# THE ART OF **AESTHETIC SURGERY**

**Principles & Techniques** THIRD EDITION



# FOAD NAHAI • FARZAD NAHAI



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# The Art of Aesthetic Surgery Principles and Techniques

#### **Third Edition**

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**To Shahnaz** My best friend and partner of fifty years whose beauty is only surpassed by the loveliness that radiates from within. You are an inspiration to us all, and your patience, understanding, sacrifices, and encouragement have made me who I am. Thank you for enriching my life.

-Foad Nahai, MD, FACS, FRCS (Hon)

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# Preface

It has been almost twenty years since my good friend and mentor John Bostwick, then chief of plastic surgery at Emory, and Karen Berger, another good friend who, at the time, was the CEO of Quality Medical Publishing, encouraged me to undertake the task of editing a textbook on aesthetic surgery. Their input and advice led to the publication of the first edition of The Art of Aesthetic Surgery in 2005. Six years later, in 2011, the second edition was published. The first two editions were an immense undertaking for me, but also rewarding and educational. Both editions were written to address the enormous demand for and interest in cosmetic surgery and the need for comprehensive information on that topic. I had not anticipated the warm reception both editions would receive from colleagues throughout the world, and I have been delighted, humbled, and gratified to witness its continued popularity and enthusiastic readership. Recent translations into Chinese, Korean, and Russian attest to the ongoing global need for education in aesthetic surgery. I never imagined, twenty years ago, that today I would be writing the preface for a third edition.

Why a third edition? Surely twice was enough for a project of this magnitude. The answer is obvious: this is a dynamic field continuing its rapid and significant growth, with numerous, exciting new developments. Interest in this topic has not abated over the years; in fact, it has grown stronger and more vibrant. While many of the procedures touted nine years ago are still being performed, others have been replaced by new, less-invasive approaches or techniques that emphasize volume replacement to enhance rejuvenation procedures. Furthermore, new technology, noninvasive techniques, and a number of new devices, fillers, and products have enhanced our ability to provide our patients a broader spectrum of options and improved outcomes. Clearly, after nine years there was a need for a revision of the book to reflect these dramatic and ongoing changes.

Today, nonsurgical cosmetic treatments, such as injectables, continue to gain in popularity, whereas the decline we had seen in some surgical approaches to facial rejuvenation seems to be reversing. Nowhere is this change more dramatic than in the area of brow rejuvenation. Another important trend has been the emphasis on volume enhancement in periorbital and facial rejuvenation, as well as surgery of the breast. In keeping with these trends, we have increased coverage of nonsurgical treatments and injectables and have added new sections and chapters dealing with volume and its role in facial rejuvenation and the role of fat grafting in breast surgery.

In contrast to the reduction in the number of invasive surgical procedures for facial rejuvenation being performed today, there has been a dramatic increase in breast and body-contouring procedures, in normal-weight patients, and in individuals who have lost massive amounts of weight. Accompanying this burgeoning interest and demand have been advances, the development of new procedures, and refinements of existing techniques. In keeping with advances and demand for genital rejuvenation, we have expanded that section and added a new section on gender-affirming surgery.

I did not approach the task of this revision lightly. As with the first two editions, it involved many late nights and weekends spent writing and editing. A busy practice, numerous academic and societal commitments, a journal editorship, and an effort to bring more balance into my own life were all forces working against such an undertaking. Why, then, did I feel this was the right time to take on the responsibilities and make the time commitment for editing a third edition? Obviously, there was more than one reason.

My commitment to learning and teaching was a primary motivator. From my earliest writings on muscle and musculocutaneous flaps, to the editing of two editions of this three-volume work on aesthetic surgery, I have always felt an obligation to contribute to the literature and to help advance our specialty. This book represents a continuation of my lifelong dedication to this process. It has been a wonderful way to reach out to young and experienced surgeons alike and to offer them insight into the remarkable contributions made by leading experts worldwide. During academic travels and interactions with plastic surgeons and trainees all over the world, I have witnessed their interest in aesthetic surgery and their desire to master the basics of aesthetic surgery and learn about the latest techniques. This new edition has been written to address that need and to provide information on current advances that emphasize safe and best practices to all aesthetic surgeons.

Recognizing my many commitments and the increasing scope of the specialty led to the decision to invite others to assist me; namely, my son, Farzad Nahai as coeditor and section editor; Dr. Jeffrey Kenkel and Dr. John Hunter as section editors, with each responsible for two sections; and Dr. William Adams and Grant Stevens as section editors. I felt this would not only lighten my load and speed up the time to publication but would allow the coeditors to add their expertise.

Every chapter has been revised with new material added. Twenty new chapters, reflecting the growth and diversity of our specialty, have been included. The amount of online material has also grown, with nineteen operative videos, fourteen of which are new, included in this edition. The entire book is also available online for quick and portable reference. It is with great pleasure that I welcome 105 new contributors who, along with our previous contributors, bring valuable insights and considerable expertise to this new edition. The contributors, drawn from all parts of the globe, represent several disciplines, including the four core specialties. These contributors, all of whom have distinguished themselves as educators and innovators, have graciously succumbed to my gentle arm-twisting and that of the section editors to provide us with outstanding chapters on a diverse range of topics.

The positive feedback we have received on the clinical decision-making chapters prompted the expansion of existing chapters and the inclusion of new ones. The additions reflect the increase in the number of options now available for each patient. These chapters reflect my own and the section editors' daily decision-making process, not only in the operating room but also in the clinic, where we evaluate new patients and care for them after the operation.

My personal interest and fascination with human anatomy dates back to my first year in medical school. I recall one of my teachers telling the class, "You will learn anatomy three times and forget it three times." He went on to say that unlike other knowledge we would acquire over the years, anatomy would never change. Of course, he was right; anatomy does not change. However, it is important to note that we change, and our understanding of anatomy evolves and deepens with experience.

Back then, I never imagined that one day as a practicing plastic surgeon not only would I remember all the anatomy I learned, but I would also learn intricate details that were unimaginable then. Little did I know that in some modest way I would even contribute to that knowledge base. Interest in anatomic detail as it applies to aesthetic surgery continues with further clarification of facial anatomy, such as the fat compartments and more detailed descriptions of anatomy of the trunk and breast relating to emerging body-contouring procedures. In keeping with these new findings, all anatomy chapters have been appropriately updated. The topic of patient safety also assumes a more prominent position in this edition, with a major chapter on safety considerations in aesthetic surgery, as well as specific chapters on problems and complications in different anatomic regions.

All volumes have been significantly updated with new information—each chapter reflects the latest information presented by experts responsible for advancing our knowledge in those areas.

As the book progressed from first to third edition, the cover also changed. The first edition cover with a modern rendition of *The Three Graces* was replaced with an even more contemporary rendition of *The Three Graces*. The third edition carries the masters version of The Three Graces.

It is my wish that readers will receive this third edition with enthusiasm equal to that of the first two editions. I hope that it will provide a source of new information, stimulate thought, and foster innovation. As with any writing project, this book has been a major undertaking, but it has also been a labor of love. I have learned as much as I have taught, and I continue to marvel at the outstanding work being done by my colleagues around the world. I am gratified to be able to share our learning and work with you in these pages. My goal for this book is to provide trainees, as well as experienced practitioners, with a solid foundation for learning basic principles and techniques in aesthetic surgery in order to enable them to build on it and advance this specialty that we all love.

Foad Nahai, MD, FACS, FRCS (Hon)

# **Acknowledgments**

This book is intended to serve as a testament to all the surgical pioneers who laid the foundation for modern aesthetic surgery, as well as a tribute to current contributors worldwide whose ingenuity and skill are paving the way for future developments. While acknowledging my mentors, I also credit the young surgeons in whose training I have been privileged to participate. Their enthusiasm and quest for knowledge continues to stimulate me.

This work would never have been completed without the support and encouragement of my family, my partners, those with whom I work on a daily basis at the Emory Aesthetic Center, and my friends at Thieme Publishers. I would be remiss if I didn't mention all of them by name.

My wife, Shahnaz, has been a support and a part of my professional life for fifty years. She, more than anyone, has put up with my unusual hours and weekends away from home. My son, Farzad, now associate editor of this work, and my daughter, Fariba, have always been interested in what I do and have encouraged me in my efforts. My partners at the Emory Aesthetic Center Grant Carson-Bert Losken, Monte Eaves, Gabi Miotto, and Vince Zubowicz-provided encouragement, advice, and most of all, support in looking after my patients while I was working on the book. Trina Walker, my patient care coordinator, has been my right hand for her hard work and support. Farzad Nahai, in addition to his role as section editor, worked diligently, capably assisting me with all aspects of putting this work together. The section editors—W. Grant Stevens, Jeffrey M. Kenkel, William P. Adams, and John G. Hunter—all lightened my load and assured that this publication would be the best possible.

I am indebted to all at Thieme, notably my friend and adviser Sue Hodgson, who demonstrated her professionalism and talent as an editor in her willingness to work and rework with me until we both felt we had a superb, scholarly, and "aesthetically" appealing product. Judith Tomat not only encouraged but also managed to corral all the contributors and section editors (and the editor as well) into submitting their manuscripts and videos in a somewhat timely manner. Sarah Landis provided the follow-up to process content for publication, gathering missing elements and keeping all aspects of the book in order and on target. Illustrators Brenda L. Bunch, Amanda Behr, Graeme Chambers, Amanda Tomasikiewicz, and Bill Winn provided quality images to accompany the text.

I acknowledge the outstanding contributors to the book, not only the original contributors who updated and in some cases totally rewrote their chapters, but also the new authors whose contributions have filled in any deficiencies that may have existed in the second edition. I am most grateful to them for so generously and readily sharing their expertise with us.

Foad Nahai, MD, FACS, FRCS (Hon)

It is an honor for me to be included in the third edition of *The Art of Aesthetic Surgery*, for so long referred to by me as "dad's book." When my father approached me to assist with the organization, writing, and editing of this book, I was thrilled—thrilled for the opportunity to contribute to the project in a meaningful way, but especially to have the chance to share this experience with him, working closely together to learn the ins and out of putting together a book like this one. It has been a joy for us to collaborate, so I am most grateful to my father for inviting me to be a part of this project and for his continued guidance, mentorship, patience, and leadership. As special as it is for him to share a passion for plastic surgery with me and work together on the common goal of publishing this third edition, it is an equally special experience for me.

The support of my wife Dana and my children Marcelle and Andre has also been important. I especially appreciate their understanding when I have needed to leave the house in the morning before they are awake to work on the book before my clinical day starts.

I would like to also recognize my mentors and their influence on me as a surgeon. The influence of my

dad on my career as a surgeon is immense and goes beyond the scope of this note to fully recount and detail. Stephen Mathes, whom I've been fortunate to know since I was a kid, was my chief during residency. He taught me the value of hard work and commitment to the patient. He was taken from us too soon, but I feel so fortunate to have had the time with him that I did. Bill Hoffman (who coauthored the photography chapter with me) was a big influence on me during my time as a resident. To this day I recall and still abide by many of his wise practices and anecdotes. David Young, Keith Denkler, Lorne Rosenfield, and Gil Gradinger were also major influences during my training and remain dear to me to this day.

I must make a special mention with regard to Ron Gruber. Ron was kind enough to allow residents who were interested in rhinoplasty to spend time with him in his private practice. I went to his office quite often, and Ron was always very welcoming and eager to teach me about rhinoplasty. Much of what I know about rhinoplasty and the success of my rhinoplasty practice I owe to Ron. Much of my chapter on rhinoplasty and my approach to rhinoplasty is based on his mentorship and the approach he taught me. Without Ron's gracious time and teaching, I would probably not be the rhinoplasty surgeon I am today.

I would also like to mention my staff and partners at The Center for Plastic Surgery at MetroDerm, who supported me in my clinical practice to where I could take the time needed to work on this book.

Lastly, none of this would be possible without the excellent team at Thieme, especially Judith Tomat and Sue Hodgson, who both put in a lot of time and hard work to help make this third edition become a reality.

Farzad R. Nahai, MD

Thank you to Suzanne, Matthew, and Ashley for the many sacrifices you have made to allow me to pursue my professional dreams. Your boundless support continues to be the backbone of my successes.

Thank you to the students, residents, and fellows who have allowed me the privilege of teaching. You have driven

me to pursue excellence and allowed me to be a small part of your accomplishments.

To my patients, I am indebted to each of you for allowing me to care for you. It has been my pleasure and honor to do so.

Jeffrey M. Kenkel, MD

I thank Foad Nahai, MD, for conceiving of and first publishing in 2005 this internationally and critically regarded masterpiece in aesthetic plastic surgery. The impact of the initial text on the aesthetic surgery community, as well as its second edition in 2011, cannot be overstated. I am honored and humbled to be included by Dr. Nahai as a coeditor for this Third Edition, entrusted with the development of two new sections: female genital rejuvenation surgery and gender affirming surgery. Both additions reflect remarkable changes in aesthetic surgery that have occurred since publication of the second edition and illustrate just how state-of-the-art *The Art of Aesthetic Surgery* has been and continues to be.

I also thank my chapter coauthors and all the authors who generously contributed chapters to both sections that I edited. I also offer very special thanks to Ms. Judith Tomat of Thieme Medical Publishers for her constant assistance, support, and positivity throughout the editorial process.

John G. Hunter, MD, MMM, FACS

I would like to acknowledge Dr. Foad Nahai and all of the section editors for their tireless work in completing this edition of *The Art of Aesthetic Surgery*. I would also like to

thank all of the authors who contributed to this landmark aesthetic surgery and medicine textbook.

W. Grant Stevens, MD, FACS

I acknowledge all surgeons who rise above the noise and seek to truly move the needle with advancement of the art and science of breast surgery.

William P. Adams Jr., MD

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# Part I Fundamentals

# **1** The Patient

Foad Nahai

# Abstract

First impressions do count. The patient's interaction with and impressions of the surgeon's website, staff, office environment, and nurses, as well as the surgeon will significantly impact the choice of surgeon. It is the overall experience that counts. Careful attention to enhance and facilitate all facets of the patient's interaction with the surgeon and staff is essential.

#### Keywords

office and staff responsibilities, first consultation, patient experience, patient financial responsibility, preoperative visit, postoperative visit

# 1.1 A Well-Informed Patient Is a Happy Patient

Our patients are bombarded with information about cosmetic medicine and surgery; it is a pervasive theme in our youth-oriented society, appearing in print, electronic, broadcast, and, most prominently, on social media. Although some of the information obtained from these sources may be helpful, much of it is self-serving and intended to entice rather than enlighten. Advertising and social media postings for aesthetic surgery are calculated to bring patients into the surgeon's office, often by promising more than can be delivered while minimizing risks, complications, and the possibility of unfavorable or suboptimal results. Websites and social media devoted to cosmetic medicine and aesthetic surgery often overload patients with information promoting one procedure over another. Although the information in itself is not detrimental, it can be confusing. Patients may not have the medical background, experience, or sophistication to sort through this material to make an informed decision. The more conflicting the information they receive, the more confusing it becomes, and often the more unrealistic their expectations. It is the surgeon's responsibility to educate the patient by presenting the facts in an unbiased manner. Even then, patients may not be able to reach a decision and may rely on the surgeon's recommendations, trusting his or her knowledge and abilities.

It is this basic concept of trust that is being eroded through the blatant marketing of aesthetic procedures and materials to the public. The implication from this promotional activity is that aesthetic surgeons are mere vendors of a commodity. Having a breast augmentation is not like buying a bra or other piece of lingerie, and a facelift is not like purchasing a high-end luxury automobile, where one shops for the most convenient dealership or the best discounts. Nothing could be further from the truth. We are not selling a product; we are providing a service—a service that is personal and customized to each patient, one that carries risks unlike those encountered at the beauty salon or spa. This is a high-end service that encompasses the entire patient experience. This experience begins with the patient's initial on line search and viewing of social media postings and the physician's website (**Fig. 1.1**), leading eventually to a telephone inquiry or an electronically scheduled appointment. It progresses through encounters with the receptionist, patient coordinator, nurse, and surgeon, and culminates in the surgical procedure. The success of this experience has traditionally been strongly dependent on the surgeon's skill, experience, and judgment. Today the surgeon's skill in managing social media may well be as important.

Not all surgeons have the same experience, medical knowledge, training, surgical expertise, or technical ability. The well-informed patient should choose a surgeon based on trust—not on hype, social media presence, or cost.



Fig. 1.1 Your website is the face of your practice to the world.

# 1.2 The First Consultation

The decision to seek cosmetic treatments or aesthetic surgery is usually not spontaneous. Most likely the patient contemplated this possibility for months, if not years, before looking online and picking up the phone to make an appointment with a plastic surgeon. Some patients may have extensively researched the procedure, the surgeon, and the surgeon's practice through the Internet, social media, and, in particular, the surgeon's website. Even today, others rely solely on the recommendations of friends and family. These recommendations are best when based on personal experience. Satisfied patients are the ideal source of referrals and are far more valuable than any advertising, promotions, social media presence, or even the best marketing that money could buy.

The initial consultation does not necessarily begin with the first phone call to schedule an appointment. Most likely the prospective patient has already visited the practice's website, and the first contact may have been through the website (**Fig. 1.1**).

### 1.2.1 The First Telephone Contact

The website and the first telephone contact leave a lasting impression with the patient; if those contacts are unfavorable, the patient may decide against making an appointment or fail to keep it. Prompt responses to the patient's inquiry through the website and proper telephone etiquette are of utmost importance. The phone should be answered after a maximum of five rings, and the voice that greets the caller should be cheerful and inviting, announcing the name of the practice and the name of the person answering, followed by "How may I help you?" This greeting should be spoken in a clear, understandable voice. Such an encounter will leave the caller with a positive impression. Conversely, an unfavorable impression may be left when the phone is answered by a programmed voice reeling off a list of options, each requiring a separate button to be pushed, until the irritated caller is either disconnected or put in touch with the appropriate person. This type of impersonal answering system can alienate potential patients. By the time the annoyed caller actually reaches a live person, she or he is no longer in any mood to discuss aesthetic surgery. In any high-end service, immediate contact with a caring individual is essential.

In most offices, the caller is first connected with the person responsible for scheduling appointments. This person must understand the importance of flexibility, even for surgeons who are fortunate enough to have large practices with few immediate openings for new patients. Impressive as it may sound to inform a patient that there are no openings because the surgeon is fully booked for 18 months or longer, in most cases this will only encourage the prospective patient to look elsewhere. We live in a world where everyone is busy. Most of our patients value their time as we do and have only specific days and times when they can afford to miss work for a doctor's appointment. This is particularly true for those seeking aesthetic surgery, who usually do not wish to ask for sick time or announce to their supervisor that they are going to see a plastic surgeon.

Although we may not always be able to accommodate every patient's scheduling needs for every office visit, it is important to do so for the initial consultation. For this reason, some practices offer evening and Saturday office hours. Patients should be asked how soon they would like to schedule the appointment. Then every effort should be made to schedule the appointment as close to that date as possible without overcommitting the surgeon, yet leaving sufficient time for the initial consultation. (In my practice, at least 1 hour is allotted.) Although patients assume that doctors are never on time, patients still make every effort to arrive as scheduled. It is a matter of common courtesy, whenever feasible, to see patients at the appointed time. Obviously, this is not always possible. It is good practice, however, to notify patients if you are running late, either before they arrive, if possible, or on their arrival.

The scheduler should record the caller's name, address, and contact information. It is also important to inquire about the reason for the consultation. Some individuals may be reluctant to disclose this information to a stranger on the phone. The scheduler should explain that while patient privacy is of the utmost importance, these questions are being posed to determine whether the practice offers the procedure that the patient is seeking. It also provides valuable information for the surgeon to help prepare for the patient's initial consultation and to ensure that sufficient time is allotted for that appointment. Patients seeking removal of a skin lesion may not require as much time at the initial visit as someone seeking facial rejuvenation.

Once the appointment is made, patients are told that a package will be mailed to them or can be downloaded from the website. Most practices now offer patients the option of filling out their initial paperwork online, thus eliminating the need to do so in the doctor's waiting room during the initial visit. Some patients may not want to receive mail, phone calls, faxes, emails, or other communications that are identified as coming from a plastic surgeon's office. Special care should be taken to cater to these needs. The scheduler should ask where the patient would like to receive correspondence from the office. Some thought should be given to using envelopes and fax cover sheets without any indication that communications are coming from a plastic surgeon's office; envelopes should have a street address without a practice name or logo. In the interest of patient confidentiality, the scheduler should also specifically ask patients how they wish to be contacted by the practice—for example, by home, cell, or office phone or by email.

The information package sent from the office should include general information about the practice; maps and directions, specific information about the surgeon, including qualifications and practice philosophy; a letter detailing what will happen during the initial consultation; and a brochure on the procedure the patient is seeking. Most, if not all, of this information is probably already available on the surgeon's practice website. However, it is important to remember, even today, that not all patients are Internet-savvy, and some may prefer a hard copy; therefore the printed material serves as a reliable resource for all patients regardless of their technical know-how.

Maps and directions to the surgeon's office should be sufficiently detailed to allow patients to locate the office easily. Parking should be ample and convenient. Any special parking instructions should be detailed in the information package. Even though a patient is looking forward to the visit with the plastic surgeon, this initial consultation is a stressful event; getting lost or frustrated over finding a parking space will merely add to a patient's anxiety.

An example of the type of patient letter that is sent with our practice information package is shown in **Fig. 1.2**.

### 1.2.2 Contact with the Receptionist

The patient's first face-to-face encounter in the surgeon's office will be with the receptionist, who should greet the patient and notify the patient coordinator or nurse of the patient's arrival. It is disconcerting for a patient to walk into the surgeon's office for the first time only to find that no one is there to greet him or her; even worse is when two or three staff members are engrossed in conversation or occupied on the telephone and the patient is ignored.

It is also essential that we respect the patient's privacy during this sign-in process; several points merit particular attention:

- Sign-in lists where the patient signs his or her name under the name of the previous patient should be avoided.
- The receptionist should sit in an enclosed space, preferably in a glass-enclosed area, to maintain privacy yet allow the receptionist to have full view of the waiting room.
- The receptionist or nurse should refrain from loudly announcing the patient's name in the waiting room.
- Under no circumstances should the patient be greeted with such words as "You are here to see Dr. Nahai about your breast enlargement?"

• In most states in the United States and in some other countries, the practice is required to display a Patient's Bill of Rights and the privacy statement.

Once a patient has signed in, he or she should be told when to expect to be taken to the consultation room to meet with the patient coordinator. If there is a delay, the patient is given an estimate of the waiting time, and coffee or a soft drink can be offered. Whenever possible, an explanation is provided for the delay. If the delay is inordinate or unacceptable, the patient is offered the choice of rescheduling or waiting. Very rarely, if I am running unacceptably late—a half hour or more—the fee for the initial consultation will be waived and the patient's parking charges paid as a gesture of goodwill.

#### 1.2.3 Contact with the Nurse or Patient Coordinator

The patient is then escorted to one of the examination rooms. In my practice, the nurse meets with the patient first. A history is taken, and the completed health questionnaire, which the patient has downloaded from the website or received in the mailed package sent out before the initial office visit, is reviewed. An overall personal history questionnaire (**Fig. 1.3**) and general intake information sheet (**Fig. 1.4**) must be filled out.

At this time the patient usually discusses the reason for the consultation with the nurse. This takes from 10 to 20 minutes,



3200 Downwood Circle, NW Suite 640 Atlanta, Georgia 30327

Dear ,

It was so nice speaking with you today! I am looking forward to meeting you when you come in for your initial consultation with Dr. Nahai. For your convenience, I ve attached your appointment details and directions to the Emory Aesthetic Center are listed below. Here is a link to our website, so that you can be familiar with our clinic: <u>www.emorysethetic.org</u>. I have attached new patient paperwork for your convenience. Please give the paperwork to our front desk upon your arrival. If you choose to complete the paperwork at the time of your appointment, please arrive 15 minutes before your appointment.

We realize your time is valuable; please allow 1.5 to 2 hours for your consultation. This will allow ample time for your consultation with Dr. Nahai and photography. I will also meet with you to discuss fees and scheduling, and to answer any questions you might have. Most of all, you will be able to familiarize yourself with our practice, our facility, and the staff, without time constraints.

To confirm your appointment, you will receive a call the business day before to make sure the time and date is still convenient for you. If you are no longer able to attend the consultation, please call to reschedule or cancel the appointment.

We look forward to seeing you soon. In the meantime, if you have any questions or if you need further information, please feel free to contact me at any time.

#### Sincerely,

Trina Walker Client Experience Coordinator Office: 404.778.7097 Emory Aesthetic Center: 404.778.6880 Fax: 404.351.0632

#### Doctor Nahai Date: Arrival Time:

Appointment Time: Address: 3200 Downwood Circle, NW

Suite 640 Atlanta, GA 30327 depending on the patient, the nurse, and the procedure. I then review this information before meeting with the patient.

# 1.2.4 Contact with the Surgeon

I greet the patient, introduce myself, and immediately ask, "What can I do for you?" We then discuss the patient's goals and what he or she hopes to accomplish through aesthetic surgery. Next we review the patient's history, including pertinent information on general health and specific information concerning previous aesthetic treatments, procedures, and skin care.

Procedure-specific information is discussed in detail. For example, patients desiring eyelid work are asked about any history of eye problems such as dry eyes, glaucoma, or risk factors for the latter, such as high blood pressure or family history (**Fig. 1.5**). Any woman desiring breast surgery is asked specifically about her family history of breast disease, including cancer, history of breast masses and biopsies, mammography, and childbearing history (**Fig. 1.6**). If the patient is contemplating liposuction or body-contouring procedures, we discuss lifestyle, exercise, nutrition, and weight control (**Fig. 1.7**). For abdominal procedures, we discuss previous abdominal operations, including liposuction and hernia surgery. For facial rejuvenation procedures, I ask whether patients are currently smoking, but I am also interested in their smoking history—that is, whether they have ever smoked, for

This i	nformation is cor	nfidential and w	vill not be re	eleased with	out your authoriza	ation.
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LAST		FIRST	4	MIDDLE		
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Thyroid N	Y	Blood pressure	N	Y	_ Lupus	N Y
Heart N	Y	Lungs	N	Υ	_ Cancer	N Y
Kidneys N	Y	Nervous proble	ms N	Υ	<ul> <li>Fibromyalgia</li> </ul>	N Y
Gallbladder N	Y	Bleeding proble	ems N	Υ	Arthritis	N Y
Stomach N	Y	Diabetes	N	Υ	Scleroderma	ΝΥ
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Fig. 1.3 Personal history questionnaire.

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LASI Defension Diversion	FIRST	MIDDLE	
Referring Physician		Phone	
CHIEF COMPLAINT		REVIEW OF SYS	STEMS
		_	
		_	
		_	
PAST HISTORY			
1. Serious illnesses		-	
2. Operations		<ul> <li>Cigarette smoking</li> </ul>	g/amount? YN
3. Other hospitalizations		DVT history? Y	Ν
4. Allergies / medications			rs? Y N
		_ Medications affec	ting bleeding:
Latex allergy? Y N 5 Present medications		ASA	
5. Fresent medications		_ vitamin E	
		Dietary / herbal s	upplements

how long, how heavily, and whether and when they stopped. I ask about previous aesthetic procedures, including injectable and noninvasive treatments. I question all patients about a history of phlebitis or deep venous thrombosis (DVT).

Once the history has been reviewed, I return to the reason for the consultation. Throughout this consultation, I know that the patient is assessing me as a person, a physician, and a surgeon. Clearly, he or she has no way of realistically evaluating my knowledge of aesthetic surgery or my technical abilities. In all likelihood, patients will base their decisions on my demeanor and how warm, caring, and attentive I appear-my "bedside" manner. Meanwhile, I am assessing the patient. Are his or her goals realistic? Will I be able to meet these goals? Do I like the individual? If we have a complication, will I be able to maintain patient confidence while we resolve the problem? I am particularly attentive to the patient's body language, eye contact, tone of voice, and most of all, his or her enthusiasm and interest during the consultation. I observe the patient's appearance, hairstyle, makeup, clothing, and accessories. These not only reflect the patient's tastes but also attention to detail and how exacting the individual will be as a patient. I am concerned when an individual who is sloppily dressed and poorly groomed comes in seeking aesthetic surgery. In a similar manner, the appearance and grooming of the surgeon leaves an important impression about the surgeon's attention to detail and the care and meticulous surgical technique that he or she offers to each



patient. I certainly would be hesitant to let any sloppily dressed or poorly groomed physician or nurse take care of me!

It is not unusual for patients to come in after researching the procedure on the Internet or on other physicians' websites. In all likelihood they have sought consultation elsewhere as well. They may have been given conflicting advice and information, which they may or may not share with me. Close to the end of our consultation, I now ask them whether I have told them anything that they were not aware of or anything that conflicts with information they may have found or been given elsewhere.

Most patients respond that they were aware of some but not all of the information that we provided. In my experience, this new information is almost always related to expected outcomes and complications. It amazes me that even today I see patients who have researched breast augmentation on the Internet and have had consultations elsewhere, but may not be aware that breast implants are not permanent.

I never pressure patients to make a decision during the initial visit. In fact, I encourage them to ask questions, take home the materials we provide, and return for a second visit, which is complimentary, before making a final decision. However, we do arrange for our patient coordinator to quote fees and discuss scheduling during this first visit.

I follow up every new consultation with a personal letter rather than a form letter, summarizing our discussion and a brief



description of my recommendations and points that need to be stressed, such as that shown in **Fig. 1.8**; I remind patients that I would be happy to meet with them again before they make a decision or schedule a procedure.

# 1.3 Motivation

A well-motivated patient is a happy patient. Understanding patient motivation is an essential goal of the initial consultation. Questions probe the reasons for seeking surgery. For whom is the patient pursuing the operation—is it to please someone else? Does the patient think that this will change his or her life? The best patients are those who are seeking surgery for themselves so they can look and feel better in their own eyes. The best motivation is self-improvement. With most patients, I am able to understand what motivates them after a few minutes. Sometimes I will ask patients whether they hope that the aesthetic surgery will change anything in their lives and inquire as to whose idea it was for them to have this procedure.

Almost always, teenagers seeking rhinoplasty or other aesthetic procedures suitable for their age are accompanied by a parent. I make it a point to address the teenagers directly and have them, rather than the parent, tell me what they would like. I usually tell them that they, not their parents or their surgeon, will have to live with the result, so they need to carefully consider what they are requesting. Although I



Fig. 1.7 Body contouring questionnaire.

will allow the parents to express their opinions, I make it clear to the patients that they should make the final decision.

Patients often have hidden agendas—secret and personal reasons for seeking this procedure. They are reluctant to share this with the surgeon, the staff, or even their family and friends. These hidden agendas may include attracting a significant other, seeking a promotion, or simply responding to a life-altering event. Beware of this hidden agenda, because even if the procedure yields an excellent result, these patients will never be happy unless the requirements of the hidden agenda have been fulfilled.

# 1.4 When to Say No

Not every person I see is a candidate for a surgical procedure. I classify noncandidates into six general categories, as follows:

- 1. Those seeking the procedure before they are ready for it (for example, breast augmentation for teenagers, facelifts in women who do not need them or who will see little difference, or rhinoplasty in 12-year-olds)
- 2. Those with unrealistic expectations (for example, those patients who believe that aesthetic surgery will "change their lives," save a marriage, or make them look like swimsuit models or movie stars)
- **3.** Patients on whom I would prefer not to operate (for example, those who are overly demanding, noncompliant, abusive to office staff, or "aesthetic surgery junkies")

# **EMORY** AESTHETIC CENTER

3200 Downwood Circle, NW Suite 640 Atlanta, Georgia 30327

#### Dear Patient,

It is important to understand that breast augmentation is not maintenance free; the implants are not permanent, will eventually fail, and have to be changed. There is always the risk of capsular contracture (hardening of the breast), which may also necessitate reoperation and implant change. I would be happy to meet with you again to go over this and the other risks and complications that we have discussed before you make a final decision. In the meantime, if you need any more information or if we can assist you in any way, please don't hesitate to call.

Best Wishes

Sincerely

(Physician Name)

MD

Fig. 1.8 Follow-up letter to prospective breast surgery patient.

- 4. Another surgeon's unhappy patient who has a reasonable result but remains extremely critical of the original surgeon
- **5.** Patients who are psychologically unstable
- **6.** Those who are seeking to improve on problem areas or imperfections that are not readily recognized by others; these individuals may well have body dysmorphic disorder (BDD)

Patients in group 1 are counseled that it is too early for the procedure they are seeking. I explain to these patients that I would like them to be my patients and that I will operate on them at the appropriate time. A woman seeking a facelift before she is truly ready will be offered skin care, other ancillary procedures, and injectables, if appropriate, until she is ready for a surgical procedure. I explain to teenagers seeking augmentation that it is best to wait until their breasts have stopped growing. Beyond that, there are Food and Drug Administration (FDA) restrictions to consider. I will make an exception for teenagers with significant breast asymmetry and promise the 12-year-old that as soon as her nose is fully grown, we will take care of it.

I explain to patients in group 2 that I do not believe I can provide them with the result they are looking for or meet their expectations. I also let them know that I am concerned that they will be unhappy or displeased with me.

Patients in group 3 require special tact. I tell these demanding patients that I do not believe that our office will be able to provide them with the level of service that they are seeking. To the abusive

patient I explain that the office staff and I are a team and, because the patient has already indicated an unwillingness to work with my office staff, I cannot care for this individual because I will not work without my colleagues. Finally, to the patient who has an insatiable desire for plastic surgery, I say, "You have had it all, and it is too early to have any more."

Dissatisfied or unhappy patients in group 4 are told that they have had a reasonable result, that they are being unduly tough on their previous surgeon, and that I doubt I can significantly improve on what has been done. My major concern is that a patient with an average result who is trashing the original surgeon will one day say the same about me, regardless of the result. Any patient who walks in and unjustifiably claims that they were "butchered" or "mutilated" is an immediate noncandidate.

Group 5 includes psychologically unstable patients whose instability is not always readily discernible. I advise them to seek counseling and treatment before considering aesthetic surgery. In fact, anyone under psychiatric care at the time of consultation, regardless of my own personal impression of his or her suitability, is referred back to the psychologist or psychiatrist for clearance before scheduling. It is not uncommon today to see patients who are taking antidepressants such as fluoxetine (Prozac) or bupropion (Wellbutrin). This by itself does not disqualify them, as long as they are stable individuals. Most of the time the antidepressants have been prescribed by their internist or family physician for mild depression rather than for any severe psychiatric condition. Most of these individuals are suitable candidates for aesthetic surgery.

Group 6 individuals may appear normal to the untrained; however, their insistence that a small blemish or minimal deviation from the norm is a major deformity that is ruining their lives and incapacitating them is an indication of BDD. These individuals should be referred for counseling. Surgical or other procedures on these patients lead to further dissatisfaction, disappointment, and anger. Extreme caution should be exercised in handling this group.

I discuss the options available to the patient and make my recommendations. I explain that I prefer to operate in our ambulatory surgical center, which is certified and inspected by the Joint Commission on the Accreditation of Healthcare Organizations (JCAHO, or simply Joint Commission) and the state of Georgia. I tell patients that anesthesia will be provided under the supervision of a board-certified anesthesiologist and that I personally will perform the entire operation. I explain that they will be charged for the consultation that day, and if I operate on them, they will be expected to prepay for the surgery. All follow-up visits before and after the operation are included in the charges for the surgery. I do not discuss specific fees and charges; our patient coordinator does that. I do, however, explain to patients that I will perform revisions, if needed, at no additional charge. Although rare, should a complication necessitate the services of other physicians or hospitalization, those expenses would be the patient's responsibility. Years ago, Dr. Gil Gradinger shared with me a letter that he gave to his patients on this subject. I still use a modified version (Fig. 1.9), which patients are asked to read and sign before surgery.

However, my no-charge policy for revisions does not always apply to liposuction patients, who often return seeking revisions and repeat liposuction after weight gain, thereby obviating the results of the original procedure. To avoid future misunderstandings, we talk to these patients preoperatively about the impact of weight gain on long-term liposuction results. Liposuction patients


3200 Downwood Circle, NW Suite 640 Atlanta, Georgia 30327

To My Patients:

Prior to surgery, you will have paid my fee as well as other costs. Although it is very unusual, complications requiring additional surgery, consultation, hospitalization, or other services can occur. There will be no additional charges for any service performed by me or the staff. However, any other doctor, hospital, or related expenses will be your responsibility.

Healing after an operation is usually a predictable process leading to a good result. However, occasionally a surgical revision is necessary to help achieve this result. In this situation there will be no charge for my services, but there may be a small facility charge.

(Date)

(Physician Name)

I understand and accept the above statements

, MD

(Patient Signature)

**EMORY** AESTHETIC CENTER

3200 Downwood Circle, NW Suite 640 Atlanta, Georgia 30327

To My Liposuction Patients:

Approximately two to three weeks after the operation, you will notice some decrease in your weight. The actual weight loss will of course depend on the volume of fat that was removed. Following the operation, it is important that you maintain your weight and avoid any weight gain. Maintaining your weight, or better still, losing weight postoperatively will only enhance your result. In contrast, any weight gain will have the opposite effect.

Normally, there is no charge for a revision or touch-up of liposuction if done within one year of the original surgery, provided your weight has remained the same. However, if there has been a weight gain of 10 pounds or more postoperatively, there will be a fee for any revision.

In order to maintain your good result following liposuction, I encourage you to maintain your weight!

(Physician Name)

I understand and accept the above statements

MD

(Patient Signature)

(Date)

Fig. 1.9 Agreement concerning fees.

are asked to read and sign an additional form regarding weight gain and repeat procedures (**Fig. 1.10**) so that they fully understand that additional liposuction after a substantial weight gain (10 pounds or more) will not be considered a revision but a new procedure.

## 1.5 Surgeon Shopping

Currently the public is being advised to seek two if not more consultations before selecting a plastic surgeon, so most patients will see at least one another surgeon before proceeding. Although a second or third opinion is not unusual today, I would be wary of patients who have seen numerous plastic surgeons. Occasionally a patient comes in with an information package and video images from another practice and a file full of information and images downloaded from the Internet. Sometimes the patient tells me that a different procedure was recommended by others. This in itself is not a red flag to me, but it requires extra time and discussion. I explain that each surgeon will recommend an operation that, in his or her hands, comes as close as possible to the patient's desired goal. I assure the patient that I have done the same. The fact that my recommendation differs from that of the other surgeon (or surgeons) does not necessarily mean that I am correct and the other surgeons are not; it simply means that I have recommended a procedure that, in my hands, would give the patient the best result.

Fig. 1.10 Agreement concerning liposuction revisions.

I tell patients who have seen other surgeons that they should not base their choice of physician on price, on who has the fanciest or sparsest office, or on convenience of location. Rather, the choice should be based on the overall impression of the physician and the office staff, rapport with them, and most of all, confidence and trust. I explain to patients that, even in the best of hands, complications are possible, and that they should have enough confidence and trust in the surgeon they choose to allow him or her to handle any problems through to resolution. Patients often make the mistake of going to another physician once they have developed a complication, even though the original surgeon would be equally capable of dealing with it. These patients often blame themselves and are convinced that they made the wrong choice. I tell them that if they choose me, they should have enough confidence to allow me to handle any complication unless I recommend that they see someone else.

### 1.6 Patient Education

I discuss outcomes, risks, and complications with the patient during the initial consultation. All are informed that all procedures carry risks and that cosmetic treatments and aesthetic surgery are no exception. I explain that the risk of a life-threatening complication is not greater than the risk of flying—and significantly less than that of driving around Atlanta. Once the patient is reassured in terms of general risks, I address specific risks. All of my patients are told that infection and bleeding are common risks to all aesthetic procedures but are extremely rare. I do prepare them for postoperative bruising and swelling, which may accompany any cosmetic procedure or aesthetic operation. I explain to all facelift patients that in my hands the most common complication is hematoma, and the risk is currently below 1%; the risk is higher in men, in persons with uncontrolled high blood pressure, and in anyone who is troubled by postoperative nausea and vomiting. I tell them that every precaution will be taken to minimize the risk, but it cannot be eliminated entirely. I add that the risk of permanent nerve damage is extremely rare—on the order of 1 in 1,000 cases or less. I inform them that all surgical procedures leave scars and that the quality of the scar reflects not only the surgeon's skill (most patients believe that scars are related solely to the surgeon's skill and that plastic surgery leaves no scars) but also the patient's body chemistry, location of the scar, and tension. I stress that we can improve on any obvious, unsightly, or unacceptable scar through conservative means, and a scar revision can be done, if needed, at no additional charge.

I also explain to my patients that although serious complications are rare, revisions may sometimes be necessary. I will reoperate on a patient whose result falls short of my own expectations as well as those of the patient. These revisions are at no cost to the patient. However, if I feel that the result is the best I can achieve and the patient is still dissatisfied, then I recommend a second opinion. In addition to my explanations, the patient coordinator also reviews the more common complications associated with each procedure, such as capsular contracture, implant failure, and nipple and areolar sensory changes following breast augmentation. Eventually patients also receive a letter and informed consent form, which they are asked to read, initial on each page, and sign on the last page. These documents enumerate the complications.

We also discuss postoperative management, including an overnight stay in our suites if needed, the frequency of postoperative visits, restriction of work and other activities, and the expected time to full recovery. I do not minimize the length of time needed for complete resolution of all bruising and swelling. I tell all facelift and blepharoplasty patients that it may take up to 5 weeks for them to look "normal" without makeup.

My first encounter with the patient lasts from 15 to 30 minutes. After that the patient is sent to the photography room, where our professional photographer will do the video imaging. I have found video imaging to be very helpful with facial aesthetic procedures, rhinoplasty, and breast augmentation. Video imaging is not routinely offered to our body contouring patients, although there is now some new software that may well make video imaging for body contouring as reliable as it has been for the face and nose. Three-dimensional imaging, though currently very expensive, may one day contribute further not only to video imaging but also to preoperative and postoperative evaluation of results.

All patients are given the opportunity to review our preoperative and postoperative album. Most will have already seen similar images on our website. It is not unusual for patients to base their decision even to come in for a consultation on the before and after images that are posted on the website. Without exception, we show preoperative and postoperative breast reduction and mastopexy images so that the patient will have a clear understanding of the location of the scars. After the video imaging session, I review the projected result and discuss with the patient whether that result is realistic and how close we can approximate it. No promise or implied guarantee of a result is made. At this time the preoperative and postoperative album is reviewed with the patient if needed. Usually it is the patient coordinator and the photographer who show the album to the patient. We do encourage our patients to bring in photographs to demonstrate what they like. For example, rhinoplasty patients bring in images of noses that they like and those they do not; the same is true for breast augmentation patients. Reviewing these images with the patient provides me with further insight into the patient's aesthetic goals. For facial rejuvenation patients, we ask that they bring in photographs taken 5, 10, and even 15 or 20 years earlier so that we can better assess their features.

At the end of the consultation, the patient spends additional time with the patient coordinator, who will discuss fees, scheduling, and the preoperative routine. The coordinator again describes the procedure, risks, likely outcomes, and expected recovery. If an overnight stay is planned, an album containing images of our overnight suites is shown to the patient. Occasionally the patient will ask to see the operating rooms and overnight suites. If there is an unoccupied overnight suite and the recovery room is empty, we will accommodate this request. A video tour of our facilities is also available on our website.

Most patients will, in fact, schedule, or at least ask to have time reserved, at that initial visit. We do encourage them to think about things and offer them a return visit before they schedule or the option to schedule by telephone.

# 1.7 Financial Responsibilities

Although the major source of patient dissatisfaction is a result that does not meet expectations, financial misunderstandings and problems with fees are also common sources of patient anger. Far too many patients who were initially happy with their excellent results become dissatisfied and find fault with their results if unexpected charges appear long after the operation has been completed. Financial surprises should be avoided if at all possible.

My patient coordinator clearly delineates the patient's financial responsibilities during the initial visit. The patient is given an itemized quote that includes the surgeon's fee, facilities fee (including anesthesia), charges for an overnight stay, and any implantable devices. It is also made clear that if other procedures are added between the time the patient has prepaid for the procedure and the actual operation, there will be additional fees. The coordinator also explains that if any specimens are removed (such as moles, breast tissues, or breast implants) and sent to the pathologist, there will be a separate bill from the pathologist. We cannot provide them a quotation for the pathologist's services; this must come from the pathology laboratory.

In our own surgicenter we do not charge the patient extra if a planned procedure takes longer than anticipated. However, this may not be the case if the procedure is scheduled elsewhere. Far too many patients have prepaid for a 4-hour procedure in a hospital-based surgicenter only to be billed later for extra time when the procedure runs long. Under these circumstances it should be made clear to the patient that although the surgeon's fee is prepaid in full, the surgicenter facility fees are only an estimate, and the actual amount will vary according to the length of time, materials, and equipment used in the surgicenter. The patient may, in fact, receive a bill for the balance several days, weeks, or even months after the procedure. If this policy has been clearly explained, patients are less likely to be dismayed and upset.

Another cause of confusion about financial responsibilities concerns cases in which a combination of aesthetic and reconstructive procedures is performed (for example, nasal airway surgery and cosmetic rhinoplasty or second-stage breast reconstruction combined with aesthetic facial surgery or body contouring), where a third party is responsible for the reconstructive portion and the patient for the aesthetic portion. It may sometimes be difficult, if not totally impossible, to delineate the patient's financial responsibility exactly for these procedures. We have a person in our practice who meets with patients to discuss insurance coverage and such financial problems. Despite all of these efforts, patients must understand that the total cost of all of these combined procedures and their specific financial responsibility may not be determined until long after the procedure. If patients are prepared for a possible financial surprise, they are less likely to become angry and find fault with the result. The patient coordinator and I also discuss financial responsibilities in case of complications, hospitalization, or consultation with other physicians.

# 1.8 Operating on Colleagues, Friends, and Family

As a practice is built and a reputation is gained, colleagues, coworkers, friends, and family will seek your services. This is a tremendous compliment to you as a physician and to your skills as a surgeon. Although this is flattering, the surgeon should understand that it can also be a significant financial drain, because this group of patients expects discounted or even complimentary surgery. Not only do such discounts and complimentary procedures generate little or no revenue to help meet overhead and malpractice costs, but also the time spent on such discounted procedures could have been spent on patients who produce full revenue. Despite this, most surgeons have a sense of obligation to discount services for this group or to provide them selectively on a complimentary basis. Your practice should have a clear policy for such discounts and free services.

I routinely discount my surgical fee for fellow physicians and their families, nurses, and other health care professionals. The amount of the discount will vary, depending on the closeness of my professional relationship with the individual in question. The same is true in dealing with friends and family. Some colleagues and family come in for a consultation expecting to pay full fees, yet others come in expecting free surgery. It is somewhat embarrassing, if not difficult, to discuss this face-to-face with colleagues, friends, and family. Years ago, Dr. Tom Rees shared with me a note that he had colleagues, friends, and family read explaining his policy for extending professional courtesy. I found the letter most useful, and to this day I use the modified version shown in **Fig. 1.11**.



3200 Downwood Circle, NW Suite 640 Atlanta, Georgia 30327

To My Dear Friends and Family,

During the many years that I have been in practice, I have extended full courtesy fees to close friends, doctors, and their families as a matter of principle. Over the years, I have been fortunate to gain more friends and to enjoy the professional confidence of doctors' families, to the extent that a significant part of my time is now consumed in performing such surgery.

Sadly, with the increasing costs of overhead in plastic surgery today, not to mention the excessive and growing premium for malpractice insurance, it is no longer possible for me to fully extend such courtesies. Needless to say, it is embarrassing and distateful for me to charge my usual fees to close friends and colleagues. Therefore, I am pleased to be able to extend a modest courtesy discount. Since all I have to offer is the expertise and skill I have developed as well as my time, I hope you will understand.

Sincerely,

(Physician Name)

Fig. 1.11 Letter presenting policy on discounted and complimentary services.

For our office staff, the procedures are usually provided free of charge on an individual basis, reflecting the person's length of service. Each practice should have a clearly delineated policy on employee discounts. It is wise to avoid providing discounted or free operations to patients who hold out the promise of future referrals. These usually do not materialize once the operation has been completed and may well raise ethical issues.

#### 1.9 Patient Documentation

I make every effort to dictate the office notes as soon as I have concluded the initial consultation. Although I take additional notes while I am talking to the patient, I make every effort to maintain eye contact with my patient rather than spending the entire time scribbling notes or being preoccupied with the computer and the electronic medical record. If at all possible, I limit interruptions to those that are absolutely necessary, such as emergencies. I put my cell phone on vibrate mode and ask all our nurses to do the same. It is not conducive to a thorough initial evaluation to have constant interruptions, and I will not leave a patient while I answer a phone call unless it truly is an emergency. It is important to sit down with the patient and focus your attention on him or her. You want to leave the impression that you have plenty of time to talk. Therefore I do not look at my watch or time myself when I am with a patient. I like to have a nurse or assistant present in the room at all times, and I feel it is advisable to have a female nurse or assistant with me when I am in a room with a female patient and mandatory when I examine a female patient for breast augmentation or body contouring, not only to put the patient at ease but also for my own protection.

Once the procedure is scheduled, the patient is given instructions in preparation for the operation. These include prescriptions for skin preparation before chemical peels and laser resurfacing and lists of medications and supplements to avoid taking pre-operatively to minimize postoperative bleeding and bruising. We encourage patients to take vitamin C. Patients are scheduled for a preoperative visit 1 or 2 weeks before the operation. Patients who will undergo general anesthesia need to have a physical examination, blood test, and clearance from their primary physician before surgery is scheduled. During the preoperative visit, the patient will meet the anesthesiologist, who performs another preoperative evaluation. The patient also meets again with the coordinator to review and sign the informed consent form and to have any further questions answered. If preoperative photographs have not already been taken, they are taken on this occasion. During this preoperative visit, the patient talks with our financial counselor, who goes over the fees and collects prepayment for the full amount of the procedure, including the surgeon's fee, facility fee, and fees for the overnight stay and materials. If there is any question about whether additional payments may be necessary after the operation, such as a pathologist's bill, this is clearly pointed out to the patient.

The patient will be evaluating the level of service before the procedure, because it serves as an indication of how well the practice will respond to her or his needs and concerns after the operation. If the patient feels that the staff were not attentive enough, were slow to respond, or were evasive before the operation, he or she will be concerned that this may well be what they should expect after the operation. Unfavorable preoperative experience may justifiably lead the patient to cancel the procedure.

On the day of the operation, I review the patient's record before I meet with the patient to discuss the planned procedures. I take my own finger or a cotton tip applicator and go over every proposed incision. I then mark the patient. If he or she is accompanied by a family member and allows that person to remain in the room, I ask the patient and the family member if they have any questions and inquire whether the patient remembers the risks, possible complications, and length of recovery. It is not unusual for patients at the last minute in the preoperative area to ask whether we could take off skin lesions, add an extra area for liposuction, or even add a completely new procedure. For that reason, and to avoid any postoperative misunderstandings, I confirm with the patient that we have neither left out any procedures nor added anything. I explain that if the patient wishes to add extra procedures and operative time is available, there will be an extra charge, and the patient will be billed for it. If he or she requests excision of a skin lesion or two or a small additional area for liposuction or fat injection, I often as a courtesy include that without extra charge. However, I mention that the pathologist will send a bill for examining the excised lesions.

We then proceed to the operating room. There is a special waiting area for family members if they choose to wait; if not, I ask for a phone number so that I can personally call when the operation is finished and the patient is in the recovery room. I also inform the patient and the family that if the operation is completed in less time than I had allotted, it does not mean that I rushed through it, and conversely, if it takes longer, it does not mean that either the patient or I encountered a problem.

After the operation, patients either go home with a responsible adult or stay in our recovery suites. If the patient goes home, I call that evening to inquire whether the patient is comfortable and whether there are any questions. If I am greeted by the answering machine, I leave a message that I called to make sure that the patient is home and comfortable. I ask the patient to call if there are questions or problems. If the patient remains in our suites, either I or someone on the team visits the patient. Two days postoperatively, all patients receive a follow-up phone call from our surgicenter asking them how they are doing and inquiring about their experience with the center.

## 1.10 Postoperative Visits

Follow-up visits are as important as the initial consultation. Most patients are concerned that the red carpet and VIP treatment will be rolled out preoperatively so that they will sign up for an operation, and that their postoperative care will be less attentive, relegated to the nurses. It is important for them to have a favorable experience in their postoperative visits. We make every effort to usher postoperative facial patients straight into a private waiting room or examination room to minimize their time in our public places, such as the general waiting room. I go in and sit and greet the patient, ask how he or she has been, and how the recovery is progressing. I explain that the nurses will clean the wounds, remove sutures, and change tapes, and that our aesthetician will take care of the areas that may have been resurfaced. I inquire whether the patient needs more medication and explain that I will return for a more thorough examination once the nurses have removed sutures and cleaned the wounds. As with preoperative examinations, a nurse is present during the postoperative examination of a breast augmentation or body contouring patient, to put the patient at ease and for my protection. It is important to close the door, sit down, make eye contact, and talk to the patient. I do not focus on the computer screen to read through it or write in it. Leaving the door open, standing, reading, and writing leaves the patient with the impression that you breezed in for a few seconds, clicked something in the chart, and left without examining him or her. When I return to see the patient, I examine every suture line and express my own opinion about the early results and stage of recovery. I then answer questions. If the patient is at the stage in a facial procedure where camouflage makeup can be applied, our aesthetician applies makeup, and I see the patient after this application. For patients who have undergone breast augmentation or body contouring procedures and have recovered sufficiently, I go back in and see them when they are fully dressed to make certain they are happy with their appearance in their clothes.

Occasionally, despite my best efforts, a patient complains to the nurse that I have not been attentive enough or spent enough time after the operation. This is an important line of communication between the patient and me, and I listen to the nurse and make every effort to resolve the situation. Very often a patient who is concerned about the result may discuss it first with the nurse or patient coordinator for fear of offending the surgeon: "I don't want to hurt his feelings." These communications are important and are dealt with in a kind and understanding fashion. I explain to my patients that I want them to be comfortable and open with me and discuss their concerns. My feelings will not be hurt if I am told that a patient is less than satisfied with the result. I tell patients that my feelings would be hurt if they felt that they couldn't communicate with me and chose to go elsewhere.

I rely heavily on the impressions of our nurse and patient coordinator. It is crucially important to surround yourself with good people and to listen to them. I have turned down patients based on recommendations from these professionals and have been able to defuse potentially unpleasant situations based on their input.

# 1.11 Management of Complications and Problems

No one wants complications. I take all complications personally and replay the entire procedure in my mind, wondering how and why they occurred. Despite my explanations to my patients that complications do occur, even in the best of hands, it is difficult for me to accept that my patient has developed a complication. Regardless of these personal feelings and the sense of disappointment, it is necessary to deal with these problems and, more important, with the patient's anxieties, concerns, and possible resentment. Most patients feel that something went wrong or that something was not done properly-otherwise they would have sailed through the operation as smoothly as their friend did, on whom your partner, your colleague, or even you operated. I usually explain the nature of the complication to the patient. If I have any idea why it happened, I explain that and outline our plan to take care of it. I usually tell the patient, "I am sorry this happened; it isn't anything you did; it isn't anything I did. Despite our best efforts, we have a problem. It is not the first time I have seen it, and we know how to take care of it." I then explain exactly what has to be done and how long it will take.

In cases of postoperative hematoma in a facelift, I reoperate usually with the patient under local anesthesia, but general anesthesia is available if needed, and I explain to the patient that this will take care of the problem. It will not affect the results, but it will leave more bruising than expected, and the affected side of the face (if unilateral) will lag behind the other side in recovery.

Devastating complications, such as skin slough following a facelift, exposed breast implants, and nipple or areola loss, require a more prolonged plan for recovery. Fortunately, these complications are extremely rare and are often associated with predisposing factors such as smoking. These patients require a great deal of attention. We naturally have an instinct to avoid unpleasant situations and circumstances, but these are times when our patients need us to be there for them. These patients must be seen on an almost daily basis. If a strong bond already exists between the patient and the surgeon before the complication develops, this will have a positive influence on the outcome. However, if the surgeon's relationship with the patient was already less than ideal, these complications will serve to undermine the relationship further and result in an unhappy situation for both the patient and the physician. This is when patients become angry and seek legal advice, especially if the complication adds an additional financial burden to the patient. It may be tempting to abandon such a patient and to blame him or her for the complication, but it would be unwise. If you absolutely cannot continue with the patient, have a partner or trusted colleague assume the care at your expense.

When I have been able to explain the reason for the complication, I have found that patients have not only been surprised by this explanation but also have appreciated my candor. This communication has further improved our physician-patient relationship and the patient's confidence in me. To do anything less will confirm the impression that "the medical profession covers up errors."

There is no question that by offering to continue working with the patient to correct a complication, you send a reassuring message. I comfort patients by telling them that I have seen these complications and know how to take care of them, and I will not stop until we are both happy with the outcome.

# 1.12 The Dissatisfied Patient

Dissatisfied patients come in two varieties-your own and those of your colleagues. Despite our best efforts in preparing and evaluating our own patients, screening them, and discussing risks and complications and realistic expectations, we still have, rarely, patients who are not satisfied with their outcomes. Even though these patients may have an average or good result, they are just not happy. This dissatisfaction may be the result of inadequate or even poor communication between the surgeon and patient or of patient expectations that were not met. Such patients are extremely difficult to deal with and may never be satisfied. They will exhaust you and test your patience and that of everyone in your office. They also have access to the Internet and the numerous websites that grade or evaluate doctors. They have the freedom to say anything they want about you, your staff, and their result. There are no checks and balances, and it is difficult, if not impossible, to respond to these allegations or comments once they have been posted. Although most of the time these comments are posted anonymously, most surgeons have a good idea who the patient may be but are bound by privacy rules from commenting. The best way to deal with these patients is not to operate on them, and with maturity and experience, one should be able to identify them.

One of the most challenging problems in clinical practice is dealing with a colleague's dissatisfied patient. If the patient has an identifiable problem that is correctable and the colleague has referred the patient to you for that purpose, this represents a relatively straightforward situation, since all three parties are involved. However, most of the time the patient is self-referred and would prefer that you not contact the original surgeon.

I evaluate these patients in the same manner that I evaluate any patient. I then explain to them that the problem is correctable and how I would do it. I also explain to them that I am flattered and honored that they have chosen to consult with me, and I take that as an indication of their confidence in me as a surgeon. If the problem is a recognized and not uncommon complication or sequela of the procedure, such as implant malposition or even lid retraction, I explain that I have seen similar complications in my own patients. If I am familiar with the other surgeon and believe that he or she could just as easily correct the problem, I encourage the patient to return to the original surgeon, who may do the revision or correction at no charge or at a discount. I explain that I would not charge my own patients for a similar revision. If the patient does not wish to return to the other surgeon, he or she will usually respond, "He doesn't think there is a problem," "I can't communicate with him," or "He says there is nothing else he can do." I then tell the individual that I would have to charge my full fee for the revision and that it may take more than one procedure. I do ask all patients to have copies of their records forwarded to me, and I ask their permission to communicate with the other surgeon. If the patient does not grant permission, then it would be a breach of his or her privacy to obtain the files, complicating the situation and putting me in an awkward position with my colleagues. These are extremely delicate situations, often involving litigation. It is paramount that the patient's best interests be considered first and that everything possible be done to correct the problem, even at the risk of affecting a collegial relationship. It is important to emphasize that complications do not necessarily indicate a deviation from the standard of care and to refrain from inflammatory comments such as "This is the worst I have ever seen" or "Who did this to you?"

We are physicians and well-trained surgeons, highly skilled in the procedures we perform. Communication skills, however, were never part of our medical school or residency curriculum; we were not taught bedside manner. Yet communication and bedside manner are as important as our skills in the operating room. Our patients expect more than good results; they like to be listened to and cared for. They want a surgeon who is responsive and who makes them feel valued and respected. Good results and satisfied patients will do far more than any advertising program to promote and grow a practice.

# 1.13 Concluding Thoughts

The practice of cosmetic medicine and aesthetic surgery is satisfying and rewarding for the surgeon. I am excited that it continues to evolve, and it is imperative that we adapt to these changes so that we can provide the best for our patients. To our patients, aesthetic treatments are not a necessity but rather are the fulfillment of a personal goal; therefore, their experience must be satisfying and rewarding as well. This is a partnership that at its best works smoothly and effectively for all involved.

In this chapter I have shared my approach, but in truth it is *our* approach—my partners and staff are all intimately involved in making the experience for our patients a positive one. Time spent

with the patient by the surgeon and the staff is time well invested. This is especially true today, when our patients have access to all kinds of information on the Internet. Our goal is to establish a long-term and trusting relationship with our patients. We nurture an environment in which our patients can feel that they are among friends when they visit us in our office. Patient satisfaction is the best form of marketing available to us. Such patients are our best source of referrals and will themselves return if the initial experience was one worth repeating.

#### **Clinical Caveats**

- A well-informed patient is a happy patient.
- A well-motivated patient is a happy patient.
- Eliminate postoperative financial surprises, or at least warn the patient about them.
- Listen to your patients.
- Learn to say "no."
- Spend time with your patients.
- Respect the patient's privacy.
- First impressions last.
- Your website is the face of your practice to the world.
- The Internet can be a friend or foe.

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# 2 Psychological Considerations in Aesthetic Surgery

David B. Sarwer and Jacqueline C. Spitzer

#### Abstract

Aesthetic surgeons have long been interested in the psychosocial functioning of their patients. Early work in the area suggested that patients seeking aesthetic surgery were psychopathological. However, contemporary research suggests that there are relatively few differences between individuals who seek aesthetic procedures and those who do not. Patients seeking aesthetic procedures, however, present with increased body image dissatisfaction compared with those who do not elect to undergo these procedures. This can be seen as more normative than psychopathological in most patients.

Nevertheless, there are several psychological considerations of patients seeking cosmetic procedures that are relevant to aesthetic surgeons. Because of this, a preoperative assessment of psychosocial functioning should be conducted with a particular focus on body dysmorphic disorder (BDD), eating disorders, and depression. Psychosocial functioning also should be monitored postoperatively, as patients can experience an exacerbation of preoperative symptoms, sometimes with unfavorable results. While research suggests that the majority of patients are satisfied with the result of their cosmetic procedures, these psychosocial considerations underscore the importance of the aesthetic surgeon being mindful of psychosocial functioning of their patients throughout the continuum of care.

