Practical Facial Reconstruction

THEORY AND PRACTICE

Andrew J. Kaufman

Wolters Kluwer

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Dedication

To my mother, short on this earth but forever in my heart and soul;

To my father, an ideal role model as physician, father, and friend;

To my brother Bobby, a hero and the embodiment of strength and bravery;

To my wife, Jayme, for her love and support, and my children, Madeline and Ethan, for whom I wish a world of love, happiness, and peace;

And to my patients, who have provided the trust, respect, and gratitude that make the subject of this book so rewarding.

Foreword

I write this foreword to *Practical Facial Reconstruction, Theory and Practice* to introduce this topic and encourage readers to study and enjoy the contents from beginning to the end. Andrew Kaufman is a talented and experienced surgeon with a long history of teaching experience to residents, fellows, and established physicians locally, nationally, and internationally. He is a premier surgeon and a leader in facial reconstruction and has contributed a great deal to our specialty. His knowledge and experience through this book adds significantly to the teaching of facial reconstruction. It is a masterpiece and should be studied by students and established physicians of all specialties involved in facial reconstruction. It is more than an atlas or a textbook. In this book, Dr. Kaufman's style is to present the rationale for a given reconstruction that teaches the reader the thought process for the choice of repair. He shows what tissue is missing, explains where to harvest available replacement tissue, and then demonstrates the most efficient way to move it. Next, he gives the pearls, tips, and important smaller details that allow the reader to take this knowledge into the operating suite and obtain the best results. The photographs are of high quality, and the drawings add significantly to the teaching and to the understanding by the reader. The summary pearls are helpful when browsing and to remember the important points of each repair. The book can be read slowly for detailed learning or used to browse for new tips and ideas. This is a book for everyone interested in facial reconstruction, including dermatologists, plastic surgeons, otolaryngologists, and general surgeons. It will be a valuable text for students and a resource for any experienced surgeon looking for ideas for complex cases. Dr. Kaufman's experience highlights beautiful results and gives the reader principles that will enhance any surgeon's surgical skills with repeatable and reliable outcomes.

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Preface

Facial reconstruction can be one of the most rewarding aspects of medicine. Taking a surgical defect or traumatic wound and creating a result that preserves function and restores appearance is tremendously satisfying not only to the patient but also to the surgeon. This is one characteristic of reconstructive surgery that has drawn physicians from varied specialties to study, practice, and excel at facial repair. Reconstruction of the face not only restores a patient's public appearance but also impacts his or her public persona and personal self-image. This degree of importance is evident in the initial consultation when a patient may voice concerns about the surgery and the resultant scar and is equally conspicuous in the patient's gratitude and kindness at the postoperative visit when viewing and discussing the final result.

To be successful, a repair must accomplish both aesthetic and functional goals. A nasal repair that looks flawless but decreases air flow because of impairment of the internal nasal valve is not a complete success. Similarly, repair of the eyelid that provides protection of the globe and avoids ectropion but leaves an unsightly scar across a cosmetic unit is also not completely successful. Both aesthetic and functional goals should be met for "success," but sometimes it is not possible to completely reach those goals in one surgical procedure. The functional goals should be addressed and achieved in the planning and primary surgical procedure whenever possible. However, sometimes the ultimate cosmetic goals may require additional procedures to "soften" or "fine-tune" the final cosmetic result through scar abrasion, scar revision, intralesional steroids, or lasers.

There are several excellent textbooks available that detail facial reconstruction, covering both the principles and designs of repairs and regional approaches to repairs. What I try to do in this book is describe a complementary approach to repair that focuses on teaching a **practical** way to evaluate a surgical defect, analyze it, and design and execute a repair that works best for that defect in that location for that patient. Rather than memorize particular types of repairs for particular locations, master an approach to facial repair that inspires creativity and adaptability. As such, this book is not meant as a primer on basic facial repair, but instead complements other more comprehensive textbooks as a readable and practical approach to enhancing one's expertise at facial reconstruction. A reader will benefit most from having at least a basic understanding of facial anatomy, surgical technique, and biomechanics.

