MASTERING REVISION RHINOPLASTY
To my mother Celia
who inspired in me a thirst for knowledge and exploration

To my father David
who taught me to always do my best and expect nothing less

To my wife Linda
my best friend and foundation, who guides me through life and continually shows me the true meaning of love

To my children Blake, Courtney and Steven
whose boundless creativity, insight, and wonderfully optimistic view of life continue to inspire my view of humanity

And to all my courageous patients
a very special thank you for your boundless confidence, trust, and support: without you, this book would not exist
The practice of surgery is at first glance a very personal and intimate profession. It is essentially one surgeon affecting the visage of one patient through the use of one's hands.

Deeper analysis reveals however an entire team of individuals who help make this process rewarding and successful.

Firstly is the partner in the intimate setting of the operating room, the operating room nurse. This person is a critical component in guiding, enlightening and aiding the surgeon. I have been blessed to have had for the past twenty years, a most ingenious and gifted nurse, Liza Uy. Liza has helped me perform the most difficult and yet the most gratifying of surgeries over the past years. Her infinite skill and judgement has helped to turn the most difficult case into a work of art. I cannot thank Liza enough for her years of service to me and my patients. I hope that her experience with me has been as fun and gratifying to her as it was for me.

The next member of the team who is equally responsible for the success of my practice and the comfort of my patients is Lillian Guido. Lillian, who has been with me for almost 15 years, is the epitome of quiet grace and streamlined efficiency. My patients and I are both lucky to have her help us with the myriad tasks which she performs flawlessly. I am indebted to Lillian for all her years of tireless and selfless service.

Theresa Wiatroska has worked tirelessly for over 15 years, contributing dearly to the health and welfare of my patients. She has taken care of all the needs of our office staff in a cheerful and caring manner. We are all indebted to Theresa for her service.

Although there are many other members of our team that have contributed to the happiness and health and welfare of my patients through the years, the person who has kept the office together by helping out in any way possible for more than twenty years is Rosa Giammarco. Helping, listening, and guiding the patients through all the steps of their surgeries, she has been the most compassionate and efficient of office managers. I often tell my patients that Rosa gets more letters of thanks for her delightful and wonderful "way" than anyone else in the office. Simply said, without Rosa the office would not be the loving compassionate place it has become.
# TABLE OF CONTENTS

Introduction ......................................................... xi

**PART 1  PHILOSOPHY/PLANNING/ART  ......................... 1**

Chapter 1  Philosophy of Successful Revision Rhinoplasty  ....... 3
Chapter 2  Planning .................................................. 7
Chapter 3  Differences Between Revision and Primary Rhinoplasty  ..... 13
Chapter 4  Aesthetics ............................................... 15
Chapter 5  The Peri-Operative Setting  ............................ 17

**PART 2  TECHNIQUE .................................................. 19**

Chapter 6  The Preservation and Restoration of Nasal Function  .......... 21
Chapter 7  Bony Nasal Vault  ...................................... 53
Chapter 8  Middle Nasal Vault ................................... 77
Chapter 9  Septum .................................................... 107
Chapter 10  Columella ............................................... 117
Chapter 11  Internal Nasal Valve Reconstruction .................... 137
Chapter 12  Nasal Rotation ........................................ 149
Chapter 13  Transition Zones ....................................... 179
Chapter 14  Nasal Lip Complex .................................... 197
Chapter 15  Tip Introduction and Anatomy  ........................ 207
Chapter 16  Tip Medialization ..................................... 211
Chapter 17  Nasal and Tip Projection  ............................. 243
Chapter 18  Total Tip Reconstruction  ............................ 287
Chapter 19  Titanium Nasal Reconstruction  ........................ 301

**PART 3  WORKSHOP .................................................. 323**

Chapter 20  Case Examples ......................................... 325

Index ................................................................. 387
Mastering Revision Rhinoplasty is a compendium of ideas that have been formulated during the past twenty years. These years encompass more than thirty-five thousand primary and revision rhinoplasties, the sum experience that have been analyzed in an attempt to categorize and clarify the technically and aesthetically challenging sub-specialty of Revisional Rhinoplasty. During this analysis certain basic themes began to emerge, which allowed me to organize the book in a manner, which when followed carefully will allow the experienced rhinoplastic surgeon to adequately handle most of the common problems associated with Revisional Rhinoplasty. It is commonly thought that Revisional Rhinoplasty is very difficult not only to perform, but also to accomplish successfully. Thus this art form has been shrouded in mystery and for the most part has never really been associated with much enthusiasm or promise of excellent or even good results. While reading this book it will become obvious that indeed many revisional rhinoplasties are relatively easy to accomplish, as one begins to realize the basic mistakes that led to the initial failure. It is indeed interesting how many major deformities fall into very specific and set categories or collections of mistakes, and when analyzed fully, can be dependably fixed, and hopefully in the future avoided.

It is axiomatic that the more one learns about Revisional Rhinoplasty the better one's primary rhinoplasty results become. It is certainly impossible for all primary rhinoplasties to turn out successfully. However, it is true that a large percentage of these failures can be repaired immediately following the incident. It is therefore, my fervent hope and wish, that by mastering these techniques, most primary revisions can be performed intra-operatively thereby obviating the need for a secondary revisional surgery. One can almost state that the true purpose of this book is to abolish the need for revisions by hopefully avoiding the error in the first place, or secondarily allowing for an intraoperative revision at the time of the primary rhinoplasty.
Thus my true impetus for writing this book stems from a desire to see Revisional Rhinoplasty become an integral part of the primary procedure, thus improving the aesthetic and functional results of this most intriguing procedure.