#### Keywords

psychosocial functioning, body dysmorphic disorder, eating disorders, depression, body image, quality of life

# 2.1 Introduction

Tens of millions of individuals around the world undergo aesthetic procedures each year, from noninvasive procedures to surgery, in an effort to improve their physical appearance. Many aesthetic surgeons and mental health professionals long have wondered why, from a psychological perspective, patients would take on the expense and risks of an elective procedure to improve their appearance. The early belief was that patients who sought aesthetic treatments were dealing with significant underlying mental health issues. Both empirical research and contemporary clinical impression have largely debunked that belief, although concerns about the psychological well-being of a minority of patients remain. Providers and patients have also speculated on the psychological changes that occur after treatment. The vast majority of patients report being satisfied with the results of their procedures, and many report meaningful changes in their physical appearance, body image, and self-esteem. However, some patients do appear to have untoward changes in psychosocial functioning after surgery, underscoring the important role of evaluating the psychosocial status of patients prior to an aesthetic treatment.

This chapter provides an overview of the most relevant psychological considerations of patients who undergo aesthetic surgery. The chapter begins with an overview of the hypothesized reasons for the growth of aesthetic surgery. Next, a brief review of the literature on psychological characteristics of aesthetic surgery patients is provided. The psychiatric conditions of greatest relevance to aesthetic surgeons—body dysmorphic disorder (BDD), eating disorders, and depression—are discussed. The final section of the chapter describes strategies for aesthetic surgeons to evaluate the psychosocial functioning of patients.

# 2.2 Explanations for the Growth of Aesthetic Surgery

There are a number of potential explanations for the worldwide growth in aesthetic surgery and minimally invasive treatments. A number of medical advances have made many treatments safer and have decreased postoperative recovery times. Much of the rapid growth of minimally invasive treatments is likely the result of decreases in the cost of these procedures, as well as the lower risk and shorter recovery times compared with traditional surgical procedures. Aesthetic procedures, unlike many other forms of medicine, are tailor-made for direct-to-consumer advertising. The latest advances in the field are a regular topic of discussion in the mass media and coverage of the entertainment industry. As a result, aesthetic procedures have become an element of popular culture and are commonly viewed as a step in the journey to the physical perfection routinely portrayed in the mass media.

The mass media and entertainment industries also impact thoughts and behaviors related to physical appearance in other ways. From print magazines to websites, television shows to movies, consumers are bombarded by images of physical beauty. Some of the images are of persons who have been blessed with youthful and symmetrical features that naturally signal attractiveness. Most, however, have been computer–enhanced. Studies have repeatedly shown that exposure to these images of physical beauty increases body image dissatisfaction that, as discussed in detail in subsequent paragraphs, is believed to be the motivational catalyst to aesthetic treatments.

Other sociocultural factors influence beliefs about physical appearance and, likely, beliefs about aesthetic treatments. Parents and peers impact our sense of our appearance starting in early childhood and through modeling of behaviors signaling the importance of physical appearance in social interactions. Early experiences with romantic relationships also provide feedback to an individual on how appearance is perceived by and responded to by others. Negative feedback about one's appearance through teasing or bullying is no longer seen as an innocuous rite of passage of adolescents; it can color beliefs about one's appearance and self-worth well into adulthood and, for many individuals, may influence the decision to pursue an aesthetic procedure. A large body of social psychological research developed over the past 50 years has confirmed the importance of physical appearance in daily life. This comprehensive body of research can be summarized with two general statements:

- Individuals who are judged to be more physically attractive are assumed to have more positive and desirable personality characteristics.
- **2.** Individuals who are seen as more attractive receive preferential treatment in a wide range of interpersonal interactions across the lifespan.

Whether we like to admit it or not, the evidence that our appearance impacts our lives is compelling.

A discussion of the role in physical appearance in the human experience also has to include a consideration of Darwin's theory of natural selection, perhaps the earliest scientific acknowledgment of the importance of physical appearance. According to the theory, the goal of all species is survival through successful reproduction. Identification of a mate who can optimize the results of reproduction is a central part of the process. To that end, specific physical characteristics have evolved to signal reproductive capability to others. These characteristics, particularly those that suggest the potential for healthy reproduction, serve as the foundation for what is considered attractive in another member of the species.

When applied to facial appearance, the characteristics of youthfulness, symmetry, and averageness have been most commonly associated with facial attractiveness. The development of adult facial features at puberty for both women and men signals reproductive potential to others. These features also may suggest reproductive health as expressions of normal levels of testosterone and estrogen. Clear skin, bright eyes, and lustrous hair draw attention to the youthful face. While a youthful facial appearance is considered attractive, an aging appearance typically is not. Ratings of attractiveness of males and females typically decline with age; the relationship is stronger for women than men.

Symmetry of facial features across the midline also is associated with increased ratings of attractiveness. Evolutionary theorists believe that the ability to develop symmetrical features in an environment full of pathogens is conferred upon only the healthiest of individuals. Similarly, averageness, with respect to the size of individual facial characteristics, also is associated with ratings of attractiveness. Composite faces made up of hundreds or thousands of individual faces via computer technology (and, therefore, believed to represent "average" facial features) are judged as more attractive than the individual faces that make up the composite. The most beautiful of the combined faces for women reflect a petite face with a smaller-than-average mouth and jawline, full lips, and pronounced eyes and cheekbones. Many surgical and minimally invasive treatments performed on the face are undertaken to help an individual look more youthful and/or enhance facial symmetry.

With these elements of evolutionary theory and social psychological research on appearance in mind, the popularity of aesthetic treatments is not particularly surprising. While decades ago an individual's interest in improving his or her appearance may have been seen as being symptomatic of excessive vanity, narcissism, or other deep-seated psychopathology. Today, it also can be seen as a more adaptive and potentially psychologically healthy behavior, akin to other self-improvement strategies such as eating a healthy diet and exercising regularly.

# 2.3 Psychological Characteristics of Aesthetic Surgery Patients

A sizable body of research starting in the 1960s has investigated the psychosocial characteristics of persons who present for aesthetic surgery. The first studies in this area relied heavily on clinical interviews of patients and described them as having high rates of psychopathology, including mood and anxiety disorders as well as personality disorders. All of these conditions were believed to be associated with poor postoperative psychological outcomes. Subsequent studies have included the use of standardized psychometric measures rather than or in addition to clinical interviews of prospective patients. These studies typically have found less psychopathology. Unfortunately, both sets of studies suffer from methodological problems that have made resolution of these conflicting findings difficult.

In the past 20 years, advances in the use of psychometrically validated measures have improved the quality of much of the research done in this area. In particular, a number of psychometrically sound patient-reported outcomes measures specifically designed for plastic surgery patients have been developed. These measures have focused on the assessment of quality of life, self-esteem, and body image in patients before and after surgery. Studies using these studies have largely found that patients typically report deficits in these areas prior to surgery.

# 2.4 Body Image

Over the past two decades, body image has been the psychological construct that has received the most research attention in the aesthetic surgery literature. Dissatisfaction with one's facial appearance and body image is believed to be the primary motivator for both surgical and minimally invasive treatments of the face and body.

There are several definitions of the construct. Cash and Pruzinsky defined body image as the perceptions, thoughts, and feelings associated with one's body and bodily experience. This definition captured the multidimensional nature of body image, including both the manner in which an individual objectively appears to others, but also the manner in which a body moves in time and space. These physical perceptions subsequently interact with thoughts and feelings about the features of one's appearance. Unfortunately, this definition does not specifically highlight body image behaviors, such as grooming habits and clothing selection, as well as more profound behaviors, such as those seen with aesthetic surgery. More recently, Cash and Smolak described body image as the "psychological experience of embodiment." This succinct description leaves the reader with a sense of the important role that body image plays in quality of life, self-esteem, and the overall human experience.

Much of our understanding of body image comes from a cognitive–behavioral theoretical model, one of the dominant theoretical models of psychology for the past several decades. The model describes the perceptual, cognitive, affective, and behavioral aspects of body image; it also accounts for *historical* and *proximal* influences of the construct. Historical influences include an individual's physical characteristics, personality traits, and interpersonal experiences. Proximal influences include cognitive processing of appearance-specific information from the

environment that, along with more general cognitive processes, lends "meaning" to situations and events.

These historical and proximal variables influence two fundamental body image dimensions. One is the degree of investment in one's appearance. Some individuals are highly invested in their appearance (those who carefully groom themselves before leaving the house); others are far less invested (those who are comfortable going out in mismatched clothes or without grooming). The second dimension is the degree of *dissatisfaction*. This dissatisfaction is believed to fall on a continuum. Likely, very few individuals are completely satisfied with their appearance on a daily basis. Most individuals likely can identify features that leave them dissatisfied. They may camouflage these features from others (through makeup and/or clothing), but this dissatisfaction does not routinely impact daily functioning. Others who are more dissatisfied may exhibit more significant behavioral change in response to their dissatisfaction. It is likely these individuals who are most likely to seek and benefit from aesthetic procedures. Finally, other individuals may exhibit a more extreme level of body image dissatisfaction that may be representative of BDD or other forms of formal psychopathology.

In general, there is consensus among thought leaders in the field that individuals who seek and receive aesthetic procedures report both heightened investment in their appearance as well as higher levels of dissatisfaction. This relationship also has been supported by research. Individuals who seek aesthetic procedures, both surgical and nonsurgical, typically report heightened body image dissatisfaction preoperatively. This dissatisfaction is typically centered upon concern with the specific feature to be improved with treatment. Thus, some degree of body image dissatisfaction is believed to be a prerequisite to aesthetic surgery.

# 2.5 Formal Psychopathology among Aesthetic Surgery Patients

Given the number and diversity of individuals who seek aesthetic procedures, all of the psychiatric diagnoses can likely be found within the patient population and a busy clinical practice. However, three disorders—BDD, eating disorders, and depression—likely warrant the greatest attention from aesthetic surgeons and their team members.

#### 2.5.1 Body Dysmorphic Disorder

BDD is a manifestation of extreme body image dissatisfaction. It is defined by the American Psychiatric Association as a preoccupation with a slight or imagined defect in appearance that leads to substantial distress or impairment in social, occupational, or other areas of functioning.

The disorder was not formally recognized until 1987. Nevertheless, the aesthetic surgery and dermatology literature has included case reports of "minimal deformity," "insatiable," and "dermatological nondisease" patients as early as the 1960s. These individuals sought procedures to improve slight or imagined defects and were often dissatisfied with their results. While the incidence rate of BDD in the general population is believed to be between 1 and 2%, a number of studies conducted throughout the world have found that 5 to 15% of cosmetic surgery patients appear to have some form of the disorder. Although persons with BDD typically report concerns with their skin, hair, and nose, any body part can become a source of preoccupation.

Persons with BDD frequently seek cosmetic medical treatments as a means of improving their perceived defects. More than three-quarters of persons with BDD report a history of aesthetic treatments. Unfortunately, most evidence to date suggests that aesthetic procedures are inadvisable for patients with BDD. Most patients report being dissatisfied with the outcome of treatment, and two large studies have found that greater than 90% of persons with BDD report either no change or a worsening in their symptoms following aesthetic treatments. A handful of small studies, however, have found some degree of improvement in symptoms in patients with mild to moderate forms of BDD. Also of note, a number of studies have documented high rates of suicidal ideation, suicide attempts, and self-harm behaviors (e.g., "do-it-yourself" surgery) among patients with BDD. There are also reports of patients with BDD who have threatened to sue or physically harm aesthetic treatment providers. In light of these issues, there is consensus that aesthetic treatments likely should be contraindicated for persons with BDD.

#### 2.5.2 Eating Disorders

Extreme body image dissatisfaction is a symptom of both anorexia and bulimia nervosa. Women (and men) with both conditions may mistakenly believe an aesthetic treatment will improve their intense dissatisfaction with their bodies. Eating disorders may be a particular concern for individuals who seek body contouring procedures, including liposuction and abdominoplasty as well as breast augmentation. Patients may mistakenly believe that these procedures can reshape their bodies in a way that restrictive eating and/or maladaptive compensatory behaviors cannot. Women who present for cosmetic breast augmentation are frequently below average weight and report greater exercise compared to physically similar women not seeking breast augmentation, both of which also may be suggestive of eating psychopathology. Unfortunately, the study of the relationship between eating disorders and other cosmetic procedures has been limited to small case series.

#### 2.5.3 Depression and Suicide

The presence of major depression or other mood disorders also warrants particular attention. Population estimates suggest that approximately 10% of adults are suffering with depression at any point in time and approximately 20% are using an antidepressant medication. Studies have suggested that the rate of usage among aesthetic surgery patients is higher and perhaps double that of the general population. Women seeking breast augmentation also have been found to report a higher rate of outpatient psychotherapy and psychiatric hospitalizations.

Of greater relevance, seven epidemiological studies have found an association between cosmetic breast implants and suicide. Across these studies, the rate of completed suicides was two to three times higher among implant recipients than estimated rates in the general population. Explanations of this relationship have largely focused on the preoperative psychosocial status and functioning of the women. Women who undergo breast augmentation have been shown to have a number of distinguishing demographic characteristics. They report more lifetime sexual partners, a greater use of oral contraceptives, and a history of terminated pregnancies. They also are more frequent users of alcohol and tobacco. Many of these characteristics are, in and of themselves, risk factors for suicide.

The most likely explanation of the relationship between cosmetic breast implants and suicide appears to be the presence of pre-existing psychopathology prior to surgery. In one of the epidemiological studies, women who underwent cosmetic breast augmentation had a higher rate of previous psychiatric hospitalizations compared with women who received other cosmetic procedures, as well as women who underwent breast reduction. A history of psychiatric hospitalizations is one of the strongest predictors of suicide among persons in the general population.

# 2.6 Psychosocial Status Following Aesthetic Surgery

Numerous studies have found that 80 to 90% of patients report being satisfied with the results of an aesthetic procedure. Other studies also have found statistically significant improvements in body image within the first 2 years of an aesthetic surgical procedure. In a recent systematic review, aesthetic patients also reported improvements in quality of life and self-esteem following both surgical and nonsurgical aesthetic procedures.

An issue that has received surprisingly little attention is the relationship between postoperative complications and psychosocial outcomes following aesthetic procedures. Intuitively, postoperative satisfaction and the psychological benefits associated with improvements in appearance may be negatively impacted by the occurrence of a postoperative complication. At least one study found that breast augmentation patients who experienced postoperative complications reported less favorable changes in body image in the first 2 years following surgery. Unfortunately, little else is known about these relationships.

# 2.7 Assessment of Psychosocial Functioning by the Aesthetic Surgeon

Given these research findings, aesthetic surgeons are encouraged to conduct a basic assessment of the psychosocial functioning and status of new patients. Aesthetic surgeons, like all medical professionals, should assess and screen for the presence of psychopathology as part of a taking of a medical history and completion of physical examination. The assessment should focus on three main areas: (1) motivations and expectations, (2) appearance and body image concerns, and (3) psychiatric status and history.

#### 2.7.1 Motivations and Expectations

Patients present for aesthetic procedures with a variety of motivations and expectations regarding the impact of surgery on their lives. Some may be expressed to the surgeon or treatment team during the initial consultation; others may be unspoken. While both patients (and surgeons) may struggle to articulate or identify specific motivations for surgery, patients with internal motivations (e.g., desire to improve one's self-confidence) rather than external motivations (e.g., undergoing surgery in order to receive a promotion) are thought to be more likely to have their postoperative expectations met.

In assessing patients' motivations for surgery, the surgeon may want to begin by asking, "When did you first think about changing your appearance?" Similarly, it may be instructive to ask, "What other things have you done to improve your appearance?" In addition to providing important clinical information, these questions also may reveal the presence of some obsessive or delusional thinking, as well as bizarre or compulsive behaviors, related to physical appearance.

Patients should be asked how romantic partners, family members, and close friends feel about the decision to change a physical feature. While these individuals likely influence patients' decision-making process, their role may not be as great as intuitively thought. Breast augmentation patients reported that their decision to seek surgery was influenced more by their own feelings about their appearance than by the thoughts of their romantic partners. Nevertheless, patients who seek treatment specifically to please a current partner, or to attract a new one, are thought to be less likely to be satisfied with their postoperative outcomes. Thus, the surgeon should inquire about patients' general expectations about how the change in appearance, which may be rather subtle and potentially unnoticed by others, will influence their lives.

While there is some evidence to suggest that patients are seen as more attractive or thought to be younger after an aesthetic treatment, there is no current evidence suggesting that cosmetic procedures directly impact interpersonal relationships. Therefore, patients should be reminded that it is impossible to predict how others will respond to their changed appearance. Some patients may find that few people notice the change in their appearance, while others may have the experience that everyone seems to notice them. While some patients may find this attention pleasurable, others may find it uncomfortable. To assess this issue, patients should be asked how they anticipate their lives will be different following surgery. The experience of unmet postoperative expectations is another possible explanation of the relationship between cosmetic breast augmentation and suicide. Some women may present for breast augmentation surgery with unrealistic expectations about the effect that the procedure will have on their romantic relationships or daily functioning. When these expectations are not met, they may become despondent, depressed, and potentially suicidal.

#### 2.7.2 Body Image Dissatisfaction and Body Dysmorphic Disorder

The aesthetic surgeon also should assess the degree of body image dissatisfaction and potential presence of BDD. Patients should be able to articulate specific concerns about their appearance that are readily visible to the treating surgeon, as patients who are markedly distressed about slight defects that are not easily apparent may be suffering from BDD. As the judgment of an appearance defect as "slight or imagined" is highly subjective, the nature of the appearance defect may be difficult to assess. What a lay person regards as a slight defect, well within the range of normal, may, to the trained aesthetic surgeon, be a defect that is observable and easily correctable. As a result, the degrees of emotional distress and impairment, rather than the specific nature of the defect, may be more accurate indicators of BDD.

The degree and psychosocial consequences of the patient's body image dissatisfaction should also be assessed. Asking about the amount of time spent thinking about a feature or the activities missed or avoided may indicate the degree of distress and impairment a person is experiencing and may help determine the presence of BDD.

# 2.8 Psychiatric Status and History

An assessment of the patient's psychiatric history and current status should be included in the consultation with a new patient. With the exception of BDD, there is limited data on the prevalence of psychiatric diagnoses among persons who undergo cosmetic procedures. The presence of a specific diagnosis, however, may not be an absolute contraindication for cosmetic surgery. In the absence of sound data on the relationship between psychopathology and surgical outcome, appropriateness for surgery should be assessed on a case-by-case basis.

Aesthetic surgeons (or their delegates) should ask specific questions about current and past diagnoses and treatments (both outpatient and inpatient). Although this information is frequently reported on standard medical history forms, review during the initial consultation allows for observation of the patient's behavior, demeanor, and ability to interact with office staff. Unfortunately, many surgeons likely skip this psychological screening portion of the assessment and, as a result, likely fail to identify patients who may exhibit symptoms of relevant psychopathology.

Patients who display symptoms of psychopathology during their initial consultation with the aesthetic surgeon, as well as those with a history of psychopathology, may benefit from a referral for additional assessment by a mental health professional. Many of the early descriptions of cosmetic surgery patients are complete with elaborate interpretations of the role of unconscious conflicts and poor parental relationships in the decision to seek surgery. There is no evidence, however, to suggest that such interpretations are necessarily valid or useful in determining patients' appropriateness for surgery. Thus, a detailed assessment of patients' parental relationships and decades-old historical experiences is unlikely to provide useful information to the referring surgeon in determining appropriateness for surgery. Rather, a more straightforward evaluation of patients' current functioning, as found in the more general cognitive-behavioral assessment, is recommended.

A trusted mental health professional can be a valuable consultant to an aesthetic surgery practice. This mental health professional should have a good understanding of the psychological aspects of aesthetic medicine, as well as knowledge of disorders with a body image component, such as BDD and eating disorders. In most cases, the mental health professional will be called upon to assess a patient's psychological appropriateness for a procedure at a given point in time. The mental health professional also may be asked to join in the care of a patient postoperatively. This is most likely to occur in situations where the patient is dissatisfied with an objectively successful outcome or when the patient experiences a significant postoperative complication. Aesthetic surgery patients may react to a referral to a mental health professional with anger and defensiveness, believing that they will feel better only if they look better, and therefore may refuse to go to the consultation. To increase the likelihood that the patient will accept the referral, it should be treated like a referral to any other health professional. The patient should be informed of the specific areas of concern and the reason for the referral, and this information also should be shared with the mental health professional.

# 2.9 Concluding Thoughts

Aesthetic surgeons have long been interested in the psychosocial functioning of their patients. The earliest work in this area, before the tremendous growth of the specialty, generally suggested that patients were highly psychopathological. As aesthetic surgical and minimally invasive treatments have become more common, this perception has changed. Individuals who present for procedures are not seen with the same degree of suspiciousness as before. Furthermore, most of the more contemporary research has suggested that there are relatively few differences between individuals who seek aesthetic procedures and those who do not. The most consistent difference seems to be increased body image dissatisfaction, which is believed to be the motivation catalyst for an aesthetic procedure.

Encouragingly, many patients report improvements in their body image following a cosmetic treatment. However, a small yet significant percentage of patients appear to suffer from BDD. Others likely suffer with eating disorders or depression. All three conditions should be assessed preoperatively. Psychosocial functioning also should be monitored postoperatively, as patients can experience an exacerbation of these symptoms, sometimes with dramatically unfavorable results, such as threats of legal action, physical harm, and suicidal behavior. These outcomes underscore the importance of the aesthetic surgeon's being mindful of psychosocial status and functioning throughout the continuum of care of the patient.

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# **3** Photographic Essentials in Aesthetic Surgery

Walter C. Lin, William Y. Hoffman, and Farzad R. Nahai

#### Abstract

Understanding of fundamental concepts and basic photographic knowledge are required for accurate and reproducible medical photography. This chapter discusses terminology and key elements with emphasis on the clinical setting, including the interplay between shutter speed, aperture, and ISO speed in obtaining proper exposure, as well as appropriate selection of focal length, acceptable lighting, metering adjustment, and control of depth of field. Photographic standards are reviewed for various regions of interest. Also discussed are considerations regarding digital photography, including key differences between smartphones, point-and-shoot, and single-lens reflex (SLR) cameras and the impact of varying sensor size, file format, resolution, dynamic range, and file storage. Medicolegal aspects of Health Insurance Portability and Accountability Act (HIPAA) compliance and privacy now play critical roles in every surgeon's practice.

Purposeful selection of focal length, exposure, and lighting permits capture of reproducible, standardized clinical photography. Application of advanced topics enable the surgeon to capture studio-quality images without the need for a dedicated photographer.

#### Keywords

photography, photographic standards, digital camera, SLR, lenses, smartphone, point-and-shoot, flash, postprocessing, HIPAA

## 3.1 Introduction

Photography plays a critical yet understated role in the practice of plastic surgeons. Perhaps most important is the ability to create standardized and reproducible photographs of the patient over time, such that the only aspect of the photograph that changes is the patient and nothing else. The underlying principles lay groundwork in clinical planning, medicolegal documentation, and patient communication. Comprehension of the underlying fundamental concepts enables meaningful application of photography in educational and commercial marketing settings.

Although most principles of photography have remained unchanged over the previous decades, new considerations have arisen because of technological advances in digital photography. The last decade has experienced exponential growth in the quality and accessibility of camera equipment, photo processing software, and image sharing that requires new considerations. Image quality from mobile phones and devices nearly rivals professional equipment from the last decade. Some modern professional equipment is no longer prohibitively expensive and is readily available even for surgical trainees. Virtually unlimited digital storage space allows documentation of every aspect of care—by both the physician and the patient. Whereas photos were once taken sparingly due to the prohibitive costs of film and film development, photos are now taken easily and often. Quality photography requires careful, thoughtful setup; however, software now enables correction of minor flaws in lighting, exposure, and other elements of composition. Traditional portfolios were once collected in elegant leather-bound binders, but high-speed Internet now enables instantaneous sharing globally, opening unprecedented possibilities for media use in education and publication.

Because of this digital evolution, it is crucial to understand older fundamental principles in addition to newer concepts so as to make full use of photography in one's practice. Skilled photography is essential in the practice of any plastic surgeon, no matter whether photography is provided by a third-party photographer or by surgeons themselves. This chapter describes the essential concepts underlying photography, lighting, and image processing, as well as digital considerations—all important elements for creating photos suitable for documentation as well as publication.

# 3.2 Background

Whether referring to a camera phone, point-and-shoot, or single-lens reflex (SLR) camera, certain concepts and considerations remain universal. Conceptually, photographs are collections of light photons reflected from the subject, which are collected and focused through a lens and finally activate a film negative or a digital sensor that records them. The combination of the lenses, aperture, and shutter control the characteristic way light contacts the sensor, determining how the subject and background are portrayed.

The following sections detail key elements that characterize a photograph. With understanding and practice, each element can be altered to achieve desired and consistent results, such as a blurred background and foreground that isolate the subject in portrait photography, or tack-sharp photographs to highlight clinical findings.

# 3.3 Basic Elements of Exposure3.3.1 Focal Length, Shutter Speed,

# Aperture, ISO Speed

#### **Focal Length**

Focal length is the distance from the optical center of the lens to the focal point on the image sensor at which the image is properly focused. The ratio of the sensor size to the lens focal length determines the field of view. Longer focal lengths magnify the image and create a narrow field of view, as experienced with telescopes or telephoto lenses, while shorter focal lengths allow a wide viewing angle at the expense of distortion, as with front door peepholes or fisheye lenses. Because the ratio of the sensor size to the focal length determines field of the view, standard convention expresses focal length in terms of 35-mm film/sensor equivalent. The field of view of the human eye is approximated by a 40- to 50-mm lens. Clinical photographs are best taken using portrait lenses in the 85-mm to 135-mm range.

#### Selecting a Lens: Zoom versus Prime Lenses

Zoom lenses provide versatility and convenience over a continuous range of focal lengths. However, their complex design requires increased weight, size, and cost as well as compromises in optical performance and aperture size. Zoom lenses typically demonstrate their worst image quality at the extremes of performance: at the longest or shortest focal lengths, and with the largest and smallest apertures.

In contrast, prime lenses provide only one fixed focal length. The simpler design requires fewer parts, which have all been optimized solely for one focal length. Overall, the result is a lighter, smaller lens with sharper images than can be obtained with zoom lenses at the same focal length. The lack of variable focal lengths is easily overcome by simply walking toward or away from the subject or changing lenses.

The choice between zoom and prime lenses is a personal preference. If nearly all photos are taken at a specific focal length, then better results would be obtained by switching to a prime lens.

# Pitfalls: Optical Distortion and Perspective Distortion

Clinical photographs commonly suffer from distortion associated with wide-angle lenses (shorter than 40 mm) in the form of optical distortion and perspective distortion.

Unwanted distortion is minimized in clinical photography by selecting medium telephoto lenses (85 mm to 135 mm) and stepping farther from the subject. If space is limited, the distance between the subject and photographer must be maximized, with the longest focal length possible.

Also known as "lens distortion" or "barrel distortion," *optical distortion* consists of the curved appearance of straight lines because our total field of view, including all the objects that we can see around us, is a sphere, but the camera projects that view onto a flat surface. Although all lenses have some amount of distortion, the effect is more prominent in wide-angle lenses, which include a larger portion of the total field of view (**Fig. 3.1**), just as a map of a small part of the earth, such as a city neighborhood, shows straight lines as straight, but a map of the whole earth is always distorted in some way. Again, selection of a medium telephoto lens minimizes the risk of distortion of clinical photographs.

In contrast to optical distortion, *perspective distortion* can be avoided. Perspective distortion refers to the bulging appearance of the subject when the subject is too close to the camera. This exaggerates the differences in distance between different parts of the subject; closer parts look much larger than more remote parts. In **Fig. 3.2**, the same magnification is simulated in both images, but **Fig. 3.2b** was taken at a much closer distance than **Fig. 3.2a**. The model's face is drastically different between the two images.

Distortion should be minimized by using longer focal lengths (medium telephoto, portrait, or telephoto) and by placing the subject farther from the camera. Longer focal lengths have the



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Fig. 3.1 Optical distortion is most apparent when viewing (a) a large grid of parallel lines through a wide-angle lens, where (b) the lines appear to be curved.



Fig. 3.2 Selection of the proper focal length minimizes perspective distortion. (a) Frontal view taken using a 90-mm lens at 1 meter distance provides no significant distortion. (b) The same magnification with a 50-mm lens requires a shorter working distance, which distorts facial features (the subject's nose and lips are proportionally much closer to the camera than her ears and neck are). The flash angle is also exaggerated and casts harsher shadows.

effect of "flattening" the image by minimizing such distortion. The recommended focal lengths are discussed in the Photographic Standards section.

#### **Shutter Speed**

Shutter speed limits the length of time that light interacts with the sensor. Film cameras use a mechanical shutter; digital cameras typically use an electronic equivalent that activates or samples the sensor for only a given length of time. Longer shutter speeds can be desirable in certain settings, such as landscape photography or astrophotography of night skies, but the image is blurred if the subject or the camera moves while the shutter is open. In the clinical setting, blurry photos are unusable photos. As a general rule of thumb, shutter speeds of 1/50 second or slower can often result in blurry photos. A shutter speed of 1/125 second or faster works well in the clinical setting.

#### Aperture

The aperture of the lens functions as an adjustable iris, varying the amount of light passing to the sensor, independent of all other settings. The size of the aperture is described by the "f-stop" number, which is the ratio of the aperture diameter to the focal length (f) of

the lens. Each step in the familiar progression—f/2, f/2.8, f/4, f/5.6, and so on—mathematically represents a change of cross-sectional area, and will thus the amount of light gathered, by a factor of 2. Thus, changing from one *f*-stop to the next (say, from f/2 to f/2.8) decreases the aperture area by half and will thus collect only half as much of the light, and so on and so forth with increasing *f*-stop numbers. Accordingly, the camera sensor requires a shutter speed twice as long to maintain the same exposure (**Fig. 3.3**).

Crucial to effectively using aperture, users must remember *the lower the numerical f-stop, the larger the aperture.* More light reaches the sensor, allowing a faster shutter speed, resulting in an image with less risk of motion blur. Lenses with large apertures, referred to as "*fast*" lenses, require larger glass elements to maintain the low focal length/aperture ratio, and are respectively heavier and more expensive. Conceptually, a lens that has an *f*/1.0 aperture would be roughly as wide as it is long, cumbersomely heavy, and prohibitively expensive.

In relative terms, the human eye has a focal length of about 17 mm. The pupil has a 2-mm diameter in bright light with an equivalent f/8.3 aperture. In the dark, the pupil has an 8-mm diameter, with an equivalent of f/2.1. Modern cameras have longer focal lengths and wider apertures than the human eye, with the ability to create photos that appear far brighter than reality, as



**Fig. 3.3** The *f*-stop controls the cross-sectional area of the aperture, which controls how much of the light from the subject reaches the sensor. Apertures are shown at **(a)** f/1.2, the maximum this lens allows, **(b)** f/1.8, **(c)** f/2.8, **(d)** f/4, **(e)** f/5.6, **(f)** f/8.

with wedding photography using available light, or astronomical photographs that capture thousands of stars too faint to see with the naked eye.

As previously mentioned, lenses have worse image quality at the extremes of their performance—at the widest and smallest apertures, images will be less crisp. As a rule of thumb, most lenses have a "sweet spot" for maximum image sharpness in the midrange. For clinical photographs, an aperture in this middle range around f/7 to f/11 will provide crisp images while providing a broad depth of field that ensures other details in the image remain in focus as well. Depth of field is a more complex but very important topic, discussed in a later section.

#### Sensitivity (ISO Speed)

Films differ in their sensitivity to light, and so do digital sensors. A high-sensitivity film or sensor requires less light (fewer photons) to activate an individual point (pixel) in the image; a lower-sensitivity film or sensor requires more light (more photons) to get the same activation. For the camera to collect more photons, either there has to be more available light to begin with (e.g., bright sunlight rather than shade), or the aperture has to be wider (lower *f*-stop), or the exposure has to be longer (slower shutter speed). At a given light level and *f*-stop, a more sensitive film or sensor takes less time to collect enough light to activate it, so it is said to be "fast," just as a wider lens that allows a low *f*-stop is.

The International Organization for Standardization (ISO) has determined an industry scale for the "speed" or sensitivity of a film or sensor to light, replacing older different scales used in the United States and Europe. Today the speed rating of a film or sensor is often called simply its "ISO." High ISO represents high sensitivity, so fewer photons are required to activate the sensor, and conversely low ISO means low sensitivity and requires more photons. A sensor with ISO 100 requires twice as much light as a sensor with ISO 200.

High-ISO films and sensors allow shooting in darker places, use of higher *f*-stops (giving better focus, as will be discussed later), and faster shutter speeds (for sharper views of moving subjects), but they tend to produce images that are grainy and noisy. If only three or four photons are necessary to activate a given individual point element (pixel) of the sensor, then one stray photon has a greater chance of erroneously activating the pixel. On the other hand, a low-ISO sensor might require a thousand photons for activating a pixel, so it will not be affected by one stray photon. Images taken with a low ISO are smoother, less noisy, and less grainy, and ultimately higher-quality and more useful.

Because lower-ISO images produce less grainy images, *optimal photographs use the lowest possible ISO* that still allows an acceptable shutter speed and the desired aperture. Most cameras have an "auto ISO" setting that automatically uses the lowest acceptable setting while maintaining a usable shutter speed.

#### 3.3.2 Exposure

Conceptually, exposure represents the cumulative light captured within a photograph, as determined by the shutter speed, aperture, and film sensitivity (ISO). A common analogy is filling a bucket with water from a faucet. The exposure represents the total volume of water (volume of photons) collected. The amount of opening of the faucet valve represents the aperture setting of the lens, and the amount of time that the faucet runs represents the shutter speed. Thus, the volume of water is determined by the opening of the valve and the amount of time the faucet is open. This is equivalent to the cross-sectional area multiplied by the time, which parallels the lens aperture multiplied by the shutter speed.

Continuing this analogy, the sensor ISO then represents the size of the water bucket. For proper exposure, the bucket requires filling exactly to the brim. If the bucket is underfilled, the sensor is not activated, and the photograph is underexposed and too dark. Overfilling the bucket causes too much light to reach the sensor, and the photograph becomes overexposed and too bright.

A small bucket represents a high-ISO, highly sensitive sensor, which requires only very little water/light to be properly exposed. A large bucket represents a low-ISO/low sensitivity sensor that requires much more water/light.

There is a tradeoff between shutter speed and aperture, as demonstrated in **Fig. 3.4**. Both frames have equivalent exposure, or the total amount of light collected, so the dog, the grass, the sea, and the sky have the same colors and brightnesses in both.



**Fig. 3.4** Tradeoff between aperture and shutter speed, with constant ISO. Both frames have equivalent cumulative exposure but differing depth of field and motion blur. (a) 1/320 sec, *f*/8.0, ISO 100 creates a wide depth of field and a detailed background, at the cost of motion blur. (b) 1/8,000 sec, *f*/1.8, ISO 100 eliminates motion blur but has a shallow depth of field with a blurred background.

**Fig. 3.4a** uses a small aperture of f/8.0, which requires a shutter of 1/320 sec for proper exposure at this light level and ISO speed. The depth of field (discussed in the next section) is broad, meaning that detail in the farthest parts of the landscape is as sharply focused as the foreground. However, the dog's motion makes him look blurry at this shutter speed. **Fig. 3.4b** uses a large aperture of f/1.8, which requires only 1/8,000 sec shutter for equivalent exposure. The dog appears sharp despite his motion, but the depth of field is shallow, with everything farther than the dog blurred. The difference in the photographs is significant despite the point of focus being the dog in both photos.

SLR cameras and some point-and-shoot cameras allow the photographer to force the camera to maintain a certain aperture ("aperture priority") or shutter ("shutter priority") while automatically computing the other variables to maintain proper exposure. "Program" mode allows the user to determine the aperture and shutter, while automatically calculating ISO. Manual mode allows the user to set shutter, aperture, and ISO, and is the best for the user to learn the concept of exposure.

# 3.4 Advanced Concepts

#### 3.4.1 Depth of Field

The *depth of field* describes the zone in front of and behind the focal plane where objects appear to be in focus and are acceptably sharp (**Fig. 3.5**). Depth of field is determined by a combination of aperture size, subject distance, focal length, and sensor size, but it is most easily controlled by varying the aperture.

A conceptual understanding of depth of field helps the photographer to use it meaningfully. Objects closer than the focal plane are focused by the lens at a spot *behind* the sensor, so they appear as a blurry spot on the sensor. Objects farther than the focal plane come into focus *in front of* the sensor and subsequently defocus, so they appear as blur spots as well.

With all camera settings equal, the size of the blur spots varies depending on an object's distance from the focal plane. There is a distance in front of and behind the focal plane where the resulting blur spots are small enough that they appear to be in focus. This range is referred to as depth of field (**Fig. 3.6**).

Decreasing the aperture size will also decrease the size of the blur spots, thus making the depth of field wider. Clinical photographs are best taken using a smaller aperture to maintain a broad depth of field, ensuring that details across all contours of the patient remain in focus.

In nonclinical portrait photography a narrow depth of field can be advantageous and aesthetically pleasing, since attention is inherently drawn toward the only object in focus—the subject. To truly create the narrowest depth of field possible, a combination of largest aperture size; shortest subject distance; longest focal length; and largest sensor size possible would be used. In practice the camera should be set to the largest aperture available (the lowest f/number), which in commercially available high-end lenses is commonly f/1.2.

However, shallow depth of field is not suitable for clinical use because of the loss of detail out of the focal plane (**Fig. 3.7**). A broad depth of field should be utilized in clinical situations, ensuring that both the nasal tip and the helical rim of the ear appear focused.

#### 3.4.2 Lighting and Flash

In the clinical setting, lighting conditions are often suboptimal. Various types of supplemental light sources compensate, including on-camera flash, external flash, and remote flash. However, single point sources of light create harsh shadows and highlight contours, similar to direct sunlight. No matter the type of device, the underlying goal remains the same: to create a broad source of noncoherent light that illuminates the subject from multiple angles. Such ideal sources of light provide "soft" illumination without casting harsh shadows.

Classic examples of ideal light include sunlight filtering through a white curtain (used commonly by wedding photographers), bright overcast days, or sunlight reflecting from a broad white wall. Studio photography recreates this effect using multiple flashes reflecting from umbrellas.



**Fig. 3.5** Example of shallow versus wide depth of field. (a) The large aperture of *f*/2.8 creates a shallow depth of field and consequently loses fine detail in the medication labels out of the focal plane. (b) The small aperture of *f*/11 preserves fine detail out of the focal plane and is more useful in clinical situations.



**Fig. 3.6** Illustration of depth of field. Point A (blue) lies within the focal plane and correctly focuses as a point on the sensor. Point X (red) is behind the focal plane; light from this point is focused by the lens and then diverges and appears out of focus. Point Y (yellow) is in front of the focal plane, so light from it has not come into focus and also appears out of focus on the sensor. Point Z (green) is in front of the focal plane but within the depth of field, and it appears as a small enough blur spot that it is considered to be in acceptable focus by the observer.

In the clinical setting, it is not often practical to re-create studio lighting. Ideally, a dedicated photography studio setup would be created in the clinic, consisting of three light sources as in **Fig. 3.8**. The key light provides main illumination, while the fill light illuminates areas missed by the key light. The back light illuminates the back of the subject, enhancing edges and borders.

On the ward, carrying around a three-point lighting setup is impossible. The most suitable alternatives include an on-camera or external flash, as discussed later in the chapter. The external flash may be used as a bounce flash, in which the external flash is directed upward toward the ceiling or backward toward the wall behind the camera. The light reflects from the ceiling or wall and acts a surrogate to a broad diffuse source of light. The built-in on-camera flash is the simplest, most direct option.

In the operating room, lighting conditions are variable. However, overhead lights can be used to emulate broad sources of light (**Fig. 3.9**). By utilizing multiple overhead lights, it is possible to simulate diffuse light. In **Fig. 3.10**, multiple overhead lights are used to eliminate shadow and simulate a broad source of light: one light is behind the subject, another in front, and another to the side. **Fig. 3.11** shows an example of a photo taken using multidirectional overhead operating light. Having said that, operating room lights can cause white-out and harsh, overexposed photos or photos with a "spotlight" effect (bright and overexposed in the middle and dark on the borders), so sometimes it is best to direct the operating room lights away from the field and adjust the camera settings accordingly.

#### 3.4.3 Metering

Within the camera, light meters monitor the intensity of incoming light and calculate the appropriate shutter and aperture for proper exposure. By selectively limiting the area being sampled, various *metering modes* permit more accurate exposure for a specific region of interest.





**Fig. 3.7 (a)** This photo demonstrates an extremely shallow depth of field, which is pleasing in portraits but should be avoided in clinical photos due to loss of detail. **(b)** Although the eyes are in focus, the eyebrows, nose, and ears all appear blurry.



**Fig. 3.8** Three-point lighting for portrait photography consisting of a main key light, fill light, and a back light.



Fig. 3.10 In combination, multiple overhead lights produce even illumination from multiple directions, eliminating distracting shadow.



**Fig. 3.9** Modern overhead operating room lights in fact behave as multi-point-source light sources.



Fig. 3.11 Operating room photograph taken using three overhead operating lights combined into natural-appearing diffuse lighting.

The default, *evaluative* metering, assesses the light levels across the whole scene in order to determine correct exposure; this is useful for travel or recreational use (**Fig. 3.12a**). However, proper exposure as determined by the camera may be unsatisfactory to the photographer. This commonly occurs in certain surgical photos, creating photos that are too dark and lack detail of desired anatomy. Correction requires proper exposure. Aside from manually changing the shutter, aperture, and ISO, corrections can be automated by altering the camera's metering mode and exposure compensation.

By changing metering to *center-weighted* (the center of the photograph is used to calculate exposure, regardless of focus point; **Fig. 3.12b**) or *spot* (exposure based on the focus point; **Fig. 3.12c**), the photographer instructs the camera to calculate the correct exposure based on a smaller, more specific area of interest. Exposure compensation instructs the camera to overexpose or underexpose the photo automatically. For instance, in **Fig. 3.13a**, the building and person are underexposed and the clouds are overexposed; detail has been lost in both subjects. To visualize detail in the underexposed building and person, exposure compensation can be set to overexpose the photograph. This results in a properly exposed building and face, at the cost of an even more overexposed cloud (**Fig. 3.13c**).

In the clinical setting, wounds tend to be composed of darker tissue (muscle, ecchymoses, and eschar for instance) and may be located in difficult-to-illuminate areas (decubitus ulcers). Important details can be revealed by forcing camera overexposure.

With image software postprocessing, photos are more acceptable when they are overexposed and then darkened, as opposed to underexposed and then lightened, as the latter results in grainy,



Fig. 3.12 Red shading represents the selected region used by a camera to determine the correct exposure. (a) Evaluative metering. (b) Center-weighted metering. (c) Spot metering.



**Fig. 3.13** Exposure compensation allows detail to be revealed in regions of interest. (a) Using the default exposure setting, the building and person are underexposed and the clouds are overexposed. (b) Setting -1 *f*-stop exposure compensation reveals detail within the clouds. (c) Setting +1 *f*-stop makes the building detail visible and gives the person's face a natural appearance.

noisy photographs that are less useful. In the hospital setting, it is often helpful to set exposure compensation to +2/3 or +1 *f*-stop.

#### 3.4.4 Postprocessing

Despite careful planning, in some instances the ideal exposure is not always obtained, resulting in unusable photographs. Fortunately, powerful programs are available to rescue such photographs through *postprocessing*, referring to the process of adjusting an already-captured image to achieve a desired appearance, without manipulating the content of the photo. Although powerful image manipulation software is available, it is crucial not to create misleading appearances or enhance results. Instead, the goal should be to correct for suboptimal lighting conditions and/or reproduce lighting conditions to allow comparison between photos. The most useful and high-yield basic adjustments include white balance and exposure correction. Sharpening and vignette correction can add subtle but significant refinement. For intraoperative photos it is helpful to darken the *highlights*, lighten the *shadows*, and selectively decrease red saturation to allow details within bloody surgical wounds to be visible. Local adjustment masks can be used to correct for suboptimal lighting and reveal detail within shadows. Combined, postprocessing adjustments can rescue a poor photograph as in **Fig. 3.14**.

When selecting postprocessing software, it is recommended to use programs with *nondestructive* editing, in which the original photo remains intact and can be restored. Editing is stored separately in a separate file or program catalog. Using such software, a series of adjustments can be stored as a "shortcut" for different lighting situations, for instance "clinic," "operating room with flash," "operating room without flash," and so on, and photos can be processed



Fig. 3.14 (a) Original photograph taken with suboptimal lighting conditions, resulting in uneven lighting and unnatural color. (b) Postprocessing the raw format file allows for correction of color, exposure, and uneven lighting distribution.



**Fig. 3.15** Example of postprocessing. (a) The unprocessed raw image of the same scene as in Fig. 3.13, exposed at a level between those of Fig. 3.13a and Fig. 3.13b, appears dull and washed out. (b) After postprocessing correction, the texture and detail are revealed vividly within both the building surface and the clouds, a result that could not have been obtained with exposure compensation alone.

quickly and efficiently. When exporting photos, it is recommended to remove file metadata so as to remove GPS information, time/date information, and other identifiable characteristics.

# 3.4.5 Compressed vs. Uncompressed vs. Raw Format

Postprocessing provides the best results when working with uncompressed raw format files, which are the digital equivalent of film negatives and retain all original data. Photos are completely uncompressed and retain the most information, so there is no data loss in shadows or highlights, as with formats compressed for the sake of file size. Without editing, photos often appear washed out and faded. However, these photos have the most potential; after processing parameters such as exposure, white balance, contrast, and other adjustment, these may produce the most dramatic photos once edited (**Fig. 3.15**). However, if storage space is a concern, as with email or internet photo sharing, compressed formats may be desirable. All compressed formats trade convenience of file size in exchange for loss of information that the user is less likely to notice. At the time of print, the most common file compressed format used is the Joint Photographic Experts Group (JPEG). In this format, information is discarded in less perceptible regions, such as fine details in the darkest portions of shadows. JPEG files are not ideal for postprocessing, because information has been discarded and cannot be rescued, resulting in odd artifacts. This is known as *lossy* compression, where information is lost every time the file is saved. The compression generates artifacts that distort fine details with increasingly higher compression levels, as shown in **Fig. 3.16**.

For the best photo quality and most control over file size, if photo postprocessing is anticipated, it is optimal to shoot photos in raw format and subsequently convert to a compressed format such as JPEG for sharing. If postprocessing is minimal or not desired, files may conveniently be taken in JPEG format with relatively low levels of compression.

As will be discussed in more detail subsequently, the advent of cloud storage and high-speed Internet communications and decreasing memory and disk space costs make the need for compression less of a concern.

# 3.5 Considerations in Digital Photography 3.5.1 Characteristics Affecting Image Quality

#### **Sensor Size**

With an identical megapixel resolution, a larger sensor has larger pixels. Each pixel captures more light, resulting in less noise and a smoother image. *High-end full-frame cameras* have sensors equivalent to a 35-mm film frame (36 mm × 24 mm in size) but consequently require larger, heavier lenses and camera bodies. Many consumer-level cameras have smaller sensors for convenience, demonstrated by the Advanced Photo Systems (APS) sensors (14 × 21 mm to 16 × 24 mm) and Four Thirds sensors (12 × 17.3 mm). Top-of-the-line digital medium format cameras have 48-mm × 36-mm sensors and currently cost tens of thousands of dollars.

The ratio of a 35-mm sensor diagonal (43.3 mm) to a given camera's sensor is termed the *crop factor*. With identical conditions, lenses, and settings, two differently sized sensors will produce different photographs, as illustrated in **Fig. 3.17**. The smaller sensor samples a smaller area, effectively magnifying the image



Fig. 3.16 Example of artifacts and loss of information detail with high Joint Photographic Experts Group (JPEG) image compression. (a,c) The 1:1 zoom shows fine details within the iris and scleral capillaries. (b,d) With unacceptably high JPEG compression, blocky artifacts distort the image.





**Fig. 3.17 (a)** Any camera sensor samples only a fraction of the image projected by the lens, cropping the original image. The yellow box simulates the image captured by a full-frame 35-mm sensor, while the red box simulates a smaller image from a crop sensor. **(b)** The image obtained using a full frame sensor. **(c)** The image obtained using a crop sensor. Note the smaller sensor captures a smaller portion of the image and has the appearance of using a longer focal length.

with the equivalence of a new *effective focal length*, calculated by multiplying the original focal length by the crop factor. In a similar fashion, the aperture and corresponding *effective f-stop* are calculated by multiplying the f/number by the crop factor as well. Thus, when using an APS sensor with a 1.6x crop factor, to create portrait photos with the appearance of an 85-mm portrait lens, a 50-mm lens should be used, since 50 mm × 1.6 = 80 mm.

#### Resolution

Adequate camera sensor resolution for publication is no longer a significant concern, as newer cameras have far greater resolution than necessary. When decreasing resolution within camera settings or during storage, it is recommended to store photos at 7.6 megapixels or greater, which would allow for an 8" × 10" photo print at 300 pixels per inch (ppi). Higherresolution files, preserving finer detail, are recommended if practical. Storage practicalities are discussed later in this section.

#### **Dynamic Range**

Dynamic range represents the ability of a sensor to identify information across varying levels of brightness, determining the quantity of detailed information captured in the very brightest and darkest areas of a scene. Outside of this detectable range, anything brighter appears as "blown out" white areas, and anything darker appears as plain black. The information in these outer regions is not captured and cannot be rescued with postprocessing. If the scene's dynamic range is broader than the camera's dynamic range, then information will be lost in the scene. The comparison between the dynamic range of the human eye and that of a digital sensor is shown in **Fig. 3.18**. Because of the human eye's superior dynamic range, scenes with highly varying brightness, such as sunsets, are far more stunning in person than in photos.

Dynamic range depends on the quality of the sensor and the file format. High-end camera sensors are able to distinguish light across a broader range of light intensity. Raw, uncompressed files

# Dynamic Range



Fig. 3.18 Comparison of dynamic range across varying levels of brightness in the human eye versus film and digital sensors. Film and sensors are unable to distinguish among light levels at the extremes of intensity, and information is lost and appears as pure black or pure white within the image.

also retain the detailed information in the brightest and darkest portions, which are typically discarded with routine compression algorithms in exchange for smaller file size.

#### File Storage and Backup

With digital images, the choice of file storage balances image quality versus file size. File format and resolution impact immediate utility, as well as future usability in publication.

In general, smaller files are easier to share and store but have worse image quality and are not useful for editing due to the loss of data during compression. Over time, with newer technologies that support higher and higher resolution, such as high-definition (HD) computer monitors, compressed files appear obsolete and dated. Larger files, on the other hand, retain as much data as possible and are more likely to be usable with newer resolution standards. Even though they consume more storage space, given the combination of high-speed Internet and unlimited, secure compliant online storage that complies with Health Insurance Portability and Accountability Act (HIPAA) requirements for security and confidentiality, uncompressed or raw files are no longer prohibitive to maintain. Such uncompressed raw files are more likely to be updated and usable in 10 to 20 years.

Since photos are irreplaceable, it is recommended to back up photo databases regularly with redundancy, optimally in a separate geographic location in the event of a natural disaster. Commonly this may be accomplished through a rotation of multiple encrypted hard drive backups that are stored in physically different buildings. Alternatively, online cloud storage provides redundancy, but care must be taken to ensure HIPAA compliance within the online service. Furthermore, the permanence and security of online storage cannot be taken for granted, and duplicate physical hard drive backup is still recommended.

#### Camera Selection: Smartphone vs. Point-and-Shoot vs. SLR

The optimal camera choice is ultimately personal preference, balancing portability with image quality, assuming all security and privacy requirements are met.

Smartphones are undoubtedly the most convenient and most ubiquitous cameras available, with acceptable image quality for general health care needs. Although some offer the ability to take photos in a raw uncompressed format, image sharpness has not yet reached the level required for publication. Patient privacy remains the primary hurdle preventing widespread use of smartphone use. Photos should not be stored locally on the phone; instead, some electronic medical record (EMR) services offer smartphone apps that allow encrypted uploading directly to the service, bypassing local storage on the phone. It is crucial to educate health care staff regarding the dangers and pitfalls of photo sharing and social media using unauthorized smartphone use in the clinical setting.

The image quality of smartphones will never equal that of stand-alone cameras in the near future, simply due to the physics involved, with sensor size and the quality of optical elements. In terms of image crispness and dynamic range, the major determinants are sensor size and quality, giving SLR (and mirrorless SLR) cameras the advantage. Interchangeable lenses used with SLR cameras offer the best performance. SLR cameras will beat point-and-shoot cameras and smartphones in virtually every aspect except for cost, convenience, and portability.

Point-and-shoot cameras provide a practical middle ground between smartphones and SLR cameras. For clinical use, the most useful cameras provide modes allowing the user to manually select the desired shutter (shutter priority), aperture (aperture priority), or both (program mode), also with the option to select ISO (manual mode). This allows consistent, reproducible photographs to be taken across timepoints by using the same aperture setting, for instance.

#### Protected Information and HIPAA Compliance

The ease of file sharing necessitates the utmost care to ensure patient privacy and security. Identifiable features of photos include showing the full face of the patient, tattoos, or any of the 19 elements of protected health information, as shown in **Table 3.1**. Of note, it is no longer acceptable solely to mask the eyes. It is strongly recommended to obtain consent when using any part of the face.

Photos must be stored in a HIPAA-compliant fashion. Digital photos must be stored securely on encrypted hard drives. Since most cameras and memory cards do not have password capability or built-in encryption, it is crucial to download and delete media from cameras regularly and in a timely fashion lest the camera be lost or stolen. Furthermore, some file-keeping software includes the patient's name in the metadata of the photograph. In that case, if the files are shared for any reason, the file name and metadata should be cleared of any patient identifying information before being shared.

Patient consent must be obtained for any use outside of a surgical practice for treatment, payment, or healthcare operations. Any external use of photos in conferences, seminars, or other public areas requires patient consent. Photos that do not contain identifiers do not require approval.

Table 3.1         Identifiable protected health information					
Identifiable protected health information					
Demographic information • Name • Date of birth • Address • Telephone number • Fax number • Email address	<ul> <li>Medical information</li> <li>Date of treatment</li> <li>Fingerprints or voiceprints</li> </ul>				
Identification numbers • Social Security number • Medical record number • Account number • Driver's license number • Credit card number • Health plan beneficiary number • Vehicle/device serial number	<ul> <li>Social information <ul> <li>Names of relatives</li> <li>Name of employer</li> <li>Website address</li> <li>Internet address of computer</li> </ul> </li> </ul>				

# 3.6 Photographic Standards in Clinical Practice

Although there are many ways to photograph a subject using various lighting styles or settings, a key tenet in clinical practice is standardization and reproducibility, which allows comparison across timepoints. With standardized and reproducible methods, the only aspect of the photos changing over time is the patient. Numerous authors have published their recommended standards, but the guiding principle is to establish a standardized system that can be performed and replicated identically over time, with the same angles, lighting, backgrounds, and content.

Across timepoints, different areas of the body should be taken from the same angles with the same focal lengths. Lighting should be consistent, ideally using multiple sources of light to avoid shadowing. Color balancing should be performed at the time of photography or with postprocessing. Distractions should be minimized, such as jewelry and certain clothing. In the operating room, bloodstained skin should be cleansed; clean, dry towels should be used to provide a uniform background; and lighting should be standardized.

In general, facial photographs are best taken using portrait lenses around 90 to 110 mm in focal length to minimize distortion. When this is not possible, due to equipment or small examination rooms, it is most helpful to step as far away from the subject as possible and crop the image to create a rough equivalent to using a portrait lens. Photos of the body and extremity are best taken using "normal" lenses around 50 mm. When using a smartphone or point-and-shoot camera, the best photos result from taking several steps farther from the subject and "zooming in" on the patient.

#### 3.6.1 Standard Views for Regions of Interest

The following sections briefly describe defined standards for varying body regions of interest. A reference booklet is available from the American Society of Plastic Surgeons and Plastic Surgery Educational Foundation and is recommended for reference. In all instances, distracting elements—jewelry, heavy makeup, hair, etc.—should be removed. To minimize variation across timepoints, ideally the same location, lighting, camera position, and patient positioning settings should be reproduced. Strategically placed tape marks (or footprints) along the floor help expedite positioning of the patient (**Fig. 3.19a**), and markings along the wall direct the patient's gaze. Standardized smooth, diffuse lighting is readily available using commercially available softboxes or umbrellas, as shown in **Fig. 3.19b**.

Facial photographs are typically taken using a portrait or medium telephoto lens (85 mm to 135 mm) at a 1-meter distance or farther, aiming to include the vertex to suprasternal notch (**Fig. 3.20**). The patient should be aligned either along the *Frankfort plane* (external auditory canal to the infraorbital rim) or the natural horizontal facial line (patient subjectively looks forward at eye level) (**Fig. 3.21**). The entire body should be rotated for oblique and lateral views. To standardize oblique views, it is helpful to align the nasal tip with the anterior border of the cheek. A standardized basal view aligns the nasal tip with the upper lid crease.

Photographs of the eyes should include from the eyebrows down to at least the upper lip to ensure inclusion of the orbitomalar troughs. Aside from the typical angles, photos should include a closed-eye view, upward gaze, and downward gaze.

Nasal photographs should include the eyebrows and upper lip as well. Additional views include a worm's-eye view, cephalic view, and views with dynamic contraction.

Lip photographs should be taken in repose, with the lips resting and slightly parted. Oblique views can be reproduced by lining up



а

Fig. 3.19 (a) Example of a floor diagram to direct patient positioning during photography. (b) Example of commercially available softboxes that provide continuous neutral white light.



Fig. 3.20 Standardized views of the face. (a–e) The camera is on the plane of the Frankfort horizontal. The patient must turn the entire body rather than just the head alone. The ears are used as reference to keep the head level. (f,g) Frontal close-up views of upper and lower facial halves. (h) Worm's-eye view.

the junction of the philtral column and vermilion with the contralateral cheek. Pursed-lip views help in identifying vertical lip lines.

Views of the chest and breast should include the lower neck and extend past the subcostal margin (**Fig. 3.22**). Arms may be placed

at the side, resting on the hips, or behind the back. For oblique views, the arms should be moved posteriorly. Lateral views may be standardized by ensuring that the chest/breast farther from the camera is not visible.



**Fig. 3.21** Effect of head position. **(a)** Frontal photograph taken in the proper plane. **(b)** The camera is below the Frankfort horizontal. **(c)** The camera is above the Frankfort horizontal. Note the difference in the appearance of the overall height of the face, the amount of scleral show, and the prominence of the nose and chin among other features. Note that in **b** and **c**, the angle of the face from the horizontal is less than 10°, yet it creates obvious differences.

The lower trunk and abdomen are photographed with the legs at hip width, with feet parallel, including the inframammary fold and extending to the upper thigh. Distracting clothing should be replaced with standard disposable blue underwear. A diver's view—taken at a slightly oblique angle, with the patient standing with the torso flexed—highlights the abdominal soft tissue (**Fig. 3.23**).

Lower extremities are shown completely from the umbilicus to the toes or, alternatively, for a half-view, from the umbilicus to the patella (**Fig. 3.24**), or from the patella to the toes. Ideally a lengthy background should be used to extend from the background onto the floor in a smooth, continuous fashion. If the feet are being highlighted, a step stage is helpful. Lateral views may be standardized by ensuring the farther leg is not visible.

#### 3.6.2 Lighting Styles

Ideal lighting consists of using standardized, reproducible broad, soft lighting to re-create even, smooth illumination from multiple angles. However, outside of the office studio, this is impractical due to the amount of equipment and time required for setup. There are several ways to arrange the photograph according to the desired result, with a tradeoff between studio publication appearance versus speed and convenience.

#### "Standard" Flash

For most circumstances in the clinic, on the ward, and intraoperatively, photos are best taken using flash. Hospital and clinic rooms are often unevenly lit with overhead light that results in unflattering shadows across the patient's face and body. Little light is available, requiring high ISO sensitivity with a large aperture to attain adequate exposure, resulting in a grainy photo with a shallow depth of field that may also be blurry due to inadequate shutter speed. Overhead tungsten or fluorescent lights frequently mask accurate skin tones and color. It is not recommended to take photos solely using ambient light unless alternatives are not available.

To compensate for poor ambient light, the on-camera or external flash provides reproducible lighting appearance regardless of the ambient light, creating a more uniform photo series comparison preoperatively and postoperatively. Flash also provides sufficient light, allowing for lower ISO sensitivity and smaller apertures within the f/7 to f/9 range, creating crisper images with less noise and a broader depth of field.

With flash photography, the position of the light source relative to the lens affects the shadows cast upon the subject (**Fig. 3.25**). With any angled or side view, the flash should be on the side of the lens that is closer to the patient's anterior to avoid uneven distracting illumination.

#### **Bounce and Ring Flash**

A more advanced technique is to direct the flash away from the patient, reflecting light off of the ceiling or a wall, referred to as a *bounce flash*. This more accurately emulates a broad source of light, decreasing the appearance of harsh shadows. Often a shoe-mounted flash on an SLR camera is needed for this maneuver.

*Ring flashes* are available and provide excellent high-intensity light for macro photography. However, light is distributed so evenly that shadows are eliminated and contours are difficult



**Fig. 3.22 (a–e)** Standardized views of the breasts. Placement of the hands on the hips for the lateral views is useful to show any postoperative scars, the inframammary fold, and other features. Note that the shoulders are aligned with the top of the photograph.





Fig. 3.25 The flash position relative to the lens casts differing shadows and should be mounted on the same side of the lens as the patient's anterior. The top row shows a frontal view with the flash mounted to the right (a), left (b), and above (c) the patient. Note the distracting shadows cast with the flash mounted toward either side. The bottom row shows a lateral view with the flash mounted toward the patient's posterior (d), anterior (e), and superior (f).

to discern. These flashes are useful for close-ups of detail or difficult-to-illuminate areas, such as with dental or dermatologic purposes, but are not typically used to photograph the body or extremities.

#### 3.6.3 "Studio Effect" Photography

Certain instances call for meticulous photographs with backgrounds completely free from distraction and evenly illuminated details. Setup requires multiple light sources at varying angles for elimination of harsh shadows. Backgrounds are meticulously neat without distraction or reflection, such as with a velvet background or a plain blue wall (**Fig. 3.26**).

Alternatively, the background can be eliminated completely as in **Fig. 3.27**. This studio effect is accomplished by illuminating the subject with high-intensity light while providing as little light as possible to the background, table, and nearby elements. By properly metering the photograph to the well-lit subject, typically with the aid of center- or spot-metering, the background and other elements appear far underexposed in relation and appear



**Fig. 3.26** A simple blue background with evenly-distributed soft lighting from multiple directions creates a pleasant appearance without distracting shadows.

**Fig. 3.27** An example of a textbook-style/studio-style photograph with an absent background. This example shows medial femoral condyle free flap anatomy prior to harvest.

black. This effect is best accomplished when the background and floor are as far from the subject as possible, since less light will reflect from the subject and provide less illumination.

