Rollin K. Daniel

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Mastering Rhinoplasty

A Comprehensive Atlas of Surgical Techniques with Integrated Video Clips

2nd Edition
With 259 Color Figures in 1408 Parts
and 146 Integrated Intraoperative DVD Clips

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Springer

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Dedication

To Beatrix Tirkanits, MD, FRCS (C)
Diplomat, American Board of Plastic Surgery
Both personal and professional partner whose sacrifice and support made this book possible.

To Andrew Nicholas Daniel, PhD
Son, scholar and fellow adventurer.

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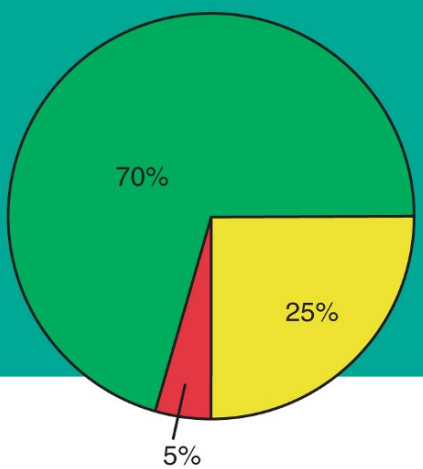
Simplifying Rhinoplasty 1



Introduction

Based on my 25-year experience of practicing, teaching, and writing about rhinoplasty surgery, I have come to the conclusion that we must simplify the rhinoplasty operation. For the average surgeon who performs less than 25 rhinoplasties a year, it makes no sense to try several new techniques each year and then discard them before attaining proficiency. Instead, one should master a fundamental rhinoplasty operation that can be adapted to a wide range of primary nasal deformities. Initially, the surgeon should operate within their comfort zone and gradually progress to more difficult cases. Over a period of 3–5 years, the operation's surgical cause and effect will become apparent. With this approach, the surgeon will attain proficiency and confidence in dealing with a variety of nasal deformities. Equally, an increasing number of happy patients will insure an expanding rhinoplasty practice.

Instead of writing an encyclopedic text of the various nasal procedures, this Atlas will emphasize a fundamental rhinoplasty operation and its application to a wide range of patients with various levels of difficulty progressing from minor (Level 1) to moderate (Level 2), to major (Level 3) deformities. The Atlas is divided into three sections. Chapters 1–7 provides the fundamentals of the rhinoplasty surgery, while Chapters 8 and 9 are an in-depth look at progressively more difficult primary rhinoplasties and Chapters 10–12 review the complex challenges of secondary and aesthetic reconstructive rhinoplasty. Since I believe strongly that rhinoplasty surgery should be learned in the operating room rather than in the library, the reader will find extensive DVD clips of surgical techniques throughout the book. These short 1–5 min DVD clips are referenced in the figures and provide a unique opportunity to see and experience how a specific technique is actually done. It is my hope that this text will represent a major advance in teaching a simplified approach to rhinoplasty surgery.

A Foundation Rhinoplasty Operation

What would constitute the "P.E.R.F.E.C.T." rhinoplasty operation? I think the following attributes are important and perhaps acronymic.

Progressive. The surgeon should be able to use the operative technique for increasingly difficult cases by adding to the foundation operation (Fig. 1.1). Rather than learning an entirely new procedure, one merely adds additional steps as more demanding cases are encountered. For example, once the surgeon learns to master open tip suture techniques, then additional tip definition can be achieved with add-on Tip Refinement Grafts (TRG) of excised cartilage.

Expandable. Although one may begin with a certain patient population, it is inevitable that one will begin to see different types of patients who require modification of the basic technique. In Southern California, I saw a large number of Hispanic and Asian patients whose thicker skin and under-projecting tips forced me to expand my surgical repertoire. Rather than being a new operation, additions and modifications represent an expansion of the foundation operation.

Reproducible. Every surgeon wants to achieve reproducible results. The critical first step is to master a procedure in-depth and learn its surgical cause and effect. Many of the steps in this operation are consistently reproducible including radix grafts, tip sutures, and spreader grafts. The number of surprises and revisions can be quite low.

Functional. Form without function is not acceptable. I am convinced that 35% of patients requesting a cosmetic rhinoplasty have a significant *preexisting* anatomical nasal obstruction, which if not corrected will lead to postoperative nasal obstruction. Therefore, a clear understanding of septal, valvular, and turbinate function, as well as their surgical correction must be a critical component of a rhinoplasty operation.

Esthetic. The reality is that virtually all female patients want a more attractive nose, but one that looks natural. The younger the patient the greater the desire for a smaller cuter nose – nine times out of ten, they inherited their father's nasal features . In addition to being smaller, they often want a slightly curved bridge, a slightly rotated columellar, and a well-defined tip. This operation enables the surgeon to achieve these goals consistently.

Comfort Zone. Each surgeon has his/her own "rhinoplasty comfort zone." Following completion of their residency or fellowship, most surgeons have experience with one operative sequence. Initially, the surgeon should select those patients for whom they are confident that they can achieve a good result. The advantage of this operation is that the surgeon can progress to levels of greater difficulty from a solid foundation.

Tip Intentsive. One of the realities of cosmetic rhinoplasty surgery is that patients are convinced that "as the tip goes so goes the result." If the tip is not attractive, the patient will not be happy. Thus, tip surgery is emphasized heavily in this operation and through out the text.

A Standard Operative Sequence

The following operation is a relatively standard procedure that I use routinely, but with virtually unlimited variations. The operative sequence is individualized for each primary rhinoplasty with certain steps deleted or modified as indicated.

1) Essentials – 2.5× loupes, fiberoptic headlight, own instruments
2) Anesthesia – general with appropriate monitors
3) Local anesthesia injection followed by Prep – wait 10–15 min
4) Remove intranasal nasal pack and shave vibrissae
5) Open Approach using infracartilaginous and transcolumellar incisions
6) Elevation of skin envelope
7) Septal exposure via transfixion incision and extramucosal tunnels
8) Tip analysis and reassessment of operative plan
9) Creation of symmetrical alar rim strips
10) Incremental hump reduction – bone: rasp, cartilage: scissons
11) Caudal septum/ANS excision (optional)
12) Septal harvest/septoplasty
13) Osteotomies
14) Graft preparation
15) Spreader grafts (optional)
16) Columellar strut and suture
17) Tip sutures with optional add-on grafts of excised alar cartilage
18) Closure
19) Alar base modification (optional)
20) Alar rim grafts or Alar rim structure grafts (optional)
21) Doyle splints, external cast, and nasal anesthesia block