Rhinoplasty is an art as well as a science, and although one might possess the technical prowess to successfully finish the operation, it is the intrinsic artistic expression of the surgeon that dictates natural from artificial; beautiful from ugly, and success from failure. As one would practice a technical skill, the truly successful surgeon appreciates the artistic aspects of this surgery and consciously develops this appreciation, methodically incorporating the two disciplines into a cohesive force. This combined artistic and scientific force over time will grow and strengthen if the surgeon is open to new ideas of form, function, art and expression.

The book of course will serve many purposes. As one reads the book and learns various techniques for repairing problems, the thinking surgeon will critically examine one’s own techniques, subsequently modifying and improving them, thereby enhancing one's ability to perform primary rhinoplasty.

It has become abundantly clear during the preparation of this book that certain mistakes, are made repeatedly. Some of the mistakes are technical in nature, either iatrogenic or secondarily due to some problem occurring during the very delicate healing process. Most however, are due to an aesthetic misjudgment, which leads to an unnatural, operated look. Some of these results are almost expected because the very nature of the operation initially was designed to offer unnatural results as a matter of course. The developers of this fascinating operation were offering patients, a change in ethnic image and identity and not an aesthetically beautiful and natural nose. This however is no longer the case. Rhinoplasty has crossed all ethnic lines and cultures and is now designed not only to change the nasal visage, but also to do it in a more secretive way.

Cosmetic surgery today mirrors the fashions and attitudes of a generation that demands natural as a definition of beauty. Natural is what we should strive for in the primary operative setting, however it is essential in a revisional setting. One could actually define Revisional Rhinoplasty as the process of naturalizing an artificial nose.

This book is designed to present a variety of techniques that have proven successful. It is most definitely not a compendium of all techniques on revisional plastic surgery. It is very much a personal approach to the complicated and diverse problems that present themselves. The genesis of many of the techniques discussed emanate from a dissatisfaction with previously published procedures which I feel do not have a high enough index of success to be used routinely. I have included techniques in this textbook, which have predictably and reliably been used over the last 20 years to solve the basic as well as the unusual problems that occur during Revisional Rhinoplasty.

Thus this book should be viewed as an attempt to systematically categorize post rhinoplastic problems, which are in need of revision. It will become readily obvious how limited a number of specific groups can be defined which concern functional and aesthetic deformities of Revisional Rhinoplasty. The book is
designed to be read section by section in the order in which it is presented. I would then recommend a re-reading of the first section so that the tenets laid down in this area are more readily understood after having experienced the technical presentations. The serious student will then utilize the book as an atlas of techniques that can be conveniently referenced when needed in any particular situation. All surgeons should then use any new information as a beginning platform of information from which to develop and refine their own experience, collecting and analyzing their own personal library of techniques, as they advance though this most wonderful and satisfying Discipline.
Part I

Philosophy/Planning/Art
Confidence

The key element necessary to succeed in any endeavor is confidence. This is observed very obviously in sports like tennis and in technical skills like shooting. However, in surgery in general and in revision surgery more specifically, the element of a confident surgeon is paramount to the successful completion of the operation. The confidence factor of a surgeon is, of course, determined by many things. Most surgeons are inherently confident. However, the supreme confidence necessary to complete a difficult and challenging revision rhinoplasty must be meticulously acquired. Initially, confidence is gained with experience, supplemented by reading, direct observation, and studying videos.

Additionally, students of revisional rhinoplasty will embark on a self-designed course of lifelong duration, which will enable them to continually evaluate the results of surgery and alter and upgrade their techniques, so as to continually improve the scope and success of their endeavors. This line of study must of necessity start at the very beginning; thus the prudent student will initially attempt to do only those cases that, for want of a better term, are “easy.” Re: A bump left on the dorsum. As experience and confidence grows, tip surgery and then combinations can be tried. Do not get discouraged. The lessons from failure can probably be more beneficial to the educational process than those from success.

The key, however, is constant monitoring and lifelong vigilance of results and techniques. This requires a system of documentation that encompasses the preoperative diagnosis, the intraoperative findings, and the actual surgical techniques used. The most important aspect, however, is the ongoing evaluation of the postoperative course of the patient, which should go on for the life of the patient. This documentation should also be as graphic as possible, since words alone are usually not sufficient enough in this genre of surgical record keeping.

As the confidence of the surgeon increases, the patient senses this, and in turn his or her confidence in the surgeon concomitantly rises. With this increases in respect, the surgeon now has a more compliant and controllable patient. This transference is absolutely necessary to successfully carry out the planned procedures and all the myriad instructions that the patient must adhere to for his experience to be successful.

Confidence also enters into both the actual planning and the technical part of an operation. There are certain maneuvers in revisional rhinoplasty that are technically challenging but necessary. An example of this might be to undermine the
dorsal skin overlying a misaligned graft. The skin is thin and delicate and made even more so by the pressure of the implant. One must have enough confidence in one's ability to undermine this skin without perforating the delicate tissue. If one has confidence in his abilities, then success is the rule; if not, then the operation is doomed to failure.