Focused high-intensity light can be accomplished with external flashes or spotlights. Operating room overhead lights function well as spotlights and, when carefully aimed at the subject, can provide sufficient lighting, as in **Fig. 3.11**. Lights should be aimed to create smooth, even lighting. It is sometimes helpful to move lights farther from the subject to allow greater diffusion of the spotlight.

#### 3.6.4 Intraoperative Photography

Intraoperative photography can be divided into two types: staged and nonstaged, "action" shots.

With appropriate staging, distractions are removed from the operative field, including instruments and cables, as shown in **Fig. 3.28**. Blood is wiped clean from the area. The area of interest is surrounded using clean, dry operative towels to mask the wrinkled, blood-speckled operative drapes. If flash is used, then the operative lights should be removed from the field because of uneven light intensity and difference in light temperature and hue. Alternatively, operative lights may be used as spotlights without the use of flash.

Staging of photographs can be time-consuming and disruptive to the flow of the procedure. Alternatively, "action" shots taken throughout the procedure capture key steps and fine detail without repeated pauses. Results are best with telephoto lenses and center- or spot-metering and overhead operative light, as shown in **Fig. 3.29**.

# 3.7 Concluding Thoughts

Photography remains one of the most essential tools available to a plastic surgeon. Mastery of fundamental principles underlying photographic exposure permits skillful use of advanced concepts, allowing the eye-catching capture of crucial details. Understanding the technological evolution in photography permits postprocessing corrections to bring the photographs



**Fig. 3.28** An example of a staged intraoperative photograph. The operative field has been cleansed, and the tendon grafts are lined up next to the hand.



**Fig. 3.29** An intraoperative "action shot" that does not disrupt the flow of surgery. In this case, a cross-finger flap is being harvested. The wispy, loose areolar tissue and fine capillaries are visible and not overblown through the correct use of metering and exposure.

to true-to-life appearance for the sake of anything from plain documentation to portfolio marketing or publication. As technology continues to evolve, novel considerations will undoubtedly arise, but fortunately the underlying concepts will endure perpetually.

#### **Clinical Caveats**

- The most useful clinical photographs are taken in a reproducible fashion using standardized patient positioning, lighting, and camera settings.
- Proper focal length should be chosen to minimize perspective distortion while using appropriate shutter speed and aperture to prevent motion blur and maintain a broad depth of field.
- The most reliable lighting is provided using external lighting (flash or light boxes) or overhead lights arranged purposefully.
- Simple postprocessing correction of white balance and exposure can dramatically improve the appearance and consistency of clinical photos.
- Camera choice is a personal preference, weighing convenience and portability versus image quality, camera size, and cost.
- All digital information should be stored in a protected, HIPAAcompliant fashion, ideally with multiple redundant backups. Higher-resolution files are recommended if practical.
- Adequate camera sensor resolution for publication is a lesser concern now, as newer cameras have far greater resolution than necessary.
- Facial photographs are best taken with a portrait lens of around 90- to 110-mm focal length to minimize distortion.
- When using a smartphone or point-and-shoot camera, the best results are achieved by stepping back from the subject and zooming in.

#### **Suggested Reading**

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# 4 Patient Safety in Aesthetic Surgery

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#### Abstract

Patient safety in aesthetic surgery is a dynamic and complex topic that is a core concern for any cosmetic practice. It represents a complex interaction between balancing medical risk factors, minimizing morbidity, preventing medical errors, and optimizing patient care. In this chapter we review guidelines and recommendations set forth by major professional societies and review the literature specific to aesthetic surgical patients. Understanding patient-specific risk factors that increase morbidity enables surgeons to perform risk stratification appropriately. Reviewing guidelines related to prevention and treatment of common surgical morbidities enables improved quality and optimal outcomes.

#### Keywords

plastic surgery, aesthetic surgery, cosmetic surgery, patient safety

# 4.1 Introduction

Patient safety represents a complex interaction between balancing medical risk factors, minimizing morbidity, preventing medical errors, and optimizing patient care. Every plastic surgeon must be adept at appropriate patient selection and risk management and be well-versed in guidelines and policies that enhance patient safety. Many of these guidelines and recommendations are not taught and are not specific to aesthetic surgery. We collect methodology from other medical disciplines to create evidence-based guidelines so as to manage risk effectively, especially in this special subset of patients in whom elective procedures are being performed. Recently, several large databases have become available for collection of outcome data specific to the aesthetic surgery population. This has allowed more accurate identification of important risk factors applicable to these patients and this specific subset of procedures. It is with this continued enthusiasm that we can optimize patient safety in aesthetic surgery.

The landmark report *To Err is Human: Building a Safer Health System*, issued by the Institute of Medicine in 1999, identified preventable medical errors as an obstacle to patient safety. This report estimated that approximately 44,000 to 98,000 Americans died annually secondary to preventable medical errors, costing the health care system over \$79 billion. It defined medical error as "the failure to complete a planned action as intended or the use of a wrong plan to achieve an aim," and it concluded that more than half of surgical adverse events are preventable. It was in response to this that the patient safety movement was founded. Large public health agencies such as the Centers for Disease Control and Prevention (CDC), World Health Organization (WHO), Centers for Medicare and Medicaid Services took on the task of improving quality and safety in health care.

The amount of information regarding patient safety is staggering. Luckily, the national plastic surgery professional associations—the American Society for Aesthetic Plastic Surgery (ASAPS) and the American Society of Plastic Surgeons (ASPS)—have created easily accessible documents and consensus statements regarding the most important patient safety initiatives. It is these guidelines, as well as the evidence available to support their adoption in aesthetic surgery, that we will review in this chapter.

# 4.2 Patient Selection: Risk Management

In order to optimize outcomes and minimize risk, appropriate patient selection is imperative. During the initial consultation, it is important to recognize the patient's behavior and identify warning signs that may affect ultimate patient satisfaction (such as fixed psychological or social problems or defensive mannerisms). At the same time, it is the surgeon's responsibility to assess the suitability for ambulatory plastic surgery. This involves a complete history and physical exam, including important patient-specific risk factors such as age, gender, body mass index (BMI), smoking status, and other complicating medical factors that could affect morbidity. Most of these factors will each be discussed separately later in the chapter. The preoperative consult must also include strategies to enhance the perioperative process, including documented informed consent, adequate photo documentation, a review of postoperative expectations, compliance with postoperative instructions, and a pregnancy test on female patients of childbearing age.

# 4.3 Patient Selection: Patient-Related Risk Factors

A complete preoperative history and physical exam can easily identify patient-specific risk factors that can increase the risk of intraoperative adverse events and postoperative complications. Identifying these risk factors as they relate to aesthetic procedures and quantifying how they impact adverse events are important. In 2009, the ASPS Patient Safety Committee published evidence-based guidelines regarding patient selection and procedures in ambulatory surgery. It has made recommendations and graded them based on the strength of the supporting data (**Table 4.1**). In subsequent years, our group has had the opportunity to publish extensively on how many of these patient characteristics and comorbidities specifically affect the aesthetic surgical patient and how they relate to complications following specific aesthetic procedures.

Iable 4.1         Scale for grading recommendations						
Grade	Descriptor	Qualifying evidence	Implications for practice			
А	Strong recommendation	Level I evidence or consistent findings from multiple studies of levels II, III, or IV	Clinicians should follow a strong recommendation unless a clear and compelling rationale for an alternative approach is present			
В	Recommendation	Level II, III, or IV evidence and findings are generally consistent	Generally, clinicians should follow a recommendation but should remain alert to new information and sensitive to patient preferences			
С	Option	Level II, III, or IV evidence, but findings are inconsistent	Physicians should be flexible in their decision making regarding appropriate practice, although they may set bounds on alternatives; patient preference should have a substantial influencing role			
D	Option	Level V: little or no systematic empirical evidence	Clinicians should consider all options in their decision making and be alert to new published evidence that clarifies the balance of benefit versus harm; patient preference should have a substantial influencing role			

Data from American Society of Plastic Surgery, Grading Recommendations, available at www.plasticsurgery.org.

### 4.3.1 Age

Adults over the age of 65 represent approximately 13% of the current population in the United States, and the number of elderly people seeking aesthetic procedures is increasing. There has been conflicting evidence that older age contributes to intraoperative or postoperative risk in the ambulatory surgery setting. Increasing age is often associated with increased comorbidities, but age alone should not constitute a contraindication to ambulatory surgery. In one of our previous studies that used the CosmetAssure<sup>™</sup> database to assess age as an independent risk factor for postoperative complications, we found a major complication rate of 2.2% in octogenarians, a number comparable to younger cohorts. Other studies have shown that individuals older than 65 years were 1.4 times more likely to experience an intraoperative event and 2.0 times more likely to experience an intraoperative cardiovascular event; however, this risk is dependent on the patient's overall health, the presence and severity of cardiovascular disease, and the nature of the surgical procedure. In conclusion, while age may increase the presence of comorbid conditions, age alone does not appear to be an independent risk factor in cosmetic surgery when these factors are controlled for.

#### 4.3.2 Gender

Gender-based disparities in surgical outcomes have long been documented across several disciplines. It has been shown that men are more likely to have higher morbidity and mortality following operative treatment of hip fractures, higher incidence of pneumonia after blunt trauma, and increased peripheral neurovascular complications secondary to diabetes. Yet the surgical literature evaluating clinical outcomes of cosmetic surgery in men is limited. Our group has recently shown that men demonstrate a similar overall complication rate compared to women. However, when specific complications were analyzed, men appeared to have significantly higher hematoma rates but a lower incidence of surgical site infections. This was especially true for facelift procedures in men versus women (1.4% vs 0.5%). This has been supported by other large-volume studies that suggest that the relative risk of hematoma in male patients is as

high as 3.86 compared with females. On multivariate analysis, independent predictors of major complications in men include BMI greater than 25 kg/m<sup>2</sup> (relative risk [RR] 1.05; p < 0.01), procedures performed in hospital-based settings as opposed to office-based procedures (RR 3.47; p < 0.01), and combined procedures (RR 2.56; p < 0.01). In conclusion, aesthetic surgery in men is safe, with low complication rates comparable to those in women. Care must be taken to achieve excellent hemostasis, as men have a higher risk of hematoma. Modifiable predictors of complications to consider are BMI and combined procedures.

#### 4.3.3 Body Mass Index

Nearly 70% of adults in the United States are overweight or obese (BMI greater than 25 kg/m<sup>2</sup>), and this constitutes over a third of patients seeking cosmetic surgical procedures. Obesity is not just an epidemic of the current era; more important, it is associated with cardiovascular disease, diabetes, hypertension, obstructive sleep apnea, and increased infections. Studies have also shown that obesity correlates with failed regional anesthetic block, unplanned hospital admissions, and respiratory complications. Our group has shown that not only does obesity increase complication rates, but these rates also increase with increasing BMI (Fig. 4.1). Specifically, surgical site infections, venous thromboembolism (VTE), and pulmonary dysfunction were twice as common among overweight patients. Complications following abdominal and body contouring procedures, or combinations of breast and body procedures, were also significantly higher. On multivariate analysis, we found that being overweight (BMI 25–29.9 kg/m<sup>2</sup>) and obese (BMI > 30 kg/m<sup>2</sup>) were independent risk factors of any complication, especially surgical site infection and VTE. Mechanisms by which obesity affects surgical morbidity and mortality are not entirely clear. However, the proinflammatory state is promoted by extra adipose tissue and may foster an environment that makes patients susceptible to injury in times of stress. Local wound complications in obesity have also been well documented. Reviews of abdominoplasty and breast reduction patients have found higher rates of wound dehiscence and seroma. Obesity and venous thromboembolism also have a known relationship. In the Caprini risk assessment model, which



Fig. 4.1 Major complications stratified by body mass index (BMI) category. VTE: venous thromboembolism.

has been validated for use in plastic and reconstructive surgery, BMI greater than 25 represents an independent risk factor and may be used as a factor when considering pharmacologic VTE prophylaxis. In conclusion, BMI has a direct and proportional relationship to the incidence of both minor and major complications following aesthetic surgery.

#### 4.3.4 Smoking

All patients should be asked about their smoking history as well as their exposure to second-hand smoke. Smoking is a well-established risk factor for atherosclerotic disease and has been shown to increase the overall risk of complications in plastic surgery. Smoking can lead to increased production and activation of fibrinogen and has been associated with VTE. It also alters the microcirculation and can compromise flap survival. Many plastic surgeons do not offer certain aesthetic procedures to smokers, and the ASPS evidence-based recommendations encourage smoking cessation anywhere from 24 hours to 6 to 8 weeks before surgery (Grade B Recommendation) and up to 7 days following surgery (Grade D Recommendation). The CDC recommends smoking cessation at least 4 weeks before surgery. Patient compliance with smoking cessation can be ensured by blood, urine, or saliva test and is encouraged.

#### 4.3.5 American Society of Anesthesiologists Status

The American Society of Anesthesiologists (ASA) status has been accepted as the standard for assessing preoperative condition (**Table 4.2**). Patients should be assigned an ASA classification, and this should be used for risk stratification. Large, hospital-based ambulatory surgery studies have shown that ASA II or III was a predictive factor for unanticipated hospital admission that increased the risk over twofold. Other retrospective studies have shown that risk significantly increased between ASA class II and III. Many cosmetic surgeons feel that a patient with an ASA class

Table 4.2	American Society of Anesthesiologists physical status
classificati	on

classification				
Class	Description of status			
ASA I	Normal, healthy			
ASA II	Mild systemic disease			
ASA III	Severe systemic disease			
ASA IV	Severe systemic disease that is a constant threat to life			
ASA V	Not expected to survive without the operation			
ASA VI	Organ donor			

Data from the American Society of Anesthesiologists, available at https://www.asahq.org/standards-and-guidelines/asa-physical-status-classification-system.

of IV is not suitable to undergo elective cosmetic surgery. This is in line with ASPS evidence-based recommendations, which state that patients categorized as ASA class I to III can be considered for ambulatory surgery (Grade B Recommendation).

#### 4.3.6 Diabetes Mellitus

Diabetes mellitus is a common chronic disease affecting 9%, or 29 million, of the U.S. population and is considered a risk factor for a variety of perioperative adverse events. Diabetics are nearly twice as likely to be overweight or obese as nondiabetic patients and are at higher risk of infection due to impaired immune function secondary to hyperglycemia. Studies have demonstrated decreased granulocyte function and microbicidal action in diabetics. Complications from hyperglycemia can be reduced with improved glycemic control; however, optimal perioperative glucose targets have not been established, and highly intensive insulin regimens are associated with minimal benefits and the risk of hypoglycemia.

Our group has shown that in aesthetic surgery patients, diabetics have significantly more complications than nondiabetics (3.1% vs 1.9%, p < 0.01), especially in body cases, most notably abdominoplasty (**Fig. 4.2**). Diabetics were also more likely to have wound infections and pulmonary complications. In conclusion, a preoperative diagnosis of diabetes mellitus is an independent risk factor for complications in the aesthetic surgery patient. It is prudent to set the right expectations in the preoperative period by notifying diabetic patients of their increased risk of complications, reviewing and optimizing their hemoglobin A1c, and ensuring adequate glucose control in the perioperative period.

## 4.3.7 Obstructive Sleep Apnea and Obstructive Lung Disease

The significance of obstructive sleep apnea in the ambulatory surgery setting is unclear, largely because it is difficult to separate the effects of surgery from the consequence of apnea. In addition, the diagnosis of obstructive sleep apnea often coincides with other comorbidities, such as obesity, hypertension, and diabetes. However, retrospective studies comparing patients with obstructive sleep apnea to those without, controlling for other comorbid conditions, have shown no difference in the rate of unplanned hospital admissions. Nevertheless, the ASA guidelines



**Fig. 4.2** Major complications in diabetic versus nondiabetic patients following aesthetic surgery on different body regions. Breast procedures include augmentation, mastopexy, reduction, and gynecomastia correction. Body procedures include buttock lift, calf implant, labiaplasty, lower body lift, thigh lift, brachioplasty, and upper body lift. Face procedures include blepharoplasty, brow lift, cheek implant, chin augmentation, facelift, facial resurfacing, hair replacement, otoplasty, and rhinoplasty. Numbers in red indicate statistical significance with p < 0.05.

state that patients with prior diagnosis of obstructive sleep apnea have an increased risk for respiratory depression and may require longer postoperative monitoring. Respiratory depression is more prominent with general anesthesia and postoperative opioid use. For this reason, the ASPS evidence-based recommendations reflect the ASA guidelines and state that patients with a diagnosis of obstructive sleep apnea are at increased risk of perioperative complications and are generally not appropriate candidates for procedures in free-standing outpatient settings (Grade D recommendation). In addition, systemic opioids should be avoided, continuous supplemental oxygen should be strongly considered, and continuous positive airway pressure (CPAP) machines should be utilized.

With regard to obstructive lung disease, patients may be considered appropriate in the ambulatory setting if they are free from symptoms and have optimal lung function documented preoperatively. If patients have symptoms, elective surgery should be postponed, and patients should be free from steroid therapy for at least 6 months prior to elective surgery (Grade D recommendation).

#### 4.3.8 Cardiovascular Conditions

There is evidence in the literature indicating that patients affected by various cardiovascular conditions, such as heart disease, stroke, or hypertension, are at increased risk for intraoperative hemorrhage and postoperative complications in the ambulatory setting. According to the American College of Cardiology guidelines, patients with active cardiac conditions should be treated and cleared prior to undergoing elective surgery. However, those with remote/prior myocardial infarction (> 6 months), New York Heart Association class I heart failure, and asymptomatic valvular disease can be considered for ambulatory surgery. Patients with cardiovascular conditions are often

on anticoagulation. While some studies have shown that continued aspirin use (75–300 mg) before surgery is an independent risk factor for intraoperative and postoperative bleeding, the increase in bleeding duration and severity is small. Risks and benefits are likely patient-specific and directly related to the procedure at hand and should be discussed with the patient preoperatively. Patients on other anticoagulation therapies, such as warfarin or clopidogrel, are likely at higher bleeding risk. Many of these patients can be safely bridged on some form of heparin therapy, but these decisions should be made in conjunction with a cardiologist, as stopping anticoagulation for any period of time may be unsafe in this specific patient subset.

# 4.4 Patient Selection: Postoperative Complications

Patient-specific risk factors, in combination with certain aesthetic procedures or groups of aesthetic procedures, may put patients at increased risk of particular postoperative complications, the most common being surgical site infection, hematoma, and life-threatening VTE. Our group has been able to use a large, prospectively maintained insurance database of aesthetic surgery patients to gather outcome data to assist in identifying particular subgroups at risk. In this way, we hope to assist plastic surgeons with patient selection and informed consent.

# 4.5 Surgical Site Infection

Surgical site infections represent one of the most common postoperative complications in patients undergoing aesthetic surgery, and while overall incidence is low, the potential outcome for the cosmetic patient can be devastating. The role of perioperative antibiotics in preventing surgical site infection is clear, and they are utilized to target the most likely contaminant. Most often, a first-generation cephalosporin is used, given anywhere from 30 to 60 minutes before incision is made. Alternative antibiotics are chosen based on risk factors and patient allergies.

It is important to understand the incidence and risk factors for major surgical site infections, in order to be able to risk-stratify patients, as well as prepare to intervene when necessary. Our group, again using the large, prospectively maintained CosmetAssure™ database of exclusively aesthetic surgery patients, found the incidence of major surgical site infections requiring emergency room visit, hospital admission, or reoperation to be low (0.46%). Wound infections were more likely in smokers, who had a 61% increase in risk compared to nonsmokers. These findings have been duplicated among multiple surgical specialties. Smoking can affect the microenvironment of the tissue through nicotine's vasoconstrictive and hypoxic effect and potentially compromise all phases of wound healing. In randomized controlled trials, smoking cessation for at least 4 weeks prior to surgery was associated with reduced infectious complications, potentially due to improvement in inflammatory cell and host defense functions.

Diabetes mellitus has inconsistently been reported as a risk factor specific for surgical site infections, but our group found that diabetes increased the risk for major wound infections in cosmetic surgery patients by 58%. While it is unclear whether this is related to perioperative glucose control, we continue to recommend obtaining a hemoglobin A1c as part of the medical clearance (ideally less than 7%). While cosmetic surgery can safely be performed on diabetics, patients should be warned of their increased risk for complications, especially in body procedures, as mentioned previously.

Trunk and extremity procedures were an independent risk factor for major surgical site infections on multivariate analysis; in fact, trunk and extremity procedures were the strongest predictor of wound infections of any independent risk factor, with a relative risk of 2.42. Of note, in our analysis, the majority of patients (68%) underwent a combined procedure. Combined procedures had a relative risk of 1.88, which was statistically significant. Even though the increase in complication rate in combined procedures is less than the sum of the complication rates of each procedure done separately, it still requires careful consideration. There was a trend toward a higher surgical site infection rate with each additional region added to the operation (Table 4.3). It should be noted that our group did not control for operative time, which has been shown in numerous other studies to be an independent variable associated with increased surgical site infections and is logically lengthened with combination procedures.

**Table 4.3** Incidence of surgical site infections among different

 procedure combinations per body region(s), stratified by gender

Body region(s)	Surgical site infection	Surgical site infection (male)	Surgical site infection (female)
Face	34 (0.2%)	5 (0.2%)	29 (0.2%)
Breast	143 (0.2%)	1 (0.1%)	142 (0.3%)
Body	266 (0.8%)	14 (0.5%)	252 (0.9%)
Face + Breast	5 (0.4%)	0	5 (0.4%)
Face + Body	15 (0.6%)	2 (0.7%)	15 (0.6%)
Breast + Body	132 (1.0%)	2 (0.3%)	130 (1.0%)
Face + Breast + Body	4 (0.9%)	1 (5.9%)	3 (0.7%)

#### 4.5.1 Hematoma

Hematoma is another very common complication in aesthetic surgery patients. In a previous study of 129,007 patients undergoing cosmetic procedures, multivariate analysis showed age, male gender, combined procedures, and procedures performed on the breast to be independent risk factors for developing major hematomas requiring emergency room visit, hospital admission, or reoperation. While our group has shown that aesthetic surgery is safe in the elderly, the data shows that advancing age can be an independent risk factor for hematoma development. This could be related to undiagnosed or untreated hypertension, or higher ASA class, which was not specifically looked at by the study.

Gender has also been previously identified as a risk factor for the development of postoperative hematoma in different plastic surgery populations, specifically breast surgery, facelift, and body contouring procedures. Male gender had a relative risk of 1.98 for major hematoma in our analysis.

Combined procedures and breast procedures were additional independent predictors for hematoma development. However, BMI, smoking, and diabetes, which are risk factors for overall complications, did not show significance with the development of hematoma specifically.

#### 4.5.2 Venous Thromboembolism

VTE, including both deep venous thrombosis (DVT) and pulmonary embolism (PE), remains one of the most feared complications in all of medicine. In the postsurgical patient, the period of highest risk for fatal PE is within the first 3 to 7 postoperative days, with the estimated 28-day mortality for a first episode of VTE being 11%. The American Association for Accreditation of Ambulatory Surgery Facilities (AAAASF) reported that between January 2001 and June 2006, there were 23 deaths among approximately 1 million outpatient aesthetic surgery procedures, 134 of which resulted from PE (57%). The procedure with the highest rate of postoperative mortality was abdominoplasty, followed by facelift surgery in combination with other procedures.

In 2008, the release of a report by the Surgeon General's office identified VTE as one of the leading public health problems. It stated that 20% of people with PE die, and postoperative surgical patients are at highest risk up to 3 months following surgery. In response, the ASPS created the Venous Thromboembolism Task Force to assist plastic surgeons in implementing best practices for VTE prevention. Among these was endorsement of the 2005 Caprini Risk Assessment Scale, which has been validated for use in plastic surgery patients and is now the most commonly used tool in cosmetic surgery to assess a patient's VTE risk profile (Fig. 4.3). In the Caprini model, VTE risk factors are assigned points, and the points are added to assess overall risk. The ASPS follows with recommendations on anticoagulation strategies based on the Caprini score (Fig. 4.3). Most notably, a score as low as 3 is considered an indication for use of postoperative chemical chemoprophylaxis (Grade B recommendation), and a score of 7 or more should be an indication to strongly consider using extended postoperative chemical prophylaxis (Fig. 4.4). This is in accordance with the American College of Chest Physicians (ACCP) recommendations that all surgical patients receive mechanical and chemoprophylaxis for venous thromboembolism unless they are undergoing a minor procedure or have a high risk of bleeding. The variety of procedures and what defines "minor" surgery in the aesthetic surgical patient make studying VTE in this population especially difficult.

One of our previous studies examined 129,007 aesthetic surgical patients and found the rate of major VTE to be 0.09%. Age and BMI were found to be the only significant patient characteristics that were predictors for VTE. Smoking and diabetes were also evaluated but not found to be risk factors. This is inline with the Caprini model, which assigns both age and BMI one point but does not include smoking or the diagnosis of diabetes in their model. In multivariate logistic regression analysis, body procedures and combined procedures were found to increase the risk of VTE most significantly (**Fig. 4.5**). The ACCP data and the Caprini model do not



Fig. 4.3 American Society of Plastic Surgeons thrombosis risk factor assessment, adopted from the 2005 Caprini Risk Assessment Model.

look specifically at plastic surgery procedures. However, smaller studies have shown that abdominoplasty specifically, as well as all body procedures, increases the risk of VTE significantly, compared with procedures performed on other body locations such as breast and face. We have also shown that face procedures, breast procedures, or combining face and breast procedures confers an overall low risk of VTE. However, body procedures, or any combinations that include body procedures, impose greater risk. In conclusion, while the overall incidence of VTE in cosmetic procedures is relatively low, the risk increases with BMI and age, as well as with combined procedures involving trunk and extremities.

# 4.6 Safety of Combining Aesthetic Procedures

Combining procedures is common practice in aesthetic surgery, not only because it reduces cost and improves efficiency but also because multiple procedures may be needed for a more balanced overall result or because patients desire multiple areas to be addressed. Our group has shown that because the incidence of major complications is relatively low in the aesthetic surgical patient, the cumulative risk of multiple procedures is
ASPS VTE Task Force Risk Assessment and Prevention Recommendations				
Ар	proved by ti	ie ASPS Execu	ltive C	committee in july 2011
		Step 1: Risk S	Stratifi	cation
Patient Population		Recon	nmendation	
<b>In-patient</b> adult aesthetic and reconstructive plastic surgery who undergo general anesthesia		Should in orde individ Or Should 2005 C based o	I complete a 2005 Caprini RAM risk factor assessment tool r to stratify patients into a VTE risk category based on their ual risk factors. <b>Grade B</b> I complete a VTE risk assessment tool comparable to the aprini RAM in order to stratify patients into a VTE risk category on their individual risk factors. <b>Grade D</b>	
<b>Out-patient</b> adult aesthetic and reconstructive plastic surgery who undergo general anesthesia		Should tool in based o Or Should to the s catego	I consider completing a 2005 Caprini RAM risk factor assessment order to stratify patients into a VTE risk category on their individual risk factors. <b>Grade B</b> I consider completing a VTE risk assessment tool comparable 2005 Caprini RAM in order to stratify patients into a VTE risk ry based on their individual risk factors. <b>Grade D</b>	
		Step 2: Pr	eventi	on
Patient Population 2	2005 Caprini RAM Score	Recommendatic	ons	The scores Based apply to the 2005 Caprini RAM and were not intended for use with alternative VTE risk assessment tools
<b>Elective Surgery Patients</b> (when the procedure is scheduled in advance and is not performed to treat an emergency or urgent condition)	7 or more	<b>Should consider</b> utilizing risk reduction strategies such as limiting OR times, weight reduction, discontinuing hormone replacement therapy, and early postoperative mobilization. <b>Grade C</b>		
Patients undergoing one of the following major procedures when performed under general anesthesia lasting more than 60 minutes:	3 to 6			
Body contouring,     Abdominoplasty,     Breast reconstruction,     Lower extremity procedures.	3 or more	<ul> <li>Should consider the option to utilize mechanical prophylaxis throughout the duration of chemical prophylaxis for non-ambulatory patients. Grade D</li> <li>Should strongly consider the option to use extended LMWH postoperative prophylaxis. Grade B</li> </ul>		
Head/neck cancer procedures	7 or more			

Fig. 4.4 ASPS Venothromboembolism (VTE) Task Force risk assessment and prevention recommendations (based on 2005 Caprini Risk Assessment Model).

often acceptable, and not directly additive. We have shown, as mentioned in prior sections of this chapter, that certain patient characteristics, such as elevated BMI, can increase the risk of both individual and combined procedures. We have also shown that the risk of these complications in combined procedures increases when the trunk and extremities are involved. Now that we have been able to define these additive risks, they should be adequately disclosed to our patients as part of our preoperative discussion and informed consent.

# 4.7 Safety of Office-Based Procedures

Over the past decade, there has been a dramatic rise in officebased surgery across surgical subspecialties, particularly in aesthetic surgery. According to the American Society of Aesthetic Plastic Surgery (ASAPS), there was over a 5% increase in officebased cosmetic procedures from 56.3% to 61.9% from 2014 to



**Fig. 4.5** Venous thromboembolism (VTE) in single versus combined procedures (p < 0.05).

2015. Guidelines and regulation to assist with safety exist in only 31 states, and regulations often vary from state to state. As part of the regulatory process, some states require accreditation from one of the three accreditation agencies: the Joint Commission on Accreditation of Healthcare Organizations (JCAHO, often referred to simply as the Joint Commission), the American Association for Accreditation of Ambulatory Surgery Facilities (AAASF), and the Accreditation Association for Ambulatory Healthcare. Much of the published literature regarding the safety of office-based surgery is limited to surveys, single-practice/surgeon retrospective reviews, or noncosmetic literature. Using the CosmetAssure database, our group looked at over 129,000 patients (183,914 procedures), 57.4% of whom had procedures done at ambulatory surgery centers (ASCs), 26.7% at hospitals, and 15.9% at officebased surgery suites (OBSS). Complication rates were lowest at OBSS (1.3%), as compared with ASCs and hospitals (1.9% and 2.4%, respectively). On multivariate analysis, there was a lower risk of developing a complication in an OBSS compared to an ASC (RR 0.67, 95% confidence interval [CI] 0.59–0.77, p < 0.01). These results are in line with other published studies that conclude that office-based surgery by board-certified or eligible plastic surgeons is safe and of relatively low risk. The most common complications were hematoma and infection. It should be noted that patients with significant comorbidities, generally reflected in ASA, may be preferentially treated in the hospital setting, possibly contributing to higher complication rates observed in hospitals; however, it is generally noted that most patients with higher ASA classifications (III, IV) may not be suitable candidates for elective cosmetic surgery at all. This study adds validity to other published studies and suggests that procedures performed in OBSS are generally safe. This is especially true in the setting of appropriate accreditation and sound clinical judgment.

# 4.8 Perioperative Considerations

Any conversation regarding perioperative patient safety would not be complete without discussing the importance of communication in the operating room and the adoption of crew resource management as a method to improve communication, reduce errors, and improve patient safety. In addition, important issues regarding perioperative patient safety include appropriate patient positioning, adequate skin preparation, prevention of hypothermia, and being prepared to manage crisis situations, most notably malignant hyperthermia.

## 4.8.1 Communication at Fault

In 2006, the Joint Commission reported that 70% of all sentinel events in health care were caused by communication failures. Now communication failures are largely touted as being the most common, and likely most modifiable, preventable cause of medical error. Communication errors likely involve verbal communication between two people but can also include ambiguity about delegation of responsibility.

## 4.8.2 Crew Resource Management and Checklists

Crew resource management, adopted first in the aviation industry, has been shown to improve performance, safety, communication, and morale as well as to decrease incidents related to crew error. The concept was designed after the industry realized that anywhere from 50% to 80% of significant aviation incidents were caused by human rather than mechanical error. The Federal Aviation Administration defines crew resource management as "an active process by crew members to identify significant threats to an operation, communicate them to a person in charge, and to develop, communicate, and carry out a plan to avoid or mitigate each threat."

Adopting from successful safety practices in the aviation industry, the Joint Commission and WHO have developed a universal protocol and surgical checklist to assist hospitals and organizations improve system-based practices and patient safety (**Fig. 4.6**). The "Safe Surgery Saves Lives Challenge," which included adoption of the WHO surgical checklist, was prospectively studied and showed a significant decrease in death rate from 1.5% to 0.8%, and in complication rate from 11% to 7%, after implementing use of the checklist.

## 4.8.3 Patient Positioning

Patient safety regarding positioning cannot be overlooked. Advanced age, extremes of body habitus, poor nutritional status, pulmonary or cardiovascular disease, or preexisting limitations in movement can predispose patients to injury. An extensive review of intraoperative patient positions is beyond the scope of this chapter; however, the most noteworthy goal with regard to patient positioning is prevention of pressure ulcers, which have a surprising incidence of 4.6 to 26%. The ASPS has identified six factors that may prevent the formation of pressure ulcers: preventing hypotension or local hypoperfusion, padding pressure points to prevent local pressure in excess of 32 mm Hg, padding pressure points with layers; reducing operative time to 90 to 120 minutes, preventing skin moisture buildup (i.e., skin preparation or irrigation) and reducing shear and friction forces during transfer.

## 4.8.4 Skin Preparation/Scrub

It is clear that antiseptic technique in the operating room has been one of the single greatest patient safety maneuvers. Skin



Fig. 4.6 World Health Organization (WHO) Surgical Safety Checklist.

preparation, hand antisepsis, and other barriers (such as dedicated operating room clothing, masks, and caps) are meant to minimize surgical site infections as well as to decrease exposure to the surgeon and operating room staff.

A recent review of hand antisepsis techniques suggested that rubbing with an alcohol-based solution is more effective than scrubbing. While scrubbing eliminates transient bacteria, it removes the stratum corneum and can cause excoriation and colonization. Like hand scrubs, an ideal skin preparation solution is broad-spectrum, safe, and easy to use. Commonly used techniques are an iodine soap scrub followed by a paint; alcohol-based preparations with either iodophor or chlorhexidine; or a simple soap-and-water preparation. The CDC and the Association of periOperative Registered Nurses also recommend the avoidance of shaving operative sites, showering or use of a surgical wash prior to antiseptic skin preparation, and the need to allow alcohol-based preparations to dry to prevent operating room fires.

## 4.8.5 Importance of Normothermia

Hypothermia is defined as a drop in core body temperature below 36.5 °C. Regional and general anesthesia can affect the body's ability to regulate core body temperature. Therefore, it is important that resources be available to assist in heating the cold patient, such as forced-air warming blankets and fluid warmers

for intravenous and irrigation fluids. Many studies involving surgical patients have shown that hypothermia correlates with adverse outcomes, including wound infections and bleeding, as well as more serious cardiac events. For this reason, ASPS has developed evidence-based recommendations regarding hypothermia that include protocols for hypothermia prevention during general or regional anesthesia. These include actively prewarming patients, monitoring core body temperature throughout the procedure, active intraoperative warming with forced-air heater or resistive-heating blankets, minimizing repositioning, warm intravenous and irrigation fluids, and aggressive treatment of postoperative shivering with heat or other pharmacologic interventions (Grade B recommendations). In addition, procedures that do not have all of these strategies available should be limited to 1 to 2 hours in duration and involve no more than 20% of the body surface area.

## 4.8.6 Management of Malignant Hyperthermia

Malignant hyperthermia is an inherited genetic disorder that causes a hypermetabolic reaction to potent volatile anesthetic gases and the depolarizing muscle relaxant succinylcholine. It is important in the discussion on patient safety because it represents a preventable and treatable cause of surgical patient mortality. Understanding the disease, how to appropriately identify and screen patients at risk, and how to treat malignant hyperthermia crisis can save lives.

The incidence of malignant hyperthermia episodes is thought to be between 1 in 5,000 and 1 in 100,000 anesthetic encounters. Malignant hyperthermia is inherited in an autosomal dominant pattern with variable penetrance and has been linked to the ryanodine receptor type 1 gene, as well as the gene that codes for the alpha subunit of the dihydropyridine receptor. Because of this known mode of inheritance, preoperative family history is of utmost importance. The patient's medical history intake should also inquire about other myopathies and inherited muscular dystrophies that can influence anesthetic choice. Common volatile inhaled anesthetics as well as succinvlcholine can trigger the clinical condition that results from abnormal release of calcium by muscle cells, ultimately resulting in hyperthermia, hypercapnia, hyperphosphatemia, and metabolic acidosis. Patients who are at risk should be referred to the Malignant Hyperthermia Association of the United States for further testing, which could include genetic testing or the gold standard caffeine-halothane contracture test. The latter involves a muscle biopsy and must be performed in an accredited facility.

While guidelines regarding patient selection and facility requirements have been established by multiple anesthesia and surgical societies, both ASAPS and ASPS require that their members operate only in accredited or licensed facilities for all procedures that involve more than local anesthesia. Officebased surgical centers should have reviewed state and national guidelines and should be prepared with appropriate monitoring equipment and treatment drugs (which include dantrolene, dextrose 50%, antiarrhythmics, calcium chloride, sodium bicarbonate, insulin, furosemide, and adequate ice), as well as an established malignant hyperthermia emergency protocol.

Nontriggering agents must be used in all susceptible and suspect patients. However, it should be noted that malignant hyperthermia can also be triggered by nontriggering agents in less than 1% of susceptible patients. Treatment protocols have been created by the Malignant Hyperthermia Association of the United States, and a hotline is available 24 hours a day, 365 days a year. Although specific treatment strategies are outside the scope of this chapter, some salient points will be reviewed. While malignant hyperthermia can be clinically difficult to diagnose, a herald sign may be a rising end-tidal carbon dioxide level. Skeletal muscle spasm, trismus, tachycardia, acidosis, hyperthermia, and hyperkalemia are other important signs. Treatment involves discontinuing the offending agent and arranging for immediate transfer of the patient to the hospital. Administration of dantrolene sodium stabilizes the ryanodine receptor and is one of the most critical parts of early resuscitation. It is important to remember that dantrolene must be reconstituted in injectable saline prior to administration.

In conclusion, the aesthetic surgery patient undergoing office procedures with deep sedation or general anesthesia may be at risk for developing malignant hyperthermia, and patients should be adequately screened preoperatively. All facilities should be ready to manage this clinical crisis if encountered. Susceptible individuals identified preoperatively are not candidates for officebased surgery.

# 4.9 Anesthetic Considerations in Aesthetic Surgery

A complete review of anesthetic considerations in office based aesthetic surgery is beyond the scope of this chapter. However, the performance of safe anesthesia (whether that is general, regional, or local), knowledge regarding common postanesthetic complications (e.g., postoperative nausea and vomiting), as well as familiarity with treatment strategies for more serious complications (i.e., local anesthetic systemic toxicity) are imperative in any safe and successful aesthetic practice.

## 4.9.1 Nil per Os

It is common practice to have patients consume nothing by mouth (nil per os, NPO) for 8 hours prior to surgery. This recommendation originated from a paper by Mendelson in 1946 that noted a higher incidence of pulmonary aspiration in obstetric patients undergoing general anesthesia. This recommendation was partially revised 50 years later by the American Society of Anesthesiologists Task Force on Preoperative Fasting, which now recommends a period of fasting for 8 hours after a meal of fried or fatty foods but allows a period of 6 hours for milk or a light meal and 2 hours from clear liquids.

## 4.9.2 Postoperative Nausea and Vomiting

Postoperative nausea and vomiting (PONV) are a major concern for patients and are more pronounced after general anesthesia. This event can affect upward of 70% of the patient population, with young women and nonsmokers, or those with a history of PONV, at highest risk. Not only can PONV reduce surgical satisfaction rates, but it also can impact patient safety with regard to increasing recovery time and possibly causing unplanned hospital admissions. The use of narcotics and nitrous oxide has been associated with increased rate of PONV. Depending on the situation, many anesthesiologists try to minimize or even avoid the use of narcotics in favor of improved local anesthesia and non-narcotic analgesics, such as ketorolac and ketamine. Other agents can prevent or treat PONV include ondansetron (5-hydroxytryptamine [5-HT] antagonist), dexamethasone (steroid), scopolamine (tropane alkaloid), and metoclopramide (dopamine and 5-HT antagonist). Combination therapy targets different pathways to prevent and/or significantly ameliorate PONV for many individuals.

## 4.9.3 Local Anesthetic Systemic Toxicity

The use of local anesthetics is commonplace and usually encouraged in aesthetic surgery. Local anesthetics are often mixed with epinephrine, which allows increased dosing and improved hemostasis. Aesthetic surgeons must be aware of maximum local anesthetic dosing, populations at risk (e.g., extremes of age and pregnancy), as well as rare complications associated with overdose. Local anesthetic systemic toxicity (LAST) is a life-threatening complication of local anesthetic overdose that can cause central nervous system and cardiovascular compromise. The clinical presentation is variable and can occur hours after injection. Systemic effects are related to sodium channel blockade and can present with symptoms of perioral numbness, metallic taste, mental status changes, or seizure. Cardiovascular symptoms begin with tachycardia and hypertension, but this ultimately degrades into bradycardia, hypotension, ventricular arrhythmias, and ultimately asystole with loss of vascular tone. Management of LAST is consistent with guidelines and checklists published by the American Society of Regional Anesthesia and Pain Management and includes stopping the injection and calling for help. The Association of Anaesthetists of Great Britain and Ireland (AAGBI) have also created safety guidelines that summarize common recommendations for treatment (**Fig. 4.7**). Advanced cardiac life support is instituted, and intravenous lipid emulsion therapy is initiated. Twenty percent lipid emulsion therapy is administered at a bolus dose by weight and then continued

# **AAGBI Safety Guideline**



**Management of Severe Local Anaesthetic Toxicity** 

1	Signs of severe toxicity: • Sudden alteration in mental status, severe agitation or loss of consciousness,		
Recognition	<ul> <li>with or without tonic-clonic convulsions</li> <li>Cardiovascular collapse: sinus bradycardia, conduction blocks, asystole and ventricular tachyarrhythmias may all occur</li> <li>Local anaesthetic (LA) toxicity may occur some time after an initial injection</li> </ul>		
2 Immediate management	<ul> <li>Stop injecting the LA</li> <li>Call for help</li> <li>Maintain the airway and, if necessary, secure it with a tracheal tube</li> <li>Give 100% oxygen and ensure adequate lung ventilation (hyperventilation may help by increasing plasma pH in the presence of metabolic acidosis)</li> <li>Confirm or establish intravenous access</li> <li>Control seizures: give a benzodiazepine, thiopental or propofol in small incremental doses</li> <li>Assess cardiovascular status throughout</li> <li>Consider drawing blood for analysis, but do not delay definitive treatment to do this</li> </ul>		
<b>3</b> Treatment	<ul> <li>IN CIRCULATORY ARREST</li> <li>Start cardiopulmonary resuscitation (CPR) using standard protocols</li> <li>Manage arrhythmias using the same protocols, recognising that arrhythmias may be very refractory to treatment</li> <li>Consider the use of cardiopulmonary bypass if available</li> </ul>	WITHOUT CIRCULATORY ARREST Use conventional therapies to treat: • hypotension, • bradycardia, • tachyarrhythmia	
	GIVE INTRAVENOUS LIPID EMULSION (following the regimen overleaf)	CONSIDER INTRAVENOUS LIPID EMULSION (following the regimen overleaf)	
	<ul> <li>Continue CPR throughout treatment with lipid emulsion</li> <li>Recovery from LA-induced cardiac arrest may take &gt;1 h</li> <li>Propofol is not a suitable substitute for lipid emulsion</li> <li>Lidocaine should not be used as an anti-arrhythmic therapy</li> </ul>	<ul> <li>Propofol is not a suitable substitute for lipid emulsion</li> <li>Lidocaine should not be used as an anti-arrhythmic therapy</li> </ul>	
<b>4</b> Follow-up	<ul> <li>Arrange safe transfer to a clinical area with appropriate equipment and suitable staff until sustained recovery is achieved</li> <li>Exclude pancreatitis by regular clinical review, including daily amylase or lipase assays for two days</li> <li>Report cases as follows: <ul> <li>in the United Kingdom to the National Patient Safety Agency (via www.npsa.nhs.uk)</li> <li>in the Republic of Ireland to the Irish Medicines Board (via www.imb.ie)</li> </ul> </li> <li>If Lipid has been given, please also report its use to the international registry at www.lipidrescue.org</li> </ul>		

#### Your nearest bag of Lipid Emulsion is kept....

This guideline is not a standard of medical care. The ultimate judgement with regard to a particular clinical procedure or treatment plan must be made by the clinician in the light of the clinical data presented and the diagnostic and treatment options available. © The Association of Anaesthetists of Great Britian & Ireland 2010

Fig. 4.7 The Association of Anaesthetists of Great Britain and Ireland (AAGBI) safety guidelines regarding management of severe local anesthetic toxicity. (Source: The Association of Anaesthetists of Great Britain and Ireland [AAGBI])

as an infusion. It is believed that the lipid emulsion binds to the local anesthetic and removes it from affected tissues; however, the mechanism is likely multifactorial. In addition to lipids, benzodiazepines can be used to suppress seizure activity, and airway management and circulatory support should be primary objectives.

# 4.10 Concluding Thoughts

The quality of the surgical care that we deliver as aesthetic surgeons is inherently intertwined with optimized patient safety. There are inherent risks to all surgical procedures. Understanding these risks as they relate to patient characteristics, procedures, and outcomes, and using this knowledge to optimize the environment in which we practice aesthetic surgery, are of utmost importance.

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# 5 Sedation and Anesthesia for Aesthetic Surgery

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## Abstract

Sedation and anesthesia for aesthetic surgery are crucial topics for the surgeon to understand in order to optimize the patient experience. General anesthesia provides total anesthesia and a lack of awareness, but it incurs higher costs and risks complications ranging from mild airway irritation to malignant hyperthermia. Monitored anesthesia care and lighter levels of sedation may be used to promote a more rapid recovery but come with their own risk of aspiration due to an unsecured airway, incomplete amnesia and analgesia, and possibly increased difficulty for the surgeon should the patient be inadequately anesthetized. Ultimately, the method of anesthesia for a procedure should be chosen by the patient, surgeon, and anesthesiologist together and guided by the nature of the procedure, medical comorbidities of the patient if any, and capabilities of the chosen facility. In this chapter, we discuss principles for ensuring the safety of patients undergoing aesthetic surgery, choosing an appropriate anesthetic modality, minimizing the associated risks of anesthesia, and managing postoperative complications related to anesthesia in aesthetic surgery patients.

#### Keywords

aesthetic surgery, anesthesia, general anesthesia, monitored anesthesia care, local anesthesia

# 5.1 Preoperative Evaluation

A simple method for screening patients prior to undergoing sedation or general anesthesia is the "Rule of Threes," consisting of the patient's (1) acute history, (2) chronic history, and (3) physical examination.

When taking a patient's acute history, the surgeon should inquire about the patient's exercise tolerance (e.g., how many blocks or flights of stairs the patient can walk or climb before becoming short of breath), history of present illness (e.g., any major organ system abnormalities, including cardiac, pulmonary, renal, and neurologic as well as a history of sleep apnea), prior problems with anesthesia or intubation, and last visit to a primary care physician. Items in the patient history that suggest difficult airway anatomy include prior problems with anesthesia; snoring or sleep apnea; advanced rheumatoid arthritis; and chromosomal abnormalities. Exercise tolerance correlates with a patient's cardiac reserve and is commonly described in metabolic equivalents (METs). Patients able to perform at least 4 METs without becoming short of breath have been shown to have improved perioperative outcomes. Examples of 4 METs include walking 5 city blocks or up one flight of stairs.

The chronic history should include a patient's medications, allergies, social history, and family history of problems with anesthesia.

The physical exam pertinent to patients undergoing sedation or anesthesia should include a careful examination of the patient's airway, heart, and lungs. The oropharynx is assessed and graded using the Mallampati classification, which is a predictor of the ease of orotracheal intubation (**Table 5.1**). Aside from a high (III or IV) Mallampati score, exam findings that may suggest a difficult intubation include obesity, a short neck with limited neck extension, decreased hyoid–mental distance (< 3 cm), cervical spine disease, syndromic facial features, mouth opening < 3 cm, and mandibular anomalies. These findings, if present, should be noted, as they will be relevant if endotracheal intubation is required.

Table 5.1 Mallampati classificationIFaucial pillars, soft palate, uvula, and tonsillar pillars visualizedIIFaucial pillars, soft palate, and uvula visualizedIIISoft palate and base of uvula visualizedIVOnly soft palate visualized

After performing a history and physical examination, the surgeon must determine whether further preoperative testing is necessary prior to proceeding with the planned surgery. Little high-level evidence is available to guide preoperative testing, and current practices are based on guidance from the American Society of Anesthesiologists (ASA), which is largely based on surveys of anesthesiologists. In general, an electrocardiogram may be considered in patients with cardiac risk factors, a chest X-ray may be obtained in patients with pulmonary disease, and a complete blood count may be obtained in patients with a history of bleeding or those on anticoagulation. All women of childbearing age should have a urine pregnancy test prior to undergoing anesthesia.

Patients are commonly stratified according to the ASA classification, which provides a global assessment of a patient's risk of morbidity (**Table 5.2**). Patients in low risk categories (ASA I or II) can be evaluated in the preoperative area on the day of surgery by the anesthesiologist. For patients with recent hospitalizations, body mass index (BMI) > 30, ASA III or greater, anticipated difficult airway, or cardiopulmonary or other significant comorbidities, evaluation by an anesthesiologist should be conducted prior to the day of surgery.

While most patients presenting for aesthetic surgery tend to be in good overall health and present few challenges in terms of preoperative workup or anesthesia, an important exception is patients presenting for body contouring after massive weight loss. Patients who have undergone previous surgery altering their gastrointestinal (GI) tract are at a high risk of nutritional and vitamin deficiencies as well as comorbidities concomitant with their

ASA class	Medical condition
T	Healthy, no medical conditions
Ш	Mild systemic disease
III	Severe systemic disease with functional limitation
IV	Severe systemic disease that is a constant threat to life
V	Moribund patient who will not survive without operation
VI	Organ donor

 Table 5.2
 American Society of Anesthesiologists (ASA) classification of patients

obesity. The combination of the risk factors present in this patient population and the risks of large body contouring surgeries, such as a higher deep venous thrombosis (DVT) rate, make this by far the highest-risk cohort in aesthetic surgery. These patients should undergo a thorough nutrition and medical evaluation prior to surgery and be assessed by the anesthesiologist well ahead of time to optimize any risk factors.

## 5.1.1 Preoperative Home Medication Management

In general, patients should take their home medications the morning of surgery to maintain steady-state serum levels. Exceptions to this rule include antiplatelet and anticoagulant agents, oral hypoglycemic medications, monoamine oxidase inhibitors (e.g., phenelzine), and herbal supplements.

Antiplatelet agents (e.g., aspirin) should be discontinued 7 days prior to surgery. Patients on warfarin prior to surgery should be transitioned to low-molecular-weight heparin by their primary care physician or other provider who manages their anticoagulation. Patients on novel oral anticoagulants (e.g., apixaban [Eliquis], rivaroxaban [Xarelto]) should hold their anticoagulation for four half-lives prior to surgery (commonly a total of 48 hours). Patients with bleeding disorders may require replacement of clotting factors prior to surgery. For a detailed review of bleeding disorders and thrombophilia, one can refer to the review by Haeck et al. Herbal supplements should also be discontinued days to weeks prior to surgery, as these can affect platelet function. It is prudent to consult with the prescribing physician when cessation of antiplatelet or anticoagulant agents may be needed for surgery or if there is any question regarding medications for any cardiovascular or pulmonary disease.

# 5.1.2 Prophylaxis and Anxiolysis

## **Postoperative Nausea and Vomiting**

Postoperative nausea and vomiting (PONV) is an unpleasant experience for patients undergoing aesthetic surgery. It also increases the risk of surgical complications (including wound dehiscence, hematoma, aspiration, and electrolyte abnormalities).

The three most important risk factors for PONV are female sex, nonsmoking status, and a history of motion sickness or prior PONV. One simplified risk stratification system for predicting PONV utilizes these three factors plus the use of postoperative opioids. This risk stratification applies to patients undergoing general anesthesia using inhalational anesthetics. Patients with no risk factors have a 10% risk for PONV. Patients with one risk factor have a 20% risk of PONV. Each additional risk factor adds a 20% risk of PONV, for a maximum risk of 80% in patients who have all four risk factors.

Four proven interventions to reduce the risk of PONV are administration of ondansetron [Zofran], intraoperative dexamethasone 4 mg intravenous (IV), droperidol, and total intravenous anesthesia (due to propofol's antiemetic activity). Each of these interventions reduces the risk by approximately one-fourth, and they work through independent mechanisms. The surgeon may wish to avoid droperidol because of its relatively short half-life and controversial effect on the Q–T interval of the cardiac cycle. Additional antiemetics include anticholinergics (e.g., transdermal scopolamine), benzamides (e.g., metoclopramide [Reglan] 25–50 mg), and substance P receptor antagonists (e.g., aprepitant 125 mg orally [PO]). A suggested algorithm for prevention and treatment of PONV is given in **Table 5.3**.

**Table 5.3** Prevention and treatment of postoperative nausea and vomiting (PONV)

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Condition	Treatment
One risk factor	Dexamethasone 4 mg IV
Two risk factors	Dexamethasone 4 mg IV + ondansetron (Zofran) 4 mg IV
Three risk factors	Dexamethasone 4 mg IV + ondansetron 4 mg IV + total intravenous anesthesia
Four risk factors	dexamethasone 4 mg IV + ondansetron 4 mg IV + total intravenous anesthesia + aprepitant 125 mg PO
Postoperative adjuncts	Ondansetron 4–8 mg every 8 hours IV or ODT Prochlorperazine (Compazine) 10 mg every 6 hours IV or PO Metoclopramide (Reglan) 20 mg every 8 hours IV or PO Trimethobenzamide (Tigan) 300 mg every 6 hours PO or 200 mg every 6 hours IM Droperidol 1.25 mg IV Scopolamine transdermal patch every 72 hours

Dexamethasone IV: after induction

Ondansetron IV: 30 min before end of case

Aprepitant PO: given in PACU

Droperidol: second line, Food and Drug Administration (FDA) black box warning for Q-T interval prolongation in cardiac cycle

Abbreviations: IM, intramuscular; IV, intravenous; ODT, orally disintegrating tablet; PO, orally; PACU, postanesthesia care unit.

Adapted from Apfel C. Postoperative and postdischarge nausea and vomiting: risk assessment and treatment strategies. Anesthesiology News 2008(October 29).

## Anxiety

Many patients benefit from anxiolysis prior to entering the operating room. Anxiolytics can improve the anxious patient's surgical experience and allow earlier onset of amnesia. Common medications used for this purpose include diazepam (Valium) 10 to 20 mg PO on the morning of surgery, and midazolam (Versed) 2 to 4 mg IV prior to entering the operating room.

## Hypertension

Patients undergoing procedures for which hypertension is especially detrimental (e.g., rhytidectomy) may be started on an antihypertensive preoperatively. The goal of preoperative prophylaxis is to decrease the risk that surgical stress, local anesthetic infiltration, and patient awareness will increase blood pressure. Clonidine is commonly used for this purpose, often given as 0.1 to 0.2 mg PO the morning of surgery, and it may be continued twice daily in the perioperative period to reduce the risk of hematoma due to hypertension (**see Chapter 56**). Notably, postoperative analgesia is another key to avoiding hypertension due to poorly controlled pain.

# 5.2 Methods of Anesthesia

The decision of which method of anesthesia to use for a given procedure depends on the patient's medical history, invasiveness and length of the planned procedure, capabilities of the facility, and the preferences of the patient, surgeon, and anesthesiologist.

## 5.2.1 General Anesthesia

General anesthesia achieves unconsciousness and analgesia through intravenous and inhaled agents. Respiratory support is required through either endotracheal intubation (ETT) or laryngeal mask airway (LMA) with a ventilator. Endotracheal intubation provides more definitive airway control with less risk for aspiration, but with a higher risk of postoperative cough, hoarseness, and sore throat (**Table 5.4**), with the opposite being true for LMA. The positioning, type and duration of procedure, and ease of intubation (should it be needed) are all factors that are considered in the LMA vs. ETT decision. For each patient, the airway management method should be discussed and agreed upon with the anesthesia staff.

## 5.2.2 Monitored Anesthesia Care

For patients undergoing less invasive procedures, or those in whom general anesthesia is less desirable, a lighter level of sedation can be provided with monitored anesthesia care (MAC). This provides a deep level of anesthesia, often using infusions such as propofol that are carefully titrated by anesthesia personnel to maintain the patient's spontaneous respirations.

The advantages of MAC include fewer postoperative side effects from anesthesia (e.g., hoarseness and cough as intubation is avoided), more rapid recovery, lower risk of PONV (if propofol is used instead of inhalational anesthetics), and lower cost. This method of anesthesia is ideal for patients undergoing shorter procedures (less than 3 hours) with good airways and baseline pulmonary status. The use of MAC provides a comfortable level of sedation for patients undergoing tumescent liposuction who wish to avoid general anesthesia. The disadvantages of MAC include the skill necessary to titrate the sedative medications carefully, to avoid respiratory depression but provide adequate sedation, and the lack of definitive airway control should the patient be unable to maintain spontaneous ventilation. Patients undergoing MAC should be informed that they may have some awareness of the procedure and that conversion to general endotracheal intubation is possible if there is any concern about maintaining the airway.

# 5.2.3 Sedation

Procedural sedation can range from minimal sedation, in which the patient has mild anxiolysis but responds normally to verbal stimulus, to deep sedation, in which a repeated painful stimulus is required to elicit a purposeful response (Table 5.5). Moderate, or conscious, sedation is commonly used for office-based procedures. During conscious sedation, the patient maintains spontaneous ventilation and is able to respond purposefully to verbal and tactile stimuli. Common medication regimens used for conscious sedation include a combination of a sedative (typically a benzodiazepine) and an opioid, such as midazolam and fentanyl. Benzodiazepine hypersensitivity and a history of acute-angle glaucoma are absolute contraindications to using midazolam. Common dosing regimens for conscious sedation are listed in Table 5.6. Conscious sedation is often administered without the presence of anesthesia personnel, leaving the surgeon responsible for ensuring an appropriate level of sedation. In these cases it is helpful to monitor the patient's

Table 5.4         Airway management in general anesthesia			
Method	Advantages	Disadvantages	
Endotracheal intubation (ETT)	Greatest airway control (e.g., during position changes) Better for cases in high aspiration risk, maintenance of airway patency, pulmonary toilet, maintaining oxygenation	Higher incidence of postoperative cough, hoarseness, sore throat	
Laryngeal mask airway (LMA)	Minimal cardiovascular response during insertion Fewer postoperative complications Reusable device (more cost-effective) Useful in rhinoplasty to act as mechanical barrier for blood entry down gastrointestinal tract	Does not protect against aspiration, gastroesophageal reflux, or upper airway bleeding	

Table 5.5         Types of sedation and anesthesia	
Type of anesthesia / sedation	Definition
General anesthesia	Loss of consciousness, unarousable even to deep painful stimulus
Deep sedation	Responds purposefully to repeated/painful stimulus; respiratory support may be required
Moderate (conscious) sedation	Responds purposefully to verbal or tactile stimulus; spontaneous ventilation maintained
Minimal sedation	Anxiolysis, but responds normally and has a clear airway
Monitored anesthesia care (MAC)	Sedation provided by anesthesiologist, can include conversion to general anesthesia

Adapted from Smith I, Skues M, Philip BK. Ambulatory (Outpatient) Anesthesia. St. Louis, MO: WB Saunders; 2015.

#### Table 5.6 Conscious sedation protocols

Class	Dosing	
Initiation agents		
Benzodiazepine	10–50 mg preoperatively	
Benzodiazepine	0.5–1 mg IV every 5–10 minutes or 0.01 mg/kg preoperatively, then 0.01 mg/kg bolus followed by continuous infusion at 0.08 mg/kg/h	
Dissociative anesthetic	200–750 mcg/kg bolus, followed by 5–20 mcg/kg/min infusion	
Opioid	25–50 mcg every 5–10 min per patient alertness or 0.7 mcg/kg single dose preop	
Reversal agents		
Benzodiazepine antagonist	0.2 mg in incremental doses up to max of 1 mg	
Opioid antagonist	0.1–0.2 mg every 2–3 min up to adequate reversal	
	Class Initiation agents Benzodiazepine Benzodiazepine Dissociative anesthetic Opioid Reversal agents Benzodiazepine antagonist Opioid antagonist	

Adapted from Mustoe TA, Buck DW 2nd, Lalonde DH. The safe management of anesthesia, sedation, and pain in plastic surgery. *Plast Reconstr Surg* 2010;126(4):165e–176e; Cinnella G, Meola S, Portincasa A, et al, Sedation analgesia during office-based plastic surgery procedures: comparison of two opioid regimens. *Plast Reconstr Surg* 2007;119(7):2263–2270.

pulse oximetry continuously and avoid the use of supplemental oxygen. The need for supplemental oxygen is an indicator of an inappropriately deep level of sedation in the absence of anesthesia personnel. Anesthesiology guidelines provide guidance for nonanesthesiologists providing conscious sedation; these are reviewed in **Table 5.7**.

## 5.2.4 Local Anesthesia

Local anesthetics are used as an adjunct in patients under general anesthesia, MAC, and conscious sedation or as a stand-alone analgesic regimen for smaller procedures. Several of the more commonly used local anesthetics are listed in **Table 5.8**.

#### **Local Anesthetics**

Local anesthetics function by crossing the membrane and blocking sodium channels to stabilize the membrane of peripheral nerve axons, thereby preventing depolarization and nerve conduction through pain fibers. There are two classes of local anesthetics: esters and amides. Esters are hydrolyzed by plasma pseudocholinesterases, have shorter half-lives, and are more likely than amides to produce an allergic reaction. Amides are metabolized in the liver and have less potential to cause an allergic reaction but are more likely to accumulate and cause systemic toxicity. In patients who have had an allergic reaction to an ester, an amide may be used for local anesthesia, and vice versa. A useful memory aid is that the amide local anesthetics

 Table 5.7
 Recommendations for patient monitoring during conscious sedation

- An additional staff member is recommended, whose primary responsibility is to monitor the level of sedation.
- The patient's response to verbal commands should be verified every 5 minutes. For patients unable to give a verbal response, a "thumbs up" can suffice to ensure that the level of sedation is not excessively deep.
- Pulse oximetry, capnography, and heart rate should be monitored continuously. Blood pressure should be measured every 5 minutes, and patients with significant cardiovascular disease should be monitored with a continuous electrocardiogram.
- It is recommended that someone with the ability to establish airway access and institute positive pressure ventilation be present. It is also recommended that emergency equipment be available in locations where conscious sedation is provided.