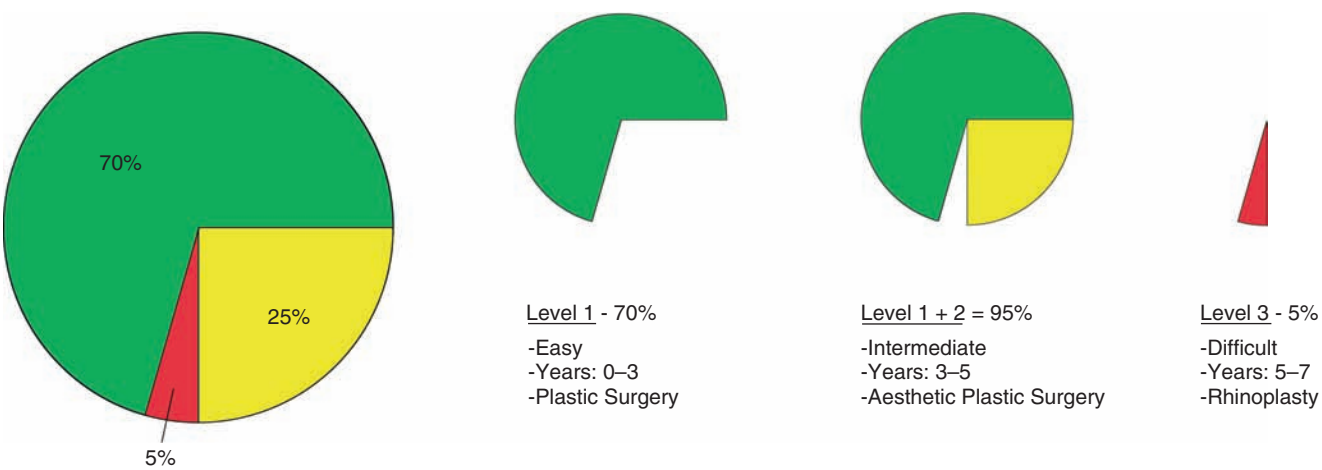


Fig. 1.1 Level of difficulty in primary rhinoplasty

Level of Difficulty: A Classification

Our assessment of how hard a rhinoplasty is involves integration of anatomy, aesthetics, patient's goals, and requisite operative techniques. Although each surgeon will have their own individual classification, I suggest dividing the range of primary rhinoplasties into three "levels of difficulty" based on the requested degree of change, requisite technical expertise, and complexity of the operative plan. I use a simple Levels 1–3 for classifying primary rhinoplasties – Level 1 (minor), Level 2 (moderate), and Level 3 (major).

Patient Request. The majority of Level 1 rhinoplasty patients have three basic complaints: the bump on profile, the wide dorsum, and the poorly defined tip. The challenge is to achieve an aesthetic result that the patient desires. The hallmark of a Level 2 case is that the complaints are similar to a Level 1 case, but the presenting deformity and requisite surgical maneuvers are more challenging. A boxy tip requiring alar rim support would be a Level 2 case. In contrast, Level 3 cases are truly "deformities" where the patient suffers from a significant loss of self-esteem. They are seeking to be "normal." Surgical correction requires an aggressive complex approach. Subtleties will not work.

Patient Deformity. Perhaps, the best method for assigning the level of difficulty to a specific nose is to use a classic "standard deviation" system based on deviation from normal. The simplest example is modification of the nasal base. Using a simple ruler or caliper, one measures intercanthal width, alar flare, and alar crease width. If the alar flare is within the intercanthal width, then no modification is usually necessary (Level 1). If the alar base is quite wide and exceeds the intercnathal width by 2 mm or more, then a combined nostril sill/alar base excision is necessary (Level 2). When one encounters extreme widths in ethnic noses or markedly retracted alars due to hypoplasia of the alar cartilages, then advanced techniques will be required (Level 3).

Surgical Techniques. After developing an individual set of "aesthetic" grading criteria for Level 1–3 cases based on presenting deformity, it can now be expanded by adding required operative techniques. A radix reduction is a magnitude harder than a radix augmentation. Ethnic noses are more challenging than the usual Caucasian nose. As regards the tip, an open structure tip graft signals a harder case than a tip suture. Yet, an open tip graft added to sutured domes is easier than one where the domes are excised to drop projection.

Operative Complexity. Each surgical technique included in the operative plan has both its range of results and risks. Therefore, one should keep the operative plan as simple as possible and do maneuvers only when necessary. Level 1 cases may not require grafts, while Level 3 always do. Lateral osteotomies may range from none for the narrow nose to as many as 8 for the wide nose. Thus, operative complexity is both how many maneuvers are required and how complex is the individual step.

Level 1: Form and Function

This patient has a typical Level 1 nasal deformity with the triad of a bump on profile, an unrefined tip, and a wide nose (Fig. 1.2). Many women will state that their nose is too masculine and request a more feminine one. All too often, it really is daddy's nose on the daughter. Cosmetic patients are most concerned about appearance and may be totally unaware of existing nasal obstruction. In this case, the patient stated that she had no functional impairment despite an obvious septal deviation and internal valve collapse due to the tension nose (see Fig. 2.22). The linkage between *form and function* is central to all of rhinoplasty surgery.

Fig. 1.2 (**a–d**)

Level 2: Tip Challenges

The Level 2 patient has a *progressively* greater degree of complexity as compared to the Level 1 patient. As seen in the patient below (Fig. 1.3), any improvement in the tip must be achieved despite an unfavorable skin sleeve and weak alar cartilages. The critical step was a folded add-on tip graft of excised alar cartilage. In Level 2 cases, a wider array of techniques, both sutures and grafts, is required to achieve the desired tip. As regards the profile, one must often pursue a "balanced" approach – reducing prominences and building up deficiencies. As the surgeon expands their comfort zone, one will encounter patients with a thicker skin envelope, a wide nasal base, or dorsal deficiencies. All of a sudden, success or failure will depend on insertion of major tip grafts, alar base excisions, or diced cartilage grafts to the dorsum. Many surgeons will decide to limit their rhinoplasty practice at this level and do the 95% of patients who present with Level 1 and 2 deformities while referring the other 5% to a rhinoplasty specialist.

Fig. 1.3 (**a–d**)

Level 3: Major Changes

Level 3 patients want a major change in their nose. These are not subtle finesse cases. The surgeon must achieve a significant change in the nose while giving it an attractive natural nonoperative look. As seen in Fig. 1.4, this 15-year-old girl desperately wanted to reduce the incessant teasing at school while her parents wanted to boost her self-confidence before she entered high school. The requisite surgical techniques are part of the basic rhinoplasty operation, but applied on an extreme scale. They included an 11 mm dorsal reduction, a 9 mm caudal septal shortening, and 7 asymmetric osteotomies. One must deal with the extremes of nasal anatomy and remodel the entire nose. Significant asymmetry intrinsic to the nose and within the face will limit the outcome. Often, techniques have to be executed in quantitative differences on the two sides to adjust for the asymmetry. Fortunately, these patients are often happy with a limited improvement.

Fig. 1.4 (**a–d**)

Teaching Yourself Surgical Cause and Effect

No one is born a rhinoplasty surgeon. With one or two exceptions, no one finishes his/her residency or fellowship being very good at rhinoplasty surgery, myself included. However, most surgeons can become proficient at rhinoplasty surgery provided they are willing to take the time to teach themselves surgical cause and effect. Here are ten ways to improve your understanding of surgical cause and effect.

1) *Pre-op Photo Analysis*. With the advent of digital photography, there is no excuse not to have excellent *standardized* pre-op photographs in all views, static and smiling. It is important to develop a reproducible system with consistent lighting. Equally, large prints, scaled to life size, are easily available. Learning to do a sequential photographic analysis is the fastest way to train your eye to analyze clinical deformities. Go through the three-step progression of developing an operative plan – define the deformity, overlay the ideal aesthetics, and develop a realistic operative goal.