**Control of Operative Forces**

In every surgical procedure, there are interacting forces that very definitely determine the outcome of an operation. It behooves every surgeon not only to be aware of these diverse forces but also to respect, analyze, and control them if possible, so that they work together to favorably influence and enhance the surgical result.

**Surgeon**

The key forces of any surgical experience are primarily related to the surgeon, his particular training, experience, and, of course, skill. The surgeon who wants to start performing revisional rhinoplasty must embark on a self-designed learning program that allows the surgeon to continually monitor the success or failure of the previous operative experience, while systematically learning and advancing through the multitude of steps of revisional surgery. As the surgeon becomes more experienced and more skillful, his decision making, preoperative diagnosis, and intraoperative technique will improve as well.

Inherent in this program is the willingness either to delay performing a certain revisional procedure until greater expertise and experience are garnered or to refer the rhinoplasty to one more experienced. It would be appropriate for the referring surgeon to watch the procedure so as to expand his wealth of knowledge. Of course this is a lifetime commitment that grows with the individual. The rewards are great and well worth the effort.

Other factors that are easily controllable and substantially affect the outcome of the surgeon’s performance are to schedule very few cases on the surgical day in question. Obtain the best possible and most experienced OR nurses and prepare them in a team approach, going over with them what might be anticipated in the surgery and the need for special equipment or supplies.

It is also vitally important to have an atmosphere of commitment and openness among the operating team. Everyone should be allowed to contribute new and innovative ideas that may indeed enhance the performance of the entire team. Failures or mistakes or poor outcomes should be openly discussed with the team during regularly scheduled meetings, in the hope that future mistakes can be avoided.
**Patient**

The patient also must be in prime condition both physiologically and nutritionally before the surgery. Baseline lab parameters must be in order, and a preoperative regimen of vitamin and mineral therapy should be instituted. If the patient has some underlying problem such as diabetes or thyroid, then this should be controlled and stabilized.

**Team: Realistic Procedural Goals**

The primary goal of revision rhinoplasty is the attainment of a properly functioning yet beautifully appearing nose. The operation is a series of interrelated steps, each with its own intrinsically defined limitations. The surgeon cannot expect, and the patient must be educated to realize, that certain defects are not within the realistic scope of the operation. Misinterpretation of this tenet will result in failure. To ensure a result that is mutually satisfactory to the patient and the surgeon, the limitation not only of the final result but also what will be accomplished at each stage must be fully comprehended.
Successful revisional rhinoplasty begins by the surgeon's carefully analyzing all the parameters relating to the operation and organizing them into a planned sequence of diagnosis (the problem), treatment (correction of the problem), staging (amount and sequence of surgery necessary to complete the task), and timing (occurrence and interval of planned surgeries).

**Diagnosis**

Although the distinction is often arbitrary, subdividing the formulation of a diagnosis into functional and aesthetic categories will help clarify the thought process. Thus, for example, a diagnosis of tip deformity due to the overzealous excision of tip cartilage would be included under an aesthetic diagnosis. If however the scar secondary to this excision disrupted the functioning of the nasal valve, then the diagnosis of nasal valve stenosis secondary to scarring should also be placed under the functional category.

A sample of this analytic outline follows. Completion of this outline includes various treatment steps to consider for each individual problem.

**Functional Diagnostic Categories**

<table>
<thead>
<tr>
<th>Anatomic boundary</th>
<th>Disease process</th>
</tr>
</thead>
<tbody>
<tr>
<td>Septum</td>
<td>deflection</td>
</tr>
<tr>
<td>cartilaginous</td>
<td>deviation</td>
</tr>
<tr>
<td>bony</td>
<td></td>
</tr>
<tr>
<td>Nasal valve</td>
<td>scarring/subluxation/collapse</td>
</tr>
<tr>
<td>Bony pyramid</td>
<td>nasal bone fracture/displacement</td>
</tr>
<tr>
<td></td>
<td>collapse into pyriform aperture</td>
</tr>
<tr>
<td>Columella</td>
<td>deflection/scarring</td>
</tr>
<tr>
<td>Tip</td>
<td>twisted/collapsed</td>
</tr>
<tr>
<td>alar</td>
<td>displaced/widened</td>
</tr>
<tr>
<td>crura (feet)</td>
<td></td>
</tr>
</tbody>
</table>
Aesthetic Diagnostic Categories

Upper third
(bony deviation/contour deformity pyramid) subluxation

Middle third
upper lateral cartilage contour deformity/scar/twist/subluxation/collapse
dorsal septum deflection/contour deformity

Lower third
tip cartilage twist/collapse/malalignment/asymmetry soft tissue
asymmetry/scarring

Treatment

After the surgeon lists the functional and aesthetic problems with their respective treatment modalities, it is then time to incorporate the two separate surgical lists into an overall therapeutic plan. This one step is probably the most difficult part of the entire scheme and the one that most dramatically spells success or failure.

Initially, a complete list of all the various treatment modalities will be formulated for each diagnostic entity. Then the list is coned down to eliminate duplicity of action; i.e., one surgical maneuver that will correct more than one problem. For example, if the dorsum is too high, and there is a contour deformity in this same area, then a simple rasping of the bony dorsum will take care of both problems in one step. A step-by-step list of each part of the operation—with routes of exposure, etc., taking into consideration—will be designed and act as the framework for the overall reconstructive effort, taking into account the most direct, efficient, and least traumatic approach to each problem.