Adapted from Practice Guidelines for Moderate Procedural Sedation and Analgesia 2018: A Report by the American Society of Anesthesiologists Task Force on Moderate Procedural Sedation and Analgesia, the American Association of Oral and Maxillofacial Surgeons, American College of Radiology, American Dental Association, American Society of Dentist Anesthesiologists, and Society of Interventional Radiology. *Anesthesiology* 2018;128(3):437–479. 
 Table 5.8
 Commonly used local anesthetics (doses based on 70-kg adult)

Name	Maximum dose without epinephrine	Duration without epinephrine	Maximum dose with epinephrine	Duration with epinephrine
		Esters		
Procaine (1–2%)	400 mg	10–30 min	7 mg/kg, max 600 mg	30–40 min
Chloroprocaine	11 mg/kg, max 800 mg	15–30 min	14 mg/kg, max 1,000 mg	
Amides				
Lidocaine (1–2%)	4.5 mg/kg, max 300 mg	30–60 min	7 mg/kg, max 500 mg	120–360 min
Mepivacaine (1-2%)	300 mg	30–90 min	7 mg/kg, 500 mg	60–120 min
Bupivacaine 0.25%	2.5 mg/kg, max 175 mg	120–140 min	2.5–4 mg/kg, max 225–400 mg	140–180 min
Prilocaine	8 mg/kg, max 500–600 mg	30–90 min		

Data from Zelman M, Ceradini DJ. Anesthesia in aesthetic surgery. In: Aston SJ, Steinbrech DS, Walden JL, eds. *Aesthetic Plastic Surgery*. New York, NY: Elsevier Limited; 2009:27–35; Mustoe TA, Buck DW 2nd, Lalonde DH. The safe management of anesthesia, sedation, and pain in plastic surgery. *Plast Reconstr Surg* 2010;126(4):165e–176e.

have two i's in the name (e.g., lidocaine is an amide whereas procaine is an ester).

The pain of injection is the major source of patient discomfort when local anesthetics are used, and minimizing this pain can drastically improve the patient experience. Lalonde and colleagues have written extensively on this topic; some of the key points are summarized here:

- Epinephrine:
  - Use local anesthetics mixed with 1:100,000–1:800,000 epinephrine. Epinephrine provides local vasoconstriction, which increases the duration of action, reduces bleeding (and therefore bruising), and allows for higher dosages by slowing systemic uptake.
- Buffering:
  - Lidocaine, bupivacaine, and other local anesthetic solutions are acidic as drawn up from the vial, which contributes to the discomfort of injection.
  - To increase patient comfort, buffer the solution 10:1 with 8.4% sodium bicarbonate to reduce the acidity of the injection solution to a more physiologic pH; e.g., add 1 mL of bicarbonate buffer to 10 mL of injectable lidocaine.
- Warm the local anesthetic to room temperature using the palm of your hand.
- Use the smallest-diameter needle feasible (27–30-gauge).
- Switch needles to a fresh needle if one becomes blunt.
- Distract the patient by having them look away. Tactile distraction can be provided by pinching the surrounding skin or cooling it with ice.
- Preanesthetize the skin using topical anesthetic creams such as eutectic mixture of local anesthesia (EMLA); a mix of 2.5% prilocaine and 2.5% lidocaine can provide topical anesthesia prior to injection. Note that EMLA requires 90 to 120 minutes to reach its maximal effect.
- Insert the needle perpendicular to the skin; an oblique angle will cross more nerve fibers, causing more pain.
- Stabilize the syringe with your nondominant hand to minimize needle movement.

- Inject subdermally, not intradermally.
- Inject a small bleb of local anesthetic immediately after puncturing the skin, then pause for a few seconds before slowly advancing the needle and injecting more.
- Inject into the subcutaneous fat if there is an open wound.
- Keep a wheal of local anesthesia 10 mm ahead of the needle tip when advancing the needle.
- Only reinsert the needle within 1 cm of the blanched skin border.
- Have patients score their pain with injection on a scale of 1 to 10, and learn from your own experience.

Local anesthesia can be especially useful for head and neck procedures. Almost the entirety of the facial skin and a significant portion of intraoral mucosa can be anesthetized using small amounts of local anesthetic deposited around the nerves of the face. Landmarks for local nerve blocks of the face have been well described by Zide and Swift (**Table 5.9**).

#### Tumescence

Tumescence solutions are dilute mixtures of local anesthetics and epinephrine that reduce pain and significantly reduce blood loss. They are commonly used during liposuction, which facilitates the safe removal of large volumes of fat in one setting, but are also widely used in body contouring, breast surgery, and other aesthetic procedures. The exact composition may vary, but typically 2 to 4 mg of epinephrine and 500 to 1,000 mg of lidocaine are mixed in 1 L of normal saline. Sodium bicarbonate can be added as 5 mL of 1 mEq/mL sodium bicarbonate for every 1 L of normal saline to reduce the acidity of the solution. Lidocaine injected as part of a tumescent solution has been demonstrated to be safe in doses as high as 35 to 55 mg/kg. Systemic lidocaine levels peak approximately 12 hours after tumescent injection in most areas of the body. In the head and neck, plasma levels of lidocaine peak sooner, approximately 6 hours after infiltration. For this reason, it is recommended that in cases where both areas are to be infiltrated with tumescence, the head and neck should be infiltrated before other areas to reduce the risk of the plasma

of the face
Landmark for injection
Palpate supraorbital notch, distract brow laterally, insert needle in middle third of brow pointed toward supraorbital notch; inject at notch, above notch, and at nasal bone. Note that periorbital ecchymosis may occur.
Palpate lower ends of nasal bone and inject just below nasal bone, 5–10 mm lateral to midline. Use 1–2 mL per side.
Palpate zygomaticofrontal suture, insert needle 5 mm inferior to the junction of the lateral orbital rim at or below the lateral canthus. Advance behind lateral orbital rim to 10 mm below the lateral canthus. Inject local while withdrawing needle.
1–2 cm lateral to junction of infraorbital rim and lateral orbital rim. Palpate junction of infraorbital rim and lateral orbital rim by palpation. Inject 1–2 cm lateral to this point. Use 2 mL.
Approach intraorally or percutaneously between the alar base and nasolabial fold, aiming toward medial limbus. Advance until foramen entered or bony contact made (then "walk up" to foramen). Use 1–2 mL per side.
Distract lip over 2nd mandibular premolar, visualize submucosal nerve. Use 1–2 mL. For lower chin, advance supraperiosteally to lower border of mandible and withdraw while injecting 2–3 mL.
Spinal needle is placed through the sigmoid notch, 1 cm posterior to the pterygoid plate. Palpate sigmoid notch externally, 2.5 cm anterior to tragus as the patient opens and closes the mouth. Inject small amount of superficial anesthetic; advance spinal needle perpendicular to face until pterygoid plate is contacted (approximately 4 cm deep); almost completely withdraw needle, readvance to a point 1 cm posterior to prior point of contact at the same depth, aspirate, and inject. Use 3–4 mL per side.
6.5 cm inferior to external acoustic meatus over the middle of the sternocleidomastoid; inject on muscle fascia.

Adapted from Zide BM, Swift R. How to block and tackle the face. *Plast Reconstr Surg* 1998;101(3):840–851; Zide BM, Swift R. Addendum to "How to block and tackle the face." *Plast Reconstr Surg* 1998;101(7):2018.

concentration curves being superimposed, raising the risk of toxicity. To decrease the risk of lidocaine toxicity, the surgeon has the option of decreasing the amount of tumescent solution used or using general anesthesia and omitting lidocaine from the tumescent solution. Bupivacaine should be avoided in tumescent solutions, as it has a longer half-life and its toxicity is more difficult to reverse should systemic toxicity occur. For patients intolerant to lidocaine, prilocaine may be safely substituted when dosed at 8 to 15 mg/kg. Patients should be observed for 12 hours after infiltration with prilocaine solutions to monitor for methemoglobinemia. Signs would include central nervous system abnormalities (headache, confusion, seizures), cardiac abnormalities (chest pain, arrhythmias), and cyanosis. Epinephrine solutions should be avoided in patients with pheochromocytoma or significant cardiac or vascular disease. Halothane should be avoided in patients undergoing tumescent anesthesia, as it increases the risk of cardiac arrhythmias. Epidural and spinal anesthesia should also be avoided in patients undergoing tumescent liposuction, as these anesthetic modalities can result in hypotension, confounding the fluid resuscitation protocols and increasing the potential for systemic fluid overload postoperatively.

## 5.2.5 Office-Based Anesthesia

Office-based surgery has become an important component of practice for plastic surgeons. Procedures carried out in the office have been shown to have lower rates of overall complications, hematoma, and infection than those carried out at ambulatory surgical centers and hospitals, with similar rates of venous thromboembolism. Procedures considered appropriate for officebased surgical centers include breast augmentation, liposuction, rhytidectomy, blepharoplasty, rhinoplasty, and laser resurfacing.

Anesthesia administered in offices ranges from local anesthesia alone to general anesthesia. In 2002, the American Society of Plastic Surgeons Task Force on Patient Safety in Office-Based Surgery Facilities provided recommendations on the nature of facilities in which procedures should be performed. Specifically, it recommended the following:

"Plastic surgery performed under anesthesia, other than minor local anesthesia and/or minimal oral tranquilization, should be performed in a surgical facility that meets at least one of the following criteria:

- Accredited by a national or state-recognized accrediting agency/organization such as the American Association for Accreditation of Ambulatory Surgical Facilities (AAAASF), the Accreditation Association for Ambulatory Health Care (AAAHC), or the Joint Commission on Accreditation of Healthcare Organizations (JCAHO).
- Certified to participate in the Medicare program under Title XVIII
- Licensed by the state in which the facility is located"

Patient selection for office-based surgery is important. State regulations differ regarding requirements for in-office surgical facilities. In general, an office-based surgical facility should have adequate preoperative evaluation, informed consent for surgery and anesthesia, age- and size-appropriate resuscitation equipment available, positive pressure ventilation ability with a well-maintained ventilator, difficult airway algorithm equipment, defibrillation equipment, oxygen, suction, backup generator, and intraoperative and postoperative monitoring equipment.

In general, procedures over 6 hours in length or those finishing after 3 pm should be undertaken in an ambulatory surgery center or hospital to allow adequate time for recovery. The American Society of Plastic Surgeons agrees that ASA class I or II patients are good candidates for office-based surgery using any method of anesthesia, while ASA III patients should be given no more than local anesthesia with sedation in an office setting, and ASA IV patients should be given only local anesthesia with no sedation in an office-based setting. Additionally, patients with labile or poorly controlled diabetes mellitus, seizure history, susceptibility to malignant hyperthermia, morbid obesity, or obstructive sleep apnea, and those without escorts home, are not candidates for office-based sedation and should be given no more than local anesthesia if undergoing in-office procedures.

# 5.3 Technical Considerations

## 5.3.1 Thermoregulation

Patients undergoing long procedures involving exposure of their trunk can be especially prone to intraoperative hypothermia. Hypothermia can have deleterious effects on the body, including increased risk for surgical site infection, impaired wound healing, altered coagulation, and increased cardiac stress. Therefore, it is important to take measures intraoperatively to maintain normothermia. These can include minimizing exposure of nonsurgical sites, airwarming blankets, administering warmed intravenous fluids, and increasing the operating room temperature if necessary. Forced-air warming is likely not beneficial in procedures that are shorter than 60 to 90 minutes.

## 5.3.2 Fluid Management

Careful attention should be paid to fluid management, particularly during large-volume liposuction where fluid shifts can occur. It is important to maintain euvolemia to maintain the body's electrolyte balance and optimize oxygen delivery to the issues. Fluid resuscitation regimens following large-volume liposuction are subject to debate; however, it is generally agreed that some intravenous fluid should be administered if more than 1 or 2 liters of lipoaspirate are removed in one setting. Additionally, it is recommended that patients with greater than 5 L of total aspirate removed be observed in a facility overnight. It is estimated that up to 70% of tumescent solution used in liposuction becomes intravascular and is not aspirated. In standard liposuction cases, patients should be administered maintenance intravenous fluids while under anesthesia, and it should be expected that 70% of the tumescent will become intravascular. In large-volume liposuction cases with over 5 L of aspirate, 0.25 mL of intravenous fluid for every 1 mL of aspirate should be infused as a bolus at the end of the case.

## 5.3.3 Patient Positioning

Careful attention must be paid to adequate positioning of the patient so as to avoid pressure-induced skin injury and neuropathy. Particular points of consideration include the cubital tunnel, axilla (especially in lateral position), and heels. Correct positioning is a patient safety issue, and justification cannot be made for neglecting it: nerve injury is only second to death in causes of settled liability claims related to anesthesia.

## 5.4 Postoperative Management

There are three phases of recovery from anesthesia. Phase 1 starts in the operating room when the anesthetic agents are stopped and continues in the postanesthesia care unit (PACU). Motor function, spontaneous ventilation, and airway protective reflexes return, and vital signs are closely monitored.

Phase 2 typically takes place in the PACU or secondary recovery area, where the patient's vital signs can still be monitored and the patient is observed for pain, nausea, vomiting, and bleeding. The patient's ability to ambulate is assessed, and he or she is evaluated for discharge home. This typically occurs during the 1 to 2 hours following surgery. Ability to tolerate oral intake is not a typical discharge requirement, and it has not been shown to correlate with PONV.

During phase 3, the patient's body returns to its baseline physiology. This portion of recovery typically occurs at the patient's home following ambulatory surgery.

## 5.4.1 Complications

#### Postoperative Nausea and Vomiting

PONV is the most common complication following anesthesia. It occurs in 20 to 30% of patients in the general population and in up to 70 to 80% of high-risk individuals. Eighty percent of PONV occurs within 48 hours from surgery, but 65% of these patients do not have symptoms until leaving the surgery facility. The use of volatile anesthetics, nitrous oxide, and intraoperative and post-operative opioids, as well as longer surgical duration, increase the risk of PONV. In plastic surgery, PONV is more common in patients undergoing breast augmentation.

The best way to avoid PONV is to administer prophylaxis to patients at high risk. This can include anticholinergics, serotonin antagonists, and steroids, as mentioned previously. Additionally, an anesthesia plan can be tailored to avoid agents more likely to provoke PONV, such as inhalational agents.

Ondansetron, scopolamine, and prochlorperazine are the mainstays of treatment for PONV. These can be administered in the recovery unit. For patients who are otherwise meeting criteria for discharge except for persistent PONV, ondansetron oral dissolving tablets can be prescribed for continued PONV control at home.

## Hoarseness, Cough (Airway Irritation)

Hoarseness and cough are more likely to occur following endotracheal intubation and occur due to airway irritation. These symptoms almost always resolve spontaneously within hours after surgery. Topical anesthetic lozenges can be used for symptomatic relief.

## Local Anesthetic Systemic Toxicity

Local anesthetic systemic toxicity (LAST) is a rare but potentially fatal complication of local anesthesia. It occurs when plasma levels of local anesthetic exceed the toxicity threshold and cause physiologic derangement. Central nervous system symptoms precede signs of cardiac dysfunction. The earliest symptoms include tinnitus, perioral paresthesias, and restlessness. This can be followed by seizures, respiratory arrest, and cardiac depression. Treatment is instituted using basic life support principles (the ABCs: airway, breathing, circulation) and advanced cardiac life support as necessary. Additionally, intravenous lipid emulsion therapy is begun as soon as feasible. Any frequent user of local anesthetics should be familiar with the treatment of LAST. For reference, the user is referred to the free LipidRescue algorithm, available from the American Society for Aesthetic Plastic Surgery.

## **Malignant Hyperthermia**

Malignant hyperthermia (MH) is a rare, life-threatening complication of general anesthesia that occurs following the administration of succinylcholine or volatile agents. Signs include rapid-onset tachycardia, acidosis, hypercarbia, muscle rigidity, and fever. MH may be difficult to diagnose intraoperatively, as there are several possible causes for this clinical scenario. Two particular signs that should alert the surgeon to the diagnosis of MH are a rise in end-tidal CO<sub>2</sub> associated with masseter spasm or trismus. The treatment for MH is cessation of offending agents, administration of dantrolene (a muscle relaxant), cooling as necessary, and frequent vital sign and electrolyte/metabolite monitoring. Every surgical facility using succinylcholine or volatile agents should have dantrolene available for this reason. MH is inherited in an autosomal dominant fashion with variable penetrance, with most cases linked to a mutation in the RYR1 gene. Anesthetics appropriate for patients susceptible to MH include propofol, opiates, and nondepolarizing muscle relaxants. Patients with muscle disorders or paraplegia should not be given succinylcholine, either, as this can trigger a life-threatening rhabdomyolysis and hyperkalemia similar to MH. Procedures with sedation in patients susceptible to MH should be undertaken in an accredited ambulatory surgery center or hospital. Patients with suspected susceptibility to MH can be referred to the Malignant Hyperthermia Association of the United States for testing, which is undertaken through a surgical muscle biopsy and caffeine-halothane contracture test (gold standard) or RYR1 mutation screening (less sensitive).

## **Benzodiazepine or Opioid Overdose**

Any procedure involving sedation requires a careful titration of medications to ensure adequate analgesia and anxiolysis while permitting adequate spontaneous respiration. During the administration of sedation, it is important to monitor the patient's level of sedation periodically (e.g., every 5 minutes) by eliciting a response to verbal stimulus or, if the patient is unable to talk, eliciting a motor response such as a "thumbs up." Excess doses of benzodiazepines or opioids lead to respiratory depression with hypoventilation or even respiratory arrest. In this emergency it is important to provide artificial respiration (i.e., bag-valve mask) and immediately institute reversal of the relevant sedative agents. The American Society for Aesthetic Plastic Surgery has published a quick-reference guide to the dosing of flumazenil and naloxone for benzodiazepine and opioid reversal, respectively.

# 5.5 Concluding Thoughts

Effective anesthesia allows patients to undergo aesthetic surgery safely so as to restore or improve their body image. Modern-day anesthesia services are overall very safe, with a low risk profile, in part due to thoughtful preoperative evaluations by surgeons and anesthesiologists. A variety of anesthetic modalities exist, ranging from general anesthesia to monitored anesthesia care, conscious sedation, and local anesthesia alone. This chapter provides a framework to assist the surgeon in choosing an appropriate anesthetic plan in concert with an anesthesiologist, in managing the patient's perioperative symptoms that may be related to anesthetic medications, and in being cognizant of potential adverse effects related to anesthesia. It is our hope that this will assist the reader in providing an optimal experience for patients undergoing aesthetic surgery.

## **Clinical Caveats**

- ASA classification is a global assessment that classifies patients according to medical fitness.
- In general, patients should take their home medications the morning of surgery to maintain steady-state levels.
- Risk factors for PONV include female, nonsmoker, past history of PONV, history of motion sickness, young age, migraine history.
- Other than procedures performed using local and mild oral tranquilization, surgery should be carried out in an accredited facility.
- Conscious sedation commonly uses midazolam for sedation and fentanyl for analgesia.
- Amides contain the letter I in the prefix of the generic name.
- To avoid pain, insert needle perpendicular to skin, use small needles (27- or 30-gauge), and inject and advance slowly.

## Suggested Reading

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# Part II Business Basics

# 6 Why Offer Aesthetic Medicine in an Aesthetic Surgical Practice?

Ali A. Qureshi, Renato Saltz, and W. Grant Stevens

## Abstract

Aesthetic surgeons may wonder, "Why offer aesthetic medicine in an aesthetic surgical practice?" The answered is based on the "Five Ps" of aesthetic medicine: patient acquisition, patient retention, patient optimization, patient education, and patient conversion. Aesthetic medicine accounted for over \$2 billion in 2017 and continues to grow with newer demographics such as men and younger patients seeking services. The explosion in new nonsurgical technologies and treatments, combined with patients' demands for quick, effective solutions to look refreshed, has compelled plastic surgeons to incorporate aesthetic medicine. We will explore in this chapter how aesthetic medicine is a core part of aesthetic plastic surgery, can help grow a practice, and above all, can lead to better results for our patients. Specifically we look at the "747" effect and how to build a practice with "patients for life." New paradigm shifts, such as outcome optimization with pre- and postsurgical skin treatments and the subscription model of aesthetic services, are also explored.

#### Keywords

aesthetic medicine, nonsurgical, noninvasive, cryolipolysis, injectables, lasers, facials, skin treatment, subscription model, patient optimization, practice management

# 6.1 Introduction

Aesthetic surgeons have long debated the value of offering comprehensive aesthetic *medical* services as a part of their *surgical* practices. Naysayers question the value of nonsurgical services to their practice and patients. Nonsurgical aesthetic services may be viewed as a "disruptive technology," forcing aesthetic surgeons to reassess and re-evaluate how to incorporate these services into their surgical practices. Competition from nonplastic surgeons and industrywide competition have also been disruptive forces, leading to change and blurring the divisions between cosmetic procedures and aesthetic surgery. Our personal experience and a growing body of evidence demonstrate a number of compelling reasons it would behoove aesthetic plastic surgeons to offer these services. These "five Ps of aesthetic medicine" are all centered on patient care (**Fig. 6.1**): patient acquisition, patient retention, patient optimization, patient education, and patient conversion.

The globalization of beauty, changing demographics and cultural preferences, and advances in technology are shaping and transforming the aesthetic marketplace. Cosmetic medicine offers exciting options for practices to grow and expand. The growth in nonsurgical and aesthetic medical consumption has been exponential; it accounted for nearly \$2 billion in 2017, according to the



Fig. 6.1 The five Ps of aesthetic medicine.

American Society for Aesthetic Plastic Surgery (ASAPS) Cosmetic Surgery Data Bank. Just from 2012 to 2017, injectables saw a 40% increase while skin rejuvenation saw a 30% increase in utilization. Even more impressive, nonsurgical fat reduction increased over 200% in the same time period. More than ever, men have been seeking nonsurgical aesthetic treatments, accounting for 10% of services in 2017. The top five nonsurgical procedures in 2017 were neurotoxin, filler, nonsurgical fat reduction, hair removal, and chemical peel. Areas with major growth have included microablative skin resurfacing and nonsurgical skin tightening procedures. The International Society of Aesthetic Plastic Surgery (ISAPS) has also seen exponential growth in nonsurgical procedures, demonstrating that the demand for such services is truly a global phenomenon.

These numbers demonstrate not only the magnitude of demand, but also the distribution and type of nonsurgical aesthetic services patients seek. Patients continue to seek quick and effective solutions in order to look young and refreshed. The services they seek range from laser therapies to cryolipolysis to ultrasound skin tightening to peels and facials. The breadth of aesthetic services cannot be underestimated. It is this diversity of services that can enable a surgical practice to incorporate nonsurgical aesthetic services selectively to complement the surgeries they offer or specialize in. This will, in turn, appeal to a broader range of patients over a long term, leading to "patients for life."

A landmark study in 2007 from the Cosmetic Medicine Task Force of the ASAPS and American Society of Plastic Surgery (ASPS) highlighted prevailing perceptions and trends in cosmetic medicine. The task force was established to address the disruption caused by noncore providers entering the aesthetic field, the growing popularity of nonsurgical procedures, and emergence of medical-grade spas. The study found that the public considered injectables low-risk procedures and that these patients were more price-sensitive and likely to seek providers of any specialty with a lower price point. Patients were found to be just as likely to see noncore providers as to see plastic surgeons for these services. The most significant finding was what is now called the "747 effect." When surveyed women were asked whom they would choose to perform their cosmetic surgery, 93% would choose a plastic surgeon and 7% would choose a noncore doctor or dermatologist. Only 25% would choose a plastic surgeon to perform a minimally invasive procedure (laser, injectables, peels, microdermabrasion, etc.)--and of patients who had a positive experience with a noninvasive procedure with a nonplastic surgeon (either a dermatologist or noncore physician), 47% would stay with the nonplastic surgeon for a cosmetic surgery as well. Similar surveys performed by the Sociedade Brasileira de Cirurgia Plastica (SBCP) in Brazil, the second-largest cosmetic surgery market in the world, had very similar findings.

The Cosmetic Medicine Task Force conclusion was obvious: demand for our surgical procedures could be in jeopardy if aesthetic plastic surgeons do not capture new patients early in their experiences with aesthetic medicine. Indeed, the impact of such sentiments could drastically affect the flow of patients into the operating rooms. In order to preserve aesthetic plastic surgery, aesthetic surgeons must be willing to incorporate "disruptive technologies" such as nonsurgical procedures and aesthetic medicine into their practices. Aesthetic medicine and nonsurgical procedures need to be incorporated into the training of residents and fellows in plastic surgery and our daily practices, or plastic surgeons may not remain relevant as *the* specialty of aesthetics.

# 6.2 Patient Acquisition

Cryolipolysis is an ideal example of how a nonsurgical aesthetic service leads to patient acquisition. With nonsurgical fat reduction seeing one of the largest periods of growth since 2012, this service offers a unique opportunity for practice growth. Stevens et al describe their clinical and business experience with cryolipolysis in 2013. Of over 500 new patients to the practice, 66% came specifically seeking cryolipolysis with CoolSculpting (Allergan, Dublin, Ireland), and 62% had never had an aesthetic procedure. This provided an opportunity to introduce patients to other offerings within the practice: injectables, skin care, laser hair removal, and even surgical procedures performed by the aesthetic plastic surgeons in the practice. Forty percent of these patients actually came back to the practice to avail themselves of other aesthetic treatments. These same patients had previously never had aesthetic surgery at the practice, let alone a nonsurgical treatment. Interestingly, 95% of patients had never had an injectable treatment, with either neurotoxin or soft tissue filler, and the practice found that the service most commonly used by returning cryolipolysis patients was for injectables.

The study also found that offering nonsurgical procedures expanded the male demographics of the practice. After a targeted marketing campaign specifically tailored for men, nearly 42% of all cryolipolysis clients were men. This demonstrates that nonsurgical aesthetic services bring patients into a surgical practice that they may have otherwise never considered. This can be a very powerful tool for new practices seeking to establish themselves or mature practices that seek to expand their demographic, as the case may be with male clientele.

In a study by Kurkjian et al examining the impact of economic factors on facial aesthetic surgery, an overwhelming majority of patients preferred treatments that have a long-lasting effect over those with shorter duration. Only physician's training and expertise with the treatment superseded this as a treatment decision driver. Further, over half of respondents said that their decision to have an aesthetic facial treatment was affected by the economy. It is important for aesthetic practices to offer diverse services with a range of price points for new patient acquisition. The study also suggests that well-trained aesthetic surgeons should consider offering nonsurgical treatments, as one of the most important factors for patients choosing to have a treatment is the physician's training and background. Plastic surgeons have a unique opportunity to offer these services.

A new paradigm shift in nonsurgical aesthetic services is currently under way, with a subscription aesthetic services model that also helps with patient acquisition. This model has been successful in other industries. Apple (Cupertino, CA) saw a doubling in sales of its iPhones when it started a monthly payment service; there is increasing momentum for a similar subscription model in aesthetics. Previous studies have demonstrated that cost can be a barrier when drawing a wider audience into aesthetics, and this model may be an affordable option that will increase patient acquisition.

# 6.3 Patient Retention

Given that it costs five times as much to acquire a new customer as to retain an existing one, building loyalty is paramount to any business. Creating a loyal aesthetics customer, however, is not an easy task, as many patients prefer to shop around for hot deals rather than return to the same practice for repeat treatments. The growth in nonsurgical procedures and the aesthetic medicine industry might not translate to increases in revenue for individual practices that are unable to retain their patients. It is not that the patients are no longer seeking treatment—it is that they are going elsewhere.

As many other physicians and nonphysicians increasingly become involved in aesthetic medicine, it is important that aesthetic surgical patients be retained in the practice. As previously mentioned, the 2007 seminal study by the Cosmetic Medicine Task Force found that 47% of patients would be willing to return to someone other than a plastic surgeon for an invasive aesthetic procedure based on a prior positive noninvasive treatment with that provider. This could bode poorly for aesthetic surgeons as we try to maintain high quality and excellent outcomes in aesthetic surgery. Maintaining patients in a practice will lead to multiple encounters and potential procedures over the course of their lifetime. For example, we found with cryolipolysis that 40% of new patients who were seen remained in the practice for up to 4 years after their treatments, which was the longest follow-up available from the study at the time.

The subscription model of aesthetic services is a unique way to deliver ongoing aesthetic services to patients and retain patients.

Instead of patients' waiting for the effects of their neurotoxin or filler to wear out before seeking treatment again, subscription services enable patients to maintain their results. In our practice, prior to implementing a subscription model, neurotoxin patients were coming, on average, 2.1 times per year, waiting for the effects of the neurotoxin to diminish and then often having difficulty making time for themselves to come in for a treatment. Since we implemented a subscription model for aesthetic services, patients now maintain their neurotoxin results and come in more often, on average 3.7 times per year. This has dramatically improved patient retention, as these patients are no longer seeking treatments elsewhere or seeking a lower price point each time they need a treatment.

# 6.4 Patient Optimization

Aesthetic surgeons pride themselves in their surgical outcomes and want their patients to look as good as they can. Presurgical treatments with skin care, facials, and proper cosmeceuticals can prepare a patient for an optimal surgical outcome particular in facial aesthetic surgery. Interestingly, the concept of patient optimization for improved surgical outcomes is not a new concept. The use of tretinoin or hydroquinone prior to laser therapy, or weight loss before an abdominoplasty, are just a few examples of plastic surgery dogma in patient optimization. The use of noninvasive devices to enhance a facial surgical outcome is an extension of that same philosophy.

In our practice, the use of noninvasive aesthetic services to enhance surgical outcomes is called "the icing on the cake." This includes laser resurfacing, microneedling, nonsurgical skin tightening, fillers, neuromodulators, skin care, facials and biologically-active cosmeceuticals. Aesthetic medical services and products optimize the appearance of our surgical patients, and this optimization leads to higher patient satisfaction as well as practice growth.

Increasingly, pretreatment and priming of the skin before surgery and noninvasive treatments with medical-grade skin care products is taking place. The thought is that, just as one would perform surgical débridement before doing a flap, medical-grade skin products cleanse the skin and prepare it for undergoing the knife and being manipulated. For example, skin care products can be used a few weeks in advance of a facelift so that the skin is "primed" and "ready to go" for the healing process. We anticipate this to be a rapidly growing trend and could be the next paradigm shift in patient optimization. It is a sort of "refining the sugar" before baking the cake and icing it.

Patient optimization with noninvasive technologies is not limited to facial aesthetic surgery. They have a role even in breast and body surgery with scar management, for example. Different devices that focus on lymphatic massage can also be adjuncts for patients who have had liposuction or other body contouring surgeries. Appropriately selected nonsurgical vaginal rejuvenation devices can also be used as adjunct procedures when treating labiaplasty patients with sexual dysfunction or distress, which can be prevalent in plastic surgery patients. The subscription model for aesthetic services has improved patient optimization, with patients visiting the practice more often, utilizing more products with less time between visits and better results. When the philosophy of the practice is deliver the optimal outcome for the patient, the surgeon and the practice must use more than just the scalpel; adjunct technologies must be used to deliver that result and complement what happens in the operating room.

# 6.5 Patient Education

When patients are treated with nonsurgical modalities, they are often in the office for extended periods of time, which can be a couple of hours. This time may include preprocedure numbing or postprocedure massage, depending on the nature of the treatment. Unlike in the operating room under a general anesthetic, patients using nonsurgical aesthetic services are awake. This means there is an opportunity to engage patients and educate them about aesthetic services that the practice offers.

This one-on-one time between staff and patients is invaluable. It is a true teaching moment and can be a costly missed opportunity for patient and surgeon. Patients can be exposed to videos or before-and-after photo books of surgical and nonsurgical procedures. These visual cues often lead to questions that staff can answer and, in our experience, has been a real opportunity to dispel myths about surgery and outcomes. Many of our patients who receive nonsurgical services ultimately go on to become surgical patients because they have learned to trust the surgeon and the practice and feel empowered with the aesthetic medicine education they got in the office.

Simple interventions such as surveys can actually help both retain and educate patients about nonsurgical procedures. In a pilot study performed in the Northeast, 17 practices administered a Cosmetic Interest Questionnaire (CIQ), which simply asked patients whether they were interested in a list of possible nonsurgical treatments. Staff would then follow through with any areas that patients said they were interested in and provide information such as before and after photographs. Patients were educated and questions about procedures were addressed. A total of 2,673 surveys were administered, and almost 60% (n = 1,586) had an inquiry. This led to almost 20% new cosmetic appointments for nonsurgical procedures.

# 6.6 Patient Conversion

It is this conversion of a nonsurgical patient to a surgical patient that is the lifeblood of an aesthetic surgical practice. A recent study performed confirmed that there was a 40% retention in nonsurgical patients, and the revenue stream was 400% greater than the original nonsurgical revenue stream. Most of this revenue was from surgical procedures. As aesthetic surgeons, our goals are happy patients and also doing more surgery. The conversion to surgical patients is key and follows the educational process.

A single-surgeon experience reported by Richards et al with injectables and facial aesthetic surgery identified over 15% conversion of aesthetic-naïve new patients, who came to a practice for injectables and converted to surgical patients at an average of 19 months. On average, patients had three injectable sessions before converting to a surgical procedure at this practice, which included facelift, upper blepharoplasties, and brow lifts. Other studies have also shown that patients who ultimately went on to have a facelift had previously undergone multiple noninvasive aesthetic procedures.

# 6.7 Concluding Thoughts

For aesthetic plastic surgeons to continue providing high-volume and high-quality surgical care, practices must be willing to incorporate aesthetic medicine. The diversity of treatments, procedures, and price points enables practices to tailor a set of services to meet their clientele. Whether with the scalpel or with the needle, the goal is to achieve the best result possible for each patient and help patients achieve their aesthetic ideals.

## **Suggested Reading**

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# 7 Optimal Correction and Patient Retention: A Personal Philosophical and Practical Approach to Your Nonsurgical Practice

A. Jay Burns

## Abstract

Historically, surgical practices including plastic surgery focused on optimizing clinical outcomes. Talking about optimizing the business side and profits were taboo. Today, things are changing rapidly for many, if not most, plastic surgeons as they look for ways to both optimize profits and enhance secondary, passive income. This chapter directly addresses ways to achieve these financial goals while, unflinchingly and appropriately, maintaining a priority on optimizing patient outcomes and satisfaction. A comprehensive patient consultation focuses on "full correction" in scope. Not only is the surgery discussed, but a long-term, comprehensive surgical and nonsurgical plan to "full correction" is also discussed in detail. It is incumbent on the surgeon to understand all of the nonsurgical options and to be able to provide them to surgical patients with expertise and confidence. These options are highlighted.

Optimally, the patient leaves the office with a comprehensive aesthetic plan. However, obstacles the patient must overcome in remaining loyal to such a plan are the financial costs and distractions of a busy lifestyle. Such obstacles and the methods to overcome them are discussed. Specifically, the author will focus heavily on the role of aesthetic subscriptions as a model to optimize patient loyalty and retention and to overcome the hurdles discussed. Data will be given proving the validity of this approach in many practices as well as his own.

## Keywords

full correction, comprehensive long term aesthetic plan, subscription economy, aesthetic subscriptions, patient loyalty, patient retention

# 7.1 Introduction

As a physician who identifies first and foremost as a surgeon, I have spent a significant portion of my career in a parallel universe of nonsurgical approaches to aesthetic concerns. This chapter would have never been included in a reputable textbook when I began my career over 30 years ago, because nonsurgical techniques were ignored at best and deemed disreputable at worst. Thankfully, we have come a long way since then, and most successful aesthetic surgeons now understand the value of their nonsurgical practice.

I feel honored to contribute to such a prestigious textbook and take the responsibility very seriously. However, I must make it clear this chapter is a wholly personal perspective. Such personal bias will differ from others' reasonable opinions, but there are no substantial studies to prove a "best approach," so I simply present mine, which, without argument, has proven both beneficial to my patients and successful for my business.

My opinions are based on general and plastic surgery training, as well as over 30 years of running a surgical and nonsurgical practice. During this time, I have also had an academic career in a teaching institution and been fortunate to be involved in research, Food and Drug Administration (FDA) studies, and many scientific advisory boards, which have helped introduce innovative technologies such as lasers, radiofrequency, ultrasound, and cryolipolysis to market. Therefore, while certain opinions on management and business decisions will be personal, many more will be based on scientific research and data.

I have a gift from one of my best friends from medical school, which I often ponder over. It is a framed quotation from Sir William Osler that reads:

"You are in this profession as a calling, not a business; as a calling which exacts at you at every turn self-sacrifice, devotion, love, and tenderness to your fellow man. Once you get down to a purely business level, your influence is gone and the true light of your life is dimmed. You must work in the missionary spirit, with a breadth of charity that raises you far above the petty jealousies of life."

I feel strongly that, as physicians, our calling is a privilege and a responsibility. I am not here to place a relative moral value on aesthetic plastic surgery, but if our focus is to put our patients' wishes above our own, then I believe we can abide by Osler's famous challenge, and if our surgery practice and business is successful and efficient, it is no sin. Whether we are treating patients for coronary blockage, cancer, psychiatric illness, or the visible signs of aging, I believe we can deliver care with the patients' best interests at heart—optimizing quality and results in the safest manner possible.

I truly believe that both objectives—excellent patient care and a successful business—can be achieved with integrity, and the aim of this chapter is to make that point to you and hopefully help you achieve those goals. By putting patients first and offering a quality, comprehensive program with long-term optimal results, I know that every aesthetic physician can achieve happy patients and a thriving business.

# 7.2 Consult with a Purpose

Ask yourself this: If you provided your patients with the best experience and quality results, every time, why would they even think about going anywhere else? I believe that, as plastic surgeons, we are uniquely trained to offer a full complement of treatments to aesthetic patients. Therefore, we should always provide, in addition to the best surgical solutions, the most technically advanced nonsurgical services and treatments as well as scientifically proven skin care and sun protection. This all starts with a comprehensive consultation . . . with a *purpose*.

My initial consult always addresses every available option to the patient, regardless of the patient's primary focus. The purpose for this is to optimize my chances of retaining a satisfied patient for life. I listen carefully to their desires, biases, fears, and expectations, and if their expectations are reasonable, I move forward to create a "win–win" for us both. And, by the way, if their expectations are anything short of reasonable, I have found that it is best to avoid a doctor–patient relationship of any kind.

We all understand that patients are most satisfied when they are fully corrected. The key, however, is to educate them on how to achieve this reasonably and logically. They must understand we are talking about "optimal" results, while never implying perfection. I find that an educational approach always leads to the most satisfied and loyal patients, and I go about it by explaining facial aging in four ways:

- 1. **Gravity:** The results of gravity are manifested by certain physical findings, including neck laxity, jowls, marionette lines, nasolabial folds, and droopy eyebrows. I realize there are varying opinions on the value of addressing only the skin, versus the fascial layers when discussing the results of gravity, but I like to inform the patient that skin is an elastic layer, which, when young and tight, shows benefits, but over time will relax and reveal signs of aging. Gravity is also a major player when it comes to laxity of the platysma. I point out that nonsurgical skin tightening will not address platysmal issues and that any pure skin tightening procedures, regardless of the approach, yield only temporary results, because skin will always relax to a resting tension of 32 mm Hg. If asked, I also advise that although nonsurgical skin tightening approaches work to a lesser and more variable extent than surgery, they do have the least morbidity and have no need for general anesthesia.
- 2. Dynamic Lines: Dynamic lines can be addressed surgically in the forehead, but the growth in effective neuromodulator usage and techniques have been impressive in recent years. Botulinum toxin injections remained the top nonsurgical procedure in the United States in 2017, with 1,548,236 procedures carried out nationwide. Compare this to the top surgical procedure, breast augmentation at 333,392 procedures, and you can see that neuromodulators continue to outpace all other aesthetic procedures. I point out to my patients that neuromodulators are excellent alternatives to surgery for frown lines and frontalis lines, as long as significant brow ptosis is not present. Neuromodulators are also the treatment of choice for crow's feet rhytids in my practice.
- **3.** Actinic Damage: Actinic skin damage plays a significant part of the aging process, and if it is neglected, surgical results and patient satisfaction are negatively impacted. For example, if the perception of skin age lags behind the perception of gravitational and dynamic age post facelift, there will be disharmony, and the face will appear awkward and unnatural. So, a plan to optimize skin to a more youthful appearance is key to my surgical consultation. In experienced hands, any resurfacing technique, such as dermabrasion or a series of chemical peels, can be utilized to a satisfactory endpoint, but my preferred technique is laser resurfacing.
- **4. Volume Loss:** When it comes to treating volume loss, there are many good uses of fat injection, either as an isolated procedure or in conjunction with other rejuvenating procedures. I have no problem with this approach, but I believe that dermal fillers play a stronger and more popular role due to their ease of use and lack of general anesthesia and fat harvesting. No matter what your preference is for volume restoration, the consultation is a golden opportunity to discuss the idea of full correction. I usually state that if there are any remaining volume issues postoperatively,

we can discuss fillers as both a "finishing touch" and/or a solution for future volume loss.

I realize every surgeon has his or her own approach to the consultation process, but I've found significant success in painting this large picture to give patients a plan for achieving full correction. Most patients are not aware of all the possibilities available, and the comprehensive consult serves a purpose, not only to educate them but to inform them that you can personally provide those services with excellence, optimizing their outcome and experience. However, I am always respectful of any plan they choose, as long as they are aware of the implications of those choices; therefore, we cover risks, benefits, and expectations. As a cosmetic surgeon, I have a responsibility to help them optimize safety, but also to point out that safe, viable options may fall short of full correction and possibly high expectations. Ultimately, patients must decide on their individual plan based on personal goals, biases, fears, financial considerations, recovery time and overall risk-to-reward ratio. My job is to explain each option clearly and fully, so they can make an educated choice. If they leave the consult with an effective personalized plan and a long-term maintenance program that enhances their surgical outcomes, skin health, and appearance, I know my job is done.

# 7.3 Offering the Comprehensive Aesthetic Plan at Your Practice

While my nonsurgical consultation occasionally takes place in my surgical office, it is most often carried out by physician extenders located in our skin care and laser/technology center. This is because our aestheticians and nurses are taught to offer a comprehensive skin care plan that ties in with our practice goal of full correction for all patients.

In my opinion, the ideal aesthetics practice should be able to offer a wide array of surgical and non surgical services that would anticipate the large majority of patient's concerns. Although difficult early in practice it, comprehensive aesthetics care should always be the end goal.

Before I describe my thoughts regarding this comprehensive package, I'd like to point out one approach you should always avoid. Do not make a technology purchase, then push all patients to that technology, regardless of their needs and wishes. This is a financially driven approach that is understandable but not optimal and perhaps a little short-sighted. If you must compromise, understandably, on limited technology do not compound the problem by overselling this treatment to some of your patients who will not benefit optimally from it. Again, this financial prioritization is tempting, but is short sighted, creating disappointed patients. Many spas fail due to poor technology choices, as a result of inferior knowledge and/or lack of proper funding. Naïve approach to management is especially problematic in struggling spas. All of these potential issues must be kept in mind and avoided if you want to provide quality treatments and service to the patient. Remember, it is imperative to maintain your clarity of purpose if you want a successful business.

In an ideal situation, after IPL purchase you would begin to add devices and services that address each patient issue more specifically to optimize the result. Examples might be to add a technology that addresses pore size and texture more aggressively, body contouring, and skin tightening. It is beyond the scope of this chapter to describe an in-depth comprehensive approach to every aging condition you will encounter. However, to serve as a limited example, if you are to start out with one piece of technology, an intense pulsed-light (IPL) device would be a reasonable choice in many offices, especially if the majority of your patients are skin types II and III. At a practice with a majority of ethnic patients, light-based technology is more challenging due to the melanin content encountered and resultant potential hypoand hyperpigmentation issues. Other energy-based devices might be a better option, but I would encourage you to do your homework attending Continuing Medical Education (CME) courses, reviewing the literature, and asking experts as to the proper choice for you.

So, why do I choose IPL? Simple. An IPL device treats many patients' nonsurgical concerns, such as texture, pore size, vascular issues, and dyschromia. Even laser hair removal can be addressed, although there are better devices for that specific issue. However, it is an excellent initial tool that will aid you in achieving your patients' goals to full correction. There are also many excellent technology platforms that can be purchased with an IPL module in place, leaving room for other laser and/or alternative energy technology additions to the platform as your practice grows.

In an ideal technology and skin care center, you would also have a set of devices that address your patients' nonsurgical concerns specifically, such as redness of the skin, dyschromia, texture, and pore size, as well as mild to moderate wrinkles and mild skin laxity. If you are prepared to invest the time and financial resources to acquire sufficient knowledge and energy technologies, you can confidently carry out a comprehensive long-term plan that will optimize the patient's aesthetic appearance.

In my office, such a comprehensive skin care assessment is aided by photographic analysis. This can be carried out with simple photographs, but it is aided greatly by modern technology and software programs that show patients the full extent of their damage through ultraviolet photography and digital filters. In many programs, a qualitative and quantitative assessment can also be rendered to place objective measurements on skin quality. This is a great tool for patients, because it enables them to see visible results and gain even more confidence in their progress and, ultimately, in your skills as their physician.

# 7.4 The Full Correction Goal

The purpose of your doctor-patient relationship and treatment plan should be crystal clear from the outset. You are not there to sell them the latest technology or to promote the most popular trend but rather to determine a comprehensive long-term treatment plan with which to optimize their skin health and appearance for life. A helpful analogy to offer the patient is to compare skin health to physical health. Nobody would go to the gym once or twice a month and truly expect to optimize their overall health and fitness. That takes discipline and commitment—something also required to achieve optimal skin and full correction.

I like to show my patients photographs of others who have committed to a comprehensive skin care plan and had better-quality skin than they did when they started.

I point out a very important study by Dr. Patrick H. Bitter Jr., a board-certified dermatologist and founder of Advanced Aesthetic Dermatology, that shows how patients who committed to three BroadBand Light Therapy (BBL) treatments a year for 3 years genetically changed their skin to a more youthful DNA expression. BBL uses a broad band (560–1,200 nm) of noncoherent light waves that are absorbed by the skin, and it is very popular for skin rejuvenation. After administering a regular, consistent course of BBL treatments to a number of aged female volunteers with moderate to severe photodamage, Dr. Bitter and his associates discovered that the skin showed significant improvements in clinical ratings of both intrinsic and extrinsic skin aging. An increase in epidermal thickness was also noted. In short, this course of BBL treatments was proven to restore the gene expression pattern of photoaged and intrinsically aged human skin to resemble that of young skin.

Another of Dr. Bitter's studies shows how patients who committed to at least one BBL treatment a year over a period of 5 to 11 years notably delayed the long-term effects of skin aging. The study proved that although participants' skin aged a median of 9 years over the course of the treatments, their treated skin appeared to have aged only a median of 2 years or less. This indicates that patients who maintain a regular annual or biannual course of IPL treatments such as BBL can delay and even reverse the visible signs of aging, including skin laxity, photodamage, telangiectases, and fine lines and wrinkles.

Such dramatic findings make it clear to patients that it is never too late to start treating the skin but that it takes commitment to achieve the results they desire.

Again, details of the various full correction options are beyond the scope of this chapter, and excellent physicians can, and will, vary greatly in their approach. In general, daily sunscreen is a given in every plan. However, an exact skin care regimen must be designed based on a comprehensive skin analysis. The practitioner must evaluate the patient's skin type and qualitative skin issues, as well as the patient's concerns and commitment. Based on the information gathered, an individualized, long-term plan can be designed and delivered.

I strongly believe that if we, as aesthetic surgeons, maintain an open mind and a commitment to skin care and all nonsurgical technology, we can provide the most comprehensive and complete set of aesthetic solutions available. We are uniquely qualified to deliver *every* need of the aesthetic patient, but we must present all of these options confidently and clearly to the patient in the initial consultation. We should be able to recommend the best sunscreen, the most beneficial skin care, the latest laser or alternative energy technology, and the most effective surgical services. Then, and only then, can we be the equivalent of a "full-service bank" that provides comprehensive, quality service and eliminates the need for a patient ever to consider going elsewhere. If this environment is provided, then I return to my original premise that if we provide the best treatments and outcomes we will be rewarded with satisfied and loyal patients... and a very successful business.

Now, the last piece of the puzzle is to recognize the patients' challenges when it comes to staying on their prescribed plan. They may be dedicated and willing, but what obstacles do they face, and are there ways to help these patients minimize such hurdles? I have personally discovered options that greatly enhance patient retention and loyalty. These options also enable many of my patients to stay on plan and finally get the results they are striving for. The business rewards financially have been equally as satisfying. In the remainder of this chapter, I will review current trends, options, and results seen nationally and in my practice.

# 7.5 The Patient Retention Conundrum

A question that frustrates almost every physician in the aesthetic space is this: why don't patients stick to their prescribed aesthetic schedule? We can deliver a "perfect consult" and spend all the time in the world curating a carefully constructed injectable, laser and/or skin care plan for our patients, but getting them to comply is an almost impossible task. Many cosmetic physicians believe they have a loyal aesthetic clientele and a highly profitable business. The actual loyalty percentages vary, but when looked at objectively, data prove that no practice has the patient retention desired, with data showing the average U.S. neuromodulator patient receives treatment only 1.4 times a year. In my practice, it remains a challenge (**Table 7.1, Table 7.2**).

Not long ago, I realized that fewer than 50% of my patients were following their schedule for injectables, and I knew that with this lack of compliance, their results would suffer and ultimately so would my business (**Fig. 7.1**). While new customers are paramount to any successful company, these *repeat* customers are the absolute essence. Not only does it cost around seven times more to acquire a new customer than it does to retain one (an average of \$800–\$1,000 per patient), but repeat customers also spend up to 33% more on services and treatments.

Table 7.1Research on < 10,000 neuromodulator patients in 2015 and</th>2016

Number of annual neuromodulator treatments	Percentage of all neuromodulator patients
1	47%
2	26%
3	15%
4 or more	12%

 
 Table 7.2
 Data from Dallas Plastic Surgery (2016/2017) demonstrating the number of neuromodulator treatments the average patient receives annually

Number of annual neuromodulator treatments	Percentage of all neuromodulator patients
1	36%
2	20%
3	17%
4 or more	26%

Interestingly, of the 30 million people in the U. S. who consider getting aesthetic procedures, only 10% of them follow through with an actual treatment. This is obviously a frustrating



My Toxin Results

Dr. Burns Data. n = 786 baseline (pre-subscription) patients vs. EpiElite membership patients, n = 359. 2016. 2018.

**Fig. 7.1** The information in the figure indicates my own personal experience implementing aesthetic memberships in my practice. Increased number of visits per year in addition to greater spend per visit increased my yearly revenue per patient on toxins alone by over \$1,000 per year.

and challenging statistic for all of us interested in this patient population.

So why are customers notoriously difficult to both acquire *and* retain in the aesthetic industry? Unsurprisingly, financial challenges are the most significant barrier. In recent studies, over two-thirds of consumers who were interested in aesthetics but had yet to try a treatment stated that cost was the main obstacle stopping them from trying a procedure. And while we are all acutely aware that countless "miracle" creams from the drugstore work out to be far less effective and way more financially costly in the long term, it's not so easy to convey this to the consumer when asking for \$500 for a 20-minute injectable session.

Regular aesthetic patients are also price shoppers when it comes to dermal fillers and neuromodulators. Rather than staying loyal to one injector, many will look around for deep seasonal discounts or the best local deal—often without a thought for who will be administering their treatment. This cost-saving approach is often shortsighted and potentially dangerous, as such treatments are best delivered in experienced and talented hands. However, if we can offer these treatments in a way that reduces financial barriers and provides other opportunities for patients to stay under our care, it will be a win–win for both the patient and the practitioner.

Fortunately, I believe our industry has an exciting new solution to acquiring and retaining patients: aesthetic subscriptions.

# 7.6 What Is An Aesthetic Subscription?

I'm certain you're aware how the subscription model is being executed successfully across virtually all industries at this time. From the way we watch television (Netflix) to how we shop (Amazon Prime), it's clear that leveraging some kind of subscription business model is the most effective way to win and retain new customers while increasing the average value of existing ones. Aesthetics is no exception.

Simply put, by offering and selling a subscription membership to one of your patients, you create a loyal, long-term relationship and better results that equate to both increasing and recurring revenue.

At the time of this writing, subscription memberships are just entering the world of aesthetic medicine, so my experience is pertinent, as I am one of the first to utilize such a model. I decided to beta-test the impact subscriptions would make on my aesthetics practice, with a primary focus on injectable subscriptions. There are several types of subscriptions, as I mentioned previously, but I chose a platform that structured their aesthetic subscriptions similarly to Apple's offering of the new iPhone. What this means is that a patient does not get as much Botox as they want for a set price; but instead they pay for the cost of their treatment over time. It made sense, since like Apple, I was trying to get consumers to commit to a luxury purchase over an extended period time, so by making payments easier for consumers along with a one-time buying decision, I felt that patient loyalty would be increased. My decision was heavily influenced by retention data on over 50,000 injectables patients from leading aesthetic practices in the San Francisco Bay area. What the investigators found was that the average neuromodulator patient was being treated only 1.4 times per year, while the average filler patient was being treated just 1.1 times a year. They were also able to show that 73% of patients do not follow their prescribed treatment schedule.

Initial reporting on 35 practices from a beta test of an aesthetics subscription software platform showed impressive and consistent results from the 3,000+ patients who had signed up for a neuromodulator or filler subscription. For neuromodulators, aesthetic subscription patient retention had increased from the average 1.4 treatments per year to 2.9 treatments per year, and filler retention from 1.1 treatments per year to 1.6 treatments a year. The researchers were also able to demonstrate that the aesthetics subscription patient spent an average of 31% more on their neuromodulator or filler each treatment and was 72% more likely to cross-sell to other services in the practice.

As stated previously, based on these pilot data, I recently implemented a personalized membership program in my own practice. This program centers on the subscription model just described. By empowering my patients to take control of their aesthetic treatments, and offering them a service that allowed them to pay for these treatments in affordable monthly installments, the business was transformed almost immediately. I had a 79% growth in patient compliance and an increase in annual recurring revenue of over \$1,000 per patient. In the first seven months, I signed up 377 members to a membership program (EpiElite) powered by the subscription software. This equated to an annual lift of \$381,524 in practice revenue based on a 12-month run rate.

In our model, the setup is relatively simple and was totally customized to my practice, pricing, and marketing requirements. Current software enables us to create aesthetic plans for our members so they can maintain their aesthetic goals through affordable monthly payments. It also enables us to prescribe and personalize the brand of treatment, frequency, and the number of units, and more important, it gives us the flexibility to change a patient's plan according to their concerns over time. I believe this personalization is the absolute key to optimized results and success in aesthetic subscriptions. It certainly has been in our practice, as our patient satisfaction and revenues suggest.

Our current software solution has seamlessly integrated into our working day, and there is a mobile app for patients, so they can follow their aesthetic journey. Let me once again remind you that the other major challenge to patient retention and staying on plan, besides cost, is busyness. The mobile app tied to the software solution for aesthetic subscription memberships also sends reminders of their plan and their appointment schedule. This app can be customized to receive texts about the advantages of membership, specials, and individualized touches from the physician or their service provider.

Our subscription program has significantly strengthened our relationships with patients and simultaneously increased practice loyalty by providing members with a personalized beauty plan that is dynamic, affordable, convenient, and extremely results-driven. This means our patients see visible results and keep returning to our practice (rather than just *any* practice) to maintain their aesthetic goals.

# 7.7 The Top Three Benefits of Implementing an Aesthetic Subscription Program at Your Practice

# 7.7.1 Consistency Means Better Results and Better Retention

Utilizing a subscription model gives patients stability and consistency with their treatments and procedures, making it much easier for them to stick with their recommended plan. It's been proven that aesthetic subscribers visit the office twice as often as regular patients, so you can expect them to stay much more closely aligned to their plan. To put this into perspective, 24 out of my first 25 subscription members returned for their follow-up toxin treatment in less than 100 days. When you compare that to the baseline of 50% returning in that same period, it is a significant impact to the practice.

# 7.7.2 Patient Satisfaction Means a Bigger Spend

Members who enjoy a positive experience with their subscription program are far more likely to spend extra dollars at the practice than nonmember patients. As an example, studies have shown that 72% of patients enrolled in a subscription membership for dermal fillers will also sign up for neuromodulators, proving that implementing a subscription model promotes full correction due to the lower upfront cost implications. Being a member of a practice also triggers customers to buy into a broader selection of procedures, treatments, or skin care products that may previously have gone ignored. I do not want this discussion to center purely on the financial ramifications, as I have emphasized that results are the primary focus. However, if subscription memberships encourage patients to try other excellent services, their results and satisfaction are enhanced. The financial advantages and results are intimately tied together, and this cannot be overlooked.

# 7.7.3 Easy Monthly Payments Mean Expansion of Your Practice with New Patients

As previously mentioned, price is the main obstacle for introducing aesthetics to a wider audience, so by implementing a subscription program, reducing up-front costs to the patient, and offering member-only prices, you automatically make aesthetics more desirable to a wider audience. Instead of paying \$500 every time they visit the practice for their fillers and toxin, for example, patients can split these payments over the year. The current average patient, especially millennials, buy with a preference for the subscription model. They have proven that they much prefer a charge of \$150 per month over a larger lump sum in most cases. We also reward our members by offering reward treatments at 6 months and/or a year in exchange for their loyalty, which has proven to be a huge incentive when transitioning patients into members. We also offer some member advantages in our particular practice to incentivize membership enrollment and retention, but many successful practices offering aesthetics subscriptions choose not to offer any additional incentive other than the financial ease provided by the subscription itself.

# 7.8 Advantages I Did Not Expect

When I implemented aesthetic subscriptions in my office, I was unapologetically driven by the need to drive patient retention, loyalty, and profits. However, I must list some further advantages that cannot be overlooked.

# 7.8.1 Barrier to Patient Transfer

Subscription memberships keep patients more loyal. They are less likely to transfer to another practice that does not provide subscription services. This barrier is not 100% effective, but if an aesthetician or nurse leaves the practice for any reason, they cannot transfer the advantages of the membership program you provide in your office. In speaking with other physicians who have implemented an aesthetic subscription program in their office, I have discovered that most find this ability to protect your patient base from departing staff members invaluable.

# 7.8.2 The Value of Data

The facts speak for themselves: few tools have offered me more customer data than my aesthetics subscription platform. Not only did it make me aware of my actual retention and the need to improve it, but also I now have access to valuable key performance indicators in my practice, such as patient spend per treatment, retention, cross-sell, and other data into which I previously had little visibility.

# 7.8.3 Building Practice Value and Providing Enhanced Exit Strategies

A dilemma for every physician is how to value his or her practice, especially when trying to add a partner or sell it. "Blue sky" is elusive to define and difficult to agree on. By bringing subscriptions into your practice, not only do you realize immediate revenue increases, but you secure an increased *future* revenue stream. This increased stream is the reason subscription businesses are generally valued higher than nonsubscription businesses (Netflix is valued today at 10× its revenue, while Blockbuster at its height in 2004 was only valued at 1× revenue). As a physician looking forward to my own exit at some point in the future, I hope to capitalize on this additional intangible benefit that subscription has brought to my practice value.

# 7.9 The Future for Aesthetic Subscriptions

It's clear that aesthetic subscriptions have already proven successful for practices and patients around the country, including my own. All signs indicate that the subscription model is not only here to stay but also here to increase due to an extremely fast-growing consumer group, millennials, as mentioned previously.

Born roughly between 1980 and 2000, millennials are forward-thinking, are comfortable with technology, and provide the biggest portion of consumer spend of any demographic group in history. Contrary to what some believe, millennials are far more concerned with aging than their older counterparts and have already proven keen to adopt a subscription model for their aesthetic treatments—data from the largest subscription model company in existence at the time of this writing show clearly that over a quarter of beauty members are aged between 18 and 38. I have a well-established facial rejuvenation practice and no doubt target a large group of aging patients over 50 years old. However, as a result of knowledge about millennial trends, we are now targeting the 35-year-old mother of two looking to get her confidence back. She, after all, is a millennial.

Further studies show that over 80% of potential millennial customers are willing to spend money on improving their appearance, compared to just 46% of the over-50s. That portends well for future subscription membership programs.

Something else to consider: these figures should only grow when it comes to the next generation in line: post-millennials. Surrounded by technology from the day they were born, postmillennials have grown up with smartphones, apps, and social media, making it an understatement to say that the subscription model to anyone born after 1995 will feel totally normal across most, if not all of their lifestyle choices.

In summary, I want to emphasize that I remain a surgeon first and foremost, as I have tried to make clear. However, we must not forget that 90% of aesthetic patients will never opt for surgery. This is why I have tried to define in this chapter how you can continue to be an excellent surgeon but still respect patients who desire other options. I believe that if you do that, you can provide excellent care to every single patient who enters your practice.

I have also tried to give you real experiences and data from new business models that are bursting onto the scene and disrupting the industry by both enhancing patient satisfaction in your nonsurgical business and enhancing passive income. Consumer data are utilized mightily in every industry today, and their value will soon be fully realized in our aesthetic practices, bringing focused, logical, and efficient strategies for marketing and patient retention.

I am proof positive that you can teach an old dog new tricks. As a result, my patients are achieving improved results with greater overall satisfaction. My practice value and current income are on the rise, and I have had more enjoyment in my practice than ever before.

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# 8 The Spa and the Law

Michael S. Byrd

## Abstract

While medical spas (MedSpas) are gaining increasing popularity, they also introduce increasingly complex regulatory and legal issues, requiring a new way of thinking and a compliant structural foundation. This chapter will not only highlight many of the common compliance issues facing MedSpas and their owners but also shed light on how to become compliant. The compliance risks for a MedSpa tend to reside with the physician. The consequences of running an "illegal" medical spa range from fines all the way to losing a medical license. When the stakes are this high, no room exists for educated guesses. Opening and operating safe and compliant MedSpas requires guidance and careful navigation of this regulatory minefield. State laws and licensing board rules governing the practitioners in a MedSpa often offer confusing (sometimes contradicting) information. This chapter will expand on these risks and offer solutions to the most common issues facing MedSpas today.

#### **Keywords**

MedSpas, medical spas, ownership, delegation, supervision, plastic surgeon, nurse practitioner, aesthetician, physician assistant

# 8.1 Introduction

The explosion of the noninvasive medical aesthetic market directly impacts the business of plastic surgery. This market, where a practice is commonly branded as a medical spa or "MedSpa," challenges both the noninvasive services offered by an aesthetic practice and the market for surgical services. Technological advances increasingly make a MedSpa treatment an attractive alternative to surgery. Health care reform and decreasing reimbursements increasingly draws noncore physicians and others to the cash-based MedSpa model. The influx of private money by investment bankers and angel investors into the MedSpa market fuels this explosion.

The data behind this MedSpa market growth is compelling. The number of MedSpas has increased by more than 20% annually. In 2016 alone, 11,674,754 nonsurgical procedures were performed, and of that, 4,597,886 botulinum toxin type A treatments were conducted, according to the American Society for Aesthetic Plastic Surgery. This number represents a 75.5% increase from 2011. Not only has the number of botulinum toxin injections risen; hyaluronic acid injections have increased by 106.9%, chemical peels have increased by 60.4%, and nonsurgical skin tightening treatments have increased by 76.9%.