2) *Write Out the Op Plan*. Writing out a step-by-step operative plan, from anesthesia to dressing, and posting it in the operating room is the best way to simplify your surgery. As you write out each step you are forced to decide whether to do that step and more importantly how to do it. By asking and answering as many questions as possible preoperatively, one has a greater sense of clarity and certainty in the operating room.

3) *Nasal Aesthetics, Analysis, and Anatomy*. Nasal anatomy determines what is wrong with the nose and what must be modified surgically to achieve the aesthetic goals. One of the best examples is tip definition and its linkage to the domal notch and the domal creation suture. The open approach allows the surgeon to carefully study and record tip and dorsal anatomy in every case. If available, cadaver dissections provide an important learning opportunity, but nothing replaces assessing nasal anatomy in every case.

4) *Inrtaop Instruments and Photos*. It took me only one operation at the University with the residents to realize that you cannot do delicate surgery with bad instruments. Although a complete personalized set of rhinoplasty instruments is ideal, one should at least have their own set of cutting instruments (scissors, rasps, osteotomes) from the very beginning. It is extremely important to take a four-view set of the completed tip surgery before closing the skin. Then, review these photos at each post-op visit.

5) *Op Diagram and three Questions*. It is extremely important to keep a visual record of the final operation (see p.51). It is so important that I fill out the op diagram before I dictate the official op report. Although checking the boxes facilitates data retrieval, it is the numerous drawings that I add that are vitally important. At the bottom of the page, I record three questions to answer at the post-op visits. Typical questions are: Is tip definition sufficient? Should I have done a structure tip graft rather than add-on grafts? Does the patient need nostril splints?

6) *Frequent Post-op Visits and Photos*. The more frequently you see the patient post-op, the quicker you will learn surgical cause and effect. In my office, the patient's chart is opened to the op diagram and the intraop tip photos when I enter the exam room. I need to know what I did both diagrammatically and visually. At the end of the exam, I answer the three questions – sometimes suspicions are confirmed and other times I am pleasantly surprised, but I always learn something.

7) *Revisions*. Yes, you will have to revise your own cases, everybody does. You also have a choice – you can see it as a sign of failure or as a learning opportunity. Recently, I revised a nose to fix a small tip bossa. To my surprise, it was not a sharp domal cartilage point, but rather the cephalic end of an alar rim graft. From this experience, I learned to taper my ARG grafts even more, do not hesitate to shorten them, and check the soft tissue facet for any distortion. Learn from your revisions.

8) *Reading and Meetings*. Read everything you can about rhinoplasty surgery. Obviously, begin with the most pertinent recent articles and books. Do not hesitate to read the "classics." A familiarity with less popular techniques is valuable in secondary cases where recognition of a "Universal tip' or a "Goldman tip" allows one to reverse the primary procedure and reduce the number of grafts.

9) *Visit Other Surgeons or Find a Mentor*. Every year, I try to spend a few days in the O.R. observing a colleague. This experience is tremendously helpful as I learn lot of tricks and alternative ways of doing things as well as new operations – some I will do and some I won't. At the initial stages of one's practice, it would be ideal to find a mentor and some one close by that you could observe frequently and discuss your problems with. Experience is a dear teacher and takes time to acquire.

10) *Give a Presentation, Write a Paper*. Until one prepares a presentation, one may think that they know how to do a good rhinoplasty. All illusions are stripped away when the 1-year result photos are examined from all four views. Rather than accepting defeat, one should see where the mistakes are and keep working until you have enough good results to present. Writing a paper provides even greater understanding as one must clarify one's thoughts and put it within the context of prior work. I have always said that writing these books has made me a much better surgeon, but a poorer golfer.

The Most Important Step – Progress to the Next Level. With experience and a greater understanding of surgical cause and effect, one is ready to progress to the next level. The reality is that most surgeons will have inadvertently operated beyond their comfort zone, by underestimating the difficulty of a few cases. Also, the opportunity to do one's own revisions are part of the learning experience. Remember: it is hard work and a commitment to excellence that is critical in the evolution of a rhinoplasty surgeon.

Guiding Principles

As one enters practice and begins to learn rhinoplasty surgery in the real world, decisions have to be made and their consequences must be accepted. Hopefully, these principles will guide the younger surgeon through the challenges of learning rhinoplasty surgery.

- Rhinoplasty is the most difficult of all cosmetic operations for three reasons: (1) nasal anatomy is highly variable, (2) the procedure must correct form and function, and (3) the final result must meet the patient's expectations.
- Few surgeons do more than 25 rhinoplasties a year. Thus, one must maximize the learning experience of each case by careful documentation of the operative procedure and frequent follow-up visits – only you can teach yourself surgical cause and effect.
- Form without function is a disaster. Most postoperative nasal obstruction reflects a failure to diagnose and treat a preoperative subclinical condition. One must identify and correct preexisting anatomical deformities of the septum, nasal valves, and turbinates. There is no excuse for not doing a thorough preoperative internal exam and recording a specific operative plan.
- One must accept in advance that there is no magic operation that guarantees perfect results. Each surgical maneuver within an operation has its learning curve. Within an operative sequence, the individual maneuvers are additive, but their interactions and potential complications are geometric. Keep the operation simple – maximum gain, minimum risk. Expand what you know from your comfort zone. Do not incorporate every new fad.
- Early in your practice, select nice patients with obvious deformities that you can easily correct using surgical techniques that you know. With experience, begin to add new maneuvers and then take on cases of greater difficulty. Operate within your comfort zone early on.
- The preoperative course is finite, but the postoperative course is infinite, so pick your patients carefully. Postoperative problems are most often confirmations of intraop suspicions – if the tip did not look exactly right during the case, it rarely gets better later. Do not cut corners or you will go in circles. Once you operate on a patient, it is your result, regardless of how many previous operations were done or how noncompliant the patient. Select your patient's carefully.
- Once you have a complication or poor result, admit it directly to the patient and discuss how it can be improved. Do not pretend that it is not there or shame the patient into accepting a minimal improvement or make it financially impossible to correct the problem. Treat patients as family – at worst they will be disappointed, but not litigious.
- Understand your own limitations and progress through Level 1–3 primary cases before embarking on major secondaries. Secondary rhinoplasty is technically more demanding and requires greater surgical expertise that can only be gained through operative experience. In primary cases one often takes away the negatives to reveal the underlying attractive nose while in secondaries the surgeon must be capable of rebuilding a destroyed framework using numerous grafts.
- Rhinoplasty is the most rewarding of all cosmetic operations, both for the patient and the surgeon. Few operations can make as great a change in a young person's appearance or in their self-confidence. For the surgeon, rhinoplasty is the ultimate in artistic three-dimensional sculpturing. It is truly worth the patient's risk and the surgeon's commitment.