My second goal is to attempt to simplify or demystify some useful reconstructive techniques. Having taught residents and fellows and lectured on reconstruction for many years, I have been impressed that some very useful repairs are quite intimidating to many surgeons. Some of this may be attributable to lack of experience in performing the repair or perhaps to gaps in their reconstructive education. Some of it

may be explained by the complex geometry in designing the repair and the potential downside to miscalculation or improper execution. I have tried to elucidate the exact points in design and execution of these repairs that simplify them and help to guarantee success. And for the seemingly more complicated repairs (e.g., bilobed transposition flaps, helical rim advancement flaps), I have provided an almost formulaic description as well as artistic illustrations that help to demonstrate key principles for completing that reconstruction.

Each defect is slightly different; each repair is unique. My ultimate goal is to make the reader think, preferring not to espouse a particular repair for a particular defect, but to enhance flexibility and ingenuity. These characteristics distinguish an innovative surgeon and ultimately elevate the care you provide your patient.

Andrew J. Kaufman, MD, FACP

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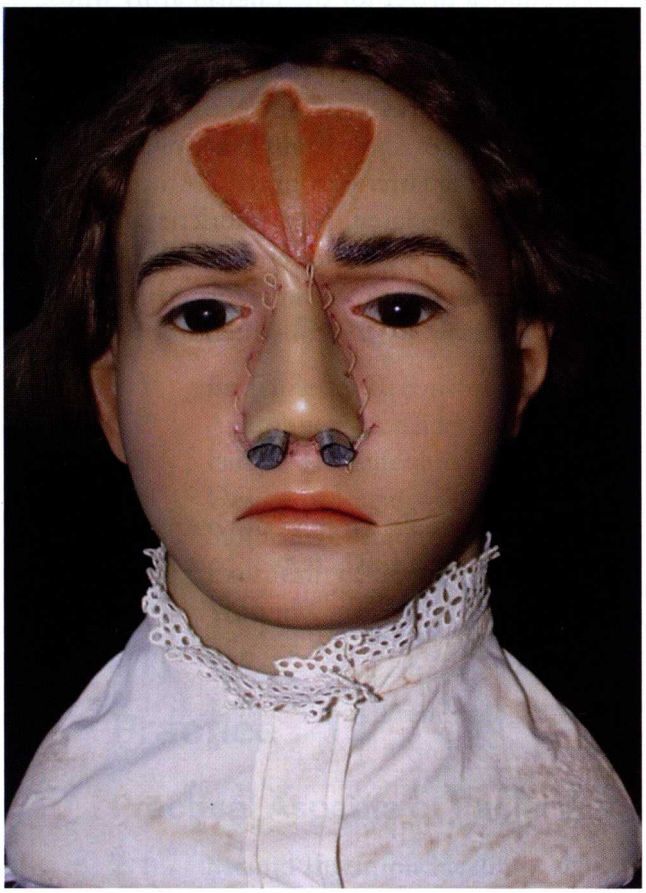
Special thanks to Timothy C. Hengst, FAMI, CMI, an amazingly talented, respected, and patient medical illustrator, who helped me to explain some key principles in this book.

Special thanks also to John A. Zitelli, MD, for agreeing to write the Foreward in this book. Dr. Zitelli has been a friend and a source of inspiration, and his lectures and published articles are a valuable resource to those interested in understanding reconstructive surgery.

Special thanks also to the front office, back office, and nursing staff who have worked with me through the years and who help make my surgeries easier to accomplish and my life easier to enjoy.

HISTORICAL NOTE: MOULAGE OF FOREHEAD FLAP



(Moulage from author's collection. Image previously published in Kaufman A. J. Moulage: The forehead flap. *Dermatol Surg* 2003;29:402.)

Moulages were wax models created by artisans during the 18th and 19th centuries within Europe and America as clinical teaching models to convey the three-dimensional, life-size appearance of disease processes as well as surgical procedures. The moulage shown here from the latter part of the 19th century depicts the Forehead Flap, also previously referred to as the "Indian Rhinoplasty."