As in so many other industries, the state and federal lawmakers are far behind the advances in the MedSpa market. It will take years to know how the various professional boards and state statutes will govern MedSpas. In the meantime, existing law causes an overwhelming percentage of MedSpas to be noncompliant. Because of the training and typical staffing of a plastic surgery practice, plastic surgeons sit on a unique compliance advantage to not only survive the influx of MedSpa competition but also thrive.

# 8.2 The Big Three: Compliance Issues to Owning and Operating a MedSpa

Because a MedSpa is a fusion of health care and retail, patients, providers, and investors have a fundamental disconnect from the need for compliance. Beneath the fast, noninvasive, relatively painless experience found often in a retail setting lies an important truth: most MedSpa treatments are the practice of medicine. In diagnosing the source of noncompliance of MedSpas, three big traps exist. The traps can be found in the ownership structure of the MedSpa and the staffing for treatment of MedSpa patients.

## 8.2.1 Who Can Own a MedSpa?

In most states, only physicians (and sometimes other health care professionals) are legally allowed to own MedSpas. The legal doctrine, called the "corporate practice of medicine," is enacted to prevent nonphysicians from employing physicians to offer medical services. States that have strong corporate practice of medicine rules include New York, Texas, and California.

This raises the obvious question as to how nonphysicians can own a MedSpa. The answer is an old model found in health care and in the business of plastic surgery (historically for different purposes): the management services organization (MSO) model.

## The Management Services Organization Model

The MSO model allows physicians and nonphysicians alike to effectively own a MedSpa. The MSO model splits the business and clinical aspects of a MedSpa into two different entities. The MSO is the business entity that provides management services to the clinical entity. Ownership of the clinical entity must follow the applicable state law governing ownership of a professional entity that provides medical services. The MSO, however, may be owned by anyone. The cord that tethers the two entities together is a management services agreement (MSA). The MSA outsources the business aspects of the MedSpa to the MSO and typically drives the economics of the MedSpa to the MSO entity. Examples of the services provided by an MSO include leasing of space and equipment, licensing of intellectual property, marketing, human resources, accounting, billing, and payroll (**Fig. 8.1**).





# Why Do the Ownership Rules Matter to Aesthetic Surgeons?

The impact of the ownership requirements of a MedSpa to an aesthetic surgeon depends on the nature of the relationship between the surgeon and the MedSpa. The three most common scenarios for a surgeon to be involved with a MedSpa are as follows: (1) the surgeon owns a MedSpa ancillary to the physician's surgical practice, (2) the surgeon owns a MedSpa with a midlevel provider or a business partner, or (3) the surgeon serves as a medical director for a MedSpa.

The situation posing the most potential risk to an aesthetic surgeon is serving as a medical director for a MedSpa. The surgeon, in this arrangement, is asked to serve in a limited role to supervise and delegate treatments to the actual providers of MedSpa services, while typically receiving not much more than a monthly stipend. Surgeons often find value in this by hoping their name awareness will generate new surgical patients from the MedSpa. Many surgeons sign on as medical directors with little inquiry into the structure of the MedSpa. If the MedSpa is not compliant with the ownership rules of the applicable state, the surgeon may unwittingly be supervising a medical practice that is not authorized to practice medicine.

The second common scenario for aesthetic surgeon involvement within a MedSpa is co-ownership with a nonphysician. Depending on state law, this arrangement may not comply with the ownership rules governing medical practices. The MSO model then becomes the compliant model for the surgeon to continue the MedSpa in this co-ownership arrangement.

Finally, many aesthetic surgeons have a MedSpa as a part of their surgical practice. This is the ideal position for aesthetic surgeons, as the MedSpa will comply with the ownership rules of any state in this scenario. Increasingly, aesthetic surgeons are nevertheless choosing to adopt the MSO model. By adjusting the legal model, the aesthetic surgeon has now positioned the MedSpa to be acquired in the future by either a successor surgeon or a nonphysician-owned MSO. The market for potential buyers then expands exponentially.

## 8.2.2 Who Can Diagnose for Nonsurgical Cosmetic Treatments?

Just like any traditional medical treatment, any MedSpa procedures that constitute the practice of medicine require an initial diagnosis. The definition for the practice of medicine is typically broad in most states and encompasses many of the common MedSpa treatments. For example, injectables, lasers, microneedling, dermablading, body contouring (e.g., CoolSculpting), medical-grade chemical peels, and microdermabrasion most often fall within the definition of the practice of medicine. In any medical practice, including an aesthetic practice, the physician may provide the initial exam and diagnosis.

Typically, physician assistants (PAs) may also perform the initial exam and diagnosis. However, the requirements vary by state, so it remains important to understand the nuances. Most states allow a PA to diagnose but require the supervising physician and the PA to have the appropriate training in aesthetics. The key then becomes planning for appropriate training when bringing in a PA from another specialty.

Similarly, a nurse practitioner (NP) and advanced practice registered nurse (APRN) will usually be able to provide the initial exam and diagnosis. The scope of practice and other boundaries for NPs and APRNs vary widely from state to state. In some states an NP or APRN will have more autonomy than a PA. On the other hand, some states have requirements that NPs or APRNs may diagnose only in the specialty for which they are certified. This creates a risk, because currently no aesthetics certification exists. Those states typically relegate the NP's or APRN's scope of practice in a MedSpa to that of a registered nurse (RN).

In most states, it would be beyond the scope of practice for an RN or a licensed practical nurse (LPN) to engage in the diagnosis phase of treatment. This becomes a problem for MedSpas, because it is common for an RN to see and treat patients in the facility without the patient ever coming into contact with a physician or mid-level practitioner (**Table 8.1**).

In a recent survey by the American Med Spa Association, 37% of responders admitted that either they do not perform a good faith examination prior to a patient's first treatment or the exam is not performed by a physician, PA, or NP. "Good faith examination" is a term used in California, but it simply refers to performance of an appropriate medical exam before prescribing, dispensing, or furnishing a dangerous medication, which would include botulinum toxin A or fillers prescribed for a patient. Other terms used for this exam and diagnosis include "initial exam" or "initial consult." This response rate indicates a broader issue of noncompliance, because physicians, or the mid-level practitioners to whom they can properly delegate the task, often do not perform an initial patient examination or prescribe treatment plans for MedSpa patients. And while the semantics may differ, all states have some requirement that a physician must prescribe a course of treatment before rendering services.

# 8.2.3 Who Can Provide Treatment?

While an initial exam must be provided by either a physician or a mid-level practitioner to be compliant, many types of licensed professionals can provide a variety of treatments in a MedSpa. The exact scope of practice for any type of practitioner is going to depend on state-specific laws and regulations, and it typically varies based on education and experience. Aside from physicians, PAs, NPs, RNs, and aestheticians (usually spelled this way to distinguish them from medical aestheticians, who usually work in hospitals and concentrate on reconstructive care) are the main practitioners in a MedSpa setting. The providers who have authority to diagnose (MDs, PAs, NPs, and APRNs) may also provide treatment. Additional providers, depending on the state, include master aestheticians, laser techs, medical assistants, and even patient coordinators.

## **Registered Nurses**

Like many practitioners, the scope of practice for an RN will depend on the state where he or she holds a license. The board of nursing for each state regulates specific action for RNs. However, in a medical practice setting, the scope of practice will rely heavily on delegation. Generally speaking an RN will have little independent authority but can receive various delegations for those procedures. Some states, such as New Jersey, currently limit an RN's ability to inject and fire a laser. Most states, however, will allow the traditional MedSpa services to be delegated to an RN.

## **Aestheticians**

Unlike other licensed professionals, aestheticians in most states are unable to perform any tasks that are categorized as the practice of medicine. While unable to perform medical treatments,

Table 8.1         Common treatments offered by MedSpas and which ones constitute medical treatments		
Medical (MD, RN, NP, PA)	Nonmedical (aesthetician)	
Microdermabrasion penetrating the epidermis	Microdermabrasion for cosmetic treatment (only outermost layer of skin or stratum corneum)	
Physician-grade chemical peels (e.g., glycolic)	Aesthetician-grade chemical peels/exfoliation (superficial/epidermis; not medium-depth/grade)	
Laser treatment (intense pulsed light [IPL] devices, etc.)	Hair removal by tweezing, depilatories, waxing (electrolysis limited to licensed electrologists)	
Treatments to remove scars, blemishes, wrinkles, pigmentation	Deep-cleaning facials and skin care (cleaning pores, sloughing off dead surface cells via commercially available products)	
Injectables (e.g., botulinum toxin)	Laser hair removal (when applicable)	

Adapted from Zide BM, Swift R. How to block and tackle the face. *Plast Reconstr Surg* 1998;101(3):840–851; Zide BM, Swift R. Addendum to "How to block and tackle the face." *Plast Reconstr Surg* 1998;101(7):2018.

aestheticians are able to administer a variety of cosmetic treatments. Aestheticians are usually licensed and regulated by the state board of cosmetology and must undergo a state-specified training program. Some national programs exist, but by and large this is a state regulation. While not yet commonplace, some states have implemented a new "Master Aesthetician" license. The master aesthetician completes training beyond that of the aesthetician license and expands their scope of practice. While expanding aestheticians' training and knowledge into areas such as pharmacology, medical terminology, and pre- and postoperative care, these programs still do not give aestheticians carte blanche to operate outside their state-mandated scope. Some states, such as Utah and Virginia, along with the District of Columbia, have expanded the aesthetician practice to include more education and, in some instances, more treatment opportunities. Employing aestheticians or master aestheticians is legal so long as they are not operating outside their scope of practice. Ensuring that they are administering only limited treatments not constituting the practice of medicine will help maintain compliance and avoid enforcement actions. As a word of caution, aestheticians are commonly operating outside their scope of practice in MedSpa settings. Typical noninvasive cosmetic treatments seem like a natural extension of traditional aesthetician services, leading physicians and aestheticians to provide medical services unwittingly.

## Medical Assistants and "Unlicensed Persons"

Last, some states have laws and regulations for medical assistants, while others are completely silent on the matter. Medical assistants are unlicensed, although sometimes certified, individuals who may work in a medical setting. Medical assistants typically assist with administrative duties or perform some clinical duties such as taking medical history and assisting a physician. Typically medical assistants are not qualified under state law to receive delegations, but there are some instances when that might not be the case. Some state laws allow delegation to "unlicensed persons." In these instances, a physician (or an autonomous NP) can delegate to an unlicensed person as long as that person is "qualified." However, there is substantial risk associated with this type of practice. Ultimately, as with any delegation or practice, the physician will hold the liability on behalf of those who receive the delegation orders. With that in mind, best practices are to delegate medical treatments to those who are licensed professionals and trained to perform the task at hand.

## Enforcement

A common question that arises with compliance issues is how the medical board, or any regulatory body, would become aware of a compliance issue. Stated more bluntly, the question is typically some variation of "How is everyone else doing it and getting away with it?" While random audit of a practice is typically a low risk, tangible ways to come under the enforcement spotlight exist. The most frequent sources of enforcement initiatives are (1) patients, (2) competitors, and (3) disgruntled ex-employees. Once the enforcement spotlight is turned on a practice, exposure becomes real.

# 8.3 Remaining Compliance Issues

## 8.3.1 Commissions

While the law varies significantly, payment of commissions to staff can create significant risk in many states. In a survey of MedSpas by the American Med Spa Association, 31% of those who responded pay commissions for the performance of certain medical treatments. For example, the providers commonly receive an hourly wage plus a certain percentage of revenues for treatments provided, products sold, and even treatments provided by other providers. The amount paid ranges from 5% of sales net of product cost to 25% of gross sales. Many MedSpas create a business problem by essentially paying all the profits to the providers. More important, commissions in some cases are illegal.

Commissions fall within a veritable minefield of regulations that intersect to make what otherwise would be a benign form of compensation (when properly structured) into a payment that can range from unprofessional conduct to illegal. Common law legal doctrines that prevent fee splitting of medical revenues vary from state to state. States such as New York and Illinois prohibit fee splitting. Other states create regulatory risk for commissions through their corporate practice of medicine doctrine, antikickback laws, and antireferral laws.

The simplest answer in navigating this regulatory minefield is to avoid commissions. The best practices of MedSpas are to pay a bonus for specified performance metrics or pay discretionary bonuses. A discretionary bonus is the simplest approach, as it avoids the pitfalls with creating complicated metrics. This approach requires trust between the provider and the MedSpa that the MedSpa will fairly compensate for performance. The performance metric approach sounds great in theory but is challenging to create. The idea behind this approach is to create performance goals that tie into the overall goals of the MedSpa. Common performance metrics include team revenue targets, individual revenue targets, efficiency targets, and patient satisfaction benchmarks.

## 8.3.2 The Health Insurance Portability and Accountability Act

While the Health Insurance Portability and Accountability Act (HIPAA) is familiar to physicians, the breadth of issues that must be considered with patient privacy and security is elusive. A common question posed by MedSpa owners is "I have heard that HIPAA does not apply to a MedSpa because it does not take insurance; is that true?" While the law, of course, is more complicated than this, there is a good rule of thumb that the federal HIPAA law may not apply for a cash-only business. However, three big caveats to this rule of thumb exist: (1) most states have a state-level HIPAA law covering patient privacy that apply to MedSpas, (2) many MedSpas are actually a part of a surgical practice that does bill insurance and is therefore subject to HIPAA, and (3) most states recognize some civil level of patient protection for violations of patient privacy, which may result in a direct lawsuit from a patient to the MedSpa.

When HIPAA does apply to a MedSpa, the real consideration is the evolution of patient privacy and security laws. The Health Information Technology for Economic and Clinical Health Act (HITECH) was signed into law in 2009 by President Obama as part of the health care reform. This act established privacy and security measures and expanded HIPAA in five ways: (1) business associates are now directly governed by HIPAA rules, (2) there is a new notification of breaches requirement, (3) there are new restrictions on certain disclosures, (4) there is an alteration of the disclosure standard, and (5) new accounting rights of patients have been provided.

Because of the importance on protecting patient privacy and information, HITECH requires that organizations implement compliance plans to describe and outline privacy policies. All covered entities are required to have privacy policies and security policies to protect sensitive patient information. Compliance plans have seven elements: (1) written privacy and security policies and standards of conduct, (2) designation of a compliance officer and compliance committee, (3) workforce training and education, (4) effective lines of communication, (5) issuing disciplinary guidelines, (6) internal monitoring and auditing, and (7) timely responses to detected breaches and corrective mechanisms.

A MedSpa must first determine whether HIPAA applies to the MedSpa and understand the scope of patient privacy regulation in the applicable state. From there, a MedSpa may design and build an appropriate plan to protect patient privacy.

# 8.4 Emerging Trends in the MedSpa Industry

## 8.4.1 Private Equity

Investment from private equity funds, hedge funds, and opportunistic businesses has been an accelerant to the explosion of the MedSpa market. Private equity brings great economic opportunity for MedSpas and aesthetic providers. The drawback to this influx of private equity capital is a lack of sophistication regarding the principles for compliance. Consequently, the lack of compliance in the MedSpa space is high and will ultimately draw increased enforcement and scrutiny from the medical boards, nursing boards, and other governmental bodies. Like it or not, private equity is a new reality for MedSpas and for those in the aesthetic sector. A look into the dental sector will shed light on the impact (good and bad) of private equity in health care.

The common thread between MedSpas and dental practices in the private equity world is that they tend to operate like a retail store from a business perspective and like a health care practice from a regulatory compliance perspective. In the dental market, this looks like a branded chain of dental offices typically found in retail real estate space. Similarly, MedSpas tend to be branded as retail elective health care services. The regulatory hurdles are similar for the management of dental and medical practices, and the legal solutions to these regulatory hurdles are structurally the same.

From a compliance perspective, private equity accesses the dental provider market in a similar manner to the MedSpa market. Dental service organizations (DSOs) and MSOs share similar business and legal compliance characteristics. DSOs are management organizations in the business of providing all back-office business management services to dental practices. MSOs, by contrast, provide similar business services to medical practices, including MedSpas. Because the DSOs have been around longer, they serve as a great example for the infusion of private equity into MedSpas.

While the private equity world is just starting to enter into the MedSpa field, the development of the dental private equity market is instructive for those physicians who want to use private equity as a MedSpa exit strategy. Because private equity investors are typically growth-oriented rather than value-oriented, it is important to be clear that the business strategy is in alignment with private equity strategy. Moreover, the founding physicians must be able to articulate clearly a vision for the next 3 to 5 years. They must also be able to communicate the competitive advantage over the competition clearly, and the MedSpa must be compliant from a regulatory standpoint. Compliance includes the legal structure from a corporate practice perspective as well as patient privacy and staff delegation. Last, the service organization must be able to articulate a strategy for attracting and keeping clinicians.

Businesses in the younger and emerging MedSpa market would be wise to pay attention to the trends and developments in the DSO market. Private equity is coming into the MedSpa market, presenting unique opportunities to surgeons to expand the potential audience of buyers of a MedSpa. If the MedSpa house is not in order from either a regulatory or business perspective, private equity will flee.

## 8.4.2 Autonomy of Nurse Practitioners

A current trend across several states has been to expand the authority and autonomy of an NP. Because NPs have earned either a master's degree or a doctoral degree in nursing, they are able to work in a variety of specialties. This impacts MedSpas in a few ways. First, in some states this allows NP ownership, which expands competition and potentially eliminates the need for physician involvement. Second, in some states, the aesthetic surgeon may staff the MedSpa with an autonomous NP and substantially reduce the need for clinical oversight, thus allowing the surgeon to spend clinical time operating and focus on the business side of the MedSpa. Although NPs may be autonomous in a particular state, states differ as to whether an NP can then own a MedSpa. For example, an NP with 3,600 hours of experience in New York obtains autonomy but is prohibited from owning a MedSpa. On the other hand, an NP in Washington may own a MedSpa outright. Whether a physician is staffing a MedSpa or agreeing to partner with an NP, understanding an NP's autonomy and ability to own are imperative from a compliance perspective.

The wave of NP independence in some states may also create opportunity for the physician in staffing a MedSpa. However, while many states have opened up legislation to allow for NP independence, sometimes this independence is tied to the NP's particular specialty. For example, an NP who specializes in neonatal care might not be completely autonomous in adult care. More important, some state licensing boards are hesitant to pronounce NPs autonomous in aesthetic medicine. Aesthetic medicine is not currently a recognized specialty for advanced education; consequently, some states take the position that an NP is limited to the scope of practice of an RN in aesthetic medicine.

## 8.4.3 New Tax Reform

In December 2017, Congress passed the Tax Cuts and Jobs Act (TCJA), which is causing big changes for the business community. At the heart of the bill is a new scheme that will reduce the personal income tax rate for owners of pass-through entities. These entities, typically partnerships, sole proprietorships and subchapter S corporations, will receive a 20% deduction on their taxable income. However, for specified service trades (which includes health care professionals), the deduction applies only for those who fall below a threshold. The threshold for a single filer is \$207,500, and the threshold for married joint filers is \$415,000. While a taxpayer loses the full deduction at \$207,500, the deduction begins to be phased out at \$157,500. In a profitable MedSpa, this could be an issue.

Because regulations indicating how the new tax law will be enforced have not been issued, Certified Public Accountants (CPAs) and tax attorneys are left to speculate on strategies that may work to fit within this deduction. Some speculate that MSO owners may be able to work around the service trade limitation. Additionally, there is a thought that separating product sales into a separate entity may create a benefit as a nonservice entity for this new deduction. This new law and the pending regulations merit monitoring, as new strategies may surface to refine the business structure of MedSpas in a tax-advantageous manner.

# 8.5 Concluding Thoughts

MedSpas directly and indirectly impact the business of aesthetic surgery. Aesthetic surgeons face important business decisions as to how and when to incorporate a nonaesthetic cosmetic service strategy into their business. The heart of the risk for the MedSpa market lies in health care compliance. While some smaller MedSpas may continue to operate in a noncompliant structure, the dual benefit of operating a compliant MedSpa is that (1) the risk for the MedSpa is substantially reduced and (2) the opportunity for a successful sale of the MedSpa is increased.

## Suggested Reading

- Adatto BE, Byrd MS. Legal and regulatory issues in the medical spa industry. Mod Aesthet 2017; (Suppl 2: May–June):8–9
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# 9 Social Media

Anthony Youn

## Abstract

How does a plastic surgeon effectively navigate the world of social media? Networks such as Facebook and YouTube have become a go-to source of information for cosmetic surgery patients. A majority of our patients use social media every day, and recent studies are documenting its rising impact on the plastic surgeon-patient relationship. Facebook, Instagram, Snapchat, Twitter, and YouTube have emerged as the most prominent and influential social media networks for plastic surgeons. But how does a doctor choose which outlet to use and how to benefit maximally from the time and effort that he or she invests? The first step is to determine which social media network matches your ideal patient, or avatar. Then, match the network to the surgeon's interests: live video? text articles? This chapter shares practical tips and advice to pick the best social media networks for a practice and use each network effectively and efficiently.

## Keywords

social media, Facebook, Instagram, Snapchat, Twitter, YouTube

# 9.1 Introduction

The methods plastic surgeons use to interact with prospective patients are constantly changing. In the 1990s, print still ruled. Plastic surgeons bought ads in the Yellow Pages, newspapers, and magazines. In the 2000s, we discovered the power of the Internet and began creating websites with extensive beforeand-after photo galleries. Today, social media have emerged as the quickest growing factor in the interactions between plastic surgeons and patients.

In fact, recent studies reveal that more and more patients are being influenced by social media to undergo cosmetic procedures, and they're utilizing social media to interact with their doctors in ways never before imagined. It's also become a way for plastic surgeons to educate and court prospective patients. So, in this chapter I'll describe the most prominent social media networks, break down which ones you want to consider participating with, and recommend how to maximize your time with them.

If you're a novice in the world of social media, the dozens of options of networks can be daunting. Which social media channel should you spend your efforts on? Facebook? Instagram? YouTube? Twitter? This is the first major question you need to answer.

The best way to determine which social media network to pick is to first decide who is your avatar. Your avatar is whom you would consider as your ideal patient. Would your avatar be male or female? What age would your avatar be? What socioeconomic group would he or she belong to? What are your avatar's primary concerns and interests? Choosing your avatar can help you choose which social media channel is ideal for you. For example, if your favorite surgery to perform is breast augmentation, then your avatar is likely to be a woman in her 20s or 30s. If your preferred procedure is facelift, then your avatar may be a woman in her 50s. Or maybe gynecomastia surgery is your primary focus? Then your avatar may be a man in his 30s.

Once you determine your avatar, then pick the social media channel that your avatar gravitates to. Go where your patients are.

# 9.2 The Main Social Channels

## 9.2.1 Facebook

Currently, Facebook is by far the most popular social media network in the world, with over 2 billion users worldwide. Its massive reach extends across all age groups, with over 70% of Internet users between the ages of 18 and 65 using this network. Its users are both male and female, with women making up 52%.

Of all the social media channels, Facebook has the most varied content. You can post photos, videos, links to articles, and even create live video (Facebook Live). So if your avatar matches Facebook's demographic and you like to share a wide variety of content, then Facebook may be the optimal network for you.

## 9.2.2 YouTube

YouTube is the second most popular social media network, with over 1 billion users. It's basically a repository for videos, allowing users to create their own "channels." Videos can range in length from just a few minutes to a half hour or longer. YouTube isn't as "social" as the other networks, as it doesn't allow for you to share thoughts or photos, limiting the interaction and community feel to it. Its demographic is extremely wide, however, and some people are even using YouTube as a search engine, taking the place of Google.

## 9.2.3 Instagram

Instagram is the most rapidly growing social media channel, with approximately 800 million users and counting. It's a very visual medium where users can post photos and videos (up to 60 seconds long) in their main feed. Followers can "like" and comment on these posts. Instagram users can also post "stories," short videos of 15 seconds or less that disappear after 24 hours. It's believed the stories feature was added in order to compete with Snapchat. Instagram users trend younger than Facebook, with 59% of Internet users between the ages of 18 and 29 active on the network but only 33% of 30- to 49-year-olds using it. Its users skew female, with 58% women.
### 9.2.4 Snapchat

Snapchat began as an app that allowed users to send rapidly disappearing photos to each other. This was initially very popular with teenagers, who used it to send hidden messages and photos to their friends. Then Snapchat added the stories feature, and the network exploded in popularity. Plastic surgeons who were early adopters, such as "Dr. Miami" (Michael Salzhauer) and Dr. Matthew Schulman, quickly accumulated audiences in the millions as they "snapped" their day's surgeries, often in explicit detail. Snapchat remains very popular among the younger crowd, with 400 million users, the majority of them under the age of 24. Although millions of men are active on Snapchat, its users skew female, making up 70% of its user base. Snapchat's growth has become fairly stagnant over the past couple years, eclipsed by Instagram.

## 9.2.5 Twitter

Twitter allows its users to post short messages, or "tweets," of 280 characters or fewer. These can include text, photos, links, and short videos. Unlike the other channels, Twitter users sometimes tweet dozens of times per day. Its demographic is wide and has a 53:47 male-to-female audience. Although Twitter has 317 million users worldwide, its growth has also stagnated in recent years.

## 9.3 Some Smaller Networks

### 9.3.1 Pinterest

Pinterest has 150 million users, most of whom are female, with an average age of 40. It allows users to create small graphics called "pins," which are then placed onto a virtual bulletin board. These graphics can include recipes, quotes, and images. Although some plastic surgeons have Pinterest accounts, as of this writing no plastic surgeons have fully taken advantage of this network.

## 9.3.2 Reddit

Reddit users skew young and male, with an average age in their twenties. It's basically a huge bulletin board of interesting stories, videos, and images, which users can up-rate or downrate, depending on how interesting they think the posts are. The posts can be grouped into separate channels depending on the subject matter—for example, Plastic Surgery, Announcements, TodaylLearned. Although the least known among the major social channels, it boasts 125 million users.

### 9.3.3 LinkedIn

LinkedIn is a professional networking site with 106 million users. It's a social channel that enables users to network with friends, coworkers, and others in industry to make connections, obtain jobs, and promote what's happening with your work. It's not a place for doctors to court patients, and it should be used in a professional fashion only.

# Google Plus, Vine, tumblr, Periscope, and MySpace

Google Plus, Vine, tumblr, Periscope, and MySpace are dead. Social media channels notoriously come and go. One day a medium is hot with millions of users, and a mere year later no one uses it anymore. This is the nature of online marketing and communication in today's world. So don't put all your eggs into one social media basket. Today's hot channel may be in tomorrow's digital dustbin.

## 9.4 Tips for Using Each Social Channel

## 9.4.1 Facebook Tips

Every plastic surgeon or practice should have a Facebook business page separate from the owner's personal page. Business pages enable you to access analytics to see how your page is performing, purchase ads, and promote posts. The business page can be centered on your actual business or on yourself. For example, I have a Facebook page for my practice, Youn Plastic Surgery, and a separate Facebook page for me as a public figure. If you haven't yet used Facebook for your business, then I recommend creating a page for your plastic surgery practice first.

Facebook allows a very wide range of posts, so if you like to share a wide variety of items, from before-and-after photos to short videos of you performing surgery or injections to links to online articles, and even images with famous inspirational quotes, then this is the best network for you. It skews a bit older, so if your practice is more mature—consisting of facelifts, blepharoplasty, and laser treatments—then it will match your avatar well. If, however, your practice skews younger—with more breast augmentation, liposuction, and Brazilian butt lift (BBL) surgeries—then Facebook probably shouldn't be where you spend your resources. Look to Instagram and Snapchat instead.

If you don't like taking photos or videos of yourself or your patients and would rather write articles and share links to other content, then Facebook is a better fit for you than Instagram or Snapchat, which require considerable amounts of video to be successful. However, over the past several years Facebook has pivoted toward live video and even added Facebook stories to its feed. So now it's basically become a one-stop shop for all sorts of sharable items.

Currently, the most effective way to use Facebook is by going live. By creating live video, you can take advantage of more organic reach than any other type of post. What types of live videos should you create? I recommend starting simple. For my first Facebook Live video, I pointed my iPhone camera at myself and discussed the popular facial fillers in my office. I had a box of each of them and pointed the camera at each box while I discussed which ones I used and why.

If you haven't done a Facebook Live, then I strongly recommend you try it. It's a real rush. You can see the number of people who are watching you during your broadcast, and you can even read and reply to their questions live! Your followers will post comments and questions which you can read on a separate device during the live broadcast. For example, you can go live from your phone and read the comments and questions on your iPad. This is a great way to interact with prospective patients, show your personality, and even promote specials in your office.

If you want to take it to the next step, then try broadcasting a live treatment. This can really enable your followers to virtually step into your office and see a procedure they are interested in. We've had great success with broadcasting live procedures on Facebook, as it demystifies the treatment for the viewers and can make them more apt to call for an appointment. I recommend starting with a noninvasive treatment first, such as a chemical peel or laser treatment, prior to proceeding to more invasive procedures such as filler and surgery.

So what do you do after you make a Facebook Live video? Post it to your feed to get hundreds or thousands more viewers and organic reach. You may also consider "boosting" the post: paying Facebook to show it to more people. You can boost a post for as little as \$1 to as much as you want to spend. If you boost a post, I recommend that you boost only posts that have some popularity already. The posts with more engagement get better results when boosted, so your paid reach can actually increase your organic reach. I also recommend boosting posts that can make you money. For example, it doesn't make sense for you to pay \$20 to boost a post about a fun movie you watched over the weekend, since there is no direct monetary benefit. But a post about your new toxin and filler office special? That makes more sense!

So how would you do this? It's actually quite easy. Once you click that you'd like to boost a post, Facebook will prompt you to target an audience. Audiences can be targeted in terms of gender, geographic area, and interests. This allows you to very specifically choose the type of users you want to see your post. For example, let's say I have a toxin and filler special I'd like to advertise. Since we perform these injectable treatments on both men and women, I'd choose both genders. I'd select Metro Detroit as the geographic area to target. In regards to interest, I may choose people who have indicated that they are interested in Juvederm (Allergan, Dublin, Ireland), Botox (Allergan, Dublin, Ireland), and cosmetic surgery. This allows me to target very specifically the types of people I'd like to see my ad and pay only for those people.

## 9.4.2 YouTube Tips

Every plastic surgery practice should have a YouTube channel. It's a perfect place to post promotional videos, such as an introduction to your practice and videos showing minimally invasive treatments, surgical procedures, and even consultations. Unlike Facebook videos, YouTube videos are often viewed for months to years after they are posted, and successful videos can garner hundreds of thousands of views.

Also, unlike Facebook videos, YouTube videos can be monetized with ads. Just click the button "monetization" when editing the video and choose which type of ad you are ok with and YouTube will pay you when people view these ads. Some experts believe that your organic reach is higher for videos that are monetized with ads, since there is a financial incentive for YouTube to show your video with ads more than a non-monetized video. Unfortunately, ads featuring graphic content such as live surgery are usually exempt from ad placement.

If you create a YouTube channel for your business, I recommend that you separate your individual videos into appropriate playlists. These playlists can have separate names, such as "Surgery Videos" and "Online Consultation Videos," allowing viewers easier navigation when they get to your site. If they open your channel and the videos are all haphazardly arranged, they're more likely to click and exit away without watching anything.

I also recommend creating a professional-looking video that introduces you and your practice. This video should be pinned to the front of your channel so any new visitor sees this video first. You may also want to embed this video on the front page of your website as well.

I also recommend that you embed relevant videos in your website procedure pages. For example, under my website page for breast augmentation, I have embedded a video of me explaining the differences between various types of breast implants. Surveys show that most people would rather watch a video than read an article, so having both available on your website is ideal. You can also embed a video of you performing the actual surgery so that the process is demystified for potential patients.

Any videos you post in YouTube can be easily shared on your Facebook page. Just click "share" on your video's page, then click the Facebook icon to place the video in a post on your Facebook page. You can also share YouTube video links on Twitter as well.

## 9.4.3 Instagram Tips

Instagram is all about the image, making it the obvious top choice for many plastic surgeons. Those users who are most successful on this network consistently post attractive images and videos. Although you don't need to hire a professional photographer or videographer, make sure any images you post are visually appealing and in harmony with your brand. Use a similar color palette when posting static images about you and your plastic surgery practice. This brings a sense of familiarity to your page. You don't want the colors to be haphazard or inconsistent from day to day.

Currently, you can post on Instagram in two ways: as a regular post and as a "story." Regular posts consist of a photo or video up to 60 seconds long. You can also post multiple photos and video in one post if you'd like to share several images or videos on one post. These show up in the main, scrolling feed of the user who follows you.

Attractive before-and-after photos typically get good engagement on Instagram. Many plastic surgeons (including myself) have had great response from intraoperative videos as well. Static images that are obviously advertisements don't typically do as well, nor do selfie photos or selfie videos unless you're a celebrity or extremely attractive.

In very short time, Instagram stories have outgrown Snapchat stories. These reside at the top of the app as a bar with a row of circles, each one representing a different person's stories. Instagram stories last up to 15 seconds long and are a great place for you to share video clips from inside the office and operating room. These stories stay for 24 hours, after which they are erased. However, you can choose to "highlight" certain stories keep them on display when anyone visits your profile page. These highlighted stories can be separated into categories that you create, such as "breast augmentation," "facelift," or "Botox."

Keep in mind that nudity is not allowed on either Instagram or Facebook, so make sure to cover nipples and private parts; otherwise you risk getting banned by the networks. Instagram stories allow you to "pin" items over these sensitive areas digitally, or you can just cover them at the time of filming. Adherent nipple covers can be purchased online.

As with Facebook, you can pay Instagram to boost your posts and show it to more people than your organic reach allows. This may be worth it for really important posts, especially those which you can monetize. These Instagram ads are actually created using the Facebook ads manager program.

#### 9.4.4 Snapchat Tips

If you're not a millennial, Snapchat can be very difficult and counterintuitive to use. It was probably engineered that way to keep older people from being active on the app and making it less "cool" to the younger crowd. Upon opening the app, you see the video camera portion of the app. Swiping in the different directions (up, down, left, and right) brings you to different screens, such as your friend list, your previous snaps, the discover page, and more. As on Facebook, you can "friend" other users, but unlike Facebook and Instagram, Snapchat doesn't have an easyto-use, general search page. This makes it more difficult to find people you might know or want to follow. For this reason, many users find that their followers on Snapchat are more engaged with their posts than, say, Facebook followers.

One main benefit to Snapchat for plastic surgeons is that it is the only major social media network that allows you to post nude photos and videos. This can be especially helpful for surgeons who do a lot of breast and genital surgery. Unlike Facebook and Instagram, Snapchat doesn't allow longer-form videos, however. Its stories only allow ten-second clips (unlike Instagram, which allows 15 seconds), but it's very easy for users to post dozens of these short clips together, which is what most plastic surgeons who are active on this network do. A recent update from 2017 increased the allowable length of recordings. Snapchat allows you to record continuously for a full 60 seconds. Then Snapchat automatically clips it into 10-second clips for upload. This is all done automatically and when viewing the snap videos, it's virtually seamless. This was a huge change that makes recording surgical procedures much simpler than on Instagram. Also, you can upload video clips of up to 60 seconds from your camera roll as well. Snapchat allows you to edit these videos (add captions, add filters, etc.) within its platform.

Snapchat's younger audience is interested in procedures relevant to their demographic, such as breast augmentation, BBL, and liposuction. Practices with older patients might not find this network as valuable. You'll get best results if you cater to Snapchat's younger interests, trying to be a bit creative with your posts without being unprofessional.

Prior to investing a lot of time and money in Snapchat, make sure to gauge the current climate for this outlet. Ever since Facebook bought Instagram, forecasters have been predicting the demise of Snapchat. It hasn't happened yet, but some people believe that the future isn't so bright.

### 9.4.5 Twitter Tips

My good friend, and the person whom I consider the "Queen of Twitter," Dr. Heather Furnas (Santa Rosa, California), has stated in our many talks together that "Twitter is not for getting new patients." Although she has amassed over 120,000 followers, she doesn't find that it's effective in obtaining new patient leads. Instead, Twitter has become a very valuable outlet for networking with other plastic surgeons.

A few years ago, Dr. Olivier Branford (London, United Kingdom) started a movement to use *#plasticsurgery* as a way for plastic surgeons to network by sharing the latest news, tips, and research. Now there are hundreds of plastic surgeons throughout the United States and the rest of the world who use this hashtag to communicate with each other, building an online community of collegial plastic surgeons. New research is shared on Twitter from *The Aesthetic Surgery Journal, Plastic and Reconstructive Surgery*, and others, with plastic surgeons commenting on the findings and learning and supporting each other.

Do you want to get involved? One way to join the conversation is to retweet and comment on posts by other plastic surgeons and the journals while using *#plasticsurgery*. Although you're unlikely to get new patients from doing this, you can make new friends with your colleagues and peers. You can get even more attention and engagement from your peers by tagging them on posts and images, essentially giving them a "heads-up" that your tweet is something for them to pay attention to. You can tag up to ten users per post, so this can be a quick and effective way to spread the word.

## 9.5 Code of Conduct

The ethical use of social media by plastic surgeons is currently a hot topic. Stories of cosmetic and plastic surgeons acting inappropriately in the operating room abound, including dancing while performing surgery, poking fun at patients and/or their body parts, and making crude jokes. The two main plastic surgery societies, The American Society for Aesthetic Plastic Surgery (ASAPS) and the American Society of Plastic Surgeons (ASPS), have both made changes to their ethics and bylaws to address the growing concern about unethical behavior on social media. Although often it is the most controversial and provocative posts that draw the most attention and views, surgeons must always remember that we serve our patients first, not our social media followers.

Please see **Fig. 9.1** for the ASAPS Suggested Social Media Guidelines. This is a great resource to gauge the ethical standards of your social media activities.

## 9.6 Patient Privacy Issues

One final, but extremely important note: Make sure always to obtain consent from your patients prior to featuring them on social media. Be very cognizant of patient identifiers that might



## ELEVATING YOUR BRAND ETHICALLY

As social networking becomes a given for many physicians, it is important to consider how to use the tools in the most ethical and professional manner possible.

While ASAPS does not police its members use of social media, nor does it have a definitive policy in place specifically for social media, the American College of Physicians issued a position paper highlighting some key factors to consider when utilizing social media as a practicing plastic surgeon:

- It is essential to maintain privacy and confidentiality of patient information, demonstrate respect for patients, ensure trust in physicians and in the medical profession and establish appropriate boundaries
- It is critical to strike the proper balance to harness opportunities while being aware of the inherent challenges in using technology. Connectivity shouldn't come at the expense of professionalism

As more patients look to social media to learn about plastic surgery and find physicians, it is up to you to position yourself as a professional and offer truthful and straightforward information with patient safety and education at the forefront of your intentions.



**Fig. 9.1** ASAPS Suggested Social Media Guidelines. (© American Society for Aesthetic Plastic Surgery, all rights reserved. Used with permission.)

not be as obvious, such as tattoos (cover them up), patient names on charts and photos, and bystanders in your videos. HIPAA rules apply with social media, and training your staff to be aware of this is definitely recommended.

You may also want to consider obtaining a cyber insurance policy. Check with your insurance carrier if your insurance covers you for breaches of confidentiality or other liability associated with your social media. If not, then you might want to look into a separate cyber policy that covers you for it.

## 9.7 The Future of Social Media

Social media represent a constantly changing and evolving avenue for interacting with and educating our patients. They may soon surpass traditional advertising as the preferred way to promote our practices to new patients. By keeping up to date with the current and future trends in social media, you can be sure to maximize this incredibly powerful tool.

#### **Glossary of Terms**

- Avatar: Your ideal patient in terms of gender, age, occupation, interests
- Engagement: Followers interacting with your social media network via liking, commenting, or sharing
- Organic reach: The number of people who view your post organically, without having to pay for it. Organic reach for most networks, especially Facebook, has dwindled over the years, causing some to proclaim "organic reach is dead."
- **Stories:** Short videos measuring 10 to 15 seconds long, which disappear after 24 hours
- Tag: To attach a user's name to a post
- **Tweet:** A post on Twitter, up to 280 characters; can also contain photos and short video

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# 10 Hiring and Training a Superstar Patient-Care Coordinator

Karen A. Zupko

## Abstract

More than just about any role in an aesthetic practice, the patient care coordinator (PCC) can be a strong marketing asset or a big marketing liability. This chapter discusses the success characteristics and skills, best practices for hiring and training, and ideas for rewarding the PCC without alienating the rest of the staff. Included are insights from practice leaders who have successfully recruited and retained high-performing PCCs.

#### Keywords

hiring, training, recruitment, incentive, motivating, patient care coordinator, practice building, sales, customer service

## **10.1 Introduction**

More than just about any role in an aesthetic practice, the patient care coordinator (PCC) is a strong marketing asset or a big marketing liability. An effective PCC can build the surgeon's value and credibility with enthusiasm, cultivate long-term patient relationships, and improve the patient acceptance rate (PAR).

Because the person you hire can enhance or fracture the patient consultation experience, as well as be a significant influence in the patient's decision to schedule surgery or not, I strongly advise aesthetic surgeons *not* to fill this role too quickly. Instead you must fill it with the *right* individual. Doing so may take a little more time, but if the process is completed thoroughly and correctly, the result will be worth the wait.

This chapter discusses the characteristics and skills of successful PCCs, best practices for hiring and training, and ideas for incentivizing. Included are insights from practice leaders who have successfully recruited and retained high-performing PCCs.

## 10.2 Superstar Characteristics and Skills

Before you even begin your recruitment effort, do you know what kind of person you are looking for? Do you know which characteristics make for a PCC superstar? Hiring someone with the right talent and aptitude at the outset increases the likelihood that the employee will be successful, stay motivated, and stick with you for many years,

We asked multiple practice leaders what they feel are the characteristics of their superstar PCCs. *Excellent communication skills* and *the ability to relate to others* are at the top of the list. They *know how to build relationships* and are *engaging* in a way that makes patients feel they are important and well cared for.

Rapport building is an essential part of the PCC's job. Her or his role is to become the patient's "best friend forever" (BFF), the nonclinical confidant to whom the patient can ask questions that might be too embarrassing to ask the surgeon. An effective PCC becomes a bridge between the surgeon and the patient's support team. She or he can be the one who will listen when a patient says she has no encouragement from her adult children or spouse. She or he helps patients find solutions to childcare during early postop. To achieve this successfully, the PCC must be able to facilitate conversation.

The PCC also must be *intuitive*, sensing when someone is hesitating and able to probe to find out the real reasons why. Despite what many surgeons believe, most of the time a patient does not schedule, it's not about the fee. Maybe a patient hasn't discussed surgery with a spouse or feels pushed. Great PCCs *know how to read people* and tailor the consultation conversation in a way that the patient can understand, handing these nonfinancial roadblocks with aplomb. They must be *good listeners*, which I would add is an essential skill not only for understanding patient concerns but also for handling objections.

Great PCCs are *genuine*. Patients can see right through a charade intended only to sell them something. Finding a PCC who is genuine ensures she or he doesn't come off as pushy or phony. Genuine people know how to convey confidently to patients that they truly believe in the practice, the surgeon, and the results patients will get if they choose to schedule their procedure with the practice. It builds patient trust. Don't underestimate the deep sense of connection that can occur when a patient feels genuinely heard and understood.

Practice leaders also describe their long-term superstars as *compassionate, empathetic,* and *nonjudgmental.* They recognize the worth of others and can sense when a patient is fearful or insecure. They know how to provide assurance that things are going to be okay. Their empathy may be enhanced if they, too, have had that procedure and had some of the same concerns.

Finally, a medical background is a nice to have but not a requirement. Few aesthetic practices these days require the PCC to have a licensed practical nurse (LPN) or registered nurse (RN) certification. Certainly, a clinically trained person can capably answer medical questions, but after working with thousands of PCCs over the past several decades, I can say with certainty that service skills are more important to this role than answering questions about drains and dressings. Moreover, Box 10.1 explains why I believe surgeons must use caution when hiring from other aesthetic offices.

Additional essential skills for this role include the following:

1. Ability to ask for the sale: The PCC role is a sales and service position. Assessing patient needs, providing estimates, scheduling consultations and surgeries, and following up with patients who have not scheduled are sales responsibilities. Glossing over this fact will lead you to hire someone who may be personable, bright, and organized but who will not fill the surgery schedule. If you are serious about hiring a superstar, you must look for someone who either has sales or service experience or has a propensity for sales and can learn. That means hiring someone who is comfortable handling objections, "closing," and asking patients for large sums of money.

- 2. *High-proficiency keyboarding skills:* This is a fast-paced, intense job. If your PCC can't speedily enter data, she will never get her quotes, emails, follow-up letters, and practice management system tasks completed. Hire a hunter and pecker at your own peril.
- **3.** *Comfort using Internet applications and social media:* A significant amount of aesthetic marketing and communications happens online. PCCs must understand the importance and use of social media, online ratings, email, and web inquiry forms.
- **4.** Ability to write in complete sentences: The last thing you want is a poor first impression when a potential patient receives a response to emails and web forms. Ask for a writing sample to evaluate each person's skills in this area.
- **5.** *Top-notch organizational and project management abilities:* Each surgical case is its own little project with many steps, forms, and customer touch points—not to mention the project of your next Facebook posts, website relaunch, or spring VIP event. A PCC must be able to stay organized and on top of every one. Keeping all these plates spinning takes organization and tenacity.

## **Box 10.1**

#### Think Outside the Botox

Our firm has recruited many hundreds of patient care coordinators. I can tell you with confidence that "She worked for another plastic surgeon" or "She looks the part" should *not* be at the top of your list of reasons to hire someone for this role. We've seen plenty of PCCs who "look right" but lack the sales ability, customer service, technology proficiency, and strategic thinking required to be successful in this role.

Handling the service experience and patient needs in an aesthetic practice requires skill and sophistication. The PCC must be adept at assessing patient needs and buying style, convey your value proposition, quote fees with grace, overcome objections, and offer personalized service. These abilities do not come naturally to everyone, and the baggage and lack of training that comes from working in a previous plastic surgeon's office can be a challenge to correct.

Some staff can be retrained, but others may be congenitally unable to change their behavior or style to meet your expectations. This is particularly important to understand when an applicant arrives with a competing aesthetic surgeon's name on her résumé. Don't assume the person was trained or has the right skill set for your practice just because of having worked in another practice. Other practices' standards don't necessarily equal yours.

## 10.3 Hiring Process Part 1: Organize, Search, and Curate

We break the hiring process into two primary parts. Part 1, shown in **Fig. 10.1**, includes all the steps in the process up to narrowing the candidate pool to two or three finalists. Part 2 includes assessment of those final candidates before deciding to make an offer to one of them.

## 10.3.1 Step 1: Develop a Position Description

To describe the job or write an ad, it's essential that you put the role's responsibilities in writing. The description should clarify the title, and reporting relationship and give a summary, as well as list the qualifications and experience you require and the tasks. We find that categorizing tasks by key areas of the job makes organization easier. Box 10.2 contains an excerpt of a PCC role description. Early-stage aesthetic practices can combine this role with an office manager role until the practice builds its patient volume, at which time the PCC must become a full-time role.

## **Box 10.2**

#### **Excerpt of a Patient Care Coordinator Role Description**

Position: Patient Care Coordinator

#### **Responsible to:** Surgeon or Practice Administrator

**Job summary:** Speaks with potential patients by phone, counsels all aesthetic patients about costs of surgery and other treatments, and coordinates scheduling and follow-up. Reviews marketing and productivity data and conducts meaningful report review and analysis. Initiates and/or implements marketing programs to increase aesthetic surgery revenues and patient base.

Education: Associate's or bachelor's degree preferred Qualifications and experience:

- Three to five years of work experience, with increased responsibility, in high-end retail, hospitality, or other service industry, or an elective surgery practice
- Sales experience required: preparing estimates, discussing details, and closing the sale
- Proficiency with Internet applications and Microsoft Office applications
- Proven ability to handle upscale clientele
- Excellent writing and communication skills; ability to build long-term relationships
- Experience discussing financial arrangements and asking for money
- Neat, professional appearance

Responsibilities include, but are not limited to, those in the following lists.

#### **Relationships with Potential Patients**

- Appropriately discusses aesthetic consultations, procedures, and skin care services with prospective patients over the phone; encourages them to schedule and executes a follow-up system for those who don't schedule immediately
- Schedules aesthetic patients into the computer system; asks them how they heard about the practice and enters required demographics
- Schedules all appointments into the computer; keeps a "cancellation list" and calls patients if their appointment can be rescheduled to an earlier time
- Sends information to prospective patients and tracks activity in the database



### Surgery Counseling, Scheduling, and Follow-Up

- Greets aesthetic patients, when possible, at the front desk
- Discusses fees and financial policies with aesthetic patients after their consultation—provides written information and answers patient questions
- Tracks information about patients who scheduled surgery and those who didn't schedule surgery
- Schedules all surgeries—coordinates patient preoperative paperwork, history and physicals (H&P), examinations, and lab work and confirms written consent for procedures
- Collects surgical scheduling deposits and posts transactions into the computer system
- Takes and/or ensures patient photos placed in the record after consultation and surgery
- Screens patient phone calls postoperatively, advising the patient or deciding whether a telephone conversation or appointment with the surgeon is necessary

#### **Practice Enhancement and Marketing**

- Ensures that all information about aesthetic patients is entered into computer system
- Generates monthly reports for surgeon and team
- Calculates the practice's Patient Acceptance Rate (PAR) of consultations to surgeries
- Ensures that marketing information capture tools are understood and used by all staff and that staff are trained properly in using marketing collateral
- Maintains the database of patients who have had surgery and who haven't, and targets specific mailings about other services and the skin care program
- Maintains and updates the patient brochure, outlining information about the surgeon, skin care, and the entire practice

- Initiates and/or implements practice enhancement programstracks revenue and discusses progress with the surgeon
- Coordinates seminars—arranges room, food, information to be distributed—then follows up with attendees on the phone or in writing
- Participates in handling requests from the practice website; checks and responds to email messages that come from the site within guidelines

#### **Other Essentials**

- Meets with the surgeon monthly to review reports and marketing program results
- Maintains proficiency with imaging software and Internet applications
- Maintains patient confidentiality by following the Health Insurance Portability and Accountability Act (HIPAA) Compliance Plan
- Attends American Society for Aesthetic and Plastic Surgery (ASAPS) and American Society of Plastic Surgeons (ASPS) training, or other educational courses as requested

## 10.3.2 Step 2: Put the Word Out

There are two ways to announce that you're looking: (1) word of mouth, through your personal professional network, and (2) placing an ad. We find that the most efficient option for finding the right person is the former, but invariably you'll need to do both. Savvy managers and surgeons begin their search by telling colleagues, employees, and their personal network, as well as posting the opportunity on LinkedIn, since that is an extended network that links with your network's networks—highly efficient.

Placing an ad in the local classifieds and on job websites invites a flood of résumés for you to wade through, many of which won't be a fit. Just as I advise clients that it is much better to have fewer consults with the right surgical candidates than to blast through a torrent of appointments only to find that only half of them are actually potential patients, a similar principle applies in hiring. So before you write an ad and post it for the masses, start with a word-of-mouth, inner-circle approach.

Practice leaders we interviewed shared these tips for ways they've procured their superstars:

- Post the job internally and ask employees whether they know anyone who is looking.
- Reach out to skin care product, implant, injectibles, and patient financing company representatives who know you and your market and may be looking or know someone who is.
- Consider people in upscale salons, high-end spas and hotels, and gourmet restaurants.
- Talk to your personal shopper, personal chef, or that amazing associate at Tiffany or Neiman Marcus who knows you by name.
- Tell your friends you have an open position, and describe the characteristics you are looking for.
- Ask the folks at the hospital and ambulatory surgery center whether they know anyone looking.

Next, post an ad on your practice website and social media sites, as well as the online job sites Monster, Indeed, CareerBuilder, GlassDoor, and Craigslist. Include in the ad a summary of the role, key requirements, and benefits, as well as who would make a good candidate. Box 10.3 is a sample you can customize to your needs.

## Box 10.3

Sample Job Ad for a Patient Care Coordinator

#### Patient Care Coordinator for Prestigious Aesthetic Surgeon

Our high-profile practice is looking for a sales-oriented and style-conscious professional who moves at a fast pace, can manage multiple projects simultaneously, and delivers superb customer service to patients. If you have experience in luxury retail, five-star hospitality, or an aesthetic surgery, dermatology, or spa environment, we'd love to hear from you.

As part of our team, you will counsel patients who are considering aesthetic surgery procedures. Experience handling an upscale clientele, providing service quotes, asking for payment, and building long-term customer relationships are all required. Use of our state-of-the-art practice management system and social media will be central to your success. Professionalism, poise under pressure, and penchant for detail are essential. Experience in aesthetic surgery, dermatology, or another elective surgical specialty, along with strong customer service and effective writing and communication skills, are all pluses. Preferred candidates who have been in managerial positions at a surgical or aesthetic dental practice that cater to clients accustomed to luxury will be strongly considered. A bachelor's degree is required. For this full-time position, we offer a competitive salary with bonus potential, health benefits, retirement, and a variety of other perks. We conduct background, credit, and reference checks, and assess skills. With your résumé, please include a cover letter detailing why your experience qualifies you for this role. Email to: hiring@highprofileaesthetics.com

### 10.3.3 Step 3: Review Résumés

You're going to receive a lot of résumés for this job position. Think of cover letters and résumés as a method to rule out unqualified candidates so that you'll have fewer to screen by phone. The following résumé missteps should immediately rule out an applicant:

- Zero sales or service experience
- Nothing that indicates the person has ever worked with an upscale clientele
- No degree, if you specified that one is required
- Typos, misspellings, poor grammar
- An email address or phone number that is clearly through the person's current employer
- A personal e-mail address that has unseemly connotations

A candidate's failure to provide a salary range/need in response to an ad that specifically requested it may not rule the candidate out immediately, but salary needs/ranges should be discussed to determine whether you are both in the same ballpark.

Be aware, however, of your state and city employment laws about salary history. To fight the issue of wage discrimination and the gender pay gap, cities, states, and territories around the United States are banning employers from asking for a job candidate's pay history. As of May 2018, Oregon, Massachusetts, Delaware, and California, as well as Philadelphia and New York City, have disallowed questions about salary history for private and public companies. New Orleans and Pittsburgh have similar ordinances for city agencies. Do your homework about what you can and cannot ask.

#### 10.3.4 Step 4: Conduct a Phone Screen

When our firm recruits in other specialties, we often make the first conversation with a potential candidate a video call. Aesthetics is different. The PCC is going to spend a great deal of time on the phone, engaging patients in conversation and encouraging them to schedule an appointment or surgery. As Kendra Cook, Operations Director at Columbus Aesthetic & Plastic Surgery in Upper Arlington, Ohio, put it, it's like being a judge on the television show *The Voice*. This seems to run counter to the idea of a video call; clarifying text might be needed. allows you to focus on energy and tone as well as whether or not they have the right phone skills.

As Cook rightly explains, the person may have relevant sales experience on paper, but is the person engaging on the phone? Can she or he keep the phone conversation going? "That's what I'm looking for and what will warrant an in-person interview," she explains. "This person is going to be asking people to pay \$20,000. If they can't do that on the phone, they won't be able to do it in person."

Janit Pike, Practice Administrator of Charlotte Plastic Surgery in Charlotte, North Carolina, adds, "If the person doesn't give 'good phone,' they don't get an interview. Effective phone screening can really save you from scheduling in-person interviews with people you are never going to hire." Ask a few basic questions on the phone, and you'll quickly know whether the person has the answer or experience or not. "If they don't, you politely thank them for their time and tell them you'll be back in touch if you decide to schedule an interview," Pike advises.

The following are a few options for phone screening questions:

- I'm curious why you are interested in this job. Tell me what attracted you.
- Give some detail about your sales experience at [company on the résumé]. Describe the customer base. What were you selling? How were you successful?
- How do you handle pricing objections?
- When customers didn't buy on the first round, what was your follow-up plan?
- Tell me two or three things you learned from our website? (If they didn't visit in anticipation of the call, that's an indicator of poor initiative.)

## 10.3.5 Step 5: Interview Three to Five Candidates In Person or by Video Call

If your phone screening has been effective, you'll only need to interview three to five candidates individually, in person or by video call. The surgeon, practice manager, and at least one other staff person should interview each candidate. Don't conduct interviews with all three in the first interview. Some practices arrange for one or two of these interviews to be completed on the same day, while others conduct first interviews to screen candidates for the surgeon to interview only the final two.

Prior to the start of each interview, ask each candidate to complete and sign an application. This important step confirms that candidates understand their own employment history, secures a handwriting sample for neatness and readability, and provides a signature attesting to the accuracy and truth of everything candidates have listed on their applications. If you don't have an application with an accuracy attestation statement, contact an attorney to obtain one that complies with the laws in your state. Many application forms ask candidates to provide the names of several references. If yours does not, ask candidates to provide them.

The goal of the first interview is to determine whether the person is a cultural fit, can demonstrate she or he has the key characteristics discussed at the beginning of this chapter, and provide assurance that he or she does have the skills and experience for the role. *Let the candidate do most of the talking during the interview.* To do this, ask open-ended questions, as opposed to questions that can be answered yes or no. Open-ended questions encourage the responder to speak at length. They begin with words such as "Describe . . ."; "Tell me about . . ."; or "How . . ." Questions that begin with "are," "is," and "will" typically represent closed-ended questions, which to do not facilitate the goal of

getting the applicant to talk. Box 10.4 offers seven questions that we find work very well to understand the candidate beyond just skills and experience.

### **Box 10.4**

#### **Interview Questions That Work**

- 1. What do you know about us? "They've got to arrive knowing something about your practice," says Pike. "If they don't, they haven't done their homework," which indicates a lack of curiosity and initiative.
- 2. What do you do when you need to accomplish something (for a project, a patient, a boss), but no one has told you how? This question provides insight into problem-solving skills, initiative, and tenacity.
- **3.** If your last manager or supervisor were sitting here, how would he or she describe you? What words would he or she use? How about a coworker? Getting the candidate to move out of first person and into the mind of others provides an interesting perspective.
- 4. Tell me about a hard time you had at work (you and your boss; you and a customer; an experience that went badly) and how you handled it. Listen for introspective responses and an ability for the candidate to be honest. If the candidate has "never" had a hard time, it indicates a lack of ability to self-assess.
- **5.** What do you read to keep up with the aesthetic practice (or high-end service) profession? Ask for specific publications. If a candidate isn't reading, his or her knowledge is probably stale.
- 6. What have you tried, in any sphere of life, that didn't work out? What did you learn? You'll get a sense of how comfortable the candidate is with dealing with failure by asking this question. A candidate who has never failed either hasn't tried to grow or is not being honest.
- 7. In order to be successful here, what do you need from me? No one you hire will be perfect. Pike says she ends the interview with this question because "I like to know what I can do to support their success. The PCC's success is our practice's success."

It's important to ascertain how well the person will be with patients, and in service and sales. Cook uses patient scenarios to find out how the candidate would handle them. She also suggests asking about time management and prioritization, providing candidates with a sample to-do list and asking what they would address first, second, and so on. Following are scenarios that our firm uses during recruitment:

- 1. The fee quote to achieve the facial rejuvenation recommended by the surgeon is \$19,500. The patient says, "Wow, that's a lot." What is your response, and how might that conversation go?
- **2.** The surgeon is running 30 minutes late in the operating room (OR), and afternoon consult patients have started to arrive. One has already been waiting for 10 minutes. How would you communicate the delay to patients already in the reception room as well as those on their way?

**3.** When you open the office in the morning, one of your regular patients is waiting. "I know it's my fault for not calling to schedule," she says. "But could Dr. Wonderful fit me in for a quick injection? Please?" The schedule is already overbooked.

Ask questions that get at the candidate's "service sense." What has the candidate done to successfully resolve a customer complaint? What specific things has the candidate done to build relationships with upscale clientele? Asking the candidate to handle scenarios can give you a sense of the person's service orientation, confidence, and ability to think on his or her feet. Expect those who have worked in high-end retail or with upscale brands to have reasonable responses, based on their customer service and sales experience.

As part of the interview, pay attention to the following:

- Do the candidate's handshake, posture, and facial expression exhibit confidence and a positive, can-do attitude?
- Is the candidate capable of keeping the conversation flowing in a way that is engaging?
- Can the person maintain eye contact?
- Is the candidate able to explain her or his work history in a way that aligns with the résumé?

Do not discount the importance of decorum. In an age where so many are fascinated with their mobile devices, etiquette is often overlooked in practice hiring. But it is not lost on your high-end patients, who expect a certain level of personalized attention and "correct" behavior.

You may be surprised the unprofessional things that some people say in interviews. Do your best not to appear wide-eyed with disbelief and simply take the odd things people say and do as an opportunity to pare down the candidate pool closer to a final decision. And keep in mind that certain questions and topics of discussion are illegal during the selection process. *Do not* ask candidates *anything* regarding marital status or plans, parental status or plans, race, ancestry, age, religion, political affiliation, sexual orientation, veteran status, or disability.

## 10.3.6 Step 6: Conduct Second Interviews with Two or Three Candidates

At the end of the first round of interviews, you should expect to have two or three excellent candidates to bring back for a second interview. Some practices ask that these candidates shadow the front desk for a few hours as part of that second meeting. Others set up peer-to-peer interviews with more members of the staff. Still others do both. All of these are efforts to have the maximum number of staff spend time with candidates and opportunities for candidates to learn more about you as you learn more about them.

## 10.4 Hiring Process Part 2: Assess Final Candidates and Make an Offer

After a second interview, you may well have been able to pare your choices. Whether your final pool is one, two, or three at this point you've ascertained a cultural fit, and candidates will have met with nearly all staff. You feel they have the right skills and experience. In the final steps, you'll assess their workstyle and skills and conduct reference checks. See **Fig. 10.2** for a list of all steps in this second part of the hiring process.

Note: Depending on scheduling and everyone's availability, sometimes the workstyle analysis and skills assessment may happen during the second interview or between the first and the second. The point is not that each step must occur sequentially only that all the steps are completed before an offer is made.

## 10.4.1 Step 7: Administer a Workstyle Analysis

The abilities of a PCC to "read" people, communicate well, and build relationships are important characteristics discussed earlier. A workstyle analysis, such as Proception2 (Maximum Potential, St. Paul, MN), is a low-cost and strikingly accurate way to determine whether the candidate has those abilities innately, as well as which other effective team building, communications, and workplace strengths and weaknesses they would bring to your practice.



Proception2 is based on the Dominance, Influence, Steadiness, Conscientiousness (DISC) theory, a neutral and observable "language" first developed by psychologist William Marston. The instrument is used worldwide, and has been validated. It measures *behavior* and *emotion*; it does *not* measure intelligence, values, skills or education, and it is *not* a personality test. The profile provides practical insight into a person's interpersonal, decision-making, data management, and other skills.