How to Use This Book

At this point in the text, the sophisticated reader will realize that this chapter is, in reality, the Preface to this book. It is my contention that very few surgeons ever read the Preface and therefore I have previewed within this chapter what is to come. Although reading this text in sequence is recommended, the reality is that most surgeons focus on that portion, which is most relevant to them at a particular moment. Thus, it is necessary to make each section complete in a stand-alone fashion, which leads to a certain repetition of important points throughout the text. I do think that is important for the reader to integrate the *DVD clips* into the learning experience. I consider the opportunity to actually be in the operating room and see how the technique are done to be of infinite value. Ideally, one should have their computer available with the appropriate DVD loaded – read the text, look at the drawings or intraop photographs, and then enter the OR to see how it is done in the real world. The overall experience should be as close to a Rhinoplasty Fellowship as possible. On another note, the number of cited references is low because this book was written from notes and diagrams made during and after surgery. Thus, it is one surgeon's approach to rhinoplasty and not an encyclopedic multivolume text on the entire subject. Once the text was completed, I did review the rhinoplasty literature and added a Reading List to each chapter. Certain references will be cited using the following format (Author, date). Once again, I have found that writing a book on rhinoplasty surgery has made me a much better surgeon and I can only hope that the same will be true for the reader.

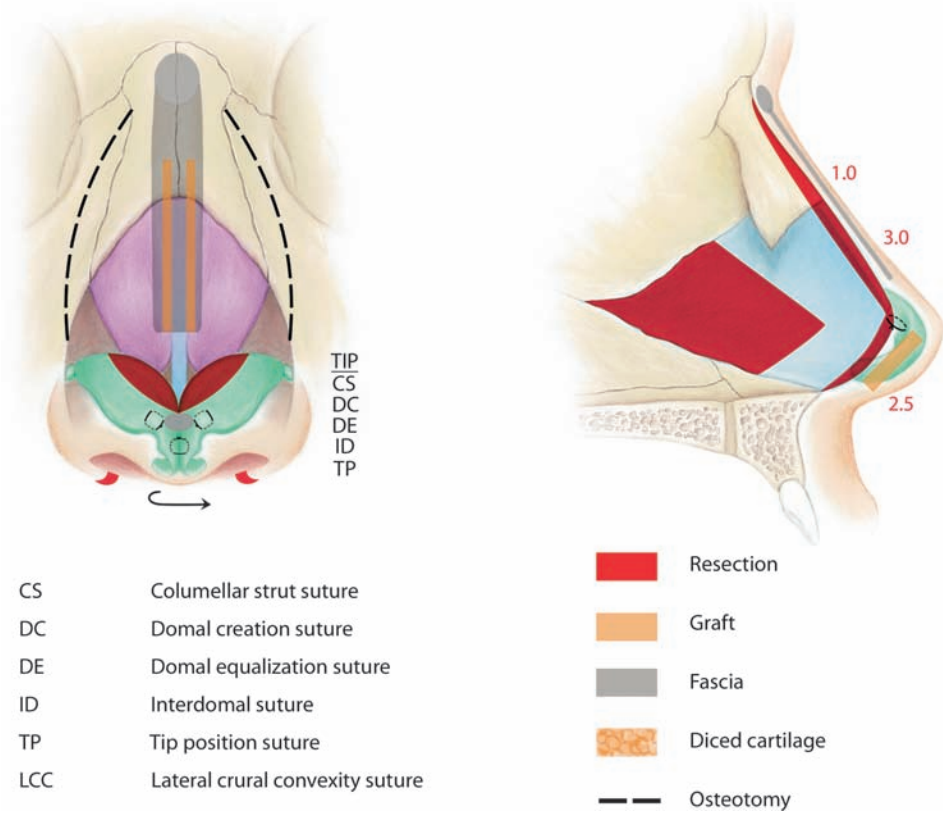
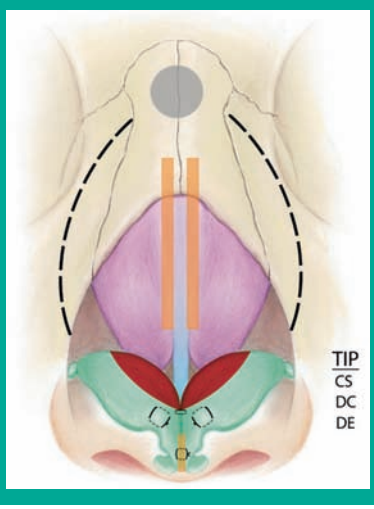


Fig. 1.5 Codex of case study diagram



2 A Basic Rhinoplasty Operation

Introduction

Why is rhinoplasty so difficult? The answer is the wide variation in the patient's nasal anatomy and aesthetic desires. For the surgeon, the challenge is mastering the endless number of operative techniques available. Thus, the question becomes can one devise a basic rhinoplasty operation? A former resident who was 3 years into private practice made the following request: "Can you give me a basic rhinoplasty operation with which I can get good results and have few revisions?" My answer was quick and blunt – "It is impossible because both the anatomy and the requisite techniques are too varied." Despite my negativity, the desire to develop a basic rhinoplasty operation has continued to intrigue me. Gradually, the fundamentals of a standard rhinoplasty operation began to crystallize. The following operation is intended for the average well-trained plastic surgeon. It can be expanded to fit a large range of nasal deformities. However, it requires that the surgeon accepts two principles. First, the surgeon must begin by doing only those cases which fit within their surgical comfort zone. Second, the surgeon must implement a progressive approach for learning rhinoplasty surgery. One begins with easier Level 1 cases and then advances to the more challenging Level 2 deformities before ultimately taking on the most difficult Level 3 problems. Distribution wise, perhaps 70% of the primary cases are Level 1, 25% are Level 2, and only 5% are Level 3. A fundamental operation will be presented in a step-by-step fashion in this chapter and its progressive adaptations for the three levels of deformities will be detailed in the rest of the text. It is important to select only those steps that are appropriate for a specific case.

Remember the 95% rule – 95% of rhinoplasty articles and lectures deal with the most esoteric 5% of noses, yet 95% of surgeons do not want to do the most difficult 5% of noses. This basic rhinoplasty operation is designed to allow the surgeon to do surgery for 95% of primary patients seen by a surgeon in the private practice of aesthetic surgery.

Consultation

During the initial consultation, I ask myself two critical questions about the patient. First, will a rhinoplasty make a significant improvement in this patient's nose? Second, do I want this person in my practice? If the answer is no to either question then I do not do their surgery. Rhinoplasty is not a frivolous operation; the procedure must be considered carefully by both the patient and the surgeon. The patient's goals should be to get a realistic assessment of the surgical risk to reward ratio and evaluate whether they feel comfortable with you being their surgeon. Unfortunately, surgeons too often concentrate on the technical challenge and the economic benefit of doing every nose, yet the risks of selecting the wrong patient is very real for the surgeon ranging from frustration to misery to physical abuse.

Nasal Deformity. In primary cases, patients are usually very accurate in defining what is wrong with their nose, but often very nonspecific about what they want. The easiest patients are those requesting elimination of obvious deformities (bump on profile, round tip), while the most difficult are those who are unable to say exactly what they desire or those who demand a specific "look." Essentially, one must get patients to commit to what they want. For this reason, I have the patient tell me what three things should be improved in the order of importance. Next, I examine the nose in detail and make my list of what must be done to make the nose attractive and to achieve balance with the face. Perhaps 90% of all the primary consultations have a correctable nasal deformity on evaluation. The other 10% are attractive females with minimal deformities, males seeking "model" refinements, and patients wanting a "major change" when only a limited improvement is realistic.

