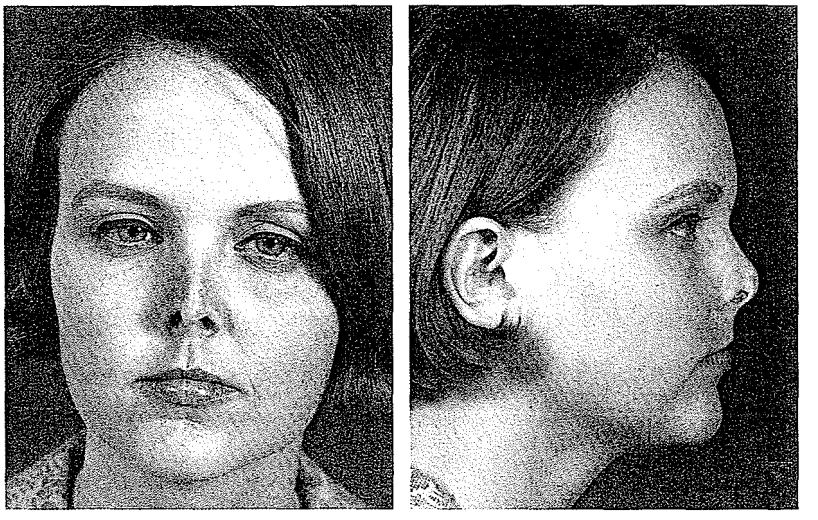




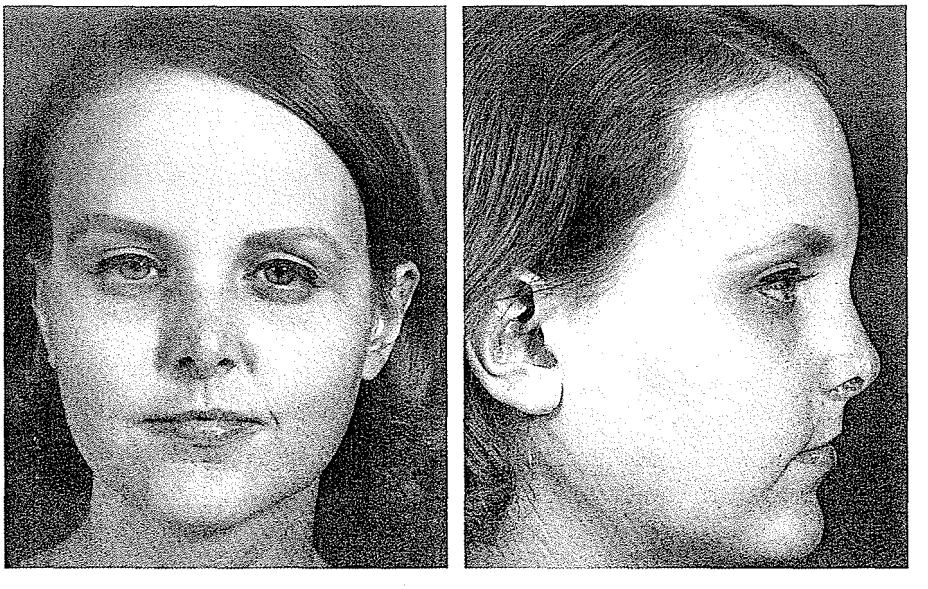


Scleroderma

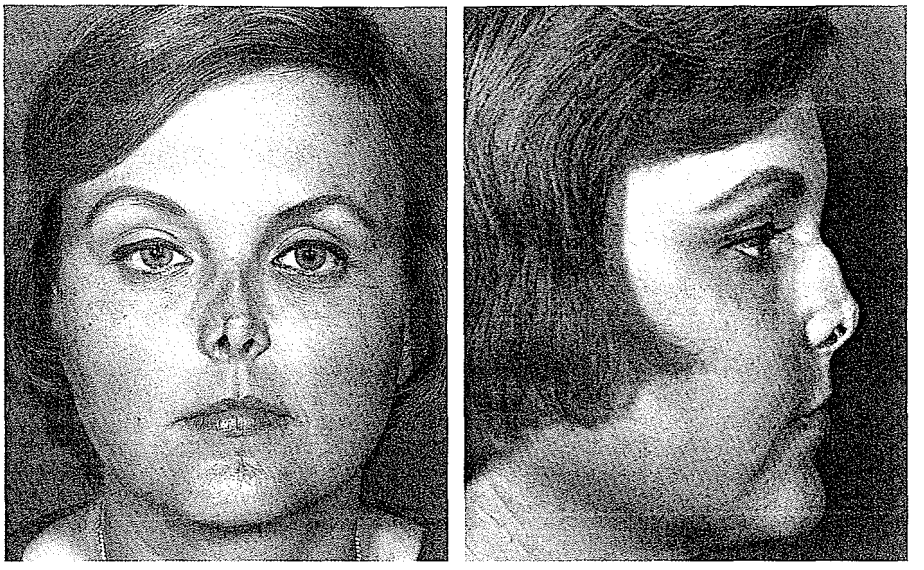
A 23-year-old married school teacher who had had a small nose underwent a rhinoplasty that resulted in shrinkage and scarring of her nose. She was referred by another plastic sur-