Our firm has used Proception2 in consultation and recruitment projects for more than 30 years. For less than \$100, you'll be amazed at what you can learn about a candidate. The assessment is striking in its ability to accurately predict the workstyle and communication preferences of candidates.

We recommend that the final candidates take the online, 26-question assessment. The result is a comprehensive profile report that can be used not only for insight, but to conduct additional conversations with candidates, as well as determine training needs.

## 10.4.2 Step 8: Assess Essential Skills

It's one thing to ask a candidate whether he or she can write follow-up letters and effective email thank-you notes. It's another to actually read what the candidate has written and determine this for yourself.

Ask final candidates to perform a few skills tests:

- Writing: Ask for several samples, for example:
  - **1.** A follow-up email to a patient who was quoted a Mommy Makeover but decided not to schedule
  - **2.** An email response to an inquiry on your website about breast augmentation and laser services

Assess for the ability to construct sentences using correct grammar and punctuation.

- *Keyboarding*: As discussed previously, an important skill is to operate quickly on the keyboard. Test how fast the candidates type.
- Office software: Test candidates' proficiency on your word processing (e.g., Microsoft Word), email (e.g., Microsoft Outlook), and spreadsheet (e.g., Microsoft Excel) software.

Total Testing (http://www.totaltesting.com) offers more than 800 online tests. Our firm has found particular utility with the Microsoft Office assessments, which distinguish the Excel and Word whizzes from candidates who would need additional training.

## 10.4.3 Step 9: Check References and Social Sites

You are in the home stretch with your final candidates. Now it's time to check the references. We are often asked whether, in these litigious times, a former employer or boss will provide much other than the person's name, position held, and employment dates. In most cases, you will find that this is not the case. Most former employers will be open to answering your questions. For PCCs who will have managerial responsibilities in their role, we ask for two references of people they have supervised.

In addition to reference checks, it's quite beneficial to review candidates' public online presence. As long as the information you review is *posted publicly*, it is legal and acceptable to "ask Google" about the candidates, as well as search for them on Facebook, Twitter, Instagram, and other social sites to review their *public* posts. Do not send them a "friend" request, however. And regardless of what you see in their public profile, interviewing and hiring decisions cannot be based on race, color, religion, sex, or national origin. Consult with an attorney for additional details.

## 10.4.4 Step 10: Send an Offer Letter

With everything complete, it's time to summarize and make the offer. We highly advise that this be done in writing; however, in those states that are "at-will," be clear in the letter that it is *not* a contract. Box 10.5 is an example of the information to cover in your letter. The sample may be customized and used in your hiring efforts.

## Box 10.5

#### Sample Offer Letter

[Put on Practice Letterhead or Insert Graphic of Logo] Date Name

Address / Email

Dear \_\_\_

I am pleased to offer you the position of Patient Care Coordinator. The job description for this role is attached, and the offer described below is contingent on the results of a background check. Details about our medical insurance and employee policies will be provided to you in our employee handbook.

This letter summarizes the benefits that are offered and is not a contract, as [your state] is an employment-at-will state.

The Patient Care Coordinator role is a full-time, non-exempt position, with an annual salary of \$\_\_\_\_\_\_. Benefits include medical insurance, 14 days of PTO, a 40% discount on skin care products, a surgery benefit (available after two years of service), and a first-year training stipend of \$1,500. After 120 days, you will have an opportunity to participate in a compensation bonus for the entire team. You will also receive on-the-job training over the next several months.

All staff are hired on a 90-day probationary basis. During this period both you and the practice can assess whether it is a good fit.

As we discussed, your start date will be \_\_\_\_\_. Please arrive by 9:00 am.

Going forward, your performance is reviewed annually on or around your hire anniversary date. Raises are merit-based, contingent on performance.

I'm very enthusiastic about the skills you bring to my practice. I look forward to having you on board!

Sincerely, Shannon Shannon Surgeon, MD, FACS

## Box 10.6

Twelve Items to Include in Your Orientation Plan Item Target date for Date completed completion Establish performance goals and initial projects that need attention. Setting expectations is 1. vital to the new person's success. Establish some short-term and long-term goals for the person and the position and put them in writing. Review the practice website in detail. The entire team must know it like the back of their 2. hand so they can direct patients to use it and explain what's there. 3. *Review the surgeon's curriculum vitae (CV).* All staff must be able to explain the scope of your training, the medical school you attended, and where you completed your fellowship. 4. Review all the practice's social media and online rating site listings. Schedule time with the surgeon and the manager to discuss findings within the first 2 weeks. 5. Review the websites of the surgeon's top five competitors. It's essential that the PCC have intelligence about the other options in the market. 6. Review social media and physician rating site listings for the surgeon's top five competitors. Look at RealSelf, Yelp!, and Vitals. 7. Read ASAPS and ASPS printed and online materials. Schedule time to discuss which procedures you perform most often and point out any differences in your patient care. 8. Schedule a welcome lunch with the manager and physician. This is a good opportunity to get to know your new employee personally and to review topics such as expected behaviors, practice culture, and the characteristics of your patient mix. 9. Attend technology training. Ideally, schedule training directly with vendor to optimize the new employee's knowledge of the system. 10. Shadow 5 to 10 aesthetic consultations. Make sure staff thoroughly understand the consultation process so they can accurately explain it to patients. 11. Observe surgery and postop care. Seeing patients in the OR and in the exam room postoperatively will give your team the "big picture" of the patient experience. 12. Read Seth Godin's Purple Cow, a book about differentiating yourself based on your uniqueness, or another book on customer service or marketing. Discuss learnings in an upcoming staff meeting.

## 10.4.5 Step 11: Conduct a Background Check

Background checks enable physicians to avoid potentially disastrous hires of people who seemed great or "looked the part" but clearly weren't. A background check provides relevant, detailed facts that typically aren't uncovered during a standard reference check, and it is an important risk mitigation step when it comes to HIPAA requirements around privacy and data security. Theft of a patient's identification can result in hefty fines and attorney fees. Our insistence that practices perform background checks has uncovered information such as the following:

- 1. Felony charges
- 2. Universities listed on résumés that the candidate never attended
- 3. Degrees and certifications the candidate never earned
- **4.** Six-figure credit card debt for a candidate who was to manage an aesthetic practice

TrustedEmployees (trustedemployees.com) is a cost-effective background screening company that provides a report of a person's criminal and credit history, work, education, and identity verification, and more. You'll need the candidate's Social Security number and signed authorization to execute the search.

## **10.5 Orientation and Training**

With the hiring process behind you, it's time to make sure your new superstar is a success. Orientation and training are vital to making that happen.

Rushing the new employee orientation process can be a costly mistake. If your practice provides a week of training that focuses primarily on completing paperwork, obtaining office keys, and observing coworkers as they do their jobs and use the computer system, the PCC is being set up to fail.

Training must be comprehensive and intense. The new PCC must learn everything from the surgeon's style and computer software to the nuances of scheduling surgery and preparing quotes, and an overview of your practice culture too.

Plan on 3 to 4 weeks of training before you put the PCC in front of a patient on her or his own.

Savvy practice leaders agree that a focus on culture is an important first step. Interviewing is like dating. While you can be blissfully happy while dating, the decision to live together might make you miserable. At Charlotte Plastic Surgery, a new PCC shadows the surgeon, a scrub tech, the front desk staff, and the clinical staff in the first week, all of whom are asked for feedback about whether they feel the new hire is a good fit. "The person could be the best coordinator in the world, but if they don't fit into your culture, it's a dead end," says Pike.

Observing the roles and tasks of every member of the practice or MedSpa team is essential. "Our surgical patients receive an allowance in the spa, so the PCC has to know all those services and products cold," shares Roxanne Housley, Executive Director at Maxwell Aesthetics in Tucson, Arizona. "They must also spend time listening to the front desk staff on the phone, observing consults, and observing follow-up visits with the surgeon."

Housley also advises allotting significant time for the new PCC to spend with the surgeon during the first few weeks and months. "The PCC needs to hear things directly from the doctor in order to learn the doctor's medical philosophy and style." Housley says that frequent, 10-minute meetings after consult days and surgeries help "cement the relationship between the surgeon and PCC early on."

Pike and Housley avoid a common mistake we observe in aesthetic offices: skipping orientation and sufficient shadowing and moving right to training. Think of orientation as "pretraining;" the foundational elements that will make your new PCC's training even more effective.

Box 10.6 contains 12 items to include in the PCC's orientation plan. We recommend that every new employee you hire—not only the PCC—complete many, if not all, of the items. The more deeply the new PCC understands the practice culture and services, the surgeon's style, and the patient mix, the better the PCC will serve as a marketing ambassador. The orientation items need not all be completed before training begins; in most practices, the two are done concurrently.

It's worth emphasizing that technology training provided directly by the vendor—not from a coworker—is much more effective. Your PCC will learn more effectively and may even bring back ideas about features and reports that are currently unused.

"No matter how dire your need, you *cannot* cut the orientation or training process short," warns Cook. Columbus Aesthetic & Plastic Surgery learned this the hard way, through experience. So Cook used the lessons to develop a 4-week, comprehensive training plan, summarized in Box 10.7. It's divided into three chunks: culture, software training, and business operations. At the end of the training Cook conducts an evaluation. If the new PCC isn't 100% ready, training continues for another week. "Everyone learns differently," Cook says. "We make sure they are confident before they are on their own."

## **Box 10.7**

#### New PCC Training at Columbus Aesthetic & Plastic Surgery

Week 1: Culture immersion: The new PCC gets oriented to everything about the culture of the practice. She or he reviews the website thoroughly, shadows front desk and call center staff, observes clinic workflow, and receives an overview the consultation process, from first phone call to scheduling surgery. This week is mostly about understanding the brand and the patient experience at every touch point in the process.

Week 2: Software training: The PCC continues with shadowing and learning processes, but this week is focused primarily on learning the software from an internal trainer, who provides an attestation that the new employee has successfully passed the training. "If your PCC can't maneuver in the software before they ever see a patient, you are going to sacrifice the patient experience," Cook insists. "There is no way they will be confident and sure. You are setting them up to fail at scheduling the patient."

Week 3: Business operations: The primary focus of the week is surgeon shadowing. The new PCC sits in on consultations and follow-up visits with the surgeons. She or he also sits in with the other PCCs to learn how to have patient conversations about the quote and how to schedule surgery. She or he continues to practice what was learned in software training and work with other team members to learn the procedures of the PCC role.

Week 4: Evaluation: Before the new PCC can see her or his first patient, Cook administers an assessment and conducts role-playing scenarios. Cook, the surgeons, and staff must feel confident that the PCC can answer questions correctly and is ready to see patients. If the new employee does not feel 100% ready, Cook addresses the hesitations and challenges and will extend training another week.

## 10.6 Measuring and Rewarding Success

"Employees respect what managers inspect."

My associates and I have been saying this for more than 30 years, and it is still true. A PCC who knows that she or he is being measured based on a standard goal, task, or metric is much more apt to focus on being on top of his or her game.

Although it is important to track and monitor your PAR, it's unfair to use this metric as the sole measuring stick for PCC performance. The reason is that there are many other influencers on whether or not a patient schedules surgery. Among them are patient interaction with the surgeon, whether the appointment schedule was on time, and the mood of the nurse that day. None of these are within the PCC's control.

The issue here is fairness. For a reward system to be effective, it must reward not only the PCC but also the other team members who contribute to converting callers to patients, building the spa business, check-in consults with a smile, or removing stitches oh, so gently. All of this is part of the patient's experience (Box 10.8).

## **Box 10.8**

#### Should I Pay the PCC a Sales Commission?

**No.** Not only can commissions balkanize other staff against a PCC who gets a bonus when they do not; commissions for this role are a violation of the state medical practice act in some states. Don't do it.

For instance, Cook has developed protocols and tasks on which she measures the practice's PCCs. "All patient leads are entered into the customer relationship management (CRM) system so we can track," she explains. Among the performance items monitored by the practice are the following:

- Was the patient contacted within 2 hours of the call or email inquiry?
- Was the correct, practice-approved verbiage emailed?
- How many phone/Internet leads converted to a consultation?

"Our benchmark is that 60% of our inquiries come in for a consultation," Cook explains. If a PCC falls below, we provide coaching."

Effective measurement includes a variety of qualitative and quantitative data. Synthesizing it provides a broad picture of PCC performance. For example:

- How many hours of OR block time are scheduled?
- Is the PCC hitting key task metrics such as sending follow-up emails within protocol time frames?
- Is their performance free of patient complaints?
- How well does the surgeon feel the PCC is performing?

Pike believes that a key to retaining sales people is offering a bonus. But because everyone in the practice contributes to the surgery schedule being filled, as well as the bottom line, it's not only the PCCs who benefit. "We give a quarterly bonus if the practice makes money. It's not based on individual performance; it's based on the practice as a whole." This system has gone over well for the practice, Pike says.

Maxwell Aesthetics implemented something similar. Everyone who is involved in the first call all the way through to the PCC and

the medical assistants receives a quarterly bonus. "It's based solely on net income," Housley explains. "We have a preset percentage for the bonus and multiply that by each quarter's net income. Then we allocate the amount to everyone based on the hours they worked during that quarter. Everybody gets something, even those who work part-time. It's easy to administer and staff are thrilled."

Cook's group provides a combination of financial and nonfinancial bonuses—for example, a monetary bonus for the PCC team and gift cards, certificates, and team competitions where the reward is free lunch for the team. The practice gives accolades for the "best month ever!" and works hard to make sure everyone knows that his or her contributions count.

The knowledge that you value an employee's opinion can be its own reward. At the end of the day, saying thank you means a lot to a team that is loyal and that has your best interests in mind. It can be energizing and motivating for the PCC and others on your team if you simply stop by their desk and tell them you've noticed that surgeries are up and that you appreciate their hard work. Try it. You'll see.

#### **Suggested Reading**

- Cain A, Pelisson A, Gal S. 9 places in the US where job candidates may never have to answer the dreaded salary question again. *Business Insider*, April 10, 2018. http://www.businessinsider.com/places-where-salary-question-bannedus-2017-10. Accessed May 30, 2018
- [2] Zupko K. 10 non-financial reasons patients don't schedule. Aesthet Soc News 2016(Spring):65–66

## 11 Evidence-Based Pricing Strategies That Work

Karen A. Zupko

## Abstract

In aesthetic plastic surgery practices, price is the least understood of the four marketing Ps. Instead of setting fees and creating offers using proven business methods that align with the practice brand, most aesthetic practices "do what everyone else is doing." Then they acquiesce to patient pleas for discounts when they fear the surgery schedule won't fill. Using evidence-based pricing strategies is a more effective way to establish fees that reflect the value of the service and experience you deliver and proactively build loyalty and revenue. This chapter discusses how to use evidence-based pricing to increase revenue while enhancing and maintaining the credibility of the practice brand.

#### Keywords

price, pricing, fee schedule, packaged price, discounts, special offers, luxury brand, premium, value, differentiate, unique, marketing strategy, patient experience

## **11.1 Introduction**

Every day, plastic surgeons make evidence-based decisions while treating and caring for patients. Yet most fail to apply researchdriven management principles when it comes handling one of their most important business decisions: pricing procedures and services. Instead, many surgeons set their fees on hunches or let emotions fuel their decisions.

This chapter explains the essentials of evidence-based pricing strategies and how they can be used to establish, offer, and discount aesthetic surgery and nonsurgical services fees. It addresses various uses of these strategies by luxury and retail brands and why aesthetic practices should adopt one or more of these strategies instead of charging based on competition, or worse: charging less than competitors in hopes that will garner more surgical or nonsurgical patients.

The primary concepts covered are

- · Premium pricing
- Strategic discounting
- Special offers
- Bundled pricing
- The power of nine

## **11.2 Premium Pricing**

The Cosmopolitan and Planet Hollywood hotels are located across the street from each other on the Las Vegas Strip. In May 2018, the rate for a double-occupancy room for a mid-July 2018 visit to "The Cosmo," as it's known, started at \$330 per night. Planet Hollywood's started at \$143.

One could argue that both hotels are offering the same product because they have similar features. Both have identical placement on The Strip. Both have casinos, restaurants, workout facilities, meeting room space, and sleeping rooms, of course. Both are highrise hotels with views.

So what's the difference? The difference is that the Cosmo has differentiated itself as a "unique luxury resort hotel and casino like no other in the heart of Las Vegas," and it can command a higher price because of it. Comparing the two hotels' websites conveys this. The Cosmo's website is chic and sexy, with high-quality photography that positions the hotel's interior design, restaurants, rooms, and clubs as hot and modern. People in the photos are stylishly dressed and are shown doing exciting things. The marketing copy tells you to "Plan on No Regrets." Anyone who ever hoped to hang out with "the beautiful people" would want to stay in a place that looks like The Cosmo.

Conversely, Planet Hollywood's home page looks like a discount travel aggregator site, boasting "deals" and wasting prime home page real estate to promote "Hotel Highlights" instead of indicating anything about the experience you'll have as a guest. On the highlights list: in-room Wi-Fi, self-check-in, pool access, and fitness center. Really? These are "highlights"? You could say the same for La Quinta. That's because these "highlights" are in fact, commodities, which BusinessDictionary.com defines as "reasonably interchangeable goods or materials that are sold freely as an article of commerce." Planet Hollywood is a decent commodity hotel offered on the Las Vegas Strip, and it has priced itself accordingly.

I doubt that, after all their years spent in training and fellowship, many aesthetic surgeons consider themselves "reasonably interchangeable." Yet many price themselves as if they are. They price themselves "like everybody else." Our firm advises surgeons to rethink this mindset and instead differentiate their practice and the patient experience as a premium brand. Doing so requires that, before you even think about your fees, you step back and ask yourself: What is my Unique Service Proposition (USP)? What makes my practice unique? What would I like to be known for? What kind of experience do we deliver to patients and potential patients? Differentiating your brand is essential when considering what to charge.

In his book *Purple Cow*, marketing guru Seth Godin talks about teasing out what makes you product or service *remarkable*. To paraphrase Godin, most cows (your competitors) are brown. A purple cow would really stand out in a sea of brown cows. It would be remarkable. And according to Godin, "Something remarkable is worth talking about. Worth noticing. Exceptional. New. Interesting. It's a Purple Cow. Boring stuff is invisible. It's a brown cow."

When Kay Jewelers offers diamond rings for \$489, does Tiffany rush to match the price? Nope. When Dunkin' Donuts and McDonald's duke it out to see who can sell the most espresso-based beverages and fancy coffee drinks, does Starbucks jump in the ring and cut the cost of a grande latte? No. Starbucks doesn't have to, because it has redefined coffee consumption and is in a class all by itself. The company is now selling "reserve" whiskey-barrel-aged coffee for \$10 a cup, with great success.

It's remarkable products like this, coupled with the memorable Starbucks store experience (music, smells, ambience), that McDonald's or Dunkin' Donuts will never be able to deliver. Dunkin' Donuts and McDonald's don't have that kind of pricing ability, because selling lattes and cappuccinos cannot change how consumers perceive their brands. Neither chain will ever be considered upscale, no matter how many trendy items they add.

Premium brands target different customers than their lower price-driven counterparts do, and there are plenty of consumers who are willing to pay a premium price for these brands. Research conducted by Michael Silverstein and Neil Fiske, formerly of Boston Consulting Group, shows that, in dozens of categories, luxury brands sell at huge premiums over conventional goods. Their findings show that people are willing to pay a little more if they feel they are getting a unique value. The aesthetic surgeon who understands how to differentiate him- or herself from the pack will win with these consumers.

Premium brands know they are remarkable. They can articulate their value proposition because they know what differentiates them from the herd. And, most important, premium brands recognize that they are not everyone's gourmet grocer, coffee purveyor, or clothing store. Not everyone will appreciate and pay for the value and experience they offer; and that's okay. Aesthetic surgeons must adopt a similar philosophy.

As you think about what makes you remarkable, realize that you don't have to spend tens of thousands of dollars on marketing or build a Taj Mahal. You just have to do three things:

- **1.** *Don't be like everybody else.* For example, don't send canned thank-you notes post consultation. Use scenting throughout the reception and exam room areas. Be on time.
- 2. Deliver memorable experiences, which create a higher price tolerance. One practice we visited uses dimmer switches in the exam room to make patients feel more confident, and decorates the rooms using beautiful furniture and framed mirrors that you would expect to find in a lovely home. A movable "swing arm" was used to enable patients to self-register into the imaging system, using a tablet computer.
- **3.** Articulate why you are remarkable, and train your team to demonstrate and deliver it.

Pricing power comes with differentiation. You can deliver *luxury*, such as a luxurious spa or facility experience, or cloth robes instead of paper. You can deliver *unique* services, such as healthy, organic meals delivered for a week after surgery, a black car service that transports patients to/from their first postop visit, or special events only for men. You can deliver *convenience* that no one else does, such as office hours outside of the typical 9 a.m. to 5 p.m., which are appreciated by working women, or upscale overnight stay suites in your facility, or a hotel partnership, both of which are staffed with your own overnight nurses.

Whatever you choose, make it memorable and make it remarkable. Box 11.1 provides guidance on how to identify your differentiators. Being remarkable is powerful. If you are not "like everyone else," you won't have to charge "like everybody else."

## Box 11.1

Premium Pricing Requires Differentiation:

#### What's Your Unique Service Proposition (USP)?

Define what makes your practice different. Hint: It's not that you are board certified. You've got to do a lot better than that to price yourself at a premium.

- 1. Sit down with your team and create a list of everything that makes you unique and different from your competitors. Once it's all down on paper, pare it back to a Top 5 list.
- 2. Ask three to five happy patients what they believe makes you fabulous. What do they believe makes you valuable and worth it? Modify the Top 5 to include words and phrases you heard from patients. Add any of the differentiators that patients valued, if they were not on the Top 5 list.
- **3.** Synthesize what you've learned into a written "talk sheet." Use it to create short, scripted responses that staff can use on the phone with potential patients and that the patient care coordinator can use to handle the objection "that's expensive" when discussing surgery options.
- **4.** Be OK with patients choosing someone other than you. If you price yourself at a premium, not everyone will be able to afford your services. That's OK. In a world of plenty, there are many who appreciate your unique value and have the means to pay for it. You must accept that you are not everyone's plastic surgeon. You may end up doing fewer cases, for more revenue overall.

## **11.3 Strategic Discounting**

*Strategic discounting* can build loyalty and repeat visits. However, it requires practices to think strategically about offering the right type of discount, at the right time, for the right reason.

*Reactionary discounting*—caving in to patients when they ask for a lower fee during the quote review—delivers no long-term benefit to the practice, and in fact, it can tarnish your brand.

When practices rush to offer discounts and compete on price, they often look desperate. Haphazard or "let's make a deal" discounting can backfire and make it difficult to recoup your reputation. When word gets out that Dr. Wonderful drops the price 15% if you just ask, *transaction buyers* will start to fill the schedule.

Dr. Paul Wang of Northwestern University's Kellogg School of Business is widely known for identifying buyer types. Two of these classifications are particularly relevant for aesthetic surgeons: transaction buyers and relationship buyers. We've summarized some of the relevant descriptors of these buyer types in **Table 11.1**.

Transaction buyers are primarily motivated by price. These are the patients who come into your office with three quotes in hand from other surgeons, demanding that you match the lowest one. Transaction buyers are not loyal. They came for the price, and they'll leave for a price. Their psychology is "I want to get the best deal." It doesn't matter how differentiated your value or how fantastic the patient experience. This is lost on them. A good piece of advice is never to price match their "best offer" from another office. Word of mouth and mouse will spread that you can be

Table 11.1         Transaction buyers vs. relationship buyers		
Transaction buyers	Relationship buyers	
<ul> <li>Price-driven</li> <li>No loyalty</li> <li>Pride themselves on getting the "best deal"</li> <li>Less profitable/fewer repeat customers</li> </ul>	<ul> <li>Seek "trust" in you</li> <li>Want friendly, reliable services and products</li> <li>Feel shopping and comparing are a waste of time</li> <li>Appreciate those who recognize and yolue them</li> </ul>	

coerced, and the floodgates will open with the transaction buyer's friends.

Offering free consultations is a good way to attract transaction buyers. When the consult is free, there's no risk for patients to see you for a second opinion after they've already scheduled surgery elsewhere. And who can blame them? Why not verify the recommendation of another surgeon when the consult is free, free, free! These patients don't, and won't, appreciate the value associated with the overall patient experience you and your team have worked so hard to create. To them it's a free opportunity to ask a "reasonably interchangeable" surgeon a bunch of questions and perhaps get an additional set of images. And if the consult is free, many patients reason, "Why not ask for a discount on the surgery?"

*Relationship buyers*, on the other hand, are patients who genuinely like you and your services. They refer to you as "their" plastic surgeon. Your staff knows more than just their names. They know about their vacation plans, which child just graduated, and the patient's most recent work promotion. These patients value good service and reliability. They believe that shopping around is a waste of time, so relationship buyers will not be swayed by bargains. They may likely become long-time patients, who will continue to invest in and trust you to keep them looking terrific. Even better, they'll recommend you to their relationship buyer friends.

Strategic discounts that effectively build your practice and attract relationship buyers have a few important characteristics:

- **1.** *Proactively offered*, which keeps you and the staff in the driver's seat instead of reacting to a patient's discount request
- **2.** Targeted to a specific demographic or a specific procedure—as opposed to offering a discount to everyone, for any procedure
- **3.** Used to solve a specific business problem, such as to introduce a new aesthetician or pay for a technology that hasn't had quite the uptick you had hoped
- **4.** *Used with discretion,* because "exclusives" work better than giving discounts to everyone; be selective and don't blast out special offers to everyone in the email database or post them to Facebook

## **Box 11.2**

#### How to Track and Evaluate Strategic Discounts

1. In the practice management system, create an "adjustment" category for each type of discount you offer—for instance, consultation, multiple procedure, skin care services, promotion.

- 2. Make specific "consultation" and "promotion" categories. For instance, an adjustment for Consultation—Breast, Consultation—Face, or Promo—Spring Laser.
- **3.** Charge the full fee, then use the adjustment category to apply the discount.
- **4.** Generate and review an "Adjustments Report" each quarter to review the totals.

In addition to reviewing the amount of the discounts, evaluate the composition of the group who took advantage of the discounts. Were they new patients or established patients? Did they schedule something else, after their discounted service? Take a look at the Lifetime Value report, available in most aesthetic practice management systems. Is the discounting strategy effective in building a valuable, loyal patient relationship, or were most recipients of the discount transaction buyers?

Following are a few examples of strategic discounts that work. Remember also to track and evaluate the discounts you offer. Box 11.2 explains how.

- Occupational discounts: Offer teachers a special discount if they schedule in July or August, when their seasonal break makes recovery time a nonissue, or offer a flight attendant discount if you live in the hub city for a major airline. In Atlanta, Dallas, and Chicago, it's easy to see why a surgeon would offer a strategic discount for Delta, American, and United flight attendants, respectively. It makes them feel special. Several clients also offer discounts to active military personnel or their family.
- Multiple procedure discounts for surgery in the same field: Consider the offer of a discounted fee when a patient schedules an abdominoplasty and two or three areas of liposuction. It makes sense because you generate an additional hour or two of surgical fees with only slightly more time pre- and postoperative. We commonly see practices offer anywhere between 5% and 25% off the second and third procedure, with 10% being the median. Never reduce the price on the primary or most expensive procedure.
- **Splurge cards:** These discount cards are given after the patient has had a procedure or spends a certain amount on services in the spa. It gives them an incentive to splurge on themselves again, this time at a 10% or 20% discount. For example, send a splurge card to patients who have had a series of neurotoxin services, encouraging them to consider scheduling a peel or other facial service at a discount.
- **Birthday discounts:** People appreciate being remembered on their birthday, which is why this discount can be more effective than the offered-to-everyone discounts. Mail or email a certificate for a \$75 credit toward fillers or laser services, for example, and make the offer valid for up to 60 days after the patient's birthday.
- **Introductory discounts for a new laser:** Promote the benefits of a new piece of equipment you purchased by offering a limited time discount on a package. It can boost appointments and help you recover the costs more quickly.

## 11.4 Special Offers

A special offer is a strategy is whereby you make special, limited-time offers designed to reach specific business goals. In luxury brands, targeting a special offer to a specific group makes it even more exclusive. For example, Nordstrom offers sales only a few times each year, whereas at Macy's nearly every item seems to be perpetually on sale. When used correctly, special offers can increase the profitability of your practice and amplify your brand.

Special offers come in a variety of forms. For example, similar to the birthday discount mentioned previously, consider the offer of exclusive vouchers to a targeted patient group. Perhaps target your best referring patients or those who attend a special VIP event, or have a Mommy Makeover in September after the kids are back at school. Science shows that vouchers can increase happiness. A study by Dr. Paul J. Zak, professor of neuroeconomics at Claremont Graduate University, showed that coupon recipients who received a \$10 voucher experienced a 14% rise in oxytocin levels, an 8% decrease in the stress hormone adrenocorticotropin, and a 27% reduction in respiration compared with those who did not receive one and self-reported that they were happier than those who did not.

In some cases you may be able to leverage special incentives from skin care or injectible companies or patient financing companies. Combining efforts can create a significant success. For instance, CareCredit, the healthcare credit card company, offered a special offer to new cardholders in the spring of 2018. When a new customer applied for a CareCredit card and spent \$1,000 with a practice, the patient received a \$100 credit on his or her next statement, which could be used toward a future service at the practice. Having \$100 to spend in your practice or spa is almost guaranteed to garner additional revenue to the bottom line. So practices that aligned their spring promotions with CareCredit's special offer were able to, in effect, benefit from the offer of a \$100 credit without actually paying for it.

Always make sure that the special offers you create are advantageous to the practice and not just a "loss leader"—a pricing strategy in which a product is sold at a price below its market cost to stimulate other sales of more profitable goods or services. In a luxury brand like aesthetic surgery, this isn't necessary for driving revenue.

A client in the West designs brilliant VIP events, inviting select patient groups. *Breasts and Bras* was held at a local lingerie boutique and featured the surgeon discussing all breast surgery options, after which guests enjoyed drinks and light snacks and had the opportunity to shop for beautiful bras. An event at the practice featured *Pilates and Plastic Surgery*, and the surgeon as well as the president of the neighboring upscale Pilates studio talked about healthy weight and healthy bodies. At these events as well as others, attendees always leave with a special offer that no one but them receives. It's different each time but is typically something like a \$75 credit in the MedSpa or a dollar figure credit toward a procedure.

Every practice, in every geography, has a "doldrums" season, a time when everything seems to slow to a near halt. For most, it's August and September. A special offer can help reach the goal of increasing the number of scheduled surgeries over the previous year during the doldrums season. When patients in spring and early summer ask for a discount or express their wish to pay less, offer a "limited-time special price" if they schedule their procedure no later than June 30 for a date of surgery that is between August 15 and September 15. The patient care coordinator can explain that as "when Dr. Wonderful's otherwise busy schedule has more openings."

Finally, consider developing special offers for procedures that have a high margin. As an example, an upper lid blepharoplasty, performed in the special procedure room, paired with the right aesthetician services, for a bundled price may be very profitable. It's an easy "age-reducing treatment" with a short recovery time that can be promoted as a limited offer during a specific time period.

## 11.5 Bundled Pricing

Bundled pricing occurs when several items or services are sold as one item, at one combined price. It goes by name names, including package price, collection, or gift set. You've seen the promotions at department makeup store counters: "Buy our new perfume and get a free Plum Power lipstick, concealer, and blush in a convenient travel bag."

The travel industry often uses bundled pricing. A 7-day trip marketed on an airline vacation site includes business airfare, hotel, car rental, and spa gift certificate for one amount, including taxes and fees. It makes the vacation easy to budget for, which speeds a person's decision making. No additional charges or surprises are lurking behind the price tag. The beauty of this approach is that the consumer cannot see which business partner or partners lowered their usual fees—nothing is itemized—so all discounting is opaque.

The reason bundled pricing is so effective is because it addresses an interesting "problem" that many people suffer from: consumer innumeracy. Research reveals that "percentage off" discounts are less enticing to people than getting something extra or free, because most people are lousy at fractions. Deals such as 10%, 13%, or 17% off confuse them because they can't do the "complicated" math in their heads that is required to determine the real value of the discount. So, when you offer "13% off a syringe of Restylane," you've put the patient into hyperperplex. And, since most people don't have an "anchor" price for a syringe of any injectable in mind, even if they could do the math, they don't have anything to compare the discount with in order to determine whether it's good or bad. According to the research, a complimentary bag of goodies, a gift set, or a bonus-something extra-entices a sale more effectively than getting it at a discount. So, swap your "percent off" deals with giving patients something extra or free. It's easier for the staff to explain, too.

Another psychological reason for the effectiveness of packaged pricing is the human preference for getting a "deal" and the fact that it's easier for people to justify a single price for a bucket of products or services than purchase multiple things individually. Advantages of this strategy for aesthetic practices include the following:

**1.** *It simplifies the price.* Fewer prices and fewer questions make it easier to decide.

- **2.** The psychological cost of purchasing all the items is lowered. Buyers feel as if they are getting a deal.
- **3.** It makes for easier accounting, in many cases. There is no need to track or report individual product sales tax. The patient sees one simple fee. Of course, on the "back end" of your practice management system is where each individual line item is properly posted and sales tax for products and/or garments is calculated. So while the patient sees one opaque fee, the practice's revenue reports retain their accuracy, and the products sold as part of the package are properly removed from the system's inventory count.
- **4.** It builds the overall value of what the patient is buying. For example, staff may explain to patients, "Our fee includes incision line reduction gel and a garment because Dr. Wonderful believes these are important to your recovery and outcome."

A simple way to incorporate the strategy of bundled pricing into your practice is to offer a single fee for certain surgical procedures. Antiaging packages for injectibles and laser services lend themselves well to bundled pricing too. In terms of procedures, bundled pricing is very effective for breast augmentation, which is typically bought by a price-sensitive, younger patient demographic. **Fig. 11.1** shows how one client provides the quote for augmentation. Notice how it delineates everything that is included, providing potential patients with an all-inclusive fee for \$7,200. (Pain medications are excluded from the bundled price because they vary due to patient safety and preference.) Mommy Makeover and abdominoplasty also lend themselves well to packaged pricing, as well as packages provided in the MedSpa—laser, injectibles, or bundling skin care products with treatment packages.

Another aesthetic surgeon uses the bundled price concept to add a "bonus" to all surgical procedures. Patients receive a spa allowance that varies in value with the cost of the surgery. Patients choose to purchase the services they desire.

The way you bundle your services is up to you, based on your creativity and your market needs. The point is to bundle items or services that increase the overall perceived value of the purchase and make it simpler for the patient to say "yes." We recommend that if you do decide to try bundled pricing, you start with breast augmentation.

## 11.6 The Power of Nine

Why is it that so many retail items are priced at \$99, \$8.99, \$79.99? Because this psychological pricing strategy has been proven to increase sales, according to multiple studies.

A classic example is an experiment conducted by MIT and the University of Chicago. A women's clothing item was tested at three price levels: \$35, \$39, and \$44. Interestingly, the price at which the item sold best was \$39. The same study also found that prices ending in 9 sold better than even their lower-priced counterparts by an average of more than 24%. This is one of eight studies dissected in the book *Priceless*, all of which concluded that the "power of 9" does work to increase sales.

To implement this strategy, simply change the last number in your procedure fees to a 9: \$4,999, \$3,599, etc. For instance, you could modify the previously discussed \$7,200 bundled price for breast augmentation to \$7,199. The power of 9 also works beautifully in the MedSpa with products and nonsurgical services.



## **11.7 Concluding Thoughts**

When pricing your services, focus less on what competitors are charging and more on creating perceived value for patients. Differentiate your practice and make the experience memorable. Implement retail-tested strategies such as premium and packaged pricing, and be thoughtful and selective about special pricing and discounts. The goal of effective pricing is to build patient loyalty over time, not to get a one-time patient onto the schedule.

### **Author's Note**

The American Society for Aesthetic Plastic Surgery (ASAPS; http:// www.surgery.org) and the American Society of Plastic Surgeons (ASPS; http://www.plasticsurgery.org) both conduct annual fee surveys of their members' surgical and nonsurgical fees. These data can be particularly useful if you are just starting practice. The survey results are available on each society's website.

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# Part III Nonsurgical Cosmetic Treatments

# 12 Clinical Decision Making for Nonsurgical Cosmetic Treatments

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## Abstract

Nonsurgical office-based cosmetic treatments are becoming more mainstream. These treatments can provide patients alternative options to surgery. It is important to understand that nonsurgical cosmetic treatments do not provide the same outcome as surgery. All options of treatment and realistic outcomes should be reviewed with the patient.

#### Keywords

nonsurgical cosmetic treatment, facials, fillers, chemical peels, toxins, injectables, laser, rhytids

## **12.1 Introduction**

Today, nonsurgical and less invasive, office-based procedures and treatments are the mainstay of therapy for our patients. According to the American Society for Aesthetic Plastic Surgery (ASAPS), nonsurgical procedures increased by a total of 4.2% in 2017. The most significant increases in nonsurgical procedures in 2017 included microablative skin resurfacing (up 99.5%), fullfield ablative skin resurfacing (up 29.2%), nonsurgical fat reduction (up 24.7%), chemical peel (up 15.9%), and nonsurgical skin tightening (up 15.1%). While they have not replaced surgery, their consistency and lack of significant recovery time requirements have appeal for many of our patients. With the emphasis on a youthful facial appearance and an appealing, slim figure, much younger patients are consulting us about facial rejuvenation and body contouring.

Cosmetic treatments are nonsurgical treatments that require minimal or almost no downtime, returning our patients to the acts of daily living without delay. Many of these treatments can be delegated to an aesthetic technologist, nurse, and/or physician assistant (PA). We feel that most treatments should be performed in a clinical environment under the supervision of a physician. While facials, lighter peels, and microdermabrasion may be performed by an appropriately trained aesthetician in a nonclinical setting, we believe that their training, experience, and the identity of a physician to contact in case of a problem should be transparent to the patient. More invasive procedures, such as injections of toxins and fillers, and invasive laser treatments should be performed in a clinical setting, such as a physician's office or outpatient center, rather than at a spa or beauty salon. These are *procedures* and require a medical environment to ensure the patient's safety. Although injectables and other technology-based procedures are safe in the hands of trained technologists, nurses, and PAs, a physician should evaluate the patient, make decisions concerning treatment, and be available while these procedures are being performed.

These office-based and less invasive procedures keep patients cycling in a practice. It is not uncommon to see some patients convert from these procedures into surgical ones. Research has shown that patients who are satisfied with their cosmetic treatments are likely to return to the same surgeon for surgical procedures as the aging process continues. It is a rare aesthetic practice that does not offer the full range of cosmetic treatments.

## 12.2 Cosmetic Treatments

Options for office-based cosmetic treatments (such as those listed in Table 12.1) are constantly increasing. Our patients are tuned in to these treatments, heightened by direct-to-consumer marketing. In many cases, claims are being made without well-controlled studies or any objective data. It is imperative for us as physicians to stay abreast of the dissemination of this type of information to our patients so that we are adequately prepared to discuss them and answer questions regarding these products and devices. While great advancements have been made in the nonsurgical arena, they are still not a replacement for surgery, nor do they approach the type of results and longevity achieved with surgery. That being said, patients understand this and are willing to accept a "lesser" result and even the need for multiple treatments. Most important, we need to choose treatments that can achieve a certain result in a predictable fashion. This is a constantly evolving field that requires treating physicians to stay informed. Outcomes and safety help differentiate us from many other providers and it behooves us to familiarize ourselves with mode of action, safety limits, risks, and limitations.

Table 12.1         Nonsurgical treatments in order of in	creasing invasiveness	
Noninvasive	Minimally invasive	Moderately invasive
Spa treatments Facials External ultrasonography	Light-based treatments Microdermabrasion Fruit acid peels Nonablative lasers Sclerotherapy Transcutaneous skin tightening	Injectables Ablative lasers Peels: TCA, croton oil Dermabrasion

Abbreviation: TCA, trichloroacetic acid.

## 12.3 Choosing the Right Option: Office-Based vs. Surgical Procedures

In the first edition of this book, this section was titled "Choosing the Right Option: The Needle *or* the Knife." It is no longer a question of needle or knife; these are not competing but rather complementary treatment methods. We also have to recognize that many patients have made up their mind that surgery is not on the "options" list. Despite this, we routinely review what a surgical procedure can accomplish. This often serves as a frame of reference as they begin to consider nonsurgical options. Choosing a nonsurgical option in a patient who clearly needs surgery to achieve the desired goal leads to a dissatisfied patient who often can be difficult to manage. On occasion, saying "no" is the best for the patient. We have seen some of these patients come back later on and move forward with surgery.

It's not unusual for young people who are nowhere near ready for a facelift to come in to discuss a facelift, while individuals with advanced facial aging who are no longer candidates for cosmetic treatments frequently ask for nonsurgical treatments. Younger patients often benefit from skin care, light peels, toxin, and injectables, if needed, while strongly advising patients to wait for the appropriate time to undergo a surgical procedure. To an older patient who is a candidate for surgical rejuvenation but comes in to discuss cosmetic treatments, I recommend surgical treatment as the first choice and discuss cosmetic treatments as a



Fig. 12.1 (a) Anterior, (b) right and left oblique views pre (*left*) and post (*right*) intense pulsed-light (IPL) treatment (five total treatments).

less effective alternative and perhaps a better adjunct to a surgical procedure rather than the primary treatment.

The choice between cosmetic treatments and open surgical procedures should be an informed decision, and all options, including expectations of them, should be discussed during initial consultation. The patient must clearly understand what outcomes are anticipated with both surgical and nonsurgical treatments and should also understand how many treatments would be required and what the longevity of the procedures are (**Fig. 12.1; Fig. 12.2; Fig. 12.3; Fig. 12.4**).

## 12.4 Face

Most women undergoing noninvasive facial cosmetic treatments are seeking improvement of their facial skin. It is important to note the degree of skin pigmentation and redness and the nature of each. Is it superficial or deep, and what does it consist of? The texture, thickness, and quality of the skin are determined. Finally, static and dynamic lines are assessed. Having a systematic approach to the analysis of the skin ensures that all aspects of the evaluation are reviewed, allowing a more detailed, patient-specific recommendation. These evaluations are usually performed by the physician and aesthetician together.

Classification systems such as the one for rhytids given in **Table 12.2** may be useful to describe the patient and objectively assess their progress following intervention.

Pigmentation, a darkening of the skin, results from an increased production of melanin. Increased pigmentation in the epidermal layer appears light brown, whereas hyperpigmentation in the dermal layer can appear blue–gray. Increased vascularity can contribute to a bluish pigmentation.

The texture of one's skin can be smooth or rough. Extremely coarse textures characterize individuals with rough skin surfaces including deep creases, wrinkles, and loss of skin laxity. Visually smoother skin would be consistent with an improvement in texture.

## 12.4.1 Rhytids

#### Grade I: No Rhytids at Rest or on Animation

Grade I patients (**Fig. 12.5**) require only preventive and maintenance skin care. The importance of sunblock is stressed, the cornerstone of prevention. In most cases, it is too early for any



**Fig. 12.2** Patient pre (*left*) and post (*right*) filler and botulinum toxin. Restylane was injected to the lower eyelid/tear trough bilaterally. The crow's feet and glabella were injected with botulinum toxin.



**Fig. 12.3 (a)** Anterior, **(b)** lateral, and **(c)** oblique patient views pre (*left*) and 4 months post (*right*) Ulthera skin tightening to the lower face and submental area.

surgical or invasive procedures, and the patient's best interests would be served by preventive measures, including tretinoins and glycolic acid peels, if needed, but most of all we discuss skin health: avoiding environmental toxins, such as smoking and secondhand smoke, and taking precautions about sun exposure. Patients are also advised on general antiaging measures, including diet, exercise, and the use of antioxidants. It is important

#### Grade II: Superficial Rhytids Only on Animation

For each successive grade, most if not all of the treatments of the preceding grade are applicable, along with specific treatments for the current grade. Superficial animation lines are best treated by directly targeting the underlying muscle function. By eliminating muscle function, especially in the glabella, forehead, and crows' feet, the lines are minimized. Additionally, the brow shape and position can be altered and improved (**Fig. 12.6**).

#### **Grade III: Deep Rhytids on Animation**

In grade III patients (**Fig. 12.7**), for the glabella, forehead, and crow's feet, toxins are the best agents to soften their appearance. Adjunct treatments may be required to have a greater impact on these areas.

Options may include some of the following:

- Intradermal fillers
- Dermal ablation with peeling agents, ablative lasers, or dermabrasion

Perioral lines and wrinkles deserve further discussion. Dynamic lines in this area are responsive to botulinum toxin. It is important for patients to realize that the results may last only 2 to 2.5 months. Additionally, it may be more difficult for these patients to drink out of a straw or to whistle. Spot treatment of the lines with dermal fillers is also an option for patients not wanting a longer downtime period. Many of these patients are concerned about "filling and plumping" of their lips, so this should be approached cautiously. That being said, most women would rather accept more limited improvement and the need for repeat treatments than the excess downtime associated with more aggressive ablative treatments.

# Grade IV: Superficial Rhytids at Rest and Deep on Animation

The recommendations for grade IV patients (**Fig. 12.8**) are essentially the same as those for grade III patients. When considering ablative treatments, it is often helpful to diminish the dynamic nature of the area with a toxin in appropriately designated areas. This may allow better healing and dermal line fill. Additional surgical procedures of the face and periorbita are often considered.

# Grade V: Deep Rhytids at Rest and Deeper on Animation

Grade V patients are the best candidates for perioral administration of toxins, but, as in grades III and IV, toxins alone are not sufficient. These patients clearly need a multimodal approach, as any single treatment alone will have limited improvement.



Fig. 12.5 Grade I rhytid condition.



Fig. 12.6 Grade II rhytids.



Fig. 12.7 Grade III rhytids.



Fig. 12.8 Grade IV rhytids.

Surgical facial rejuvenation procedures help address these lines by shifting the underlying superficial musculoaponeurotic system (SMAS)/fascia and skin, helping soften the appearance of the lines. Most of these patients benefit from ablative resurfacing, which may be performed in combination with surgical intervention or in a staged procedure (**Fig. 12.9**).

## 12.4.2 Nasolabial Folds and Marionette Grooves

While surgery is a very good option for treating deep nasolabial fold and marionette lines, injectable fillers have become the mainstay of treatment for many patients due to the ease of treatment and quick recovery. These areas are often one of the earlier signs of aging noticed by patients, with glabella frown lines pushing them to seek treatment. Complaints of looking old, tired, and even angry are common. We have learned that even when surgery is chosen, these areas often need either fat or filler to complement the surgical procedure. It is hard to compete with the predictability and ease of office-based filler injections.

Unlike facial rhytids, which reflect the insertion of the muscles of facial expression into the skin, nasolabial folds and marionette grooves reflect not only muscle insertion and muscle pull but also adhesions of the dermis to the fascial layers of the face. Established nasolabial folds and marionette grooves are resistant to superficial and even deep ablative skin procedures. However, muscular manipulation with toxins and superficial and deep injections of filler materials can be very effective in ameliorating these folds. The deeper the fold, the deeper the level of injection and the more viscous the material. In addition to dermal and subdermal injections, filler materials may also be placed within the subcutaneous tissues. Many surgical options are also available, including various rhytidectomy procedures as well as local excisions. Recommendations are made based on the grading of the folds according to the system shown in **Table 12.3**.

#### **Grade I: Visible Folds on Animation**

The majority of patients with this presentation need nothing more than reassurance. Nasolabial folds with animation are

Table 12.3         Classification of nasolabial folds and marionette grooves	
Grade I	Visible folds on animation
Grade II	Visible folds at rest
Grade III	Visible folds at rest and deepening of folds on animation
Grade IV	Deep folds at rest and deeper on animation
Grade V	Overhanging folds

normal and are part of human expression. Fillers injected dermally to obliterate dynamic lines may be noticeable and prominent in repose. We discourage the use of injectable products for this type of fold (**Fig. 12.10**).

#### Grade II: Visible Folds at Rest

For grade II patients (**Fig. 12.11**), dermally injected fillers may be the best option to soften their appearance. Typically, a small amount of product is needed superficially. It is important to inject evenly. When lower-viscosity products are used, care should be given to how aggressively one massages the area treated, as it may dissipate the product, losing its effect.

# Grade III: Visible Folds at Rest and Deepening of Folds on Animation

Grade III patients (**Fig. 12.12**) require the injection of a filler product at different levels. Deeper injections help fill its depth, but often a dermal injection is required to soften the fold better. Fat may be used as an alternative to injectable fillers. While fat is less predictable than off-the-shelf filler products, it nicely complements a surgical procedure and may be preferred by some patients.

Toxin injections of the depressor anguli oris for the marionette grooves are helpful in some patients. Toxins in the lip elevators (the levator labii superioris and the levator labii superioris



Fig. 12.9 Grade V rhytids.



Fig. 12.10 Grade I nasolabial fold.



Fig. 12.11 Grade II nasolabial folds.

alaeque nasi) should be approached with caution, as animation can be affected.

# Grade IV: Deep Folds at Rest and Deeper on Animation

The recommendations are similar to those described for grade III. Surgical intervention, specifically midface lift with fat transfer, should be considered (**Fig. 12.13**).

#### **Grade V: Overhanging Folds**

The recommendations of filler injections and toxin remain the same for this grade (**Fig. 12.14**). As far as surgical interventions, I add the option of direct excision as an alternative to a midface lift. Should the patient choose to undergo a midface lift, the direct placement of autologous dermis fat graft or SMAS fat graft is an alternative to autologous fat injections. Most individuals in grades IV and V are more suitable candidates for rhytidectomy procedures, with injectable fillers as an adjunct.

## 12.4.3 Periorbital Region

The periorbital region improves predictably with nonsurgical options. Proper analysis enables one to manipulate the area, also



Fig. 12.13 Grade IV nasolabial folds and marionette grooves.



Fig. 12.12 Grade III nasolabial folds and marionette grooves.

correcting asymmetries and elevating the brow. The mainstay of treatment includes the use of botulinum toxin along with both superficial and deep filler injections to diminish volume loss along the orbital rim and tear trough, as well as their use to help correct upper lid and brow volume deficiencies and to help improve static lines. These products are very predictable and, in the case of the fillers, often last over a year. These products cannot address skin laxity, crepelike skin, or fat herniation. Other adjuncts, including surgical excision and ablative resurfacing, may be required in order to address these specific issues. Administration of injectable products in this area should be performed with a thorough understanding of the underlying anatomy, including the vasculature. Significant complications, including tissue loss and even blindness, have been reported.

## 12.4.4 Neck

The neck is a more challenging area to treat with nonsurgical devices and products. The following areas may require intervention:

- Skin
- Medial platysmal bands
- Fat
- Salivary glands
- Anterior belly of the digastric



Fig. 12.14 Grade V nasolabial folds and marionette grooves.

The skin of the neck may be thin and lax. It is important to understand that neck skin has about 10% of the glandular structures of facial skin, significantly decreasing its healing capacity following injury. For that reason, caution and conservatism should be used when treating the neck with ablative devices. There are a number of skin tightening procedures available using laser, light, radiofrequency, and microneedling. In some cases, a combination of several modalities can be used. Appropriate expectations must be established with these devices (**Fig. 12.15; Fig. 12.16**).

Fat in the neck can be addressed in many ways. The gold standard remains liposuction, which can be performed in the office under a local anesthetic. It requires one treatment and produces predictable results. Alternatives do exist, including cryoadipolysis, deoxycholic acid, and heat-based technologies,



Fig. 12.15 (a) Anterior, (b) lateral, (c) oblique views pre (*left*) and 3 months post (*right*) Ulthera after one treatment.

Fig. 12.16 (a) Anterior, (b) lateral, (c) oblique views (*left*) pre and (*right*) 1 year status post office-based neck liposuction.

It is beyond the scope of this chapter to elaborate on nonsurgical means to address platysmal banding and prominent salivary glands (**see Chapter 21**).

# **12.5 Concluding Thoughts**

Facial rejuvenation with office-based products and devices is now commonly performed on a wide range of ages. Early changes and late changes from the aging process can be delayed or reversed. Toxins and fillers lead the way. There are more and more treatment options for our patients, allowing the physician to tailor treatment plans to the patient's specific needs. Most of these treatments have little downtime and produce predictable results. These procedures not only keep patients with our practices but nicely complement the surgical procedures we perform.

#### **Clinical Caveats**

- Patients have an increasing number of options for office-based cosmetic treatments. These treatments can provide great benefit for appropriate candidates but are not a replacement for surgery.
- Utilize a systematic approach to determine which nonsurgical office-based cosmetic treatments should be administered.
- Referring to the classification of rhytids can help in objectively assessing outcomes of interventions.
- Injectables are usually the first-line treatment for deep nasolabial folds and marionette lines.
- The neck region is a challenging area to target with officebased cosmetic treatments.

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# 13 Over-the-Counter Skin Care and Nutraceutical Basics for the Aesthetic Surgeon

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## Abstract

Skin care is a basic step in the improvement and maintenance of healthy, beautiful skin. There is a plethora of choices on the market, which can be overwhelming for the patient. Many physicians retail cosmeceuticals from their offices. It is optimal, however, to have at least some knowledge about less expensive, mass-marketed, over-the-counter products, their ingredients, and their best uses. Skin care protocols are needed to target the treatment of different symptoms of skin aging and maintain improvement postprocedure. This chapter discusses key components of skin care protocols from the perspective of the cosmetic physician.

#### Keywords

over the counter (OTC), recommended daily allowance (RDA), antiaging, skin care regimen, sunscreen, cleansing, moisturizing, cosmeceuticals, nutraceuticals, dyspigmentation

## **13.1 Introduction**

Proper skin care is an essential component of both health and beauty. The skin plays a vital role as the first line of our body's defenses. It is constantly exposed to internal and external influences, which ultimately lead to visual and physical changes, hastening skin aging. For the aesthetic surgeon, patients often present with specific concerns. These concerns of irregular pigmentation, coarse texture, fine lines, deeper folds, and laxity can be the result of both intrinsic (chronological) aging and extrinsic aging. External influences, including but not limited to lack of adequate cleansing, ultraviolet radiation, tobacco and chemical exposures, lack of exercise, stress, hormonal dysfunction, and insufficient nutrition are a few of the most common factors leading to damaged skin. Internally, increased production of free radicals, oxidative stress, and inflammation lead to quickened collagen and elastic fiber reduction, cell damage, and cell death. These intrinsic factors also result in the signs and symptoms of aging skin.

Over-the-counter (OTC) skin care can be overwhelming for the patient, as the products available for purchase are vast. In turn, the extensive OTC options to choose from can be challenging for the aesthetic surgeon to have a comprehensive understanding of all available products. In this chapter, we review common OTC skin cosmeceuticals and oral nutraceuticals, recommended practices, and suggested ingredients for pigment, inflammation, redness, and scar reduction.

## 13.2 OTC Skin Cosmeceuticals and Oral Nutraceuticals

OTC skin cosmeceuticals and oral nutraceuticals are thought to play key roles in antiaging, maintaining youthful and healthy skin, and treating damaged skin. Cosmeceuticals consist of products that have more than a superficial benefit to the skin but do not quite reach to the level of pharmaceutical changes. If the manufacturer claims physiologic changes, more rigorous testing is required. Nutraceuticals are naturally derived dietary components thought to have benefits medically as well as nutritionally. It is critical to mention that few OTC cosmeceuticals and oral nutraceuticals have been extensively investigated or validated by significant clinical trials. Most are not regulated by the U.S. Food and Drug Administration (FDA), and not all have recommended dietary allowances (RDA) set by the Food and Nutrition Board of the Institute of Medicine. This discordance places the responsibility on the aesthetic physician to research and recommend products appropriately based on the physician's clinical expertise.

In this section, we discuss what we believe to be the most important components of a comprehensive skin care regimen for the aesthetic surgeon to recommend to patients. To understand which type of product to recommend in order to slow the appearance of aging, maintain improvement from aesthetic procedures, and treat aging skin, we review the mechanisms in which skin is damaged and best aesthetic practices. As you will find, many of the cosmeceuticals and nutraceuticals mentioned in this chapter have many functions in the skin and human body. Some of these agents fall under multiple categories and will not be repeatedly discussed. Whether addressing a specific concern, tailoring for a procedure, or creating a daily routine, these components all play a role in a comprehensive skin care regimen and can be applied to any aesthetic patient.

## 13.2.1 Skin Cleansing

When creating a comprehensive skin care regimen for the aesthetic patient, it is essential to start with skin cleansing. The number of available OTC facial cleansing products is vast, making skin cleansing the first step to tackle when recommending products.

There are multiple types of cleansers, each with a different composition and pH. Surfactants are the main active component in a cleanser, with the ability to reduce surface tension, allowing the cleanser to remove substances that do not readily mix with water such as makeup, dirt, and sebum and offer a fresh facial canvas and better absorption of active ingredients. The skin's natural pH is around 5.5. Ideally, the closer the pH of the cleanser is to the skin's natural pH, the more tolerated. In regard to facial cleansers, one of the most popular types of cleansers is a synthetic detergent (syndet), non-soap-based, that creates a neutral to mildly acidic pH environment (pH 5.5–7). This composition is optimal, as it decreases the amount of protein denaturation, which can then cause a reduction of intercellular lipids. Loss of epidermal lipids compromises the skin barrier. This compromise from cleansers with a higher pH can result in irritation, pruritus, tightness, ery-thema, and dryness as the skin loses its ability to retain moisture. Various ingredients can be added into cleansers such as natural oils, exfoliating materials, topical vitamins, antibacterial agents, fragrances, and moisturizers (hydrators/occlusive/emollients).

Micellar cleansers are one of the most popular cleansers recommended by aesthetic physicians, as they delicately cleanse the skin and they are suitable for all skin types. Micellar cleansers are considered mild surfactants, containing molecules with a hydrophilic head and hydrophobic tail. These surfactant molecules arrange to form clusters, referred to as micelles. These more or less spherical micelles arrange themselves in such a way that when applied to the skin, the hydrophobic tail gently removes makeup, dirt, sebum, leaving the face cleansed without disrupting the epidermal lipid layer.

For sensitive skin patients and those more susceptible to contact allergens, it is imperative to review the ingredients in these products carefully. Patients with dry and/or sensitive skin should focus on facial cleansers that contain micellar properties, or ones with added oils and moisturizers to help support the stratum corneum's epidermal barrier. Patients with oily and/or less sensitive skin can usually tolerate foaming cleansers. Patients with acne-prone and oily skin can use benzoyl peroxide washes. It is important to inform patients that benzoyl peroxide can be drying and irritating to delicate facial skin. Benzoyl peroxide is generally well tolerated on the chest and back, even if not also tolerated on the face. Benzoyl peroxide is also notorious for bleaching towels, so recommend use of white towels when using benzoyl peroxide–containing products.

All aesthetic patients should be advised to cleanse the skin every morning and evening, as this allows the skin to be properly cleansed of external factors residing on the surface, and washing the skin serves as a vehicle for better penetration of later steps in the regimen.

## 13.2.2 Skin Moisturizing and Barrier Repair: Hydrators, Occlusives, and Emollients

As the skin serves as a barrier to what it defends inside, it is essential to provide additional protection by adequately moisturizing the skin. Adequate moisturization supports the stratum corneum's ability to hold on to water within the dermis and epidermis. When the epidermal barrier is disrupted, signs and symptoms of skin dehydration become a common concern for the aesthetic patient. Patients often want to discuss moisturizers when the skin shows signs of dryness, roughness, scaling, or irritation. Regardless of skin type or aesthetic concern, all patients should be advised to moisturize the skin appropriately as a part of their daily skin care regimen.

Moisturizers come in multiple vehicles, such as lotions, creams, ointments, gels, and serums. The components needed

in a moisturizer can be tailored to a specific skin type (oily, dry, combination, sensitive, etc.). In general, it is best to recommend moisturizers with the properties of being noncomedogenic, hypoallergenic, and fragrance free. Moisturizers are most commonly either a lotion or cream. Lotions are compounded as oil-in-water emulsions, while creams are compounded as water-in-oil emulsions, the main differences being the amount of lipid composition and thickness of product.

Moisturizers, regardless of vehicle used, are intended to assist in hydrating the skin, serve as an additional barrier to extrinsic factors, and support the intrinsic properties of the skin. During patient counseling, it is recommended to apply twice daily after properly cleansing the face for best results. In patients with dry and sensitive skin, it is imperative to implement at least twice daily moisturization to the entire body. More frequent application of moisturizers reduces epidermal lipid loss, which helps prevent inflammation resulting from skin dehydration. When showering, advise patients to pat dry and apply moisturizer to damp skin within minutes of bathing since lipids and water are lost during bathing, leaving the skin feeling tight and even drier. The benefits of shorter showers, utilizing more tepid to cool water temperatures, should be mentioned. There are various types of moisturizers to consider.

#### Hydrators/Humectants

Hydrators/humectants are products that increase water retention by drawing water into the skin through water-soluble, absorptive properties. This allows the stratum corneum to appropriately swell and retain water from viable epidermal and dermal layers, as well as external exposures when in high humidity. Examples of humectants are hyaluronic acid, glycerin, alpha-hydroxyl acids, and sorbitol.

Hyaluronic acid (HA) is currently the most common humectant. It has gained in popularity lately for its innate humectant and hypoallergenic properties. HA is a glycosaminoglycan found in the skin's extracellular matrix (ECM). HA's ability to enhance tissue hydration is seen in its capacity to bind and retain water. HA has been reported to bind water nearly one thousand times its volume. As we age, the concentration of HA is significantly reduced, leading to signs of aged skin such as loss of elasticity, dehydration, and atrophy. HA has been claimed to improve fine lines and wrinkles. This ability is the result of HA's absorptive properties by drawing water into the stratum corneum, allowing viable layers to swell, giving the appearance of a reduction in fine lines and a more even skin texture. Humectants work best in more humid environments, where water can be captured extrinsically.

#### **Occlusives**

Occlusives are products that serve to decrease transepidermal water loss by creating a hydrophobic layer on the skin surface. These oily products have strong hydrophobic properties that repel water from being lost to the outside environment; as such, these are ideal in low-humidity climates. Petrolatum is a commonly used ingredient in occlusive products. Petrolatum consists of a synthetic substance that mimics the work of the skin's intercellular lipids, thereby decreasing transepidermal water loss. Mineral oil is a thinner, less greasy occlusive used for its same properties as petrolatum. It is also a commonly added ingredient to moisturizers to ease the spread on the skin surface during application. Other commonly used occlusives are olive oil, coconut oil, silicone, paraffin, and ceramides. Occlusives are considered the optimal family of products to use after skin resurfacing to speed re-epithelialization and protect from secondary infection. It is important to note that acne-prone patients undergoing resurfacing for acne scars will most likely get an acne outbreak as a result of this occlusive therapy and be advised as such preoperatively.