Staging

Staging is basically a function of matching the extent of damage with the necessary reconstructive efforts needed to ameliorate the pathology.

Damage Assessment

There are several factors related to staging that must be discussed.

I. Extent of damage.

How much damage have the nasal tissues endured, and to what extent? Certain issues that directly impact the staging decisions are (1) How many previous surgeries were there and (2) over how much time? Multiple operations are generally more damaging, but another consideration is what interval of time was allowed to pass between surgeries. When evaluating the level of destruction, use the guidelines of diagnosis already discussed, and don't concentrate that much on the number of surgeries. For instance, one very destructive surgery is far worse.
then a multitude of partially finished surgeries that don't destroy too much tissue. Which particular tissues were damaged, and how compromised are they? Re: the bony areas can withstand far more trauma than the cartilage or the delicate skin.

Anoxia of tissues is also important to assess. Make sure to examine areas with poor blood supply, especially with patients with diabetes or heart disease. Areas that have been previously grafted or irradiated need particular inspection. Assess whether or not tissue has been compromised in an area of the previous implant. Look for areas of pressure necrosis or partial anoxic necrosis.

2. Support mechanisms.

The integrity of the support mechanisms must be carefully evaluated.

Finally the amount of surgery in each procedure and the exact sequence is planned. All of these parameters can of course change, depending on the various factors already discussed. It is, however, advantageous to have a completed game plan at the onset. Winging it, so to speak, is fine if it is done in a controlled fashion. Winging it in a milieu of let's see what happens can only spell disaster. Basically, the staging part of the planning process identifies all the steps and maps them out.

Staging Tenets

Establish support mechanisms first, then build the aesthetic and functional reconstructions on this stabilizing platform. For example, the diagnosis is (1) malformed tip due to excessive and asymmetric removal of tip cartilages and (2) severely deflected caudal septum.

Due to the lack of support that correction of the anterior caudal septum would result in, it is mandatory to establish this support in this particular example because the tip cartilages are going to need this to maintain their structural and, thus, aesthetic integrity. The best plan of action would be to totally correct the caudal septum in one stage and then, at a second stage, correct the tip.

The ideal revisional procedure is one that accomplishes all the repair in one stage. This, however, is very rarely the case, since most revisional strategies incorporate at least two separate procedures. When evaluating the staging process, it is best to err on the conservative side and schedule one additional surgery than to do too much in one setting. Once a revisional course has been charted, it is necessary to keep advancing and improving. If the already damaged tissues are pushed too much and too far, then the subsequent operation will fail. It is much better to proceed at a little slower pace, all the while improving the function and aesthetics of the nose.

Timing

The timing of a routine surgical procedure usually does not impact the outcome of the operation. In revisional rhinoplasty, however, timing is such a critical factor that it is necessary to analyze all aspects of this issue.
The overriding concept in planning revisional rhinoplasty is basically to wait until such time as all or a large part of the healing has been completed. At five years postoperatively, one can assume that the healing is complete; Re: the edema is minimal and the scar tissue present will not misbehave if intervened with again, and the nasal tissues can be relied upon to heal spontaneously and effectively. It can also be assumed that the area is healthy and that a good blood supply is established.

Practically, two years is usually long enough to wait before considering a significant amount of revisional surgery. A minimum safety factor before contemplating a revision would be one year.

These time limits are not arbitrary; they are directly related to the diagnoses, which in turn cannot be made until all the edema has subsided and one can examine the fine points of the nose, so that an accurate preoperative diagnosis can be made and a specific operative plan developed. Most noses needing revisional rhinoplasty tend to get worse with time: As the swelling diminishes the technical errors become more obvious. The individual's ability to rid itself of this edema is varied and relates to sex, age, skin texture, nutrition, smoking and alcohol consumption, and amount of trauma. Once all the errors of the previous surgery manifest themselves, then the diagnostic plan can be initiated.

The second timing tenet is to wait a sufficient period of time for the nasal soft tissues to recover from the trauma of the previous surgery or multiple surgeries. This allows for reestablishment of the critical blood supply that is necessary to prevent necrosis and subsequent infection. When performing revisional rhinoplasty, the tissues undergo stress due to manipulation and pressure. The blood supply must be at least adequate to withstand these maneuvers without breaking down.

The third tenet is to allow the scar tissue to calm down and to perform the operation with a minimum of trauma, so that the scar tissue already present does not become overly aggressive and proliferate, thereby camouflaging the subsequent repair. Although physiologically identical, a more practical way of looking at the same problem is what I refer to as a "softening" of the nasal tissues. This is very much location dependent; Re: the tissues in the upper third of the nose usually do not present this sort of a problem, whereas a tip that has been multiply surgerized has tremendous difficulty in softening and redraping itself after repair. Massage and intralesional steroidal therapy are helpful in accelerating this process. Much more detailed analysis of these factors will be discussed in the technical section. In general, a year is the beginning safety point to start when considering a reoperation. This of course is quite variable, and if indeed there is a problem that must be corrected immediately, then of course this must be dealt with. These might include an I&D of an infected implant, or when cartilage or bone is severely distorted and is compromising the viability of the overlying soft tissue and skin, or when a severely twisted nose is completely blocking the airway.