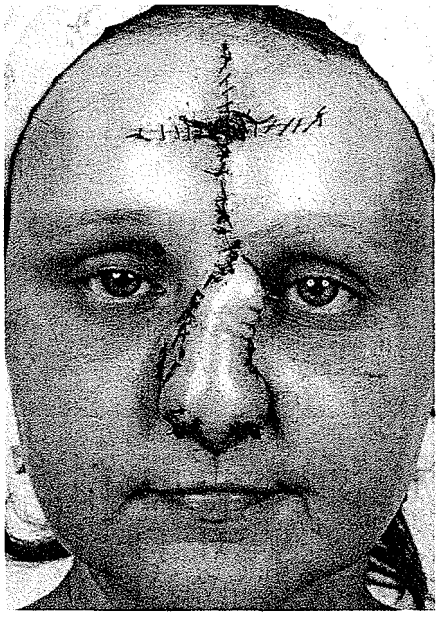
geon. In 1968, release of the retracted lining of the nasal vestibule was achieved by releasing incisions in the intercartilaginous line, which, along with a membranous septal incision, allowed the nose to extend to more normal position. An auricular composite graft to the septum and full thickness skin graft to fill bilateral lining defects resulted in early improvement.



By six months, abnormal shrinkage was noted and diagnosis of scleroderma was made. More dermal grafts were used to



try to improve contour, but by 1975 the shrinkage was such that the patient, ridiculed by her students, begged for further surgery. In 1977, a through-and-through release of the nasal tip and later delay of local lining flaps, as well as a seagull forehead flap based on the right supratrochlear vessels were carried out. Two months later the lining was turned down, the forehead flap transposed, and the forehead donor area closed. The forehead pedicle was divided and inset after three months. The patient progressed well for several years and in 1982 seemed to be satisfied.




Gradually the shrinkage began to appear again and attempts with auricular cartilage and silastic and rib grafts were all to little avail. The patient's complaints began to focus on restricted breathing, so nasolabial flaps were transposed to open the airways. This is the patient in 1993.

An Epilogue

Over the past 30 years a number of letters have arrived with enclosed photographs of patients with unusual problems accompanied by requests for instructions what to do. Time and time again I have diagrammed the logical plan but seldom ever hear whether the design was used and, if so, how the case turned out. Of course it is difficult to go entirely by photographs. Seeing the patient directly and being able to palpate as well as observe from every angle, brings a helpful dimension to the diagnosis. It is important also to know to whom you are trying to transfer complicated surgical directions. It helps to be familiar with their training and extent of expertise. When previous residents or fellows write for suggestions, it is a pleasure to comply.

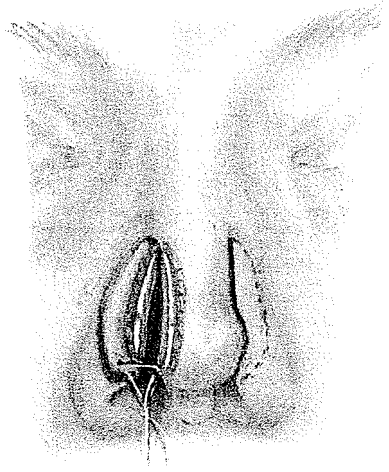
This is what happened recently when G. F. Maillard, a fellow at the University of Miami School of Medicine in 1976 who is now a savvy, world renowned plastic surgeon in Lausanne, wrote a short note. He forwarded three photographs of a patient who had had numerous operative procedures on her nose.