#### **Emollients**

Emollients serve as fillers between desquamating corneocytes and keratinocytes in order to hydrate the skin and increase cohesion between cells. Emollients adequately hydrate the skin while also improving skin texture with increased appearance and smoothness. Emollients are frequently found in thick topical agents such as those used for atopic dermatitis patients, as the epidermal barrier is more easily disrupted than normal skin. Many topical products have emollient properties as well as humectant and occlusive properties. Common emollients are shea butter, collagen, and elastin. Common combination hydrators are products such as petrolatum and mineral oil.

## 13.2.3 Exfoliation and Cell Renewal

#### Alpha-Hydroxy and Beta-Hydroxy Acids

Alpha hydroxy acids (AHAs) and beta-hydroxy acids (BHAs) are in many OTC products used for acne, antiaging, and dyspigmentation, as well as when preparing the skin for procedures. AHAs and BHAs exfoliate the skin, creating an environment to allow for deeper penetration and support a more homogeneous skin surface by thinning the stratum corneum. AHAs are typically water-soluble and work by decreasing intercellular adhesion, allowing the bonds between dead skin cells to dissolve on the skin surface. BHAs are commonly oil-soluble, so they penetrate deeper beneath the skin's surface, desquamating the stratum corneum. In specific preparation for procedures, AHA- and BHA-containing products are often used in combination with a procedure such as a chemical peel for enhanced results. During patient counseling, it is recommended that patients use moisturizers containing AHAs and BHAs for 2 to 3 weeks prior to certain procedures in order to decrease the risk of postinflammatory hyperpigmentation and promote a more even skin surface. This pretreatment step may reduce acne flare in resurfacing patients.

#### **Retinoids**

Topical retinoids are one of the most commonly recommended product for the aesthetic patient. Topical retinoids are acknowledged for their highly efficacious abilities such as increasing dermal thickness, healing, and re-epithelization, while also decreasing the risk of hyperpigmentation and acne. Retinoids are also celebrated for reducing appearance of fine lines and wrinkles. Topical retinoids accelerate skin cell turnover, normalize follicular hyperkeratosis, reduce inflammation, and inhibit melanogenesis by a few proposed mechanisms, such as inhibiting the transfer of melanin from melanosomes to keratinocytes. These properties make topical retinoids highly effective for patients when targeting aging, dyspigmentation, and acne and in pre- and postprocedure patients.

For the pre- and postprocedure patient, a minimum of 2 weeks prior to procedure has been found to be beneficial. In the ideal setting, applying topical retinoids nightly for 3 months prior to the procedure is desired. In the preprocedure setting, topical retinoids are intended to accelerate re-epithelization and decrease melanin production. Discontinue topical retinoids 1 week prior to procedure. Patients using retinoids prior to a procedure such as a chemical peel can discontinue use 5 to 7 days prior to and after the procedure to decrease risk of irritation. Caution should be used if the retinoid is not discontinued a week before the procedure, as it will make the procedure more aggressive than the clinician might have intended or might be prepared to handle. For the acne and antiaging patient, it is recommended to apply a pea-sized amount of the topical retinoid to the entire face nightly. For patients with dry or sensitive skin, recommend the patient to start every other night and increase to nightly as tolerated. For sensitive skin patients using topical retinoids, it might be beneficial to discuss the short-contact application technique, allowing the topical retinoid to be applied to cleansed skin for 2 minutes to 2 hours, then rinsed off the skin. Increase length of application time as tolerated. Patients can also be advised to mix the topical retinoid with a moisturizer in order to decrease initial irritation when adding this step into a daily regimen.

It is noteworthy to counsel the patient on the side effects such as dryness, flakiness, and possible irritation during the first few weeks of using topical retinoids. It is key to discuss a quality moisturizer for patients. It is crucial to advise patients to discontinue topical retinoids in patients who are pregnant, trying to become pregnant, or breastfeeding, as topical retinoids have not been validated as safe to use in these circumstances.

## 13.2.4 Photoprotection: Sun Protection Factor, Antioxidants, Ultraviolet Radiation Defenses

#### **Chemical and Physical Sun Protection Factor**

It is of the utmost importance to stress daily sunscreen use to all patients. There is a common misperception that sunscreen is to be used when there is direct, visible sunlight, when exposed for an extended amount of time, or during distinct events such as sunbathing on the beach. What patients might not understand is the significant and cumulative exposure they receive when near a window, walking to and from locations by foot, driving or riding in the car, on cloudy/rainy days, and during nonpeak sunlight hours as well as the importance of reapplication throughout the day.

Patients often express dislike for sunscreens due to their texture, smell, or appearance when applied. There are countless sunscreen-containing products on the market. It is recommended to review major differences in specific products such as differences in vehicle (cream, lotion, stick, spray), in texture (thin or thick), and in appearance (tinted or nontinted). Having specific products

to recommend on a sheet of paper or having products available for sale in the office are recommended ways to increase use of daily sunscreen. The goal is to help your patients find sunscreen products that they will consistently use for best results.

Ultraviolet (UV) light can be broken down into three different categories (UVA, UVB, and UVC); however, only two are pertinent to discuss in this chapter. UVA (320 to 400 nm) and UVB (280 to 320 nm) are important to discuss with patients, as these wavelengths are harmful to the skin, while the shorter UVC wavelengths are filtered out in the stratosphere. UVA wavelengths are commonly described as the photo-damaging rays, while UVB wavelengths are notorious for causing sunburns. To review, sun protection factor (SPF) refers to protection from UVB radiation. The higher the SPF, the greater the UVB radiation needed to develop the minimum erythema dose (MED) after adequate sunscreen application. SPF 30 stops  $(1 - 1/30) \times 100\%$  = approximately 97% of UVB rays, while SPF 50 blocks  $(1 - 1/50) \times 100\%$  = 98% of UVB rays.

There are two broad categories of sunscreens-chemical and physical-which differ in how they process UV light. Chemical sunscreens work by absorbing the UV radiation and release it as heat, while the majority of physical sunscreens instead reflect the UV light. Chemical sunscreens commonly consist of compounds such as octocrylene, octisalate, octinoxate, avobenzone, and homosalate. Physical sunscreens most commonly consist of zinc oxide or titanium dioxide. Chemical sunscreens vary in their UV radiation coverage, specifically targeting UVA, UVB, or broad spectrum (UVA/UVB) filters. Chemical sunscreens are more common for causing contact and irritant dermatitis, particularly in patients with rosacea and atopic dermatitis. For patients with various contact allergies or sensitive skin, it might be beneficial to recommend a physical blocker. Physical sunscreens are primarily better tolerated by patients, with a decrease incidence of reported sensations such as burning, stinging, erythema, or contact dermatitis. However, physical sunscreens are often reported as thicker by patients and noted to leave visible residue when used in excess, so compliance can suffer as a result.

During patient counseling, review recommended practices with your patient, including when to apply sunscreen, how often to reapply, and key words when searching for a product. It is crucial for your patient to understand the importance of daily sunscreen use with SPF 30 or higher. Sunscreens should be applied at least 15 minutes prior to sun exposure, with reapplication every 2 hours at baseline, and every hour when in water or excessively sweating. Sunscreens should generally be water resistant and should be broad spectrum in coverage, meaning that they protect against both UVA and UVB exposure. It is also relevant to mention that although many makeup products have SPFs, it is important to wear a sunscreen on its own, over other steps in the skin care regimen but under makeup. To reiterate, the best sunscreen for your patients is a sunscreen they are willing to consistently and appropriately apply.

#### Vitamin C

Vitamin C, also known as ascorbic acid or ascorbate, is a water-soluble compound with major antioxidant and free radical scavenging properties that play a vital role in defending the skin, cell membranes, and DNA from oxidative and free radical damage. Previous studies report that vitamin C can reduce the skin's malondialdehyde concentration, a marker of oxidative stress. Vitamin C is an electron donor and a vital cofactor in collagen hydroxylation, which supports the growth of intracellular and extracellular collagen production. Most recently, studies have reported that vitamin C is able to decrease UVB-induced oxidative damage and UV radiation-induced skin neoplasms in mice. Studies also note that vitamin C is capable of protecting keratinocytes from UVA-induced lipid peroxidation. Topical vitamin C agents, such as products containing 5 to 20% ascorbic acid, have been reported to improve pigment and are commonly a part of a daily regimen for their skin-brightening effects.

For ascorbic acid to be stable, it has to be kept at an acidic pH, which encourages a greater potential for skin irritation, especially if other topical products are used in addition to vitamin C. Derivatives of ascorbic acid, including tetrahexyldecyl ascorbate (fat-soluble), magnesium ascorbyl phosphate (water-soluble), and ascorbyl palmitate (fat-soluble), are stable at neutral pHs and are better tolerated by patients.

Vitamin C must be ingested by humans or applied topically. In vivo, vitamin C is oxidized to dehydroxyascorbic acid, which is then transported into cells by glucose transporters. Once inside the cell, dehydroxyascorbic acid is reduced to ascorbic acid and so can be used by the cell. Oral vitamin C supplementation has been proven to be effective in increasing skin and plasma content. Well-known dietary sources of vitamin C consist of fruits such as strawberries, oranges, and grapefruits as well as vegetables such as Brussels sprouts, broccoli, and peppers. RDA for oral vitamin C is 90 mg/day for men and 75 mg/day for women.

#### Vitamin E

Vitamin E is a fat-soluble compound that is most commonly found as alpha-tocopherol ( $\alpha$ T), which is its biologically active form in human metabolism.  $\alpha$ T defends against UVB damage by inhibiting the formation of reactive oxygen species and free radicals, which in turn stabilizes the membranes of cells, decreasing the amount of apoptotic cells. UV radiation counteracts vitamin E by decreasing the  $\alpha$ T concentration in the skin when exposed. Vitamin E, along with vitamin C, has been shown to increase the MED when taken orally. Oral supplementation of vitamin E is most popularly found in nuts and seeds such as peanuts, almonds, walnuts, pistachios, and sunflower and sesame seeds. The RDA is 15 mg/day orally for men and women.

#### Zinc

Zinc is an essential mineral and cofactor that serves to defend against lipid peroxidation, UV-induced cytotoxicity, and oxidative stress. The highest concentrations of zinc in the skin are found within the epidermis, as zinc supports keratinocyte differentiation and epidermal proliferation. Of note, zinc is involved in wound healing and has anti-inflammatory properties by decreasing proinflammatory markers within keratinocytes as well as nitric oxide. Topical zinc is noted to support re-epithelization by activating matrix metallopeptidases (MMPs), which prompts keratinocyte migration. Proteins such as red meat and seafood, whole grains, and fortified foods are rich in zinc. The RDA for oral zinc is 11 mg/day for men and 8 mg/day for women. For the purposes of wound healing specifically, suggested daily supplementation is 15 to 30 mg/day.

#### Selenium

Selenium is an essential mineral that most commonly exists as selenomethionine in humans. Selenium assists enzymes: glutathione peroxidases and thioredoxin reductases. Through these reactions, harmful by-products such as lipid hydroperoxides, hydrogen peroxide, and peroxynitrite are removed, which protects against oxidative damage to DNA and enhances cell membrane stabilization through DNA synthesis and repair. Foods rich in selenium are meat and seafood. The RDA of oral selenium is 55 mcg/day for men and women.

#### **N-Acetylcysteine**

N-Acetylcysteine is a crucial amino acid that acts as a precursor for glutathione. Glutathione serves as the major endogenous intracellular antioxidant in the body. As we age, the synthesis of glutathione production slows, which poses the risk of increased oxidative stress, leading to oxidative stress and ultimately aging. A previous study evaluated the significance of cysteine and glycine oral supplementation. The study reported that prior to supplementation, older individuals were found to have significantly lower levels of intracellular glutathione than younger individuals. The subjects were evaluated 2 weeks after taking daily oral supplementation and found to have a significant increase in concentrations of red blood cell glycine, cysteine, and glutathione. They also reported a decrease in oxidative stress and oxidative damage. Various studies have suggested ranges from 1,000 mg to 3,000 mg orally a day.

#### **N-Acetylglucosamine**

N-acetylglucosamine (NAG) is another vital amino acid, serving as the precursor to hyaluronic acid. It has multiple crucial roles in the human body, one of which is its role in the skin. NAG is reported to have properties in the skin such as aiding in wound healing, increasing hydration of the skin, improving fine lines and wrinkles, reducing dyspigmentation, and stabilizing structural integrity of the skin. Further studies are needed for oral supplementation recommendations. Topical products containing NAG have been found to improve pigmentation as well as strengthen the dermal–epidermal junction.

# Carotenoids (Beta-Carotene, Lutein, Zeaxanthin, Lycopene)

Carotenoids are fat-soluble plant pigments that mammals are unable to synthesize, so that humans must consume them by a well-balanced diet or through supplementation. Carotenoids are known for scavenging reactive oxygen species, which defends the skin against oxidative stress. Oxidative stress and UV exposure cause a decrease in carotenoid concentrations in the skin. Beta-carotene, lycopene, lutein, and zeaxanthin are four common dietary carotenoids.

Beta-carotene increases the MED, protecting against sunburn and photosuppression of the immune system. It also serves by halting free radical and singlet oxygen-induced lipid peroxidation, thus defending against cell damage. Green leafy vegetables and yellow and orange fruits are packed with beta-carotene. Beta-carotene gives rise to vitamin A. The RDA of dietary all-*trans*-beta-carotene is 10,800 mcg/day for men and 8,400 mcg/day for women. The RDA for oral supplemental all-*trans*-beta-carotene is 1,800 mcg/ day for men and 1,400 mcg/day for women.

Lutein and zeaxanthin are carotenoids found in the skin working as antioxidants against free radical damage and protecting against UV radiation damage. Studies report that both lutein and zeaxanthin increase the mean MED, inhibit MMPs (which slows ECM degradation), decrease lipid peroxidation, defend keratinocytes from UV photoaging, and improve skin tone, luminance, and color. Both oral supplementation and topical application have been studied to show these skin effects. Eggs, green leafy vegetables, and oral supplements are required in adequate amounts, as the body cannot endogenously produce lutein and zeaxanthin. Studies suggest 2 mg/day of zeaxanthin and 6 to 10 mg/day of lutein.

Lycopene is the last major carotenoid we mention. It serves a crucial role as a singlet oxygen quencher, which decreases UV-induced erythema, and slows the breakdown of collagen by inhibiting the activity of MMP-1. It has been shown to decrease the severity of skin roughness when greater amounts are found in the skin. There is no RDA for lycopene; however, foods with higher levels of the carotenoid include tomatoes, watermelons, and grapefruits.

## 13.2.5 Collagen and Dermal Repair

Collagen and dermal repair has been a huge focus as of late. Various cosmeceuticals and oral nutraceuticals fall into this category that have already been discussed elsewhere. Peptides, growth factors, collagen supplements, retinoids, vitamins, and minerals are promoted for their rejuvenation properties.

#### **Peptides**

Peptides, which are short-chain sequences of amino acids, are capable of encouraging the production of collagen, increasing skin hydration, and lessening skin wrinkling through various mechanisms depending on the specific type of peptide contained in the product. Signal peptides exhibit their effects by enhancing new collagen production and inhibiting the destruction of existing collagen. Neuropeptides work by specifically targeting different aspects of the neuromuscular junction (NMJ), which clinically results in improvement in fine lines and wrinkles, as they lessen the contractions of facial muscles. Finally, carrier peptides play a role in collagen regeneration and wound healing by stabilizing and delivering known essential elements, such as copper, to the skin. Cosmeceutical peptides are recommended in addition to topical retinoids. Topical peptides are especially recommended after procedures to help further increase collagen production with lasting results. These peptides are applied daily, along with sunscreen if used in the morning, or with retinoids if applied at night.

#### Copper

Copper is an essential trace mineral that has many roles in the human body. Copper is vital in the proliferation of dermal fibroblasts, stimulating the production of collagen and elastin by fibroblasts. It maintains collagen-crosslinking properties, serving a vital role in collagen building and wound repair by enhancing fibroblast and keratinocyte production. It also functions as a cofactor with lysyl oxidase and tyrosinase during enzymatic reactions. During the lysyl oxidase enzymatic reaction, collagen is crosslinked, which is necessary for building and maintaining the ECM. Copper also has antioxidant properties, serving as a cofactor in antioxidant reactions protecting against free-radical production, lipid peroxidation, and membrane damage. Among these roles, copper's wound-healing properties (by enhancing angiogenesis and promoting and stabilizing the skin's ECM) prove to be most key when focusing on postprocedure scar prevention/reduction. Topical copper is also reported to have anti-inflammatory and antibacterial properties, which help in wound healing in damaged skin. Meat, seafood, grains, nuts, and seeds are popular dietary sources of copper. When consumed orally, the RDA is 900 mcg/day for men and women.

## 13.2.6 Pigment Reduction

Heterogeneous skin pigmentation is undesired by the aesthetic patient, as it is a primary sign of aging skin and skin damage. Pigment reduction is a common request, whether the patient is postprocedure, post-trauma, or has accumulations of unwanted melanin from factors such as chronic UV radiation exposure or hormonal/pharmacologic causes.

Pigment-modifying products are successful in reducing melanin production by inhibiting the main enzyme, tyrosinase, responsible for creating pigment. There are multiple mechanisms by which pigment reduction can be accomplished, including simply inhibiting tyrosinase from working, inhibiting the production of the enzyme itself, reducing the transfer of melanin from melanosomes to keratinocytes, or interrupting any part of the process that assists in melanogenesis. Regardless of the pigment-reducing product used, it is key to inform patients that multiple treatment types may be needed and to inform patients of the consequences of re-exposure to the underlying cause of pigment production. Often patients who are continuously exposed to UV radiation will exhibit repigmentation after treatment, as UV light is a known stimulator of melanogenesis. Broad-spectrum UV protection is crucial for many reasons, this being one of them. There are oral and topical products available to modify pigment, including AHAs and BHAs, kojic acid, vitamin C, vitamin E, niacinamide (vitamin B<sub>2</sub>), hydroquinone (HQ), oral tranexamic acid (TXA), azelaic acid, polyphenols, and fatty acids. Here we will review a few of the most common products that have not been mentioned previously.

#### **Kojic Acid**

Kojic acid is a hydrophilic product that is derivative of various fungi. It limits melanin production by inhibiting the binding of copper to tyrosinase. Kojic acid is commonly found in OTC skin-lightening lotions, creams, serums, and pads.

#### Niacinamide

Niacinamide, vitamin  $B_{3}$ , is a water-soluble vitamin that inhibits the transfer of melanin to keratinocytes. Previous

studies reported that niacinamide also supports skin hydration, decreases transepidermal water loss, increases skin elasticity, softens fine lines and wrinkles, and improves the appearance of hyperpigmented macules.

#### Hydroquinone

HQ inhibits the production of pigment, melanogenesis, by inhibiting tyrosinase and is reported to have melanocyte cytotoxic effects. As mentioned previously, tyrosinase is the main enzyme responsible for creating pigment. Hydroquinone remains the topical gold standard for pigment reduction. The amount of the active component in a product typically ranges from 2 to 4% but can be as high as 8% in some agents. Recent studies have shown no significant benefit in percentages greater than 2 to 4% HQ. HQ can cause skin irritation and postinflammatory hyperpigmentation at higher doses, so it is commonly compounded with topical steroids. Improvement in pigment is commonly seen between 4 and 6 weeks, with reports of stabilizing results in 3 to 4 months. However, newer products on the market are promoting HQ skin brighteners that can be used year-round. It is recommended that patients use the skin-brightening product twice daily for best results.

#### **Oral Tranexamic Acid**

TXA is an oral agent used for pigment reduction. In 1979, Sadako reported the use of TXA for melasma. TXA works by inhibiting tyrosinase activity through various mechanisms involving the plasminogen/plasmin conversion and interaction between keratinocytes and melanocytes. Suggested dosing for treating melasma ranges from 250 mg twice daily to 1,500 mg daily for 8 to 12 weeks. Caution must be exercised in patients with a history of blood clots.

## 13.2.7 Inflammation, Redness, and Scar Reduction

Whether a patient is postprocedure or dealing with inflammation and redness from other etiologies, there are multiple oral and topical products to recommend. These products commonly have antioxidant and anti-inflammatory properties while also hydrating the skin. Commonly recommended products that assist in lowering the erythema and inflammation include oral and topical vitamin C, oral and topical vitamin E, hyaluronic acid (humectant), ceramides, niacinamide (vitamin B<sub>3</sub>), and oral and topical polyphenols. Vitamin C, vitamin E, and hyaluronic acid have been mentioned previously. Here we discuss some in further detail.

#### **Topical and Oral Polyphenols**

Polyphenols, such as curcumin and epigallocatechin gallate (EGCG), are secondary metabolites of plants with reported anti-inflammatory, antioxidant, and anticarcinogenic properties. Curcumin is a chemical compound found in the turmeric spice. Curcumin is well known for its anti-inflammatory properties by hindering proinflammatory cytokines (prostaglandin  $E_2$ , interleukins 6 and 12, MMPs, tumor necrosis factor–alpha, and
cyclooxygenase [COX]-2). Curcumin is also capable of hindering lipid peroxidation, reducing reactive oxygen species (ROS) production, scavenging free oxygen radicals, and diminishing c-reactive protein levels, which highlight curcumin's antioxidant abilities. Reported studies suggest 2 to 8 g/kg daily for oral supplementation of curcumin.

EGCG is found in green tea and is reported to be the most potent tea polyphenol. EGCG and other tea polyphenols have anti-inflammatory and antioxidant properties. ECGC also has the ability to hinder proinflammatory cytokines, similarly to curcumin. ECGC is able to reduce the amount of UV radiation– induced DNA damage, minimize the amount of ROS and free radicals produced, and hinder lipid peroxidation in the skin. EGCG has effect both topically and orally. Topically, ECGC has been shown to decrease erythema and edema induced by UV radiation. It has also been reported to decrease UV-induced skin tumors in mice. Recent publications support 300 mg/day of oral EGCG is tolerated.

### **Licorice Extract**

Licorice extract, also known as licochalcone A, exhibits anti-inflammatory and antierythema properties by indirectly inhibiting COX and lipoxygenase pathways, reducing UV-induced erythema, and decreasing the production of proinflammatory cytokines released by keratinocytes. Topical products containing licorice extract can be applied daily.

### Oatmeal

Colloidal oatmeal is one of the most common ingredients found in OTC products targeted to help relieve inflammatory skin conditions such as atopic and contact dermatitis. One of the main components contributing it its anti-inflammatory properties is the dietary component, beta-glucan. It is found in many OTC cleansers and moisturizers thanks to its anti-inflammatory and soothing properties. Beta-glucan has also been studied and found to have wound-healing properties both topically and orally. Previous studies note that beta-glucan supports wound repair by encouraging wound growth factors released by macrophages, which stimulate fibroblast and collagen activity. When focusing on wound-healing properties, a previous study suggested that topical beta-glucan be applied twice daily or 50 mg/kg/day when supplemented orally. Topical oatmeal is suggested to be applied at least twice daily to help relieve inflammation.

# **13.3 Concluding Thoughts**

In this chapter, we reviewed many OTC cosmeceuticals and oral nutraceuticals that play a role in a comprehensive skin care regimen for the aesthetic patient. As the skin is constantly challenged by many internal and external influences, it is important to discuss and recommend the vital components of daily proper skin care. Many of the cosmeceuticals and oral nutraceuticals mentioned in this chapter play multiple roles in skin care. Whether addressing a specific concern, tailoring for a procedure, or creating a daily routine, the OTC cosmeceuticals and oral nutraceuticals discussed in this chapter all play a role in a comprehensive skin care regimen and can be applied to any aesthetic patient. It ultimately is the responsibility of the aesthetic surgeon to recommend a regimen based on clinical judgment and expertise.

### **Clinical Caveats**

- Every aesthetic patient should be educated on and recommended a comprehensive daily skin care regimen.
- Every patient should be educated on the importance of daily sun safety precautions and be knowledgeable about proper SPF use.
- It is beneficial to have products available in the office for purchase or a suggested product list with retailers so that patients can purchase from verified sources.
- It is helpful to give written instructions for a daily regimen to ensure proper compliance.

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# 14 A Scientific Approach to Cosmeceuticals

Leslie Baumann

## Abstract

A scientifically validated approach to diagnose skin phenotype and customize a targeted skin care regimen to patients is critical to enhancing skin health. Once an efficacious skin care regimen has been developed, the physician must communicate the plan to patients and encourage them to follow it. To match products properly to patients, and to educate and encourage them to use the products, it is critical to enlist the help of staff members to improve efficiency and engagement with patients. A methodology to educate staff and patients in a systematic manner is essential so that patients are given the correct products, told how and encouraged to use them, and reminded periodically to stay on the prescribed regimens. This chapter discusses the science behind a skin typing system known as the Skin Type Solutions (STS) system, which was developed to streamline the cosmeceutical recommendation process in a brand-agnostic manner, enabling physicians to choose what products or brands they want to retail in their practice and prescribe them using a scientific method designed to improve outcomes. The STS system assesses skin based on four primary barriers to skin health: dehydration, inflammation, dyspigmentation, and skin aging. Evaluating the presence or absence of these barriers to skin health in facial skin provides the physician with data to diagnose the patient as having one of 16 Baumann Skin Types, for which proper cosmeceutical ingredients can then be prescribed. The patient's Baumann Skin Type (BST) is diagnosed using a customized, expert skin care diagnostic system that diagnoses the skin type and automatically generates a skin care regimen that contains ingredients beneficial to that skin type and does not contain ingredients harmful to that skin type. The STS system assists physicians in selecting skin care products in an unbiased, ethical, and methodical way to improve personalized care for patients. Appropriate use of the system can enhance staff training and doctor-patient communications, as well as patient education, compliance, and outcomes. This chapter will discuss the science of the skin issues that need to be considered when developing a skin care regimen: sebum production, skin barrier, presence of inflammation, melanocyte activity, and the presence of lifestyle habits that lead to skin aging.

### Keywords

Skin Type Solutions System, barriers to skin health, Baumann Skin Type, cosmeceutical, skin aging, skin lightening, skin rejuvenation, sensitive skin, compliance, outcomes, staff training, antiaging, antioxidants, anti-inflammatory, tyrosinase inhibitors, regimen, skin care

# 14.1 Introduction

To achieve and maintain skin health, consistent daily use of a skin care regimen ideally suited to an individual's skin is critical. Pre- and postprocedure skin care regimens customized specifically for the patient's skin type and procedure type will improve outcomes if the patient is compliant with the directions. It is a challenge for practitioners to stay up to date on cosmetic science and to communicate current knowledge to their staff, who are a vital part of the skin care recommendation process. Establishing a standard approach or methodology for prescribing skin care products yields consistency in patient recommendations and provides a scientific methodology for the staff to follow while promoting patient education, engagement, and compliance.

Diagnosing a patient's skin type is the key first step in prescribing an ideally suited skin care regimen. The Skin Type Solutions (STS) system, developed by the author to address the essential features of the skin, employs a validated questionnaire for patients. This allows practitioners to diagnose patients as having one of 16 Baumann Skin Types (BSTs).

The STS system evaluates skin according to four spectra or barriers to skin health:

- 1. Dehydration (oily [O] vs. dry [D])
- 2. Inflammation (sensitive [S] vs. resistant [R])
- 3. Dyspigmentation (pigmented [P] vs. nonpigmented [N])
- 4. Skin aging (wrinkle-prone [W] vs. unwrinkled or tight [T])

A validated questionnaire identifies skin phenotype based on these four parameters, allowing 16 different skin types, each represented by a four-letter designation as well as color and number designations to help patients remember their BST (**Fig. 14.1; Fig. 14.2**). For example, an individual with dry skin, redness, even skin tone, and fine lines would be assigned as a DSNW (Dry, Sensitive, Nonpigmented, Wrinkle-prone) type, or BST number 4 with a light pink color code. Multiple forms of labeling are used because studies have demonstrated that some patients primarily remember the number of their skin type, while others primarily remember the color, and yet others the four-letter designation. This skin-typing system facilitates communication between physicians and patients as well as the process of prescribing the optimal products for a patient's skin type.

The BST should be diagnosed at least once a year because the skin type can change based on numerous factors, such as climate, lifestyle habits, hormone status, pregnancy, medication use, sun exposure, smoking, and other factors. At each visit the patient's skin type and regimen should be evaluated and updated according to the presence or absence of the four barriers to skin health. This chapter will proceed with a discussion of diagnosing skin type based on the BST, matching product ingredients to skin type, and designing a corresponding skin care regimen. The focus will shift then to the science of skin aging and pigmentation as well as the cosmeceutical ingredients best suited to treat these conditions, along with the formulations appropriate for treating the skin before, during, and after cosmetic procedures.

# 14.2 Diagnosing Skin Types

The 16 BSTs are based on the presence or absence of these primary barriers to skin health: dehydration, inflammation, dyspigmentation, and skin aging. The patient is assigned a designation for each of the skin status parameters or barriers: O (oily) or D (dry), S (sensitive) or R (resistant), P (pigmented) or N (nonpigmented), and W (wrinkled) or T (tight), with 16 different combinations possible. There are also four subtypes of sensitive skin: acne, rosacea, burning and stinging, and susceptibility to contact and irritant dermatitis.

# 14.3 Matching Ingredients to Skin Type

Each of the following factors should be considered when choosing ingredients by facial skin type.

## 14.3.1 Oily Skin

Individuals with oily skin (O) produce an adequate or elevated level of skin sebum. Sebum functions as an occlusive that helps the skin hold on to water, which can compensate for an underlying barrier impairment. For this reason, patients with an adequate or excessive amount of sebum do not have decreased amounts of water in the epidermis (i.e., dry skin). An "oily" skin type is desirable because of the protective effects that sebum has on the skin, including hydrating and antioxidant properties.

## **Products These Patients Should Use**

### **Salicylic Acid**

This lipophilic compound can penetrate into the pores to facilitate desquamation of the stratum corneum (SC), thus preventing the clogging of pores and the development of comedones (blackheads or whiteheads) and acne. This member in the salicylate (aspirin) family also confers anti-inflammatory activity. Cleansers containing salicylic acid are ideal for acne-prone individuals with oily skin. Such cleansers should be formulated at a pH of less than 2.97 to be effective.

## **Foaming Cleansers**

Anionic surface-acting agents (surfactants or detergents) produce foam and display the greatest ability among cleansers to remove oil, sunscreen, and debris. Only individuals with oily skin types should use these products, which remove oil from the skin and can be irritants to dry, sensitive skin types.

### Retinoids

These vitamin A formulations can help keep pores clear by regulating keratinization. Oral retinoids can reduce the size of sebaceous glands, thus diminishing sebum production. Topical retinoids are unlikely to affect the sebaceous glands directly but are beneficial in oily skin by preventing comedones.



**Fig. 14.1** The 16 Baumann skin types. (This image is copyrighted by Metabeauty Inc. and cannot be used without permission.)

## Polymers

Skin appearance can be rendered less shiny through the use of polymers, which surround or sequester oil. These are often called "primers." Polymers should be rinsed off nightly to prevent the development of comedones.

## **Products These Patients Should Avoid**

### Oils

Individuals with oily skin already have increased amounts of lipids on the skin. They should avoid oils or heavy creams that contain oils, which feel heavy and greasy on oily skin types. Oily skin types can omit a moisturizer or choose a light moisturizer with humectant ingredients instead of occlusive oils.

### **Comedogenic Ingredients**

Oily skin types are more likely to develop comedones. Many ingredients (**Table 14.1**) can contribute to comedoformation. Major culprits include coconut oil, isopropyl myristate, and isopropyl palmitate.

### Silicone-Containing Moisturizers and Sunscreens

Silicones are often used to mask oil on the face but they can hold sebum and debris in the pore, resulting in comedones. If silicones are used on the face, they should be washed off at night.



Fig. 14.2 (a) DRPW: This skin type is characterized by wrinkles, pigmentation and dry skin. (Photo credit El Nariz/Shutterstock.) (b) OSNT: This skin type often occurs under the age of 30 and is characterized by increased sebum production and inflammation resulting in acne. (Photo credit Vladimir Gjorgiev/Shutterstock.) (c) OSNW: This skin type has increased production of sebum and often cannot find a sunscreen that does not feel oily. Inflammation in this skin type results in rosacea and an increased risk of aging. (Photo credit Lipowski Milan/Shutterstock.) (d) OSPW: This skin type is characterized by increased sebum production. Inflammation and sun exposure has resulted in unwanted pigmentation and an increased risk for aging. (Photo credit Michael Jung/Shutterstock.)

# 14.3.2 Dry Skin

Individuals with dry (xerotic) skin have an impaired skin barrier, characterized by the absence of water in the epidermis. Cracks and fissures appear in the skin when levels of water, the main plasticizer for the skin, are low. The water content of the SC must surpass 10% for the skin to feel and appear normal. When a defect in the permeability barrier of the skin permits excessive water to be lost to the atmosphere, this rise in transepidermal water loss (TEWL) results in dry skin. Genetic defects, harsh detergents, acetone, alcohol, and frequent bathing in hot water are among the various factors that can engender such barrier disturbance. As skin becomes too dry, desquamating keratinocytes build up on the skin's surface, making it rough and unable to reflect light properly. It can become irritated, inflamed, and itchy. The arms, legs, and torso, which contain relatively few oil glands, are the most vulnerable to this condition.

## **Products These Patients Should Use**

## **Nonfoaming Cleansers**

Nonfoaming cleansers, which were developed through attempts to mitigate the irritancy of cleansers by adding secondary components,

are appropriate for patients with dry skin because these compounds deposit lipids on the skin. Superfatted soaps, transparent soaps, combination bars (combars), and syndet bars (bars composed of synthetic surfactants) are the primary nonfoaming cleansers, which have a neutral pH and include ingredients such as alkyl glyceryl ether sulfonate, alpha olefin sulfonates, betaines, sulfosuccinates, sodium cocoyl monoglyceride sulfate, and sodium cocoyl isethionate. Patients are increasingly concerned about the sourcing of products, so it is important to assure them that organic nonfoaming agents are also available, including saponins, a large family of plant-derived structurally related substances, and sucrose laurate.

## **Hydroxyacid Cleansers**

These versatile compounds exhibit humectant activities that help hydrate the skin and are appropriate for individuals with dry skin. Humectants are water-soluble materials with high water absorption capacities. Hydroxyacids help to exfoliate dead skin cells, which tend to amass on the surface of xerotic skin. Skin appears more radiant when the skin surface is smooth. It is worth noting that enzymes that help exfoliate do not work as well when there is less water on the skin. However, the exfoliating activity conferred by hydroxyacids allows better penetration into the SC Table 14.1 Acne-causing ingredients to avoid for individuals with oily skin

Acetylated lanolin alcohol Algin Almond oil Anhydrous lanolin Arachidic acid Ascorbyl palmitate Azulene **Beeswax** Benzaldehyde Benzoic acid Beta-carotene Beta-hydroxy acid Bubussa oil Butyl stearate Butylated hydroxyanisole (BHA) Cajeput oil Calendula Camphor Capric acid Carbomer 940 Carnauba wax Carotene Carrageenan Castor oil Ceteareth-20 Cetearyl alcohol Cetyl acetate Cetyl alcohol Chaulomoogra oil Cocoa butter Coconut butter Coconut oil

Colloidal sulfur Corn oil Cottonseed oil D & C Red # 3 D & C Red # 4 D & C Red # 17 D & C Red # 19 D & C Red # 21 D & C Red # 27 D & C Red # 30 D & C Red # 36 D & C Red # 40 Decyl oleate **Dioctyl succinate** Disodium monooleamido Emulsifying wax NF Ethoxylated lanolin Ethylhexyl palmitate Evening primrose oil Glyceryl-3-diisostearate Hexadecyl alcohol Hydrogenated castor oil Hydrogenated vegetable oil Hydroxypropylcellulose Isocetyl alcohol Isodecyl oleate Isopropyl isostearate Isopropyl lanolate Isopropyl linoleate Isopropyl myristate Isopropyl palmitate Isostearyl isostearate

Isostearyl neopentanoate Laneth-10 Lanolin acid Lanolin alcohol Lanolin oil Lanolin wax Laureth-23 Laureth-4 Menthyl anthranilate Mink oil Myristic acid Myristyl lactate Octyl palmitate Octyl stearate Oleth-3 Oleth-10 Oleyl alcohol Palmitic acid Peach kernel oil Peanut oil PEG (polyethylene glycol) in: • PEG 2 sulfosuccinate • PEG 8 stearate • PEG 16 lanolin • PEG 100 distearate • PEG 150 distearate • PEG 200 dilaurate • PEG 300 PEG 400

Pentarythrital tetra isostearate Propylene glycol (PG) in: PG caprylate/caprate • PG dicaprylate/caprate • PG dipelargonate PG monostearate Polyglyceryl-3-diisostearate Potassium chloride PPG (polypropylene glycol) in: • PPG 2 myristyl propionate • PPG 5 ceteth-10 phosphate Red algae Sandalwood seed oil Sesame oil Shark liver oil Solulan 1 Solulan 16 Sorbitan oleate Sovbean oil Steareth-2 Steareth-10 Steareth-20 Stearyl heptanoate Sulfated castor oil Sulfated jojoba oil Synthetic dyes (especially, D&C Red #3, 4, 6, 7, 9, 17, 19, 21, 27, 30, 33, 36, 40), Triethanolamine Vitamin A palmitate Wheat germ glyceride/oil **Xvlene** 

by ingredients applied after the cleanser. These compounds are also suitable for individuals with dry, acne-prone skin because the low pH contributes to an inhospitable microbiome for *Propionibacterium acnes*, rendering it difficult for the bacteria to thrive.

### **Barrier Repair Ingredients**

The topical application of ceramides, cholesterol, and fatty acids-the main skin barrier lipid components-has long been targeted as central to enhancing skin barrier function and hydration. It is important to apply all three of these in a 1:1:1 ratio because an imbalanced ratio impairs the barrier. In 1993, Man et al demonstrated that barrier recovery was delayed when ceramide and fatty acid were applied without cholesterol. They also showed that barrier repair was delayed with the application of two other mixtures of cholesterol plus fatty acid or cholesterol along with ceramide. Such incomplete mixtures generated abnormal lamellar bodies, yielding abnormal SC intercellular membrane bilayers. Conversely, complete blends of ceramide, fatty acid, and cholesterol resulted in normal barrier recovery. Additional studies have buttressed the importance of including all three primary barrier repair ingredients in topical formulations in a minimal ratio of 1:1:1. Investigations in young mice (< 10 weeks) and humans (20-30 years of age) have revealed that applying a mixture of cholesterol, ceramides, and essential/nonessential free fatty acids (FFAs) in an equimolar ratio results in normal barrier recovery, and application at a 3:1:1:1 ratio of these four ingredients, with cholesterol dominant, accelerates barrier recovery. Multilamellar emulsion (MLE) technology touting

the inclusion of type III synthetic ceramide or pseudoceramide was established nearly 15 years ago as the foundation for such innovative approaches to barrier repair. See **Table 14.2** for a list of fatty acid alcohols suitable for use by patients with dry skin.

## **Products These Patients Should Avoid**

### Foaming Cleansers

As noted previously, only individuals with oily skin types should use these products.

## Alcohols

These compounds dry skin out and injure the skin barrier (see **Table 14.3**).

Table 14.2 Fatty acid alcohols safe in dry skin

Cetearyl alcohol	Decyl alcohol (1-decanol)
Stearyl alcohol	Lauryl alcohol (dodecanol)
Behenyl alcohol (docosanol)	Myristyl alcohol (1-tetradecanol)
Caprylic alcohol (1-octanol)	Isostearyl alcohol
Cetearyl alcohol (very common)	Oleyl alcohol (octadecenol)
Cetyl alcohol (very common)	

 Table 14.3
 Alcohols that individuals with dry skin should avoid

Isopropyl alcohol E Specially denatured (SD) alcohol M Denatured alcohol B

Ethyl alcohol (ethanol) Methyl alcohol (methanol) Benzyl alcohol

### Hot Water

Individuals with dry skin should avoid prolonged exposure to hot water, especially if it is "hard" water (containing iron and calcium compounds).

## 14.3.3 Sensitive Skin

A British study in 2001 revealed that 57% of women and 31.4% of men reported an adverse reaction to a personal skin care product at some stage in their lives, with 23% of women and 13.8% of men having had a problem within 1 year of the investigation. These individuals are described as having "sensitive skin." A full characterization of sensitive skin requires subdividing sensitive skin into subtypes: acne, rosacea, stinging, and the predilection toward contact or irritant dermatitis.

## **Acne-Type Sensitive Skin**

A multifactorial process involving the pilosebaceous unit, acne vulgaris affects between 40 to 50 million people each year in the United States alone. The majority of these patients, between 70 and 80%, range from 11 to 25 years old. Most patients beyond this age cohort are adult women who usually display a hormonal aspect to their acne. A comprehensive discussion of the pathophysiology of acne is beyond the scope of this chapter, but a brief review of the salient features of acne pathophysiology as well as suggestions for treatment and prevention follow.

## Pathophysiology

Acnegenesis is characterized by inflammation of the follicular epithelium, which results in compacted hyperkeratotic material within the follicle that makes the environment more hospitable for the *P. acnes* bacteria, thus engendering pustules and papules. An overarching etiology for acne is difficult to identify or isolate because the sources of such lesions vary from person to person and within individuals. Nevertheless, the three principal causative factors—sebaceous gland hyperactivity, changes in follicular keratinization, and the influence of the bacteria *P. acnes*—have been identified and are known to work interdependently, mediated by significant influences such as heredity and hormonal activity. *P. acnes* bacteria divide every 12 hours, so a topical product geared to eradicate this bacterium should be used at least twice a day.

## **Products These Patients Should Use**

General guidelines for treating acne include use of the following:

## **Benzoyl Peroxide**

This organic compound in the peroxide family imparts anti-inflammatory, antibacterial, keratolytic, and wound-healing activity. It is one of the most common ingredients used topically to treat acne. It can be used alone or combined with other ingredients. Benzoyl peroxide is safe and effective for treating acne but is tolerated better by people with oily as opposed to dry skin because it can irritate the skin of individuals with an impaired barrier, which permits greater penetration of the product. Sensitive skin types prone to facial redness often cannot tolerate benzoyl peroxide without combining it with anti-inflammatory ingredients.

### Retinoids

Several studies have demonstrated the efficacy of retinoids in treating acne and have resulted in FDA approval of various tretinoin-, adapalene-, and tazarotene-containing acne medications. The use of retinoids contributes to the prevention and elimination of comedones through desquamation, influencing cell adhesion, and regulating keratinization. The comedolytic properties of retinoids have been found to be similar to those linked to benzoyl peroxide and salicylic acid. Retinoids treat current acne and prevent future acne and are the most important ingredients to treat acne. The entire skin care regimen should be designed so that the patient can tolerate using the retinoid. Applying it over a moisturizer can decrease the redness and peeling associated with retinoids.

## Salicylic Acid

Derived primarily from willow bark, this aromatic acid has anti-inflammatory and comedolytic properties, which account for its prominent status in the antiacne arsenal. Salicylic acid is well established, along with benzoyl peroxide and low-dose retinoids, for treating mild acne. It is also cited in the FDA monograph for acne for 0.05 to 2% concentrations in over-the-counter (OTC) products and deemed effective for acne at 3% strength in prescription medications, as stipulated by the FDA.

## **Topical Antibiotics**

Antibiotic resistance is of great concern in medicine, and *P. acnes* resistance rates are estimated to be as high as 60% in some patient populations. Clindamycin, erythromycin, and methicillin are the most frequently reported antibiotics to which bacteria have been found to have developed any resistance. Combining erythromycin or clindamycin with benzoyl peroxide has been proven to prevent the emergence of resistant strains of *P. acnes*; therefore, the current clinical acne recommendation calls for including benzoyl peroxide in topical antibiotic antiacne regimens. Antibiotics should never be used alone in the treatment of acne.

### Silver

Silver acts as a bactericidal and anti-inflammatory agent, without engendering free radicals as benzoyl peroxide does. Consequently, it is considered a viable option for treating acne. Silver has not been approved by the FDA to treat acne, but silver sulfadiazine has been used "off-label" for this purpose for several years. Silver sulfadiazine as an acne treatment is limited by the risk of sulfa allergy and the thick, white, pasty consistency of the preparation. However, silver-containing cleansers and textiles can also impart antiacne activity.

## Tea Tree Oil

Recent data support the use of the essential oil of *Melaleuca alternifolia* (tea tree) to treat acne vulgaris and other conditions such as seborrheic dermatitis and chronic gingivitis as well as

to promote wound healing. In 2007, a randomized, double-blind clinical trial in 60 patients with mild to moderate acne showed the efficacy of 5% tea tree oil gel. Researchers observed that the botanical gel was 3.55 times more effective than placebo in lowering total acne lesion counts and 5.75 times more effective than placebo in decreasing the acne severity index, with the side effects similarly mild and tolerable in both groups. The recommended approach to using tea tree oil for acne calls for three or four topical applications daily. However, many reports of contact dermatitis to tea tree oil reduce its usefulness as an acne treatment.

## Acne-Prone Types with Dry Skin

Ascertaining the appropriate cleanser for acne-prone skin depends first on determining where the patient's skin falls on the oily-dry spectrum. Individuals who have both dry skin and acne likely cannot tolerate the drying acne formulations. Two different cleansers are often needed for such patients. Creamy cleansers, which are effective for makeup removal, should be used once daily, ideally at night by individuals who use makeup. With a relatively low pH, glycolic acid is the best example of hydroxyacids effective in a morning cleanser for managing dry, acne-prone skin. Skin with a lower, more acidic pH is less hospitable to P. acnes growth. The use of hydroxyacids can exfoliate dead skin cells, thus helping to prevent clogged pores and the development of acne comedones. Glycolic acid offers the added benefit of acting as a humectant ingredient, providing needed moisture. Acne-prone patients with dry skin should avoid foaming cleansers and mechanical exfoliators such as scrubs, facial brushes, and loofahs.

## **Acne-Prone Types with Oily Skin**

Patients with oily skin and acne are easier to treat because these individuals can better tolerate the drying acne medications. A salicylic acid cleanser in the morning will help to unclog pores, and its anti-inflammatory activity helps prevent the development of the papules and pustules characteristic of acne. The use of a foaming cleanser in the evening will remove dirt, makeup, and other debris that can clog the pores and contribute to or aggravate acne. For patients with oily skin and acne, the twicedaily use of salicylic acid would feel too drying when combined with acne medications such as a retinoid and benzoyl peroxide. Acne-prone types with oily skin should choose physical sunscreens rather than chemical sunscreens that often contain comedogenic oils.

## Products and Treatments All Acne Patients Should Avoid

### **Comedogenic Ingredients**

See **Table 14.1** for a list of comedogenic ingredients. Isopropyl myristate is particularly problematic for acne-prone patients. This ingredient is found in several hair conditioners and hair-smoothing products. Face washing for such patients is recommended to be timed *after* rinsing out hair conditioner. Hair products left in overnight can contribute to acne by depositing on the pillowcase.

## Elective surgery on acne-affected areas

Note that the bacteria *P. acnes*, which causes acne, is also responsible for wound infections. Therefore, acne must be under control before any procedures are performed in the affected area(s). Elective surgical procedures within six months of Accutane (isotretinoin) use is discouraged or contraindicated because of an increased risk of scarring.

## **Rosacea-Type Sensitive Skin**

Rosacea is a chronic cutaneous condition in which patients present with central facial erythema, telangiectasias, papules, and pustules. Several years ago, a Swedish study indicated a rosacea prevalence of about 10% in the general population. There are thought to be approximately 13 million people affected with rosacea in the United States. Most patients are diagnosed between the ages of 30 and 50 years, with women affected more often than men but men experiencing the phymatous changes of the condition more often. In addition, rosacea is more prevalent in individuals with fair skin. Risk factors for acquiring rosacea include sun damage, a propensity to flush, and genetic predisposition. Rosacea patients tend to experience stinging more than other skin types. They may not be able to tolerate products with a low pH, such as ascorbic acid and glycolic acid, and often experience stinging from chemical sunscreens such as avobenzone. Rosacea patients should use special care when starting retinoids, beginning first with an anti-inflammatory agent to help minimize retinoid dermatitis. After a month's time on an anti-inflammatory agent with good control of redness, a retinoid can be slowly introduced. Start with a low-strength retinoid on top of the moisturizer every third night (a pea-size dose) for 2 weeks, then every other night for 2 weeks, and finally every night. Patients should be advised always to start with a retinol 0.025% or less on top of a moisturizer. The dose and frequency directly correlate with the incidence of side effects (**Table 14.4**).

## Pathophysiology

There are many hypotheses about rosacea, but there is no consensus cause that explains all of the types of rosacea that are seen. Some patients improve with therapies targeted to kill *Demodex* mites, while other patients improve on vasoconstricting agents and topical metronidazole. One constant across all rosacea patients is the presence of triggers, which usually include heat, stress, emotion, hormones, alcohol, heat, and spicy food. Avoiding these triggers and anything that causes inflammation, such as facial scrubs, loofahs, and microdermabrasion, is the mainstay of treatment.

## **Products These Patients Should Use**

- Anti-inflammatory ingredients (argan oil, green tea, metronidazole, azelaic acid)
- Vasoconstrictors (oxymetazoline or brimonidine)
- Anti-Demodex mite medications, such as ivermectin cream 1%
- An anti-inflammatory moisturizer in the morning
- A physical sunscreen every morning
- A moisturizer in the evening

Table 14.4 Patient instructions for retinoid use

- Always use retinoids at night, because the sun breaks them down.
- Your skin will acclimate to retinoids with time, so use sparingly and be patient.
- Start with the weakest strength (retinol 0.25%) and slowly increase the dose with each new tube.
- Apply retinoid on top of moisturizer until you are tolerating it every night for a month, then apply it before the moisturizer.
- Use only a pea-sized amount every third night for the first 2 weeks.
- If no redness or irritation occurs, increase use to every other night for 2 weeks.
- If no redness or irritation occurs, increase use to every other night.
- Stop using retinoids 1 week prior to waxing.
- Buy retinol products only from a source you trust; there are many counterfeit products online.
- If redness or irritation to retinoids occurs, stop use for 4 days, moisturize twice a day, and restart slowly. Redness and irritation indicate that what you are using is too much, too strong, or too often.
- Long-term use of retinoids has been shown to improve wrinkles, dark spots, and skin texture and protect skin from further aging. It is worth the effort to use retinoids.

## Products and Treatments These Patients Should Avoid

- Friction, particularly in the form of exfoliating scrubs, brushes, and microdermabrasion
- Menthol, camphor, alcohol
- Starting retinoids quickly
- Sunscreens with avobenzone

## **Stinging Skin**

Stinging skin is common throughout the world. It is common in rosacea patients but can also occur in a patient who does not exhibit redness or any other visible findings. One study has shown that women are more likely to be sensitive to the subjective effects elicited by lactic acid than men.

Stinging reportedly occurs most often on the face, especially on the nasolabial folds and cheeks. The hypersensitivity of this area is ascribed to a more permeable SC, a high density of sweat glands and hair follicles, and a convoluted network of sensory nerves. Much remains to be learned about the stinging response, particularly on the subject of specificity. For example, an individual may be a lactic acid stinger but not react to other ingredients such as benzoic acid and azelaic acid. In one 2004 study, there was no correlation between patients who stung from lactic acid and those who stung from azelaic acid. The implication is that a specificity in reactivity has not yet been elucidated.

## **Products These Patients Should Use**

#### Anti-inflammatories

Although stinging is not usually accompanied by redness or skin changes, anecdotal experience shows that anti-inflammatories can help reduce stinging (**Table 14.5**).

### Barrier repair moisturizers

In some cases, repairing the skin barrier will decrease stinging.

### **Products These Patients Should Avoid**

- Alcohols of any kind, even the fatty acid alcohols (see **Table 14.2**, **Table 14.3**)
- Menthol and other stinging ingredients (Table 14.6)
- Ascorbic acid, due to its low pH
- Hydroxyacids
- The chemical sunscreen avobenzone

#### Caution

Retinoids can exacerbate stinging. If retinoids still emerge as a compelling choice for such patients, they should be started slowly (**Table 14.4**).

Table 14.5         Anti-inflammatory ingredients for the skin	
4-Ethoxybenzaldehyde 7-(1 H-imidazol-4-ylmethyl)-5,6,7,8-tetrahydroquinoline Allantoin Aloe Argan oil Arnica Bisabolol Caffeine Caffeyl glucoside Chamomile Colloidal oatmeal Cucumber extract Feverfew	<ul> <li>Grape seed extract</li> <li>Green tea:</li> <li>Epigallocatechin-3-gallate [EGCG]</li> <li>Epigallocatechin gallatyl glucoside (Unisooth, Givaudan, Vernier, Switzerland)</li> <li>Inoveal EGCG</li> <li>Licorice extract</li> <li>Macadamia nut oil</li> <li>Niacinamide (nicotinamide)</li> <li>Portulaca oleracea extract</li> <li>Rosmarinyl glucoside</li> <li>Safflower oil</li> </ul>
Gallyl glucoside (Endothelyol, Givaudan, Vernier, Switzerland)	Unimoist U-125 (Givaudan, Vernier, Switzerland)

Table 14.6	Stinging ingredients
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Ascorbic acid (vitamin C)	
Avobenzone	
Azelaic acid	
Benzoic acid	
Benzophenone	
Capsaicin	
Denatured alcohol	
Eucalyptus oil	

Glycolic acid Isopropyl alcohol Lactic acid Menthol Peppermint Salicylic acid Sorbic acid Witch hazel

## 14.3.4 Pigmented Skin

Pigmentation in skin is due to melanin pigment production by melanocytes. Skin color arises from the incorporation of the melanin-containing melanosomes, synthesized by melanocytes, into the keratinocytes in the epidermis and their subsequent degradation. Although skin color is influenced by additional factors, such as carotenoids and hemoglobin, the amount, quality, and distribution of melanin in the epidermis collectively represent the main source of human skin color. Interestingly, the volume of melanocytes in human skin is equivalent across humanity; therefore, the factors ascribed to skin color are the activity of the melanocytes and their interaction with the keratinocytes and not their number.

Disorders of pigmentation, or dyschromia, can result when excess melanin is synthesized. UV radiation, estrogen, melanocyte-stimulating hormones (MSH), stress, inflammation, injury, infrared (IR) light, and heat are significant factors that can promote the production of melanin. Melasma, solar lentigo, postinflammatory hyperpigmentation, and dark circles under the eyes are the prevalent forms of dyschromia. There are several common types of pigmentary disorders.

### Melasma

Melasma, also known as chloasma or "mask of pregnancy," is a common condition typically seen in women of childbearing age. This chronic disorder frustrates patients and physicians because it recurs frequently, especially due to exposure to the sun or estrogen. Melasma appears as irregularly shaped, but often discretely defined, blotches of light- to dark-brown pigmentation. These patches usually emerge on the upper lip, nose, cheeks, chin, arms, forehead, and neck. They typically are difficult to treat and often recur. Patient education is critical in the treatment of this disorder because it is worsened by heat, stress, UV light, melatonin supplements, and any kind of inflammation. Any topical treatment of melasma will take 12 to 16 weeks to see results.

## Solar Lentigo

Solar lentigos result from acute as well as chronic sun exposure and appear as macular brown lesions usually ~ 1 cm in diameter. Areas that receive the greatest amount of sun exposure, such as the face, shoulders, chest, back, and hands, are most often affected. These can be treated with destructive methods such as laser and liquid nitrogen or a series of chemical peels.

## **Postinflammatory Hyperpigmentation**

Postinflammatory hyperpigmentation, also referred to as postinflammatory pigment alteration (PIPA), manifests as a

consequence of various skin disorders and procedures. Therapies for skin disease can sometimes generate or exacerbate dyschromia, such as resurfacing lasers or chemical peels. This side effect occurs more often in patients with darker skin types. These lesions are treated in the same manner as melasma.

## **Cosmeceuticals for Dyspigmentation**

A combination of ingredients including tyrosinase inhibitors, protease-activated receptor 2 (PAR-2) blockers, and exfoliating agents represents the optimal strategy for treating disorders of pigmentation. Physicians should also advise patients to practice sun protection as well as heat and sun avoidance so as to treat dyschromia successfully. Lasers, light, chemical peels, and other methods should be used as a last resort or with extreme caution, because they can cause inflammation and worsen the pigmentation.

### **Products These Patients Should Use**

### Sunscreen

Whether or not a patient stays indoors, sunscreen should be a routine part of the skin regimen. There are several novel SPF formulations that block IR and other forms of light that can aggravate melasma. For patients with oily skin, SPF is recommended instead of a moisturizer. Noncomedogenic sunscreens are best for acne-prone patients. Oral sun-protective supplements such as *Polypodium leucotomos* and pycnogenol also provide added protection as long as they are used in conjunction with sunscreen.

### Tyrosinase Inhibitors

Tyrosinase inhibitors, which suppress the synthesis of melanin, include ascorbic acid (vitamin C), hydroquinone, kojic acid, arbutin, mulberry extract, and licorice extract. Several authors recommend a tyrosinase inhibitor "holiday" every 3 to 6 months to prevent tachyphylaxis, although such a need is anecdotal. Ascorbic acid can be used during such a break because its structure differs from those of other tyrosinase inhibitors. Hydroquinone is the most effective tyrosinase inhibitor, but unfounded public concerns about its safety have led to the popularity of derivatives such as kojic acid and arbutin. Notably, hydroquinone is considered efficacious in combination with a retinoid and a steroid in the "Kligman formula," because retinoids and steroids such as fluocinolone block tyrosinase. This triple combination agent leverages retinoids, which prevent the skin-thinning effects of steroids, and steroids, which in turn mitigate the inflammation from retinoids and hydroquinone.

### PAR-2 Blockers

Soybean trypsin inhibitor and Bowman-Birk inhibitor, which are minuscule proteins found in soy, display depigmenting activity and prevent UV-induced pigmentation in vitro and in vivo. These soy proteins suppress the cleavage of the seven transmembrane G-protein-coupled receptor called PAR-2. It is expressed in keratinocytes at intersections with melanocytes and acts like a key opening a lock, permitting the melanosomes to transfer from the melanocyte into the keratinocyte. Both soy and niacinamide, a vitamin B<sub>3</sub> derivative, have been demonstrated to inhibit melanosome movement from melanocytes to keratinocytes.

## Exfoliants

Removing the top layer of the SC causes the cell cycle to accelerate, hastening desquamation of melanosome-laden keratinocytes. The melanocytes are unable to manufacture the pigment rapidly enough to keep the keratinocytes full of melanosomes; therefore, less pigmentation is seen at the cell surface. Exfoliants work much better when used along with tyrosinase inhibitors and PAR-2 blocking agents as well as sunscreen. Exfoliants are either in chemical form, such as hydroxyacids, or mechanical form, such as microdermabrasion, scrubs, rotating brushes, or rough fabrics. Retinoids also act to speed up desquamation. Such agents can be incorporated into the skin care regimen or applied in the doctor's office to treat dyschromia. It is important to note that overuse or misuse can lead to inflammation, which would cause the melanocytes to produce more melanin and worsen the skin condition under treatment. Consequently, exfoliants should be used with extreme caution, and patients should be educated about the risks of overexfoliating. The use of exfoliating cleansers (e.g., hydroxyacid cleansers) is a lowrisk method to include exfoliants in the skin care regimen. In-office peels should also be used with caution and only by experienced practitioners, because peels can easily exacerbate melasma.

## Antioxidants

Antioxidants are effective in preventing hyperpigmentation by suppressing inflammation. Polyphenol antioxidants, in particular, have been shown to be potent chelators of metal ions, such as Fe<sup>2+</sup>, Fe<sup>3+</sup>, Cu<sup>2+</sup>, Zn<sup>2+</sup>, and Mn<sup>2+</sup>, and can disrupt the function of tyrosinase. Antioxidants play dynamic, various roles in the prevention and treatment of dyschromia, including chelating copper, neutralizing free radicals, and reducing inflammation. Tyrosinase needs copper to function properly, and numerous antioxidants such as flavonoids chelate copper. Free radicals can incite inflammatory pathways, which elevates melanocyte activity. Several antioxidants such as argan oil and green tea exert anti-inflammatory activities independent of their antioxidant activity. UV-induced pigmentation is prevented by some antioxidants that act by altering the p53 pigmentation pathway through the rate-limiting step of p53 phosphorylation at site 15. Specifically, this phosphorylation step is hindered by the plant-derived antioxidant phloretin. Ascorbic acid is a unique antioxidant in that it displays tyrosinase-inhibiting activity distinct from its antioxidant qualities.

## Products and Treatments These Patients Should Avoid

- Heat
- Sun exposure
- Anything that causes inflammation
- Melatonin supplements
- Estrogen

### **Regimen Guidelines**

Studies of melasma reveal a 1- to 2-grade improvement at 12 to 16 weeks in most cases. Therefore, the treatment regimen should last 3 to 4 months, and the patient should be advised that multiple treatment cycles may be necessary depending on melasma severity, sun avoidance, patient compliance, and the presence of other factors such as stress and estrogen use. Monthly visits and the use of photography and Mexameter (Courage + Khazaka Electronic GmbH, Köln, Germany) or other objective measurements can improve compliance. To prevent discouragement, which usually emerges around the week 8 visit, patients should be cautioned that changes in these measurements and in photos are not typically noticeable until 12 weeks. The treatment cycle should include the following:

- Daily broad-spectrum SPF
- Twice-daily tyrosinase inhibitor
- Nightly retinoid
- PAR-2 blocking agent in a sunscreen, serum, or moisturizer
- Exfoliating cleanser

To improve efficacy and efficiency, the evening product can be a triple combination of retinoid, tyrosinase inhibitor, and steroid such as the Kligman formula.

Many physicians choose to do a "tyrosinase holiday" every 4 months because it is believed, but not proven, that tyrosinase inhibitors lose efficacy. After 4 months, or once a pigmentation disorder has cleared, the regimen should segue to a maintenance regimen. The maintenance regimen should exclude tyrosinase inhibitors (with the exception of ascorbic acid) but should include the following:

- Daily broad-spectrum SPF
- Antioxidant such as ascorbic acid
- PAR-2 blocking agent in a sunscreen, serum, or moisturizer
- Exfoliating cleanser

Patients should be counseled to pursue the maintenance regimen for at least 1 month or until pigmentation begins to return, at which point the treatment regimen can be resumed for another four months. This alternating cycle continues until the dyspigmentation clears, with anywhere from one to six treatment cycles necessary until clearing occurs in almost all cases if the patient is compliant with the regimen and lifestyle advice.