Timing of multiple revisions is another more complex issue. Usually it is best to time revisions no sooner than three months apart. The reason this time frame can be shortened once the revisions are under way is that the assumption is that the staging and planning of the revisions are so well conceived that one procedure does not interfere with the blood supply of the subsequent surgery, or at
least interference is minimized. This can be accomplished by limiting the extent and location of incisions and dissection to minimize the interactions with scar tissue and subsequent surgical planes or areas.

**Example:** As mentioned earlier in the case of a total removal and reconstruction of a tip with a caudal anterior deflection of the septum, one would design the surgery of the septum first, so as to support the tip, and also design the septal incisions so that they do not compromise or cross over the incision areas that will be utilized for the tip reconstruction.

---

**INTRAOPERATIVE PLANNING**

Intraoperative planning is the logical extension of the very deliberate preoperative process that initially analyzed and subsequently mapped out a strategic surgical plan. This intraoperative process is best conceived as a kinetic system of surgical decision making.

A surgical procedure as defined in its most abstract form is a series of discrete interrelated steps, each one designed to correct a component of the overall pathology. Often, the exact sequence is not critical; however, at other times the exact next step is crucial to the outcome. It is important when performing complex revisional procedures to consider the overall plan but to never lose sight of the theoretical end point of the operative sequence, the final aesthetic, and functional result.

The actual operative sequence should remain kinetic. The decision-making process should be logical but exquisitely adaptable. The completion of one maneuver opens up a constantly varying array of alternative steps or options that the surgeon may consider. Thus I have compared this type of surgical reasoning to a “forking path.” During this type of operative sequencing, a surgeon can travel down any number of constantly forking paths or directions. The operation then becomes a living, kinetic, ever-changing entity, instead of a column of preordained and immutable steps.

It is this type of intraoperative thinking that allows for the utmost in flexibility and creativity, and for a balanced series of alternative maneuvers that precisely match the ever-changing spectrum of pathology that is presented to the surgeon. Thus, it is fruitless to hang up beautifully prepared preoperative photos on the operating room wall and to constantly refer to them as if they were the Rosetta stone. Once the first incision is made in the nose, the pictures become almost worthless in an intraoperative setting. In fact, I’m quite sure that they hinder the overall direction and decision-making process by interfering with the thought process and distracting the surgeon by continually referring to a point of reference that has passed, instead of the pathology that presents itself.

It would be much more advantageous to show a photo of the ideal nose for this particular patient than the preoperative one. The surgeon would then be continually striving for the perfect next step to achieve a successful result. This surgeon is aware of the changing structure between the step before and the future next step, as well as how the nose changes to itself and to its proportional relationship with the face.
**Intraoperative Considerations**

Because of the scarring and fibroblasts already set up in the nose from the previous surgery, the surgeon must use every effort to control the situation and limit further damage to the nose, while at the same time fixing the problem. Extra careful handling of the tissues is always recommended, but the surgeon must find ingenious ways of minimizing total trauma to certain areas of the nose. This is best accomplished by planning the location and extent of incisions. Often times, limited incisions can accomplish the task at hand without reincising into previously operated areas. Scar tissue itself can be sculpted; however, this is a relatively unpredictable technique and should be used sparingly.
Differences Between Revision and Primary Rhinoplasty

Healing Factors

In general it takes as long as two full years for most of the healing process in rhinoplasty to subside enough so that a revision can be optimally scheduled. The operative word here is of course optimal. It is unfortunate but true that so many factors enter into rushing a revision prematurely that most of the time, a two-year wait is theoretically good but practically impossible. Most of the time either the patient or the doctor, or both, are so hurried and desirous of a quick fix to a problem that months instead of years is all the time that is allowed to pass. I would say as a rule of thumb that at least six months should be the lower limit for timing a revision, and only in unusual circumstances that will be thoroughly discussed below.

Scar formation is one of the many, but certainly one of the most important, factors that have to be considered. Wound healing in the nose is not that much different from traditional wound healing elsewhere in terms of fibroblastic proliferation and collagen formation. However, two conditions are unique to the nose. One is the fact that the surgeon must see the conditions that are being repaired. There is a certain amount of camouflage that is inherent in the actual healing process. The second is that the nose is a unique blend of diverse types of tissue (bone, cartilage, fat, muscle, dermis, and epidermis), all of which heal at different times. Each area must be evaluated carefully before revisional work can be considered.

Limitations Set by Previous Operations

The main limitation imposed by a previous operation or series of surgeries is the loss of important anatomical and structural tissues. Some of these tissues, Re: cartilage, can be readily replaced with autogenous sources, but they never match up to the original in terms of blood supply and, thus, longevity.

The ever-important soft tissue envelope is also easily damaged during previous surgeries, with the loss of blood supply and scarring that can cause eventual necrosis, of utmost importance to diagnose and consider during the preoperative planning stages.

Technical errors caused by previous surgeons can be categorized into destructive elements that are the most deleterious and errors of omission. The latter
errors can be considered as unfinished steps in an otherwise successful operation. The revision of these kinds of “mistakes” are easily remedied. Destructive errors are, of course, more considerable and will require significant planning and execution to correct.

Most of the technical errors will manifest themselves as anatomic and structural defects. Equally important is to consider the loss of intrinsic proportion of the nasal tissues that these destructive elements tend to change. An example of this is seen if the upper bony dorsum is too aggressively removed. This throws into disproportionality the entire lower third of the nose, including the tip. The revisional surgeon must thus evaluate the tip of the nose in proportion to the rest of the face, and not just the upper third of the partially destroyed nose.