Let me quote Maillard. "A real cripple! the nose is a block of scars! She was operated for an aesthetic rhinoplasty by about ten different plastic surgeons in Europe (nasolabial flaps, columella reconstruction with helix composite grafts and parasagittal open rhinoplasty were the last procedures). What would you do in this case? Leave it or consider a complete reconstruction?"

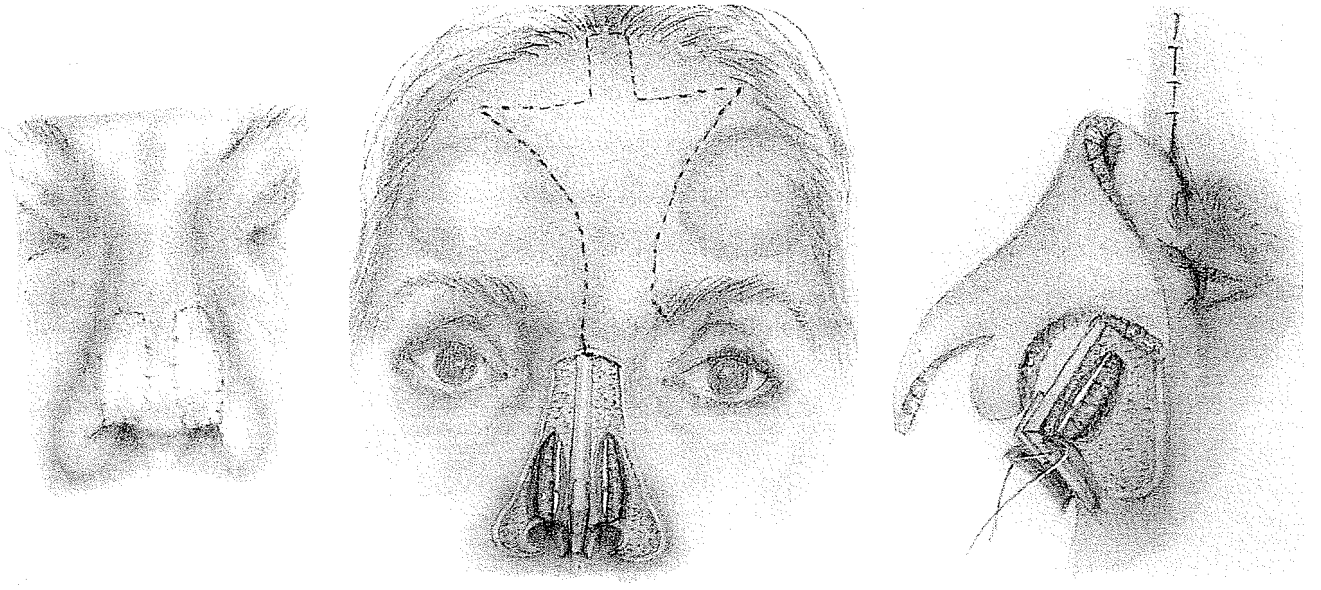
Not being able to tug on the ala, look into the vestibule, palpate the bridge and tip or feel the septum, limits the scope of my specific knowledge about this case. Experience does make it possible for me to estimate a good percentage of what I have not felt or seen. On this basis I have diagrammed a plan.

The nose has been so abused that it has shrivelled with loss of profile, contour, definition and units. As the entire nose has shrunken in scar I imagine that the lining may be short. If not, then the proposed first stage can be bypassed. As the overall reconstruction will plan a one-piece forehead flap cover, the present nasal cover can be discarded or partially used to turn in to supply a more generous vestibular lining. This can be accomplished by a through and through incision on either side of the septum to allow the turn-over of two skin flaps each 1–2 cm wide to open the vestibules. These turn-over flaps are sutured into position and the raw dorsal surfaces created can be covered temporarily with split skin grafts. At the same time a vertical, midline seagull shaped forehead flap based on the left supratrochlear vessels and measured by pattern, can be delayed



by incisions. Two 50 c.c. expanders are placed bilaterally under the unused forehead skin. Expansion is begun.

Two weeks later all skin covering the nose including the skin grafts is discarded. The skin of the retracted columella should be split down its center and the edges turned out. A costal cartilage hinge graft is now placed down the center of the bridge with the L angle at the future nasal tip and the anterior prop tucked into the columella split to rest on the nasal spine. A thin shaving of cartilage can be laid along each ala. Then the forehead flap is elevated, thinned carefully of excess galea and brought down to cover the entire nasal unit. The expanders are removed and the forehead donor area closed with care along natural lines.