Patient Factors. It is important to assess the patient's motivation. Open-ended questions should be asked as they will often reveal the patient's motivation. "What do you not like about your nose?" "Why do you want surgery at this time?" "What effect will a rhinoplasty have on your life?" It is extremely important to "hear" what the patient is saying psychologically rather than merely listening to the words. Which patients do I reject for primary rhinoplasty? These would include the overly narcissistic male, the perfectionistic female who will never be satisfied, and the unhappy patient who thinks that the operation will change his or her life. Once you choose to operate, you must provide the care and concern that the patient requires, not the amount that is reasonable. I have learned the hard way that "the pre-op course is finite, but the post-op course is infinite."

Analysis. Given the choice, would most surgeons rather be a master technician with golden hands or a strategic tactician with a critical aesthetic eye? In rhinoplasty as in chess, it is the thought process before the manipulation of the pieces that is critical. If one fails to recognize that the radix is low, then the dorsum will be lowered excessively resulting in a nose job appearance. In contrast, the simple addition of a fascia graft to the radix allows a more limited dorsal reduction producing a more natural, elegant, unoperated look. The difference is not surgical skill, but rather the design of the operative plan based on preoperative analysis.

Prior to my evaluation, I hand the patient a mirror and ask them to show me what bothers them the most, preferably in the order of importance. I write these down on the operative planning sheet and they become the cornerstone of the operative plan assuming they are correctable. After a thorough internal and external exam, I do a top-down region exam.

Radix and Dorsum. The radix is analyzed on lateral view for both the radix area (from glabella to lateral canthus level) and nasion (the deepest point in the nasofrontal angle). The critical decision is whether the radix needs to be maintained, augmented, or reduced. Fortunately, no modification is necessary in most cases (82%). Next, the dorsum is evaluated for height and width, while the bony base is assessed for width. The key determinant of dorsal height is the nasofascial angle, which is measured from nasion to tip. The desired profile line is slightly curved for females, straight for males. On anterior view, the width of the parallel "dorsal lines" is roughly the same as the philtral columns or tip-defining points, 6–8 mm for females, 8–10 mm for males. The maximum base bony width of the nose is marked as the "X-point" and should be less than the eyes' intercanthal width.

Tip. Tip analysis is complex and will be discussed in great depth in Chapters 4 and 8. The following is a basic overview. The "lobule" is the entire area overlying the alar cartilages, whereas the "intrinsic tip" incorporates just the area between the tip-defining points transversely and between the columella breakpoint and supratip point vertically. I focus on these characteristics: (1) the intrinsic factors of volume, definition, and width; (2) the extrinsic/intrinsic factors of rotation and projection; and (3) the overall factors of tip shape and skin envelope. I assign a "value" to each: ideal, minor, moderate, or major deformity in both a positive and negative direction. Then, I make a critical decision: is the tip inherently attractive or do I need to change it. As will be discussed extensively in the chapters on tip surgery, I feel that most surgeons should learn an open tip suture technique which can be expanded to fit a wide range of tip deformities. At the consultation, I draw the anticipated tip surgery procedure including the various sutures and any tip refinement grafts (TRG).

Base. The base of the nose consists of alar bases, nostrils, and columella. Numerous factors must be assessed including caudal septum, anterior nasal spine, and maxilla. The most common decision is whether to reduce alar base width or nostril size. In general, the alar bases should be narrower than the intercanthal width and the nostril sills should not be excessively visible on anterior view. I have evolved a simplified approach of three procedures – nostril sill excision, alar wedge excision, or combined to deal with these problems. Although conservative in the amount of excision, one should not limit their application. Preexisting nostril asymmetry should be pointed out to the patient preoperatively as only a slight improvement is realistic.

Operative Planning

Formulation of an operative plan involves selecting specific surgical techniques which are combined to produce the optimal *individualized* operative sequence for the specific patient (Fig. 2.1). The first step is to define the patient's goals and the surgeon should write out the proposed operative sequence following a thorough internal and external exam (Op Plan #1). Nasal photographs are taken and individual views are printed to allow detailed planning using classic landmarks and angles defining actual, ideal, and realistic goals (Op Plan #2). When the patient returns for the pre-op visit, the nose is examined from the surgeon's perspective with the questions being: What do I not like about the nose (the negatives)? What are the aesthetic possibilities for this nose (the upside goal)? What will the patient's tissue and my experience allow me to achieve (the reality check)? (Op Plan #3) Then I review the photographs of the desired noses that the patient has brought. At the end of the pre-op visit, the final operative plan has evolved (Op Plan #4). A step-by-step operative plan is written out and it will be posted in the operating room with the photographic analysis of the patient. During the actual operation, changes may occur on a "sliding scale" but rarely is a step dropped. The final operation is recorded both by a check box table database plus drawings and dictated (Final Operation). The data table with drawings is checked at each post-op visit with emphasis on surgical cause and effect.

Operative Sequence

The advantage of a standard operation is that the operative sequence is largely predetermined (Table 2.1). I favor a dorsum to tip sequence. I first establish the ideal profile line and then fit the tip to it. I do the dorsal reduction prior to the septal surgery as it minimizes disjunction of the critical septal strut. Alar base modifications are done after all incisions are closed and alar rim grafts (ARG) follow any alar base modification. Initially, the surgeon should write out an operative sequence for each patient prior to surgery and then post it in the operating room below the patient's photographs.

Markings

On the day of surgery with the patient sitting up, I mark the following: ideal dorsal profile line, x-point, lateral osteotomies, ideal tip point, transcolumellar incision, and any alar base incisions.

PRINCIPLES

- One must correct the deformities that bother the patient or they will not be happy.
- The more detail the pre-op planning is, the smoother the operation.
- The simpler the operative plan is, the smaller the risk. Always design an operative plan with maximum gain and minimum risk.
- Write out your operative sequence step by step and put it up in the operating room – know what you are going to do.

Fig. 2.1 (**a**) Patient analysis (**b**) Operative planing DVD

Table 2.1 Operative sequence of a basic rhinoplasty operation

1. Essentials – 2.5x loupes, fiberoptic headlight, own instruments
2. Anesthesia – General with appropriate monitors
3. Local injection followed by preparation – wait 10–15 min
4. Remove intranasal nasal pack and shave vibrissae
5. Open approach using infralobular and transcolumellar incisions
6. Elevation of skin envelope
7. Septal exposure via transfixion incision and extramucosal tunnels
8. Reassess operative plan based on alar and septal anatomy
9. Creation of symmetrical alar rim strips
10. Incremental hump reduction – rasp:bone, scissors:cartilage
11. Caudal septum/ANS excision (Optional)
12. Septal harvest/septoplasty
13. Osteotomies
14. Graft preparation
15. Spreader grafts (Optional)
16. Columellar strut and suture
17. Tip sutures with optional add-on grafts (excised alar cartilage)
18. Closure
19. Alar base modification (optional)
20. Alar rim grafts (ARS) (optional)
21. Doyle splints, external cast, and nasal block

The basic operation is a relatively standard sequence that I use routinely, but with virtually unlimited variations. The operative sequence is individualized for each primary rhinoplasty with certain steps deleted as indicated. Although every step of the basic rhinoplasty operation does not need to be done in each patient, I am convinced each step will be needed in your first 25 rhinoplasties.