Lastly, the timing and absolute number of previous surgeries impacts greatly on what revisional steps can be taken to correct the problems at hand. It is often the responsibility of the revisional surgeon to tell the patient that in fact not all the problems can be corrected but that a certain percentage of improvement is all that can and will be made. Trying to work “miracles” will only lead to disappointment and failure.
AESTHETICS

PRIMARY AESTHETIC CONSIDERATIONS

It has been well documented over the past several decades what parameters make a nose attractive. The key concepts here are proportion. Each element of the nose should be proportional to the other intrinsic parts of the nose and blend smoothly from one anatomic region to the other. Secondly and just as importantly, the entire nose should fit the proportions of the face. The surgeon should not only consider facial features such as lips and eyes and cheek bones but should also be aware of the general shape of the face (oval, round, triangular), the size and relative location of the ears, the height and shape of the forehead, and, of course, the shape and projection of the chin. It is thus important to leave the entire face undraped and ready for intraoperative visual inspection.

SECONDARY AESTHETIC CONSIDERATIONS

The goal of the revisional surgeon is to recapture the natural look of the nose, even at the expense of making the nose more beautiful. In general, natural and beauty go hand in hand, and a natural or unoperated-looking nose is probably the best-looking nose for that particular patient. There are times however when, for example, a slightly more bulbous but naturally contoured nose will fit the image of a natural or unoperated look than a tip that is too sculpted, too thin, and “unnatural.”

AESTHETIC LIMITATIONS OF THE REVISED NOSE

Although one strives for anatomic perfection during revisional rhinoplasty, it is often painfully apparent that restoring the nose to this level is impossible. The revisional surgeon must accept this de novo and work to achieve the best possible outcome, even though it may fall short of the patient’s expectations. The surgeon must always strive for realistic goals, so as to ensure at the very least an improvement, and never plan too much too quickly, which will surely end in making a bad nose even worse.
Aesthetics of Ethnicity

The artistic surgeon will appreciate the beauty of all races and not try to mold ethnic diversity into one type of “ideal” nose. Each region of the world accepts a standard of beauty based on the particular genetic predisposition of that area. The revisional surgeon must be particularly aware of the various types of natural noses and try to repair the nose into an ethnic equivalent. Thus, for example, the Asian nose that is too low at the bony dorsum should not be raised to a height equivalent to the average Caucasian bridge. The astute surgeon will study ethnic anatomic diversity and tailor the surgery appropriately.

The Aesthetics of Optical Illusion

For want of a better term, the nose undergoes many changes during an operation that can only be described as optical illusions. There are many different examples of this phenomenon, and with each individual patient there are variances. One of the many examples of a typical optical illusion that the surgeon must be aware of is that which occurs when the bony and cartilaginous dorsum is lowered. Invariably, in such cases, the nose looks as if it has upwardly rotated. If the surgeon is unaware of this phenomenon and then further upwardly rotates the nose directly, the result will be an overly upwardly rotated nose. Another example occurs when the caudal edge of the columella is reduced. This tends to give the impression that the nose is downwardly rotated. There are of course other examples of this phenomenon, which will be illustrated throughout the text.
Preoperative Care

Needless to say, the patient should be in the best physiological state that is possible before any revisional surgery is attempted. All metabolic function should be adjusted appropriately, diabetic treatments should be fine tuned, and hormonal therapies should be evaluated. Full medical clearance is essential for anyone over 50 years of age, if performed under local twilight anesthesia, and there should be no local areas of infection on the face.

Intraoperative Care

The tissues should always be handled with the utmost delicateness and gentleness to avoid trauma or pressure that may lead to infection or necrosis. The tissues in revisional surgery have already been traumatized and scarred, leading to less-than-optimal blood supply. Any further mishandling will certainly cause problems.

Unplanned mishaps during a difficult revision may necessitate postponing additional surgery. At some point, due to fragility of tissue or unforeseen lack of anatomic support, a fully contemplated procedure may not be able to be completed as previously planned. It is better to close at this point and reevaluate further surgery at a later time.

Additionally, precarious bleeding that is obscuring the field, or anesthetic complications such as uncontrolled hypertension, coughing, laryngospasm, etc., may necessitate the suspension of operative activity. It is necessary to have optimal conditions to complete a difficult revision. If these conditions cannot be sustained, then the best choice of action is to postpone completion of the procedure until another time.

Postoperative Care

The placement of immediate postoperative dressings should really be considered an extension of the actual surgical procedure, and although it probably does not impact the final result as much as the actual surgical manipulation of tissues, it certainly influences the outcome to quite a considerable degree. The dressings actually help the healing process as a continuation of the surgery. During the
surgery, the tissues are changed and then placed in certain specific areas. These tissues will begin to heal so that scar tissue or potential scar tissue will eventually mold and blend the tissues together and sometimes contract, which will allow the nose to achieve its final form. Dressings play a very important role in allowing the healing tissues to accomplish this by stabilizing them in a preset way that will enhance healing. It is similar to setting a fractured leg, in that you want the structural elements of the reconstruction to stay where they should be until all the areas have initially healed.

Example: One desires upward rotation of the tip and has purposely excised upper lateral cartilage and cephalic border of tip cartilages to set up a healing scar contracture between these two areas to help upwardly rotate the nose. The proper dressing positions these two areas in juxtaposition so that the scar contracture can initiate and eventually complete the upward rotation of the nose.