Three weeks later the pedicle can be divided and returned to the glabella area to symmetrize the brows.

After a couple of months, when I had heard nothing, I called Maillard. He was extremely appreciative of the diagrams and was thinking over the possibility of carrying out this reconstruction. He explained to me that the patient was a bit frightened at plans of such extensive surgery so he did a face lift and she is very happy at the moment. When she asks about her nose again then he plans to go ahead with our plan . . .



Acknowledgments

Anne Cohen, a blend of intelligence, integrity, and kindness, my secretary of 40 years and still going strong, handed me the final typed text of the manuscript of this book at her alert age of 87 years.

Evalyn Dyer, for the clear and beautiful art work that explains the surgery; Jorge Insua and Evalyn Dyer, for the excellent photographic records without which this book could not be; the late Hamilton Millard, my brother, for my photograph and the Tagliacozzi tapestry; Mohamed Fahim, M. D., for the intraoperative color photography; R. Picard, M. D., for his poignant cartooning and intraoperative drawings and origami models; Walter R. Mullin, M. D., for a photograph of a sundial in Scotland; Monica Sipko, M. D., for a photograph of a seagull.

Charming Cristina Montoto and astute Louisa Gilbert, for persistent combing the files for forgotten cases and recalling patients for follow-up.

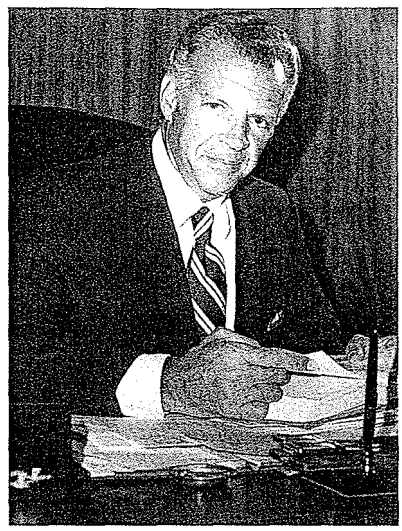
Outstanding craniofacial surgeon and scholar, S. A. Wolfe, M. D., for his cooperation and the value of his contributions to our team work; F. Stan MacMahon, M. D. and assistant Cesar Olivera for superb anesthesia; Scott Spiro, M. D. and Charles Lee, M. D., plastic surgery residents, for their part in helping me in the final construction of this book; Norman Bakshandeh, M. D., for helping with the title; and Jaime Lebed, M. D., for a critical eye.

The patient care and support in surgery has been effected by Ellen Cohen, R. N., Audrey Carlton, R. N., Iona Leeds, R. N., Trevor Ramsamy, R. N., Marcia Hemsing, R. N., and surgical technician Roberto Ruiz.

The staff at Little, Brown, for their help in creating a book from a lifetime of patient photographs and manuscript: Thomas A. Manning, Publisher; Tammerly J. Booth, Editor; Priscilla Hurdle, Production Editor; and Michael A. Granger, Production Supervisor and cover designer.

All journals in which I published the original work and from which I have borrowed examples are acknowledged in the text, especially *Plastic and Reconstructive Surgery*, *Annals of Plastic Surgery*, *British Journal of Plastic Surgery*, *Cleft Palate Journal, Archives of Otolaryngology*, *New England Journal of Medicine*, *Clinics in Plastic Surgery* (W. B. Saunders Co.), *Principles and Art of Plastic Surgery* (Little, Brown and Company), *Principlization of Plastic Surgery* (Little, Brown and Company), *How They Do It: Procedures in Plastic and Reconstructive Surgery*, L. Vistnes (Ed.), Little, Brown and Company.

Appreciation is expressed to Ethicon for their needles and suture material—catgut, silk, and Prolene—much of which I have used for nearly 40 years.



Biographical Notes

David Ralph Millard, Jr., M.D., F.A.C.S., Hon. F.R.C.S. Ed., Hon. F.R.C.S. Eng., O.D. Jam.