Anesthesia

I do the vast majority of my rhinoplasties under general anesthesia because this is what the patient and I prefer. Certain precautions have improved the safety record of general anesthesia: (1) a Raye tube is used and the tube is marked with tape at the lip line, (2) alarm sensors can determine any disconnection of the tube within 5 seconds, and (3) oxygen and carbon dioxide monitors are routinely used. Additional precautions include ointment in the eyes to prevent corneal abrasion and a throat pack of wet 2 in. gauze to prevent ingestion of blood. In nonallergic patients, 1 g of Ancef is given intravenously during the operation.

Once intubation is complete, the external and internal areas of the nose are thoroughly scrubbed with Betadine paint by the surgeon. Then, the local anesthesia with its vasoconstrictive agent (1% xylocaine with epinephrine 1:100,000) is injected (Fig. 2.2). The injections are done in two components: a picture frame block to reduce the regional blood supply and then the specific areas of surgery. This method also produces an effective sensory block. Specifically, the five areas for injection consist of (1) tip and columella, (2) lateral wall, (3) dorsum/extramucosal tunnels, (4) incision lines, and (5) septum if appropriate. First, the needle is inserted from the vestibule toward the infraorbital foramen with injection occurring on withdrawal. Three sites are injected: infraorbital foramen (infraorbital vessels), lateral nasofacial groove (lateral facial vessels), and alar base (angular vessels). The columella base is injected extending outward below the nostril sills (columellar vessels). The needle is then inserted along the top of the septum in the area of the extra mucosal tunnels (anterior ethmoidal vessels). On withdrawal, the needle passes along the dorsum to facilitate future dissection and terminates in the radix area on either side (infratrochlear vessels). Next, the access incisions are injected with minute amounts of local anesthesia. The septum is blocked from posterior to anterior. For an open approach, I inject the lobular skin envelope over the alar cartilages from the tip extending laterally and down the columella. The nasal vibrissae are most easily trimmed with a scissors. The internal nose is packed with 18 in. strips of 0.5 in. gauze wetted with 4 cc of one of the three solutions: 4% cocaine, 1% xylocaine with epinephrine 1:100,000, or Afrin. I prefer 4% cocaine, but any of the three is effective.

PRINCIPLES

- Use general anesthesia with appropriate monitors and a throat pack.
- Do a thorough intranasal prep with Betadine prior to injection.
- Do a five-area injection of local anesthesia based on the vascular anatomy.
- With an open approach, do not hesitate to hydrodissect the entire lobule (1.5–2 cc). It will disappear quickly.
- Pack the nose with 0.5 in. gauze soaked in a topical vasoconstrictive agent.
- Once injected, wait 15 min. Do the definitive prep and drape.

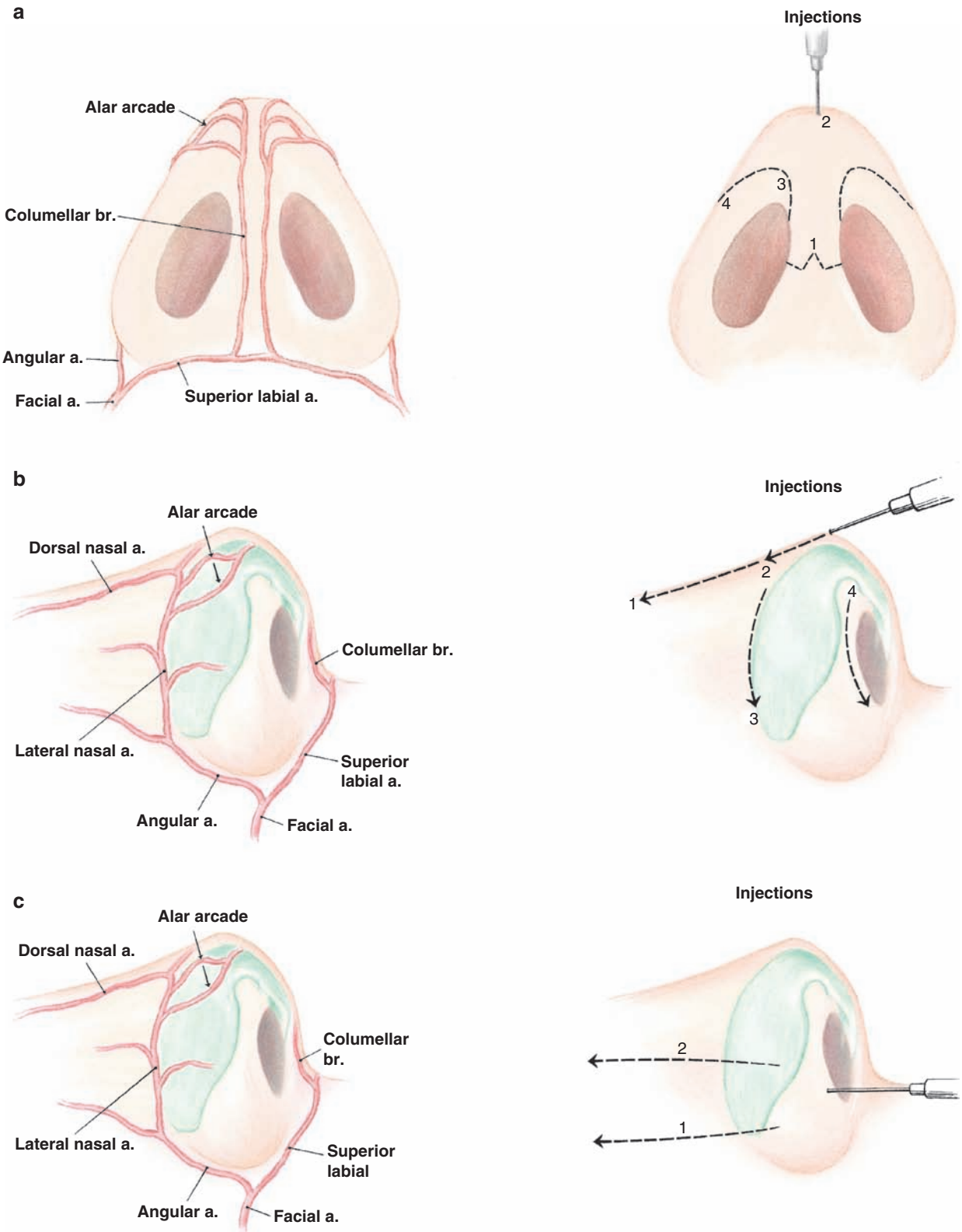


Fig. 2.2 (**a**-**c**) Local anesthesia DVD

Open Approach

Immediately prior to the incisions, I redraw the transcolumellar incision and reinject the columellar with local anesthesia. Over the years, I have tried virtually all the standard columellar incisions, but I still prefer Goodman's original inverted-V with wings. A small 3 mm equilateral inverted-V is drawn whose apex is at the narrowest point of the columellar (Fig. 2.3a–d). The transverse wings are drawn across and behind the columellar pillars. The standard infracartilaginous incision consists of three parts: lateral crura, dome, and columella. It must be emphasized that this incision *follows the caudal border of the lateral crura* and not the nostril rim. Using a 10 mm double hook, the surgeon retracts the alar rim and then provides counterpressure with the ring finger. The #15 blade is then placed at the dome and the lateral cut is done following the caudal border of the lateral crura. Then the double hook is readjusted and counterpressure is placed on the dome allowing the incision to be carefully "scratched" high in the vestibule from the dome down onto the columellar to the level of the transcolumellar incision. Holding the columella with the nondominant hand, a #11 blade is used to make the inverted-V incision and then a #15 blade is used to make the transverse wings being careful to "scratch" through the skin overlying the cartilage.