Immediate postoperative care centers around bed rest, antihypertensive therapy, which is best begun preoperatively, and controlling undue nausea and coughing. Steroids and antibiotics are given prophylactically to prevent infection and significant edema. It is important to communicate to the patient that a certain amount of edema is preferable and sets up a natural healing process. The edema process washes the area clean and allows for the tissues to begin a healthy healing phase.

Intermediate postoperative care centers around the care and maintenance of the dressing. A limited activity level for a period of one to two weeks and a diet high in protein, with vitamins, and low in salt will help ensure a good result. Communication with the patient is essential during this period of time, and any unusual pain, bleeding, fever, purulent discharge, or instability of the dressing should be reported immediately.

Long-term care of the patient centers around minimizing direct trauma to the nose and careful observation by the surgeon for a period of up to two years.
Part 2

Technique
This section serves to present most of the technical information necessary to perform consistently successful revisional and primary rhinoplasty. It is formatted in the general outline following for the sake of clarity and consistency of information presented.

**Surgical Anatomy:**
**Pertinent anatomical details**

Definition of surgical anatomy: In understanding any aspect of surgical manipulation, the first step is obviously to define and understand the intimate relationship of the basic anatomy and comprehend the surgical anatomy, which in a sense is identical but much more complex and ethereal. The surgical anatomy begins only with an outline and understanding of the basic structures and continues with an exquisitely thorough understanding of the interrelationships of these structures and the relative fragility and strength of their tissues. The surgical anatomy of a structure also connotes instantaneous understanding of the three dimensionality of the structure so that at any time in the manipulation of the area, the observant and knowledgeable surgeon will know to within millimeters, and sometimes less, what structures surround, are next to, and deep to the anatomic part being manipulated at any point in time. The surgical anatomy goes beyond pure description to capture the taste and essence of the surgical field. The description of anatomy to surgical anatomy is analogous to describing a steak, but then relating the heat, texture, aroma, and flavor of the meat. To understand the surgical anatomy of such a structure as the nasal valve requires not only understanding of the basic anatomy but also a sense of the feel, taste, and smell of the region. In its ultimate sense, this understanding must transcend the present and extrapolate, at the time of surgery, the future healing processes that will occur and adapt to them at the time of surgery. Thus, not only does the procedure have to take into account the present set of relationships but must also help understand the healing processes in the future to such an extent that judgments and adjustments made at the time of surgery will be obvious and adaptable to the final result in the future. Some areas of the nose do not need such an in-depth understanding to be operated on successfully. The nasal bones, for example, are uniformly strong and certainly remain static in vivo. If they are described and mastered superficially by the surgeon, their manipulation will not be that critical, and will most likely be successful. If, however, the nasal valve is only understood by its basic anatomic components, then disaster awaits the rhinoplastic surgeon.

**Glossary**

Aesthetics: A description of normal or desired aesthetics
Aesthetic pathology: Presentation and etiology of presenting problems
Technical concepts of reconstruction: Pertinent overview and outline of techniques necessary to effect the repair.
THE PRESERVATION AND RESTORATION OF NASAL FUNCTION

The Preservation of Nasal Functionality During Primary Rhinoplasty

The success of cosmetic rhinoplasty is initially judged by aesthetics; however, the final result is deemed successful only if the internal nose functions as well as the external nose appears. A pinched supra-tip area, for example, that disrupts the natural contours of the nose is usually caused by a combination of overresection of the cephalic borders of the tip cartilages in connection with overresection of the upper lateral cartilages. Although this problem is devastating in terms of nasal aesthetics, it is equally destructive to the nasal functionality by causing significant internal nasal valve destruction. This is just one of many examples of these intimate tissue relationships of which the nasal surgeon must be continually aware.

Subdividing a nasal operation into purely functional and aesthetic categories is, at best, artificial, and, at worst, injurious to the patient’s health. Every aesthetic change is directly related to nasal function. The famed Bauhaus School fully realized this significance in relation to architectural design over 60 years ago and taught the now famous tenet “form follows function.”

Surgeons must also appreciate the nose as a living form of architecture and adhere to these worthwhile and fundamental principles. It is only by doing so that we will create both beautifully functioning and aesthetically pleasing noses.

The prevention of postrhinoplastic obstruction begins with a careful assessment of the pertinent aesthetic pathology, which is then specifically addressed by a thoughtful, concise, and well-planned operative procedure. It is best to tailor the operation specifically to that patient. Do not try to fit the patient into a model form of rhinoplasty, barely varying the technique from one operation to the next. This can lead to errors in both planning and execution. An example of these mistakes is to routinely perform a full transfixion incision or to disarticulate the upper lateral cartilages from the septum in a patient in whom no alteration of the dorsum is being considered.

The avoidance of nasal obstruction begins in the pre-operative planning steps of the operation. The key tenet at this stage is conservation. If one minimizes the surgical insult to the nose and carefully preserves the anatomic structures while still gracefully and elegantly sculpturing a new form, then the ubiquitous problem of nasal obstruction can be limited. Do only those steps of the rhinoplasty that are necessary to either expose or manipulate the tissues that need re-structuring. Do
not perform gratuitous steps simply because a textbook has described it as part of the “basic rhinoplasty operation”.