David Ralph Millard, Jr., was born at Barnes Hospital, St. Louis, Missouri on June 4, 1919. He earned a gold palm Eagle Scout, graduated cum laude from Asheville School, and majored in English at Yale University, where he was on the varsity football and boxing teams. He received his M. D. degree from Harvard Medical School and interned in pediatric surgery at Boston Children's Hospital under W. Ladd and R. Gross. During World War II he served as a LTJG in the Navy and after the war went to Vanderbilt University as an assistant resident in general surgery under Barney Brooks. He then became a trainee with Sir Harold Gillies at Basingstoke, England, with regular visits to Professor T. F. Kilner of Oxford and Sir Archibald McIndoe at Harley Street. He later served as an assistant resident at Washington University, St. Louis, with J. B. Brown, L. T. Byars, and F. McDowell; a fellow with C. Straith in Detroit; and finally as a senior resident at Jefferson Davis Hospital, Houston, under B. Hardy, T. Cronin, R. Wise, and R. Brauer.

In 1952 he returned to England to coauthor the two volume book, *The Principles and Art of Plastic Surgery*, with H. D. Gillies. Upon completion of this book he became chief plastic surgeon (Major) in the U. S. Marines in Korea, receiving a letter of appreciation from the U. S. Marines and a letter of commendation from the Korean Marines. In 1955 he started his teaching career at the University of Miami and was made Clinical Professor and Chief of the Division of Plastic Surgery in 1967. In 1971 he presented the Gillies' Gold Medal Lec-

ture at the Royal College of Surgeons, London. In 1974 he became the first Light-Millard Professor of Plastic Surgery, a position he holds today. He has served as an associate editor of *Plastic and Reconstructive Surgery*, a director of the American Board of Plastic Surgery, President of the Educational Foundation of the American Society of Plastic and Reconstructive Surgeons (1970–1972), and President of the American Association of Plastic Surgeons (1984–1985).

He has presented the Edward P. Richardson and the George H. Monks lectures at Harvard Medical School; the Kazanjian Lecture at New York University; a lecture at Post-graduate Medical Federation (Plastic Surgery Section) at St. Johns College, Cambridge University; the opening address of the 8th International Congress of Plastic Surgery, Montreal; the Robert H. Ivy, A.S.A.P.S. lecture and the Tagliacozzi lecture at the University of Bologna. He has been visiting professor at University of Michigan, Cornell University, Yale University, Harvard University, University of Indiana, Johns Hopkins University, University of Pennsylvania, U.C.L.A., University of California, San Diego, and James Barrett Brown visiting professor at Washington University. He gave the first J. M. Converse lecture in 1992. Among his publications are 212 articles and, in addition to his book with Gillies, he has edited *Symposium on Corrective Rhinoplasty* and has written *Cleft Craft: The Evolution of Its Surgery in 3 Volumes.* Volume I received the 1970 R. R. Hawkins Award and was reviewed by *Time* magazine. He also wrote *Principlization of Plastic Surgery* in 1986. Other awards he has received are the Education Foundation senior prize (1965, 1968); the Order of Distinction from the Government of Jamaica; honorary medal from Komenius University, Bratislavia; honorary award of the American Association of Plastic Surgeons; honorary award of the American Cleft Palate and the Florida Cleft Palate associations; Herbert Lipshutz Memorial prize (1976); State of Indiana's Sagamore of the Wabash (1982); the Asheville School Award of Merit; Dade County Medical Association Physician's Award and Physician of the Year, Dade County Medical

Association (1986); Honorary Fellow of the Royal College of Surgeons, Edinburgh (1986); Spirit of Excellence Award, *Miami Herald* (1986); honorary award of the American Society of Plastic and Reconstructive Surgeons (1988); honorary medal from the Peoples's Republic of China, Beijing (1988); honorary member of the Japan Society of Plastic and Reconstructive Surgeons, Inc.; Hall of Fame award, Miami Children's Hospital (1991); Distinguished Faculty Scholar award, University of Miami (1991); Honorary Fellow of the Royal College of Surgeons, England (1990); J. T. Dieffenbach award presented at Humbold University of Berlin (1992); Hunterian Professor of the Royal College of Surgeons (1992–1993), presenting Hunterian Lecture at Oxford (1993); annual Cleft Palate Foundation D. Ralph Millard, M. D., Lectureship sponsored by the American Society of Maxillofacial surgeons, 1995; Medal of Honor, National Society of DAR, 1996; Clinician of the Year, American Association of Plastic Surgery, 1996.



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