The origin of the forehead flap dates to the 6th century BC., when it was described in an ancient Sanskrit text on medicine and surgery, the Sushruta *Samhita*. A caste of potters or brickmakers in India developed the forehead flap as well as a cheek flap for nasal reconstruction. With the translation of the *Samhita* in Sicily during the 15th century, surgeons like Branca de Branca and his son, Antonius, embraced the new technique and added more sites of donor tissue (e.g., arm) as well as recipient repair sites (e.g., lips and ear). Gaspare Tagliacozzi further improved upon surgical reconstruction techniques for nasal reconstruction, in particular, the use of the arm for

donor tissue (later referred to as the "Italian Method" of rhinoplasty) and published his treatise, *De Curtorum Chirurgia per Insitionem,* in 1597. Although Tagliacozzi's text was popular among surgeons, religious and political views disapproved of the concept of changing one's appearance even for reconstructive purposes, and it was not until 1794 that the surgical technique reached an English-speaking audience. A Letter to the Editor in *Gentleman's Magazine* described the Indian Forehead Flap in the reconstruction of the nose of a bullock driver for the English army whose nose and one hand were amputated while he was a prisoner of Tippoo Sultan. Twenty-two years later, an English surgeon, J.C. Carpue, described his use of the technique in an account of the reconstruction of the noses of two army officers. Over the remainder of the 19th century, many more forehead flaps and various iterations of the forehead flap were performed, but it was not until the latter part of the 20th century when the full utility of this interpolation flap was appreciated. Now, subtleties in design and execution as well as the need for structural support and restoration of nasal lining make the paramedian forehead flap an important technique for repair of larger nasal defects, and its history a key turning point in facial reconstruction.

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Part I Theory

Principles, Design, Completion

1

PRINCIPLES OF RECONSTRUCTION 1.1

The first step in cancer surgery is to ensure clearance of the tumor. Neither cosmetic nor functional goals can be met if the results are short-term, and the patient will require further surgery to remove persistent tumor. Taking too narrow a surgical margin or leaving positive surgical margins untreated will likely doom the patient to more extensive cancer surgery and reconstruction in the future. Although adjuvant radiation therapy may help "clean up" some residual tumor cells in some situations, a better, more consistent option may be to consider Mohs micrographic surgery as a primary method to clear difficult or recurrent skin cancers before reconstructive surgery.

Mohs surgery was first described in the 1930s by Dr. Frederic Mohs. At that time, the procedure was described as "chemosurgery" in reference to the zinc chloride paste that was applied to the tumor prior to surgery. This process fixed the tissue "in situ," and although it made surgical excision of the tumor easier in some ways, it made immediate postoperative reconstruction of this devitalized wound bed impossible. Although Dr. Mohs did perform the procedure without zinc chloride paste in certain locations such as the eyelids, several other physicians began utilizing Mohs surgery without zinc chloride paste in the 1970s, a procedure subsequently referred to as "fresh tissue technique." Today, almost every case of Mohs surgery is performed without the tissue fixative, and the procedure is termed Mohs micrographic surgery. The two greatest benefits of the procedure are that it provides the highest cure rate for most primary and recurrent skin cancers and preserves the greatest amount of healthy tissue around the tumor site. Even if another surgeon will be performing the reconstruction, it may be in the patient's best interest to have the tumor removed by Mohs surgery. And for the surgeon performing the reconstruction, the benefits of highest cure rate (i.e., less chance of performing another excision and repair in this area) and greatest preservation of healthy tissue (i.e., more healthy adjacent tissue means more options for local flap or side-to-side repair) should sound like a good option.

After cancer removal, we address the two goals in reconstruction: functional and aesthetic. Both of these should be addressed in consultation with the patient, and one should get a sense of whether one's ability and goals will match the patient's expectations. (See also Section 1.3.) As mentioned before, selection and performance of reconstructive technique needs to address functional as well as aesthetic requirements. Functional requirements may include the eyelids' protection of the globe, the lips' retention of food and liquids, the ears' collection of sound, and the nostrils' movement of symmetric and uninterrupted air flow. Each of these functional requirements can be disturbed by a poorly planned or executed reconstruction. A suboptimal