The most important aspect of pre-operative planning is to determine which areas need altering and which parts can be left alone. This requires mentally molding the undesirable parts of the nose into those that are attractive. This part of the planning process is key and also quite difficult to master. It necessitates employing an operative approach that is quite advanced and totally flexible. Practically this translates into an operative procedure that is eclectic yet direct enough to circumvent the unnecessary steps that cause trauma to the fragile nasal tissues.

When planning an operation, I like to conceptualize the nose as a delicate wind tunnel, which delivers to the lungs a stream of smooth, softly flowing air. Obviously this aerodynamic state is altered by scarring, extraneous bits of tissue, or any other structural deformity that will impede the flow of air. If one is conscious of this scenario while performing the rhinoplasty, the results will be rewarding.

**Bony Nasal Vault**

**Importance of periosteal envelope.**

The manipulation of the bony nasal vault during rhinoplasty is essentially limited to removing the upper bony dorsum and narrowing the nasal bones medially. Both of these maneuvers are ideally performed underneath the protection and support of the periosteum.

The periosteum actually serves to hold and support the nasal bones after osteotomy and secondarily adds smoothness to the nasal dorsum. Thus it is extremely important that the elevation of the periosteal envelope be exacting and limited. The ideal periosteal elevation should begin approximately 2 mm above the caudal edge of the nasal bones, leaving enough attachment to the upper lateral cartilages so that they will not become detached from the nasal bones and cause obstruction or a dorsal contour deformity. The lateral extent of the elevation should be equal to one-half the distance of the width of the remaining nasal bones after hump removal. This allows the periosteum to bridge the distance between the nasal bones and the maxilla after osteotomy, obviating the obstructive problem of a fully mobile nasal bone collapsing into the pyriform aperture.

**Dorsal adjustment.**

The upper one-third of the nose is composed of paired nasal bones that articulate with the medial edges of the maxillary bones and the frontal bone. Although these bones coalesce with one another at the nasomaxillary and nasofrontal suture lines, in a practical sense it is best to consider this area as a single bony structure. Because the suture lines do not add any significance to the surgical anatomy, they can be essentially ignored, allowing a more direct and exacting alteration of this area.

Anatomically, the bony vault is the sturdiest part of the nose. It is also the most sensitive to change. The key at this very sensitive step is to minimize the assault on the bony vault and to manipulate these tissues delicately and cleanly.

The correction of the bony vault begins with dorsal tissue removal. During the planning stage, the amount of bony removal is first estimated and matched to the corresponding segment of the cartilaginous dorsum. To minimize trauma to these
tissues, a sharp chisel that follows the exact height and pathway of the partially resected cartilaginous dorsum is preferred. The removal begins with the incision of the cartilaginous dorsum with a right angled serrated scissors. The cartilaginous septum and upper lateral cartilages are appropriately resected. An osteotome completes the resection of the nasal bones (Figure 6-1). This technique simplifies the procedure of bony dorsal removal, creates a smooth continuous cut from cartilage to bone, and prevents scarring in the delicate cartilaginous bony junctional area. The upper dorsum is then removed en bloc. Final trimming of the cartilages is reserved for a later step in the rhinoplasty.

Lateral osteotomies.

The operative plan at this point should concern the length, height, and width of the nasal bones. Focus on the glabellar area and decide whether narrowing is desirable. Most patients do not need narrowing in this area, so the osteotomies do not have to continue completely to the superior edge of the bones. Inspect the height of the bones and determine if rasping alone can accomplish the desired result. If so, then the internal nose can be spared an operative insult. Because osteotomies are potentially the most damaging part of the rhinoplasty, careful handling of tissue is paramount. Periosteal elevation should be minimized; therefore saws should never be used.

My personal preference is to perform the lower portion of the osteotomies with a 3-mm osteotome in such a way as to preserve the delicate periosteal attachments of these bones. The osteotome usually begins its “postage stamp”—type perforation just above the inferior edge of the bone and continues up until the exact point at which the narrowing of the nose is to be completed. Usually the osteotome ends somewhat short of the glabellar region, with multiple green-stick fracture possibilities determined by the height of this first perforation (Figure 6-1G). It takes no more than three or four perforations to set up the final step, which is the creation of a transverse greenstick fracture by direct digital pressure that exactly matches the height of the last perforation. An equally effective maneuver is to medialize the osteotome while it is still within the perforation of choice, using the osteotome as a fulcrum, thus exerting a tremendous mechanical advantage over the bone and allowing for a more exacting fracture (Figure 6-1H). When the osteotomies are performed in this way, the nose is effectively narrowed, but the important attachments of the periosteum to the base of the nasal bones are maintained, preventing complete nasal bone mobility and displacement into the pyriform aperture (Figure 6-1I).

Careful insertion of the osteotome into the nose is important in preventing cicatricial scarring of the anterior vestibule. The speculum is placed first into the lateral nasal vestibule and pulled as laterally as possible, acting as a guard. The osteotome is placed through a small stab incision as laterally as possible and then rotated to complete the bony perforations. These maneuvers prevent the internal nasal vestibular incisions from joining each other thus, limiting cicatricial scar formation.

Note: medial osteotomies are performed only as required and should only be needed rarely. The postage stamp osteotomy by its very nature does not reach as far superiorly as routine osteotomies, so that fracturing into the substance of the frontal bones is unnecessary.