Columella-to-Tip Exposure. With the incisions completed, a "columella to tip" dissection technique is used with three-point traction (Fig. 2.3e, f). The assistant retracts the alar rim upward with a small double hook while retracting the dome downward with a single double hook. The surgeon then elevates the columellar skin with a small double hook and dissects upward using the angled converse scissors. It is often necessary to switch back and forth between the two sides, and to use extreme caution as one approaches the domes. The skin envelope is retracted upward with a Ragnell retractor and the area overlying the septal angle is entered to expose the glistening cartilaginous vault. Hemostasis is done as required.

Bidirectional Exposure. Although the "columella to tip" exposure method is the classic one, the "bidirectional" exposure technique is easy to learn and extremely useful in scarred secondary tips (Fig. 2.3g, h). Essentially, one makes the standard infracartilaginous incision and then dissects over the lateral crura using blunt tip tenotomy scissors. Then the scissor tips are turned perpendicular and spread to allow rapid avascular dissection which is continued toward the domes. The soft tissue is elevated from the transcolumellar incision upward. The bidirectional exposure allows the dome to be preserved.

PRINCIPLES

- The location of the transcolumellar incision is more important than its shape. It's apex is at the narrowest point of the columellar.
- The infracartilaginous incision follows the caudal border of the alar cartilage – a true nostril rim incision can be a disaster.
- Do not hesitate to inject 1–2.0 cc of local anesthesia into the tip lobule – it facilitates dissection and will dissipate quickly.

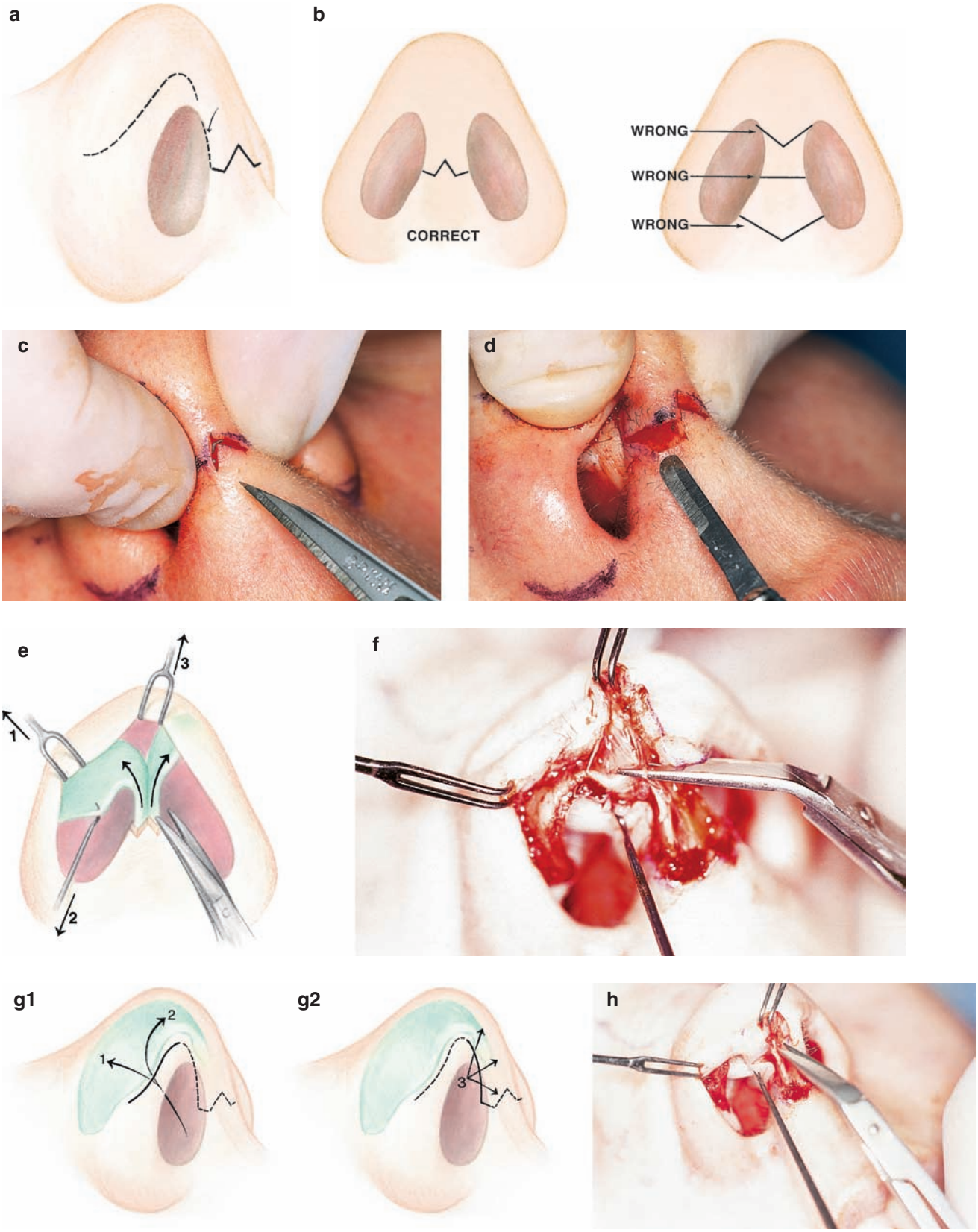


Fig. 2.3 (**a**–**d**) Open approach: incisions DVD (**e**, **f**) columellar to tip exposure DVD (**g**, **h**) bidirectional exposure DVD

Septal Exposure and Extramucosal Tunnels

Most surgeons think of exposure as elevating the skin envelope off the underlying structures. In reality, one must elevate the skin above and the mucosa below the osseocartilaginous vault (extramucosal tunnels) before doing the dorsal reduction.

Septal Exposure

There are two basic methods of septal exposure – the classical transfixion approach and the top-down bidirectional approach.

The Transfixion Approach. The caudal septum is exposed by retraction of the nostril rim and columellar to the left side using two wide double hooks (Fig. 2.7a, b). A vertical full-length transfixion incision is made 2–3 mm back from the caudal border on the right side. Using the angled Converse scissors, the mucosa is elevated and the subperichondrial space is entered. The lining is cross-hatch with a #15 blade and then scraped through to the cartilage using the dental amalgam. Once the perichondrium is elevated, the dissection continues posteriorly over the cartilage and onto the ethmoid and vomer bones using a Cottle elevator. Inferiorly, the dissection is blocked at the junction of the cartilage and premaxilla due to the joint fascia where perichondrium and periosteum fuse. For most cases, this degree of exposure via an "anterior tunnel" is sufficient. However, in complex cases, it is necessary to create an "inferior tunnel" for complete access to the premaxilla to correct inferior bony septal deflections (Chapter 6).

The Bidirectional Top-Down Approach. With downward traction on the alar cartilages, the anterior septal angle area is exposed and one can easily elevate the septal mucosa. Additional exposure can be gained by splitting the upper lateral cartilages (ULC) off the cartilaginous dorsum or splitting the alar cartilages in the midline (Fig. 2.7c, d). In secondary cases, this area can be heavily scarred and thus a clean dissection upward from the transfixion incision allows a bidirectional exposure.

Which dissection method is preferred? In reality, the surgeon can use either one or both. I start with a transfixion incision and then split off the ULCs via the extramucosal tunnels. Following the dorsal reduction, I always have a combined bidirectional exposure which facilitates any septal surgery while preserving the tip cartilage relationships.

Extramucosal Tunnels

The purpose of extramucosal tunnels is to drop the lining mucosa away from the dorsum allowing the dorsal hump to be modified without disruption or scarring of the underlying mucosa (Fig. 2.7e). Once the septum has been exposed then additional local anesthesia is injected beneath the vault of the dorsum. The round end of the Cottle elevator is passed beneath the dorsum and then reflected downward on the septum. If a large hump is to be removed, then the mucosa is dissected off the under surface of the upper lateral cartilages. Later in the operation after the cephalic lateral crura has been resected, a second confirmatory dissection of the extramucosal tunnels can be done under direct vision.

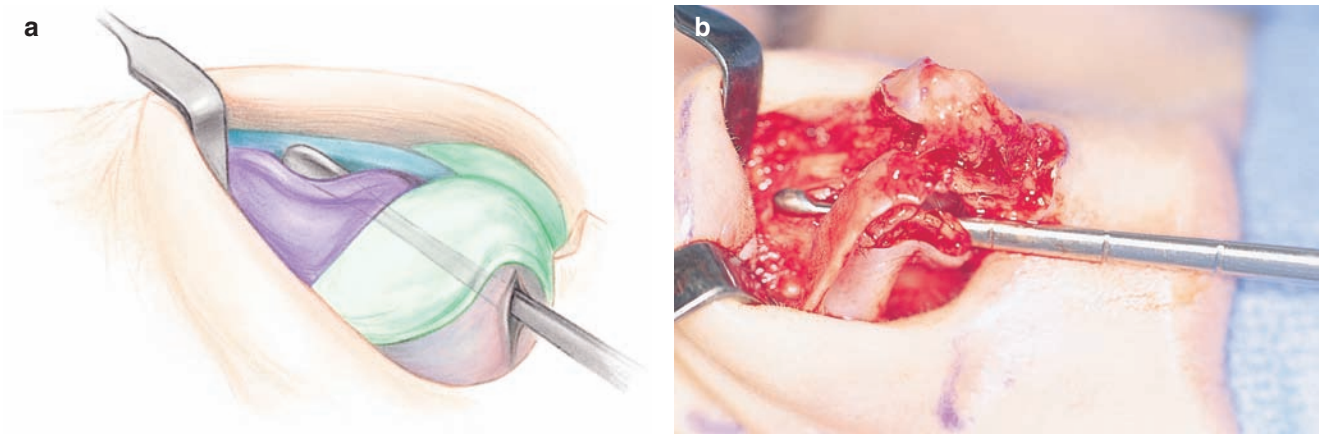


Fig. 2.4 (**a**, **b**) Septal exposure: transfixion/bidirectional DVD

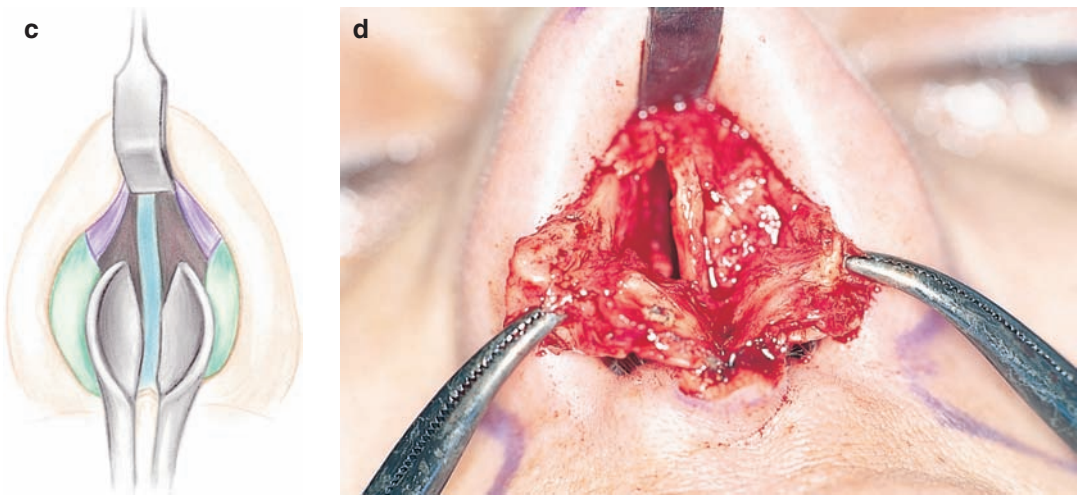


Fig. 2.4 (**c**, **d**) Septal exposure: tip split DVD

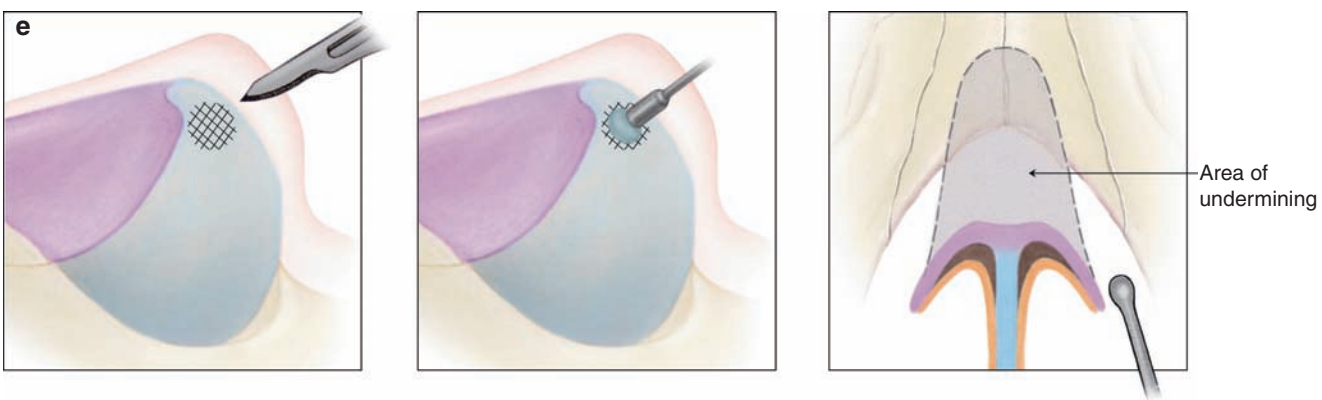


Fig. 2.4 (**e**) Extramucosal tunnels DVD