## 14.3.5 Aging Skin

The largest market for skin care products is for skin aging, so that subject will be covered in depth here. Cutaneous aging is engendered by a wide array of factors both intrinsic and extrinsic. Influenced by genetics, intrinsic aging emerges from the cellular processes that occur over time. Diminished function of keratinocytes and fibroblasts, intra- and extracellular accumulation of by-products, impaired function of sirtuins, mitochondrial damage, and the shortening of telomeres characterize intrinsic aging.

Conversely, extrinsic aging occurs as a consequence of environmental exposures ultimately deleterious to cells, including UV light (natural or from tanning beds), IR and other radiation exposure, air pollution, smoking, alcohol and drug usage, stress, and poor diet. This type of aging also results from intersecting processes spurred by free radicals, DNA damage, glycation, inflammation, and other activities of the immune system. Such harm can be attenuated partially through behavioral change. For instance, up to 80% of facial aging can be attributed to solar exposure. Various mechanisms through which sun exposure triggers aging are well understood. UV light induces covalent bonds between nucleic acid base pairs and forms thymine dimers, which can destabilize tumor suppressor gene *p53* function, thus damaging DNA and increasing the risk of skin cancers and aging. UV exposure also creates free radicals, which cause damaging oxidative stress, thereby galvanizing the arachidonic acid pathway leading to inflammation.

## **Cellular Roles in Cutaneous Aging**

### Keratinocytes

The epidermis is made up of keratinocytes, which are cells found in layers that resemble the brick-and-mortar structure of a brick wall. Each epidermal layer is characterized by specific functional roles and qualities. The skin barrier is represented by the SC, the top layer of the epidermis, which contains crosslinked proteins to impart strength, antioxidants to protect the cells from free radicals, a bilayer lipid membrane layer to prevent water evaporation from the cell surface, immune cells, antimicrobial peptides (AMPs), and a natural microbiome. Accelerated cutaneous aging can be stimulated by damage to any layer of the epidermis.

### **Fibroblasts**

Fibroblast cells, which produce collagen, elastin, hyaluronic acid, heparan sulfate, and other glycosaminoglycans that keep the skin smooth, strong, and healthy, are the primary active constituents in the dermis. Collagen imparts strength, elastin confers elasticity, and the glycosaminoglycans such as hyaluronic acid, heparan sulfate, and dermatan sulfate bind water, deliver volume to the skin, and provide support for important intercellular communications. As keratinocytes and fibroblasts age, their responses to cellular signals such as growth factors may lapse. These foundational skin cells are the primary targets for protection and rejuvenation in antiaging skin care regimens.

## Cellular Damage That Contributes to Cutaneous Aging

With the accumulation of damage due to intrinsic as well as extrinsic factors, keratinocytes and fibroblasts falter in synthesizing key cellular components as well as they did when they were younger. Cellular factors implicated in cellular aging include impairments to nuclear DNA as well as mitochondrial DNA, reduced lysosomal function, and structural weakening of proteins and cell membranes. The direct effects of UV radiation, pollution, toxins, free radicals (oxidation), glycation, and inflammation account for such cellular damage.

Patients should use products for the prevention and treatment of DNA damage, as detailed in the following paragraphs.

### Preventing and Treating DNA Damage

Thymine-thymine dimers, pyrimidine-pyrimidine dimers, impaired telomeres, or other mutations are manifestations of DNA damage. Use of broad-spectrum sunscreens and sun avoidance are important behavioral steps in preventing DNA damage engendered by exposure to UV radiation. Other cosmeceutical agents are intended to block the effects of UV radiation or to foster DNA repair. Antioxidants, in addition to sunscreens, are the chief components in the dermatologic armamentarium against DNA damage. Data revealing the skin-protective effects of antioxidants have been associated with notable ingredients such as *Polypodium leucotomos* (PL), ascorbic acid, and green tea. A lower volume of data is linked to other antioxidants, but hypothetically, numerous other antioxidants can confer similar benefits.

An oral extract derived from ferns, PL has been shown to exhibit photoprotective activity at an oral dose of 7.5 mg and has consistently displayed the capacity to render antitumor and skin-protective effects. Two oral doses of PL were demonstrated in a 2004 study in humans to have played a role in a significant decrease in DNA damage after UV exposure, while a 2017 study revealed that PL protected skin DNA from UVB. Although PL is associated with delivering topical benefits, the oral form is most often used for skin protection.

Ascorbic acid, for which an acidic environment is essential for optimal absorption, is linked with copious evidence of cutaneous benefits when given both orally and topically. Topical application of ascorbic acid, combined with vitamin E and ferulic acid, has been shown to decrease the formation of thymine dimers. Ascorbic acid is also unique in that it stimulates procollagen genes in fibroblasts to augment collagen synthesis.

Niacinamide, also known as nicotinamide, plays a crucial role in the niacin coenzymes nicotinamide adenine dinucleotide (NAD<sup>+</sup>) and nicotinamide adenine dinucleotide phosphate (NADP<sup>+</sup>) and their reduced forms NADH and NADPH. These enzymes factor into DNA production and repair and play roles in numerous other important enzymatic reactions. Topical niacinamide has been shown to contribute to DNA repair by energizing cells so that the DNA repair enzymes can unwind the DNA strand, replace the nucleosides, and rewind the strand. Niacinamide enhances DNA excision repair and correction of UVB-induced cyclobutane pyrimidine dimers and UVA-induced 8-oxo-7,8-dihydro-2'-deoxyguanosine. It is used topically because oral forms of niacin are associated with flushing.

Epigallocatechin-3-O-gallate (EGCG), the main active constituent in green tea, is known to induce interleukin (IL)-12 to enhance the synthesis of enzymes that repair UV-induced DNA damage. The established photoprotective effects of topical and oral green tea include diminishing UV-induced erythema, lowering sunburn cell formation, and mitigating DNA damage.

# Preventing and Treating Mitochondrial DNA Damage

What is known as the "common deletion" is mitochondrial DNA damage caused by UV radiation. Impaired mitochondria synthesize deleterious free radicals known as reactive oxygen species (ROS). ROS-induced harm to the mitochondria denudes its capacity to generate ATP energy, which is essential for DNA repair and other cellular processes.

In addition to UV exposure and free radical production, regular cellular metabolism also exerts damage to mitochondria, ranging from mitochondrial DNA impairment and loss of mitochondrial enzymes to reduced ATP production. The cellular consequence is that less energy is available to enact DNA repair and other remedial processes. There are no methods yet known to attenuate or reverse mitochondrial damage once it has occurred, though several investigations are under way to achieve this end. The best option for now is to protect the mitochondria from harm using sunscreens and antioxidants.

The use of antioxidants can help prevent the damaging effects of free radicals on susceptible mitochondria. Coenzyme  $Q_{10}$  (Co $Q_{10}$ ), a component of the mitochondrial respiratory chain and an antioxidant itself, is especially useful in this role and available in oral and topical formulations. Oral Co $Q_{10}$  should be taken only in the morning because of its caffeine-like effect. Topical Co $Q_{10}$  is unappealing to some patients because of its dark yellow color. PL, the oral form of which is recommended, has been demonstrated to reduce the number of common deletions found in the mitochondria of irradiated keratinocytes and fibroblasts. Curcumin, another robust antioxidant, is being investigated for the potential to protect mitochondria. Due to its bold yellow pigment and strong aroma, curcumin would likely be more welcome by patients in oral form, though several manufacturers are attempting to develop cosmetically elegant topical formulations.

### **Scavenging Free Radicals**

Free radical formation is provoked by exposure to UV light, pollution, and other insults. Unfortunately, even the use of sunscreen has been implicated in augmenting free radical production. ROS traumatize cells in various ways, such as mitochondrial impairment, DNA mutations, glycation, and lysosomal damage, as well as oxidation of important lipids and other cellular components such as proteins. Antioxidants impart multiple benefits, including scavenging free radicals, diminishing activation of mitogen-activated protein kinases (MAPK), chelation of copper required by tyrosinase, and inhibition of inflammatory factors such as nuclear factor (NF)-κB. To prevent the aging of skin, antioxidants are imperative.

## **Preventing and Treating Inflammation**

Inflammation emerges from a plethora of etiologic pathways, with several inflammatory mediators potentially involved, including histamines, cytokines, eicosanoids (e.g., prostaglandins, thromboxanes, and leukotrienes), complement cascade components, kinins, fibrinopeptide enzymes, NF-κB, and free radicals. Through a variety of mechanisms, cutaneous aging can result from inflammation. For example, when UV light and free radicals oxidize cell membrane lipids, an inflammatory chain of events leads to the release of arachidonic acid. In turn, the arachidonic acid cascade activates cyclooxygenase (COX)-2, which promotes the production of substances such as prostaglandins and leukotrienes. These compounds create cutaneous inflammation and recruit inflammatory immune cells to the area. NF-κB is another important regulator of inflammation in the skin.

Myriad anti-inflammatory ingredients have been used successfully in topical skin formulations, including aloe, argan oil, caffeine, chamomile, feverfew, green tea, licorice extract, linoleic acid (present in high concentrations in argan oil and safflower oil), and niacinamide among others. The effect of UV radiation on COX-2 expression has been shown to be inhibited through the use of oral PL. Suppression of COX-2 signaling and other inflammatory mediators has also been displayed via the use of glycolic acid.

## **Preventing and Treating Glycation**

In 1912, Louis-Camille Maillard observed that amino acids can react with sugar to yield brown or golden-brown substances. The Maillard reaction, which is especially well known in cooking, is a chemical chain of events between an amino acid and a sugar that typically requires heat. Glycation is the result. It was not until the 1980s that scientists came to understand the significance of glycation in health.

When glycation occurs, sugar molecules attach to proteins, forging crosslinked proteins known as advanced glycation end products (or AGEs), which incites a series of chemical reactions. Glycation arises in collagen fibers and culminates in the development of crosslinks that bind collagen fibers to each other, thus rendering the skin stiffer. Glycosylated collagen is thought to be involved in the appearance of aged skin. Glycation can also impact elastin insofar as the process can precipitate elastosis, which is abnormally clumped together elastin and manifests more frequently in aged skin.

Glycation is not a reversible reaction, though many manufacturers tout antiaging skin care products as capable of treating it. Prevention is the only option, currently. Some studies imply that antioxidants can be used to avert glycation, but the greater likelihood is that they manage to forestall or divert the process down a different pathway that still yields glycation. Glycation can best be impeded or avoided by lowering serum glucose levels. The recommended approach to achieve this end is dietary intervention and oral metformin.

## **Reversing the Aging of Skin Cells**

### **Epidermal Keratinocytes**

Young basal stem cells produce a profusion of new keratinocytes that prompts a rapid cell turnover and efficient synthesis of protective epidermal components. Not surprisingly, old keratinocytes exhibit less energy and diminished responsiveness to cellular signals and fail to produce these protective constituents. Keratinocyte stem cell function deteriorates over time as defects accumulate, manifesting in a diminished response to growth factors, curbed keratinization, and hindered capacity.

## **Dermal Fibroblasts**

Young fibroblasts fabricate important cellular components, including collagen, elastin, hyaluronic acid, and heparan sulfate. Such synthesis dwindles in older fibroblasts. Aged fibroblasts, like old keratinocytes, become depleted of energy, with subsiding responsiveness to growth factors and other cellular signals.

## Using Cosmeceuticals to Rejuvenate Aging Skin

Gene expression, chemokines, cytokines, growth factors, and receptor activation direct the function of keratinocytes and fibroblasts. To decelerate or reverse cellular cutaneous aging, old keratinocytes and fibroblasts must be galvanized to acknowledge such signals or the signals must be heightened.

### Stimulating Old Keratinocytes and Fibroblasts

Energizing gene expression, adding growth factors, prompting cytokines and chemokines, turning on receptors, and enhancing cellular responsiveness to signals are the necessary measures to stimulate aged keratinocytes and fibroblasts.

### **Influencing Gene Expression**

The use of retinoids can influence collagen genes and foster activity of procollagen genes, thereby decreasing collagenase synthesis. Several studies have revealed the efficacy of retinoids in treating aged skin and preventing skin aging in sun-exposed as well as non-sun-exposed areas. The prescription retinoids tretinoin, adapalene, and tazarotene as well as OTC retinol represent first-line choices for preventing and treating cutaneous aging by invigorating old keratinocytes and fibroblasts. Unfortunately, erythema and flaking are likely consequences, in the first few weeks of therapy, of exposing retinoic acid receptors to retinoids. Titrating retinoids slowly is the way to work around such a result. Physicians should note that retinoid esters such as retinyl palmitate and retinyl linoleate do not penetrate into the dermis and are not as effective as retinol, tretinoin, adapalene, and tazarotene. Compliance with a retinol regimen, as opposed to prescription retinoids, is more likely because retinol is available without a prescription and is less expensive.

Alpha hydroxyacids can also spark collagen genes to ramp up collagen production. Further, ascorbic acid has been shown to stimulate collagen genes, resulting in fibroblasts increasing Type 1 collagen production.

## **Growth Factors**

Growth factor-containing cosmetic products can be used toward effecting skin rejuvenation. There are diverse types of growth factors with the ability to activate old keratinocytes and fibroblasts to improve function. Growth factors, which are inert or susceptible to degradation in their native, soluble form, can directly stimulate genes or serve as a signaling mechanism. To impart their quintessential activities, growth factors must be transferred to the appropriate receptor site in order for the cells to respond to their signals.

## **Heparan Sulfate**

Heparan sulfate is a significant factor in intercellular communications. It enhances cellular response to growth factors by promoting the response of old, indolent fibroblasts to cellular signals, and it binds, stores, and protects growth factors, allowing them to arrive at their targets and present to the appropriate binding site. A topical analog of heparan sulfate has been shown to rejuvenate aged skin.

## Stem Cells

Stem cells packaged in cosmeceutical formulations are essentially useless, as these typically plant-derived substances are too large to penetrate the SC, have short shelf lives, and do not act as human stem cells would. Fortunately, novel technologies have revealed compounds that can coax stem cells to repopulate the epidermis and dermis with young cells. Stem cells in skin include basal stem cells and a collection of 10 different hair follicle stem cells. The leucine-rich repeat-containing, G protein-coupled receptor (LGR)6+ hair follicle cells are key in repopulating the epidermis in response to wounds. Aesthetic physicians have known for several years that inducing skin wounding with lasers, needles, and acidic peels renders an improved skin appearance. Researchers have now found that wounding the skin prompts LGR6+ stem cells to repopulate the epidermis. In response to a wound, neutrophils release the peptide defensin, which drives the LGR6+ stem cells to repopulate the epidermis. Topical defensin, formulated to grant penetration into hair follicles where the LGR6+ stem cells are located, has been shown to deliver a smoother, more youthful appearance to the skin.

# 14.4 Designing a Skin Care Regimen

In addition to knowing which products to include and exclude in a patient's skin regimen based on skin type, practitioners must be aware of the order in which topical products should be applied to optimize efficacy. This entails understanding of how cosmeceutical ingredients interact with and alter each other and how they are influenced by temperature, pH, humidity, and the microbiome in which they are in contact, as order in the manufacturing process also impacts product efficacy. Identifying and obtaining properly manufactured products are important steps, of course, but there is much more to designing the patient-tailored skin care regimen than choosing the products. For instance, a low-pH skin care product (e.g., a glycolic acid cleanser) selected for a regimen will influence the efficacy and safety of other products subsequently applied to the skin. Physicians should consider such chemical reactions when designing the order of product applications, especially when including ingredients known to interact with other ingredients, such as benzoyl peroxide, retinoids, hydroxyacids, hydroquinone, vitamin C, and peptides. Fig. 14.3 illustrates the ideal skin care regimen structure.

## 14.4.1 Step 1: Cleansers

These products confer a wide range of action, as they can alter the skin's pH, loosen attachments between cells, eliminate lipids and disrupt the bilayer protective membrane, desquamate layers from the SC, and affect the permeability of the skin for the next topical product that is applied. Therefore, physicians should recommend cleansers based on the knowledge of which products would best be subsequently applied in the regimen, ideally according to the patient's BST, with a goal of increasing efficacy of the treatment to follow. For example, cleansers for oily skin should be able to remove excess sebum, while cleansers intended for dry skin would remove far fewer

# Ideal Regimen Structure

	MORNING
STEP 1:	Cleanser
TEP 2:	Eye Product
TEP 3:	Treatment Product
TEP 4:	Moisturizer
STEP 5:	Sunscreen
	EVENING
STEP 1:	Cleanser
STEP 2:	Eye Product
STEP 3:	Moisturizer
STEP 4:	Retinoid
STEP 5:	
	NOTES

Fig. 14.3 Ideal regimen structure.

DIAGNOSIS

lipids. Washing skin with a foaming cleanser can disturb the skin barrier, setting the stage for greater penetration of the ensuing product application. Among the ingredients that affect skin penetration are oleic acid, hyaluronic acid, stearic acid, and other lipids. Every ingredient and characteristic of the cleanser is important.

# 14.4.2 Step 2: Eye Products

Topical skin care for the eyes—intended to address issues such as dryness, puffiness, fine lines, and dark circles—imparts the added benefit of protecting the thin delicate area around the eyes from facial formulations. Eye products, particularly those containing barrier repair lipids or other protective ingredients, can also help patients better tolerate potentially irritating formulations applied subsequently. Pre-emptive use of a protective eye product before bedtime can prevent an individual from experiencing irritation from a nighttime treatment product, as ingredients can smear on pillowcases and transfer to the upper and lower eyelids. For example, acne patients frequently develop erythema at the corners of the eyes from nightly application of benzoyl peroxide or a retinoid. This side effect can be mitigated by applying an eye cream before using the acne medication.

## 14.4.3 Step 3: Treatment Products

Treatment products are defined as targeted to ameliorating skin conditions such as acne, rosacea, melasma, dryness, skin cancer, eczema, psoriasis, and photoaging. These may be cosmeceuticals, OTC drugs, or prescription medications. Promoting the efficacy of treatment products and reducing side effects are the most important components to consider when designing the skin care regimen. In order to be effective, treatment products must be able to reach their target tissue in the proper chemical form. Each ingredient is characterized by unique constraints. For example, ascorbic acid, which is a treatment product for skin pigmentation and cutaneous aging, is optimally absorbed when formulated at a pH of 2 to 2.5. However, washing skin with a soap cleanser at a pH of 9 will increase the skin's pH and decrease the absorption of ascorbic acid applied subsequently. Instead, patients using an ascorbic acid treatment product should wash with a low-pH cleanser such as salicylic or glycolic acid (usually a pH of 2.5-3.5), which will reduce the pH of the skin and promote absorption of the ascorbic acid treatment product.

# 14.4.4 Step 4: Moisturizers

Moisturizers are versatile products that impart skin hydration, protection, and delivery of key ingredients, as well as the ability to enhance the efficacy of a previously applied treatment product. Typical moisturizer ingredients, all of which can promote penetration of other skin care ingredients, include oleic acid, hyaluronic acid, or other fatty acids. Several moisturizers also deliver an occlusive effect that aids penetration and even protects the underlying treatment product from getting wiped off on a pillowcase or into the environment. That is, moisturizers "seal in" the treatment product. Heparan sulfate, which is incorporated into some moisturizers, may play a role in how well the skin cells respond to signals elicited by the treatment products.

# 14.4.5 Step 5: Morning Sunscreen

The importance of a daily sunscreen cannot be overstated. Sun exposure plays a role in almost every skin condition. A complete discussion of sunscreens is beyond the scope of this chapter. There are two main classes of sunscreens: chemical and physical. Chemical sunscreens absorb UV energy but can produce free radicals, may cause skin allergies, and are controversial because they may be absorbed systemically. Some chemical sunscreen ingredients have been shown to exhibit estrogenic effects. Physical sunscreens coat the skin and reflect UV rays away from the skin. They may not block all wavelengths of UV light and can look white or violet on the skin. The most important consideration when using a sunscreen for patients is which sunscreen they will accept using every day. The patient should receive a recommendation for a daily sunscreen that is chosen for his or her skin type and a higher SPF sunscreen for prolonged sun exposure. These should be selected by skin type, sport, and other lifestyle factors. Compliance is key! Facial foundation makeup and powders should not be relied upon for daily sun protection, as these are used in too small a quantity to actually provide the SPF that is listed on the label.

## 14.4.6 Step 6: Evening Retinoids

For patients using retinoids for the first time, physicians should advise application of the retinoid as the last item over the moisturizer. This can reduce the incidence of side effects and increase compliance. Unlike other ingredients, retinoids penetrate readily into the deeper layer of the epidermis. These products should always be limited to nighttime use, as several, particularly retinol and tretinoin, break down easily upon UV exposure. Layering a retinoid over a moisturizer can help titrate retinoid absorption, and the moisturizer can be selected to modulate retinoid penetration (**Table 14.4**).

# 14.5 Preprocedure Cosmeceuticals

The outcome of any skin procedure, whether a biopsy, microneedling, fillers, toxins, lasers, or surgery, will be enhanced when the patient engages in proper skin care before and after the procedure. Educating patients as to proper skin care is a crucial step toward ensuring compliance and optimizing patient outcomes.

# 14.5.1 Preprocedure Skin Care and Supplements

The aim before the procedure is to set the stage for rapid healing and minimizing infection, scarring, and hyperpigmentation. Patients should be advised to use products that have been shown to speed wound healing by increasing keratinization and/ or collagen production for 2 weeks prior to surgery. Retinoids, such as tretinoin and retinol, are the mainstay ingredients in this context. Copious experimental data show that pretreatment with tretinoin speeds wound healing. More than two decades ago, Kligman assessed healing after punch biopsy and observed that the wounds on arms pretreated with tretinoin cream 0.05% to 0.1% were significantly smaller by 35% to 37% on days 1 and 4, and 47% to 50% smaller on days 6, 8, and 11 than the wounds on untreated arms. A pretreatment regimen of tretinoin for 2 to 4 weeks is suggested by the preponderance of studies, because peak epidermal hypertrophy occurs after 7 days of tretinoin application and normalizes after 14 days of regular treatment. This approach provides ample time for the skin to recover from any retinoid dermatitis prior to surgery. Adapalene treatment should be initiated 5 to 6 weeks before a procedure because it has a longer half-life.

Although wound healing studies have not been conducted in this area, pretreating skin with topical ascorbic acid and hydroxyacids might help hasten wound healing by augmenting collagen production.

## 14.5.2 Medications, Foods, and Supplements to Avoid Prior to Procedures

To minimize bruising, patients should avoid using or ingesting aspirin, ibuprofen, naproxen, St. John's wort, vitamin E, omega-3 fatty acid supplements, flaxseed oil, ginseng, salmon, and alcohol for 10 days prior to a procedure. Patients should be urged to avoid smoking for at least 4 weeks prior to a procedure.

# 14.6 Postprocedure Cosmeceuticals

## 14.6.1 Postsurgery Skin Care and Supplements

Oral vitamin C and zinc supplements have been demonstrated to accelerate wound healing in rats when administered immediately after a procedure. Such supplementation in human patients might speed recovery. To mitigate bruising and inflammation, oral arnica tablets and tinctures may be taken prior to and after surgery. There is copious anecdotal support for the use of arnica, but clinical trial evidence to substantiate its efficacy to prevent bruising and reduce swelling remains scant.

Topical products play a significant role in healing after surgery. A gel pad combining topical arnica and *Rhododendron tomentosum* (*Ledum palustre*) was found to lessen postoperative ecchymosis and edema after oculofacial surgery. Topical curcumin enhances wound healing in animals. Another study has shown that an occlusive ointment containing a trio of antioxidants improved wound healing.

Defensin, a protein known to be critical in wound repair, is available in a topical formulation and has been demonstrated to stimulate LGR5 and LGR6 stem cells. It accelerates wound healing by expanding LGR6+ stem cell migration into wound beds.

Wounds should be covered to protect against sun exposure until re-epithelialization occurs. At that point, patients can use zinc oxide sunscreens, which have been shown to be safe with minimal penetration into the skin.

## 14.6.2 Ingredients to Avoid Postsurgery

Patients should be cautioned not to use topical retinoids after re-epithelialization is complete. A 1989 study in a porcine model used 0.05% tretinoin cream daily for 10 days prior to partial-thickness skin wounding, revealing that such usage prior to wounding sped re-epithelialization, but use after the procedure delayed wound healing.

Acidic products sting wounded skin. Therefore, benzoic acid, hydroxyacids, and ascorbic acid should be avoided until the skin has completely re-epithelialized. Patients should also be advised to abstain from using products with preservatives or fragrance.

Vitamin E derived from oral supplement capsules has been shown to slow healing after skin cancer surgery and was accompanied by a high rate of contact dermatitis. Chemical sunscreens have the potential to provoke allergic contact dermatitis, so patients should be counseled to avoid such products for 4 weeks after skin surgery. Organic products with essential oils and botanical ingredients may also pose a higher risk for causing contact dermatitis due to allergen exposure.

## 14.6.3 Notes on Cosmeceuticals Used During Specific Procedures

### Microneedling

To stimulate collagen production, patients should take ascorbic acid and retinoids before microneedling. Immediately after the

procedure, nothing should be taken, so as to keep channels open. Even an SPF product should be withheld for at least 24 hours after the procedure.

## Injectables (Fillers/Toxins/Deoxycholic Acid)

Before injection procedures, patients should be advised to take arnica oil orally. After the procedure, oral arnica, in gel sheets, and topical arnica are recommended. Topical bromelain is also advisable post procedure. Consumption of pineapple, which is high in bromelain, is also a useful dietary adjunct.

## **Efficacy and Compliance**

No matter how well designed the skin care regimen is, it is ineffective if the patient does not use the regimen consistently. Efficacy and compliance go hand in hand, as improper selection and incorrect layering of skin care products lower efficacy and raise the risk of adverse effects, leading to poor patient compliance. Studies have revealed that 95% of people underdose, and one out of every three prescriptions is not even filled. Just as side effects render patients more likely to underdose or stop a treatment, properly selected cleansers and moisturizers that accompany treatment products and alleviate or prevent side effects increase compliance. Several studies have shown that compliance is much more likely when physicians provide patients with written instructions so that they understand the proper order in which to apply products.

## **Brand Selection**

Manufacturers typically conduct research on individual products, not complete skin care regimens. This leaves practitioners on their own regarding the construction of a treatment plan. The author recommends opting for the best technologies from each brand and combining them using the layering technique to increase efficacy. It is ideal to choose the best "hero" products from the various brands and test the entire regimen on patients to figure out what combinations yield optimal efficacy and the least side effects. The author has described over 3,300 distinct efficacious regimen combinations to treat various skin issues. Providing a written step-by-step program increases the odds of patient compliance, because the order of products is very important to maximize results.

# 14.7 Concluding Thoughts

All of the best medical knowledge and procedural skill can be rendered meaningless if patients do not use recommended products and follow advice. Patient compliance is an integral part of achieving optimal patient outcomes. Unfortunately, studies show that compliance is often poor in the treatment of many dermatologic disorders such as acne and psoriasis. In 2007, Feldman et al reported that patients are more likely to use their products in the days leading up to and just after a visit to their dermatologist. They suggested that more frequent office visits would improve compliance.

To ensure the best outcome from skin care regimens and surgical treatments, patient education is also essential. The more that patients know and understand about the ways in which they can care for their skin as well as prepare for their procedure and treat their skin after the procedure, the better the outcomes will be, including their overall skin health. Practitioners should provide this type of information in an easy-to-follow printed instruction sheet because studies show that patients cannot remember most of the oral instructions offered in the health care setting. Patients need encouragement. A three-step process of engaging, educating, and motivating patients can significantly boost compliance. I use software that automatically generates patient information based on their BST. This engages them, educates them, and helps motivate them to continue using the correct regimen. Consistent use of the correct skin care products will improve patient outcomes and lead to skin health.

Patients should be encouraged to ask questions during their consultation and procedure and to contact their health care providers if they have any concerns after they leave. These steps bolster patient compliance and satisfaction, which will help the physician maintain a trusting relationship with established patients and attract new ones through word-of-mouth referrals.

### **Clinical Caveats**

- A patient's skin type and needs should be assessed prior to choosing skin care.
- Skin care recommendations should be ingredient-based according to the patient's skin type.
- The regimen should be designed so that each product helps improve the efficacy of the other products.
- Patients should be given printed instructions with clear regimen steps.
- Pre- and postprocedure regimens can be designed to improve procedure efficacy.
- The staff should be educated to discuss skin care with every patient to encourage compliance.
- Outcomes will be improved if patients are properly educated and are compliant with the skin care regimen.

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# 15 Botulinum Toxin Injection for Facial Rejuvenation

Sean Michael Devitt and Steven Fagien

## Abstract

Nonsurgical procedures are the most common treatment modality used for facial rejuvenation, with neurotoxin injection being the most common of these procedure performed. In this chapter, we discuss the history and development of botulinum toxin, its role in the nonsurgical management of facial aging, its advantages and disadvantages, and its clinical applications for patients undergoing aesthetic surgery. Case examples and specific injection techniques for each target muscle are provided.

### Keywords

neurotoxin, botulinum toxin, Botox, Xeomin, Dysport, Jeuveau, nonsurgical, facial rejuvenation, safety, rhytids, aging

# **15.1 Introduction**

For a brand name to become a part of the common vernacular, it often requires being first in a new and unique application, time-proven benefits, and widespread use that translates to a strong association with a certain type of product. Use of such names as Band-Aid (Johnson and Johnson, New Brunswick, NJ) for adhesive bandages in general, Xerox (Xerox Corporation, Palo Alto, CA) as a verb for "the making of a photocopy," and Google (Alphabet Inc., Mountain View, CA) as a verb for "searching the Internet" are examples of this brand recognition. Brand association has emerged in the world of aesthetic treatments as well. Since its FDA approval in 2002 for the temporary treatment of glabellar rhytids, Botox (onabotulinumtoxinA; Allergan, Irvine, CA) Cosmetic has transformed aesthetic medicine, and "Botox" has become the household name despite the later introduction of many competitive neurotoxins. Naturally, the popularity and effectiveness of Botox has led to the development and FDA approval of four additional botulinum toxin type A derivatives for the temporary treatment of glabellar lines. Dysport (abobotulinumtoxinA; Galaderma Laboratories, Fort Worth, TX), which was approved in 2009, and Xeomin (incobotulinumtoxinA; Merz Pharmaceuticals, Raleigh, NC), which was approved in 2011, and now Jeuveau (prabotulinumtoxinA-xvfs), with approval in 2019, are widely commercially available. The American Society for Aesthetic Plastic Surgery (ASAPS) reported that botulinum toxin type A injections were performed 6.5 times more than the top five cosmetic surgical procedures combined, and more than the top four nonsurgical minimally invasive cosmetic procedures combined. It is crucial for the physician to understand the similarities and more importantly the differences in these products to treat patients appropriately. For aesthetic purposes, botulinum toxin is primarily used in the face and neck, although unique uses continue to expand for both aesthetic and nonaesthetic indications.

Facial rejuvenation requires an understanding of the natural aging process and how it is related to a patient's underlying anatomy. Without this knowledge, it is impossible to manipulate a patient's tissue to restore a more youthful appearance. While patients' overall appearance and aesthetics are their focus, a physician must see deeper and understand how each region of the face ages differently in order to provide the best guidance and treatment plan. There are many surgical and nonsurgical methods available to rejuvenate the face; deciding which method for each specific patient is part of the art of medicine. Surgical procedures are inherently more invasive, with longer downtime, but they are often able to make greater changes and are in general used to restore the effects of soft tissue laxity and ptosis. Greater does not necessarily mean better, however, as a patient often seeks subtle changes or just wishes to slow down the aging process. Nonsurgical procedures address skin quality, soft tissue volume, and the hyperdynamic movements of underlying muscles that lead to both dynamic and static rhytids. A physician must know the benefits and drawbacks of both surgical and nonsurgical methods, regardless of the age of the patient, in order to provide the patient with multiple options for treatment and to manage patient expectations. Only then can a patient truly give informed consent and partner with the physician to develop a rejuvenation plan.

# 15.2 Nonsurgical Skin Rejuvenation

After seeing a patient in consultation, a physician must decide whether the patient would benefit more from a surgical or from a nonsurgical treatment. These are not mutually exclusive, as many patients benefit from a combination of treatments. Office-based nonsurgical skin rejuvenation for addressing facial rhytids, and more broadly facial aging, is performed using one of these three methods, depending on the nature and location of the concern.

- 1. Lasers, intense pulsed light (IPL), photo rejuvenation, chemical peels, and dermabrasion are used for softening static lines and improving appearance and quality of skin. These resurfacing techniques have their greatest benefit in leveling the epidermis and improving collagen in the dermis. Unlike botulinum toxin treatment, these resurfacing methods require varying lengths of recovery as the dermis and epidermis heal. Fractional lasers or subdermal techniques allow for a quicker recovery time.
- 2. Botulinum toxin is used for the chemodenervation of underlying muscles to prevent or attenuate dynamic wrinkles in the overlying skin. Repetitive motion of the skin during facial expression leads to dermal atrophy and rhytids. Paralysis of the underlying muscle by botulinum toxin prevents or reduces continued movement and stress on the skin, improving the appearance of dynamic lines. In the absence of movement, static lines can also be improved as dermal repair occurs. Botulinum toxin can also contribute to facial shaping by decreasing muscle bulk or altering the dynamic balance between elevator and depressor muscles.

3. Tissue fillers are used to replace missing dermal components or subcutaneous volume. These injectable materials augment areas of dermal atrophy by supporting or promoting regeneration of the dermal matrix or by enhancing volume. There are many products to choose from, all with varying properties used to shape and influence the native soft tissue along a spectrum. They have been traditionally used in the treatment of volume loss and the correction or improvement of soft tissue contours and static lines. More recently, however, it has become clear that with a greater understanding of the unique properties of particular agents, a variety of soft tissue fillers placed with precision can influence the excursion of soft tissue with animation to restore balance of the (dynamic discord) muscles' dominance over the failing soft tissue integrity with age. Furthermore, the effects of soft tissue agents in residence on the retaining ligaments and positive distal muscular effects (myomodulation) are areas of great interest and exploration.

Nonsurgical and surgical procedures are often used in conjunction to give the best result. As with most things in medicine, a patient-specific combination of treatments is better than a onesize-fits-all approach. Nonsurgical treatments can complement and enhance surgical results and are used by many patients to delay surgical intervention. Patients are hesitant go "under the knife" and are more comfortable with office-based procedures. However, nonsurgical procedures, in general, should not be considered to be, and rarely are, a satisfactory replacement for surgical rejuvenation procedures.

When evaluating a patient for nonsurgical or surgical procedures, the provider must not overlook the quality of skin. Patients are often surprised at how much a good skin care regimen can affect their overall appearance. A multimodal plan to improve all aspects of aging from the outside in leads to facial harmony and a youthful appearance.

Of the three broad categories of treatment for nonsurgical facial rejuvenation just discussed, denervation, or more broadly, neuromodulation with botulinum toxin type A injection still enjoys the honor of being the most commonly requested procedure among the spectrum of options because of its predictability and dependability, ease of application, minimal downtime, and repeatability. In this chapter we discuss the history and development of botulinum toxin, its role in the nonsurgical management of facial aging, its advantages and disadvantages, and its clinical applications for patients undergoing aesthetic surgery. It is crucial that injectors understand the similarities and differences among Botox, Dysport, Xeomin, and Jeuveau, so we will discuss reconstitution, dosing, and storage guidelines, injection techniques, posttreatment protocols, and potential complications.

A fifth botulinum toxin, Myobloc (rimabotulinumtoxinB; Solstice Neurosciences, San Francisco, CA), is on the market and is FDA-approved for the treatment of cervical dystonia. Unlike the three previously mentioned products, which are derived from botulinum toxin serotype A, Myobloc is derived from botulinum toxin type B, and its use for aesthetic indications is off label. It is widely available and is included in our discussion.

Finally, another botulinum toxin type A, DAXI (daxibotulinumtoxinA; Revance Therapeutics, Inc., Newark, CA), is expected to get FDA approval in 2020. Due to the lack of or limited experience postmarket with Jeuveau and DAXI, discussion and comparatives with these two specific products will be limited.

# 15.3 History

A toxin produced by the anaerobic bacterium Clostridium botulinum was identified in 1897 as the causative agent in descending muscle paralysis from food poisoning. The toxin was responsible for devastating the canning industry in the 1930s, until reliable methods for killing the bacterium's spores were developed, and was later purified by the United States Army for biological warfare research. Some 40 years later, pediatric ophthalmologist Dr. Alan Scott collaborated with Dr. Edward J. Schantz in the preparation of a batch of crystalline toxin to determine its effectiveness as an injectable agent for producing transient weakness of extraocular muscles and permanent changes in ocular alignment in a primate model. In 1980, Scott was the first to use the toxin in humans to treat strabismus. Since that time, the clinical use of botulinum toxin has been expanded and applied to a wide range of conditions for which the principal therapeutic aim is to reduce undesired or excessive contraction of muscles. The transition of botulinum toxin's use from ophthalmologic to aesthetic indications is credited to Carruthers and Carruthers in 1992, who serendipitously noted a reduction in glabellar rhytids when injecting the corrugator supercilii muscles for benign essential blepharospasm. Table 15.1 provides a brief timeline of Clostridium botulinum toxin in clinical medicine and highlights the FDA approval dates for its aesthetic uses to date.

# 15.4 Nonaesthetic Uses

Once feared as one of the most deadly toxins in the world, botulinum toxin is now one of the most widely used medicines, and its applications are continuously expanding. It has been successfully used to treat conditions from head (headache, cervical dystonia, blepharospasm, facial rhytids) to toe (poststroke spasticity) and everywhere in between. **Table 15.2** includes just some of its clinical uses and is by no means all-encompassing.

# 15.5 Available Neurotoxins/ Fundamentals

## 15.5.1 Product Preparation

Botulinum neurotoxin type A (Botox, Dysport, and Xeomin) is one of seven serologically distinct and species-specific toxins produced by *C. botulinum*, a gram-positive, spore-forming, obligate anaerobe that is found naturally in the soil. It is produced by fermentation of the Hall strain of *C. botulinum* type A in a culture medium.

To prepare onabotulinumtoxinA (Botox Cosmetic), the culture solution is purified by a series of acid precipitations to a crystalline complex containing the toxin and other proteins. This complex is then dissolved in sterile sodium chloride solution containing human albumin and is then sterile-filtered before filling and

Table 15.1         Chronology of Clostridium botulinum toxin in clinical medicine			
Date	Event	Author	
1897	C. botulinum neurotoxin isolated	E. Ermengem	
1920	Purification attempts	H. Sommer	
1946	Crystallized type A purified	E. J. Schantz	
1950	Therapy of hyperfunctional muscles	V. Brooks	
1973	Pharmacologic weakening of extraocular muscles in monkeys	A.B. Scott	
1979	Crystalline botulinum toxin A; batch 79–11	E. J. Schantz	
1980	Botulinum toxin for treatment of strabismus in humans	A. B. Scott	
1985	Botulinum A exotoxin used to treat blepharospasm	A. B. Scott	
1985	Botulinum toxin used to treat spasmodic torticollis	J. K. Tsui	
1989	FDA approves Botox for treatment of strabismus, benign essential blepharospasm, and hemifacial spasm		
1990	Botulinum toxin used to treat dystonias	J. Jankovic	
1992	Botulinum A exotoxin used to treat glabellar frown lines	J. D. Carruthers, A. Carruthers	
1993	Botulinum toxin used to treat hyperfunction of facial expression	A. Blitzer, M. E Brin	
1997	New lot of Botox reformulated and produced from bulk toxin		
2000	Myobloc (botulinum toxin type B) approved for treatment of cervical dystonia		
2002	FDA approves Botox Cosmetic for treatment of glabellar lines		
2004	FDA approves botulinum toxin for treatment of primary axillary hyperhidrosis		
2007	Botulinum toxin injections are the most common aesthetic procedure in the United States, as reported by the American Society for Aesthetic Plastic Surgery (ASAPS)		
2009	FDA approves Dysport for treatment of cervical dystonia and glabellar lines		
2011	FDA approves Xeomin for treatment of glabellar lines		
2013	FDA approves Botox Cosmetic for treatment of crow's feet		
2017	FDA approves Botox Cosmetic for treatment of forehead lines		
2019	FDA approves Jeuveau for treatment of glabellar and forehead rhytids		

**Table 15.2** Partial list of the uses of botulinum toxin in medical therapy

Achalasia	Dental procedures	Inner ear disorders	Spinal cord injury
Anal fissure	Esophageal stricture	Masseteric muscle hypertrophy	Strabismus
Back pain	Essential tremor	Mohs Micrographic Surgery repair	Temporomandibular joint
Benign prostatic hypertrophy	Facial nerve disorders	Neck pain	dysfunction
Blepharospasm	Facial spasms	Overactive bladder	Teeth grinding
Breast reconstruction and	Gustatory sweating (Frey's	Parotid fistulas	Tourette's syndrome
augmentation	syndrome)	Poststroke limb spasticity	Vasospastic disorders
Cerebral palsy	Headaches	Pressure ulcers	Vocal cord disorders
Cervical dystonia	Hyperhidrosis	Reduced appetite	Wound healing

vacuum drying. Botox Cosmetic is commercially available as a sterile, lyophilized powder without preservatives. Each single-use vial of Botox Cosmetic contains 100 units (10% variation) of botulinum type A neurotoxin complex, 0.5 mg of human albumin, and 0.9 mg of sodium chloride. A 50-unit vial is also available.

AbobotulinumtoxinA (Dysport) is prepared by purification of the bacterial culture supernatant by a series of precipitation, dialysis, and column chromatography. The neurotoxin complex is composed of neurotoxin, hemagglutinin proteins, and nontoxin, nonhemagglutinin proteins. It is commercially available as a sterile, lyophilized powder. Each vial of Dysport contains 300 units of botulinum toxin type A complex, 125 mcg of human serum albumin, 2.5 mg of lactose, and trace amounts of cow's milk proteins. A 500-unit vial is also available for the treatment of cervical dystonia. IncobotulinumtoxinA (Xeomin) is also prepared by the purification of the bacterial culture supernatant. The neurotoxin is then separated from the accessory proteins (hemagglutinins and nonhemagglutinins) to yield a purified active neurotoxin. It is a commercially available as a white to off-white lyophilized powder. Each 100-unit vial of Xeomin contains 100 units of botulinum toxin type A, 1 mg of human albumin, and 4.7 mg of sucrose. A 50-unit vial is also available.

RimabotulinimtoxinB (Myobloc), as previously mentioned, is subtype B. It currently has FDA approval for the treatment of cervical dystonia, but any aesthetic use is considered off-label, so it is far less used for cosmetic purposes than the preceding three. It is produced by the fermentation of the Bean strain of *C. botulinum* type B, purified by a series of precipitation and chromatography steps, and packaged as a clear to light yellow injectable solution that does not require reconstitution. Each vial of Myobloc contains 5,000 units of botulinum toxin type B in 1 mL of a solution containing 0.05% human serum albumin, 0.01 M sodium succinate, and 0.1 M sodium chloride at a pH of 5.6. It is also available in 2,500 units (0.5 mL) and 10,000 units (2 mL).

It cannot be stressed enough that the unit dosings among the four botulinum toxin products are *not* equivalent.

## 15.5.2 Mechanism of Action

Both Botox Cosmetic and Dysport are composed of botulinum toxin type A, each with a unique toxin/protein complex that results in different dosing between the two products. Once injected, the botulinum toxin core quickly dissociates from the complex due to the change in pH. Xeomin is a purified toxin Type A that is not complexed to any proteins. For all three formulations, the core neurotoxin single-chain protein has a mass of approximately 150 kDa and is made up of two polypeptide fragments (a 100-kDa heavy chain, Hc, and a 50-kDa light chain, Lc) that are linked by a disulfide bond. The neurotoxic effects occur in four sequential steps:

- 1. Binding: Hc responsible
- 2. Internalization: endocytosis into vesicle
- **3.** Translocation: Lc released from vesicle into cytoplasm of presynaptic neuromuscular junction
- **4.** Intracellular proteolysis: Lc cleaves SNARE protein (toxin A cleaves SNAP-25, whereas toxin B cleaves synaptobrevin), preventing vesicles containing acetylcholine (ACh) from fusing with the presynaptic membrane and thus blocking the release of this neurotransmitter

Thus the toxin produces chemodenervation by preventing the release of acetylcholine at the neuromuscular junction of the peripheral nervous system and at ganglionic nerve terminals of the autonomic nervous system. This occurs within 6 to 36 hours of exposure to the muscle, yet the clinical effects of flaccid paralysis are not seen for several days, possibly related to spontaneous release of ACh at the neuromuscular junction. The maximum effect of the toxin takes place 7 to 14 days after injection, and the extent of muscle paralysis and atrophy correlates directly with the amount of toxin injected.

At therapeutic doses the toxin produces paralysis limited to the injected muscle; however, the toxin has the potential to cause paralysis or weakness of adjacent muscles by diffusion or spread. These terms are oftentimes erroneously confused.

- **1.** *Diffusion* results from toxin moving down its concentration gradient and is related to the total dose of toxin and local receptor concentration.
- **2.** *Spread* is the physical pushing of toxin from the area of injection and is related to the solution volume and injection technique.

Therefore, diffusion and/or spread are a function, in part, of concentration gradient and physical force and may not be attributable to the specific formulation of toxin. This concept has been supported by multiple studies showing no difference in diffusion between the different brands or neurotoxin, while other research and clinical experience has opposed this concept, suggesting there may be some subtle differences in what some call "field of effect," whereby there is an apparent and differential effect on neighboring muscles with seemingly equivalent dosing. Treatment with botulinum toxin has a temporary effect that last an average of 3 to 4 months. There is ongoing turnover of neuromuscular junctions, so muscle function gradually returns. For unknown reasons, even with high doses of toxin, it is estimated that paralysis occurs in only 80% of the muscle; although the functional 20% is not clinically relevant, it may have a protective effect on the muscle. It is believed that axonal sprouting and reorientation of muscle fibers prevent permanent paralysis of muscles that are treated repeatedly.

# 15.6 Toxicity

The lethal dose of Botox Cosmetic is measured in units, with 1 unit being the lethal dose of toxin causing death in 50% of a group of 18- to 20-g female Swiss Webster mice within 3 days of intraperitoneal injection. The median lethal dose  $(LD_{50})$  has been estimated to be 2,700 units in a 70-kg human, based on the same  $LD_{50}$  of approximately 40 units/kg in primates. Species-specific sensitivity to the toxin precludes a precise calculation of the human  $LD_{50}$ . It is not known what normal dose should be to prevent toxicity; however, single doses exceeding 500 units of Botox Cosmetic may produce acute symptoms and signs of botulism.

Botulinum toxin is one of the most potent and neurospecific toxins known. It is also one of the most studied, discussed, and published substances used in medicine, and it has a long track record of safety. It is estimated that in a 70-kg adult, the lethal dose of crystalline botulinum type A would be approximately 0.09 to 0.15 mg by the intravenous or intramuscular route, 0.7 to 0.9 mg by inhalation, and 70 mg if ingested orally. Considering the type available in the United States, it would be inaccurate to consider it as a potential bioterrorism agent (each vial contains only 0.3% of the estimated lethal inhalation dose for humans and 0.005% of the estimated lethal oral dose). The toxin does not penetrate intact skin, and person-to-person transmission does not occur.

The maximum total recommended dose of Botox Cosmetic is 300 to 400 units at any one session and not more than 400 units over a 3-month period. The maximum dose of Dysport is 1,000 units over a similar period. (Keep in mind that these higher doses are almost exclusively utilized for noncosmetic purposes.) The dosage should be adjusted for the following reasons:

- 1. Anatomic location
- 2. Muscle mass
- **3.** Age
- **4.** Sex of patient
- **5.** Desired outcome/effect
- 6. Patient prior experiences/dose of toxin
- 7. Condition being treated
- 8. Time interval since last exposure to toxin

# 15.7 Dilution/Storage

The FDA approval for treatment of with glabellar lines is based on a dilution of 2.5 mL of 0.9% preserved saline into a 100-unit vial of Botox Cosmetic and Xeomin or 2.5 mL and 1.5 mL dilutions into 300-unit vial of Dysport. In practice, there is a large variety of dilutions that are acceptable and commonly used, as the injection technique is much more important than the specific dilution. Most dilution occurs in the range of 1.0 mL to 4 mL. Large dilutions with lower concentration of toxins require larger volumes of injection to achieve the desired result. Utilizing a higher level of dilution can increase the potential for spread (not diffusion) of the toxin to neighboring muscles. It has also been suggested that the higher volume of injection may also give a shorter duration of effect, but this is anecdotal and longevity may perhaps relate more largely to dosing than to dilution. For this reason, a *low volume* and *high concentration* of botulinum toxin is preferred for more targeted treatments.

The manufacturer recommendation for diluent for all of the neurotoxins is nonpreserved 0.9% sodium chloride (based only on the methods utilized in the registration trials); however, we (and many) prefer to use benzoic acid–preserved (bacteriostatic) 0.9% saline. In addition to the bacteriostatic properties that help avoid bacterial contamination, the preserved saline has been shown to decrease procedural pain during injection in randomized controlled trials. The fragility of the toxin also raises concern during reconstitution. It is thought that agitation or foaming during reconstitution can degrade the toxin and decrease the potency of the injection, but this concept as well has never been proven. Although studies have shown this is not necessarily true and the toxin is less fragile than previously anticipated, it is still our practice to avoid turbulence and foaming by reconstituting the toxin with a larger-bore (18-gauge) needle.

An additional area of controversy is the length of time neurotoxin can be stored after reconstitution. The manufacturer recommendations are as follows:

- Botox Cosmetic: Unopened vials require refrigeration at 2 to 8°C (35.6-44.4°F) for up to 36 months; reconstituted vials should be used within 24 hours
- Dysport: Unopened vials require refrigeration at 2 to 8°C protected from light for up to 12 months; reconstituted vials should ideally be used within 4 hours, 24 hours maximum
- Xeomin: Unopened vials can be stored at room temperature or in a refrigerator or freezer for up to 36 months; reconstituted vials should be used within 24 hours
- Myobloc: Unopened vials should be stored in refrigerator; do not freeze or shake; diluted vials should be used within 4 hours, as the formulation does not have a preservative

The length of time a neurotoxin can be stored after reconstitution has been studied numerous times, with strong evidence to suggest it can be stored up to 4 to 6 weeks in the refrigerator without any change in potency of the toxin. We make every attempt to use the toxin within 48 hours after reconstitution but would not hesitate to use it if stored longer, as long as it is kept refrigerated.

# 15.8 Aesthetic Indications and Contraindications

When discussing the use of botulinum toxin for aesthetic facial rejuvenation, it is important to decipher between the FDA-approved indications and the numerous off-label uses of the toxin. The FDA approved *aesthetic* uses are as follows:

- Botox Cosmetic:
  - 1. Temporary treatment of moderate to severe glabellar lines associated with corrugator and/or procerus muscle activity
  - **2.** Moderate to severe canthal lines associated with orbicularis oculi activity
  - **3.** Moderate to severe forehead lines associated with frontalis muscle activity
- Dysport:

Temporary improvement in appearance of moderate to severe glabellar lines associated with procerus and corrugator muscle activity in adult patients < 65 years old

• Xeomin:

Temporary improvement in appearance of moderate to severe glabellar lines with corrugator and/or procerus muscle activity

• Jeuveau:

Temporary improvement in the appearance of moderate to severe glabellar lines associated with corrugator and/or procerus muscle activity in adult patients

• Myobloc

The off-label uses of botulinum toxin are far more encompassing and address the muscles in all regions of the face. Although often discussed in terms of upper, middle, and lower face, it is always important to treat the face/patient as a whole and tailor the treatment to a patient's specific anatomy. Common indications and their target muscle for treatment with botulinum toxin are as follows, divided by facial region.

- Upper face: Glabellar lines (procerus, corrugator, orbicularis oculi), horizontal forehead lines (frontalis), lateral canthal lines/crow's feet (orbicularis oculi), brow shape and position (lateral: orbicularis oculi; medial: procerus, corrugators, orbicularis oculi, depressor supercilii)
- Midface: Infraorbital rhytids (orbicularis oculi), eye aperture (orbicularis oculi), nasal flare (dilator nasalis), nasal tip elevation (depressor septi nasi), nasal oblique lines/bunny lines (nasalis, levator labii superioris alaeque nasi, depressor nasi septi), excessive gingival show/gummy smile (convergence of levator labii superioris alaeque nasi and zygomaticus minor with insertion of levator labii superioris)
- *Lower face:* Downturned commissures (depressor anguli oris), chin cobblestoning (mentalis), masseter hypertrophy (masseter), perioral rhytids (orbicularis oris), platysmal banding (platysma)
- Additional uses are following surgical procedures to improve the result and/or allow healing to occur without tension caused by movement of neighboring muscles, and in combination with other facial rejuvenation procedures (fillers/peels/ lasers) and scarring prophylaxis

The contraindications are as follows:

- **1.** Patients with known hypersensitivity to any of the ingredients in the formulation (botulinum toxin, albumin, sodium chloride)
- 2. Active infection at the injection site

- **3.** Patients with a neuromuscular disease (myasthenia gravis, Eaton-Lambert syndrome, motor neuron disease)
- 4. Patient with allergy to cow's milk protein (Dysport)
- 5. Pregnant or lactating women
- **6.** Patients on other medications that interfere with neuromuscular transmission (certain antibiotics, including aminoglycosides, penicillamine, quinine, calcium channel blockers, neuromuscular blocking agents, anticholinesterases, magnesium sulfate, and quinidine) that may increase paralytic effect of toxin
- **7.** Patients with unrealistic expectations or poor understanding of effects of toxin
- **8.** Patients on anticoagulation/antiplatelet therapy or a propensity to bleed from a medical condition (hemophilia; relative contraindication)

Botulinum toxin treatment in the elderly (over 65 years old) has been shown to be safe, but these patients are often not ideal candidates for toxin treatment alone. With age, patients experience an increase in tissue elasticity as well as a loss of soft tissue and bony volume. Rhytids are less likely a result of hyperdynamic muscles and more likely from loss of volume, which botulinum toxin does not address. Because of the greater frequency of comorbid medical conditions, if it is decided that an elderly patient is appropriate for botulinum toxin treatment, we recommend starting with low initial doses due to changes in muscle mass and function with age.

# 15.9 The Ideal Patient

- **1.** Has a good understanding of the cause of his or her aesthetic issue and the potential role of botulinum toxin in improving it
- **2.** Is aware that botulinum toxin's mechanism of action is to address hyperkinetic muscles of facial expression, causing them to relax and therefore releasing the overlying wrinkle rather than filling it in or decreasing its depth
- **3.** Has relatively isolated defects that are not necessarily the result of overlapping conditions (dermal or subcutaneous fat atrophy, excess skin) in addition to the rhytids
- **4.** Understands the chronology of botulinum toxin's onset of action and need for continued dosing to maintain effects
- **5.** Understands the value of different surgical and nonsurgical treatments, how these treatments can be used in combination to improve their aesthetic and address different issues, and the various timelines of their effectiveness (botulinum toxin: 3 months, fillers: 6 months or more, surgery: even longer)

# 15.10 Pertinent Anatomy

Many facial changes associated with aging are in part related to facial animation. It is obvious that facial cosmetic procedures are destined for regression if these known causes are not addressed. The application of botulinum toxin to modify facial expression can be used for line reduction, for facial shaping, and as an adjunct to a variety of plastic surgery procedures. A clear understanding of the facial musculature anatomic influence on facial animation and subsequent aging is essential to delivering the most appropriate application of botulinum toxin. A patient's specific anatomy and functional disposition will dictate where treatment will be most effective. An injector must have a thorough understanding of the facial muscles, especially those in which botulinum toxin is most commonly injected. The use of botulinum toxin for rhytids or to reshape or reposition structures requires an in-depth mastery of the function and location of the muscles of the face, their interaction with other muscles (agonist versus antagonist), and the unique anatomic features of each region of the face. The muscles must be precisely located by having the patient animate, and the amount and depth of toxin injection must be tailored to the patient-specific strength of animation and muscle mass. The effects of facial aging may likely have more to do with different animation patterns rather than the actual anatomic component. The most animated and facially expressive persons seem to exhibit more facial lines, so these patients should be treated differently than less expressive individuals (**Fig. 15.1**).

# 15.11 Pretreatment Assessment

When a patient presents for consideration of management of facial aging, it is important to determine treatment options that specifically address the patient's desired outcomes and pathology. Patients who are candidates for aesthetic improvement with botulinum toxin range from those who are not quite ready for surgery because of early age, emotional disposition, multiple previous surgical procedures, or financial conditions to those who desire improvement of dynamic and functional facial lines and furrows, facial asymmetries, and improvement in facial shape. The patient must be evaluated in three dimensions, noting the quality of skin, dynamic and static rhytids, and areas of soft tissue loss or malposition.

A thorough history should take place during the initial consultation, with focus on patient expectations and desired outcomes; the patient's current understanding of how botulinum toxin works; past medical, surgical, and medication history; and any previous botulinum toxin injections. The patient is asked in front of a mirror what area or issue is the cause of concern. This allows the injector and patient to come up with a treatment plan together while also providing an opportunity for patient education about what things can and, more important, cannot be treated with botulinum toxin alone. The patient is asked to frown (glabellar lines), squint or smile (lateral canthal lines), or look surprised (forehead lines) to accentuate dynamic facial rhytids. Facial asymmetries should be pointed out at this time, and photodocumentation is recommended for future reference. It is also important to identify any ptosis masked by an overactive frontalis so as to avoid treatment in this area, which will lead to ptosis posttreatment.

As with any medical procedure, patients are required to sign an informed consent document before treatment. Benefits and limitations of botulinum toxin treatment are discussed, and alternative and supplemental treatments that could benefit the patient are reviewed. It is important to explain the role of botulinum toxin, the intended results, the length of time before results are typically seen, the average length of its effectiveness, and potential complications. It is emphasized that patients should return to the clinic within 2 weeks if they have any concerns about asymmetry, complications, or therapeutic failures. A patient is then given an opportunity to have any additional questions answered.



Fig. 15.1 Pertinent facial muscular anatomy most commonly injected with botulinum toxin.

# 15.12 Pretreatment Planning

Prior to injection, all areas of the face that are going to be treated are cleansed with alcohol to decrease the bacterial load on the skin and remove makeup. Although we prefer separating neurotoxin and soft tissue filler treatments (we prefer to treat with neurotoxin and then have patient follow up 2 weeks later to address residual soft tissue issues), if both are going to be injected in the same session, the skin should be cleansed with chlorhexidine. Every effort should be made to reduce patient discomfort during injection. The patient is offered cold compresses, topical anesthesia if requested, for which the smallest-gauge needle is selected (30-gauge or higher) to lessen the discomfort. The patient is injected in the upright position, with the chair placed at a height that is most comfortable for the injector.

Marking the areas or points to be injected is unnecessary and inefficient. The patient is an active participant during botulinum toxin treatment and is asked to exaggerate facial expressions to guide injection sites. If the patient is going to be injected intraoperatively, markings can be made in the preoperative holding area.

# 15.13 Injection Technique

The toxin is reconstituted with 2 to 4 mL of 0.9% preserved saline. The toxin is then drawn into a single-use plastic syringe with an 18-gauge needle to minimize turbulence, or directly into an insulin syringe. Preferably, a 32-gauge needle is used for injection. The skin is then cleansed with alcohol and allowed to dry completely prior to injection. With the patient in an upright, seated position, each muscle of concern is identified and isolated. The intended muscle is isolated and stabilized or grasped with the injector's nondominant hand. Although there are many variations in injection technique, we have found our technique to be safe and reliable while providing consistent results, so it will now be discussed organized by target muscle/indications (**Fig. 15.2**).

# 15.14 Target-Specific Dosing Recommendations and Pearls

The following section will discuss our dosing recommendations and technical pearls for injection of Botox Cosmetic or Xeomin into specific areas. It is recommended that dosing of Dysport be 2.5 to 3 times more units per muscle area.

Muscle	Deformity/Aesthetic Concern	Patient Concern	Depth	Average Treatment Dose(Female) Botox Xeomin:Dypsort	Technique ( PHOTOS)
Frontalis	Transverse forehead rhytids	Surprise lines	Subdermal	10-25/30-75	
Corrugator	Vertical glabellar rhytids	Frown lines	Deep medially, becoming superficial at lateral head	15-25/40-75	
Procerus	Transverse glabellar rhytids	Frown lines	Deep	5–10/15–30	
Lateral orbital orbicularis	Lateral orbital rhytids	Crow's feet	Superficial (just under dermis)	7.5–15/20–45	
Superior orbital orbicularis	Flat brow, brow ptosis	Brow ptosis	Superficial (just under dermis)	5–10/15–30	
Inferior pre-tarsal orbicularis	Decreased eye aperture	Eyelook small/ squinting	Very superficial	1-2/4-8	
Nasalis	Vertical/transverse nasal lines	Bunny lines	Deep	5/15	
Masseter	Masseteric hypertrophy	Widened jaw	Intermediate to deep	25-50/75-150	
Orbicularis oris	Vertical peri-oral rhytids: excessive gingival show	Lip lines/gummy smile	Superficial	5–10/15–30	
Depressor anguli oris	Downturned oral commissures	Month always looks unhappy	Intermediate if treating midportion of muscledeep if treating caudal aspect over mandible	2.5-7.5/8-20	
Mentalis	Cobblestoning of chin	Bumps on chin	Deep	5–10/15–30	
Platysma	Platysmal bands	Vertical band on neck	Intermediate	15–25 per band/ 40–75 per band	

Fig. 15.2 Graph of injection target/depth/dosing.

# 15.14.1 Glabellar Lines (Corrugator and Procerus)

## **Dosing Recommendations**

Product labeling recommends 20 units divided into five equal injection points; we recommend starting with 10 to 20 units on average and going up to 30 or even 40 in those with stronger muscles (particularly men or otherwise refractory patients). Patients also may require fewer injection points or sometimes as many as seven or eight injection points, and particularly two injections to the procerus, depending on individualized activity. This is all based on a good preinjection assessment.

## **Technical Pearls**

Identify or occlude supratrochlear vessels when injecting medial/ deep corrugator. Identify the supraorbital notch to avoid the supraorbital artery. Follow the tail of the muscle and inject more superficially as you move laterally. Inject deep, directly into the muscle belly of the procerus. Too superficial of an injection at the lateral corrugator may inadvertently target the frontalis muscle, causing medial brow ptosis.

# 15.14.2 Crow's Feet (Lateral Canthal Lines)

## **Dosing Recommendations**

Eight to 16 units on each side of the face, usually three to four injection points per side.

## **Technical Pearls**

Note regional veins and avoid them; do not inject deep, or it will cause bruising. Always inject with the needle pointing *away* from the eye. Insert needle tangential and superficial to skin surface to decrease pain.

# 15.14.3 Lower Eyelid

## **Dosing Recommendations**

0.5 unit per eyelid starting dose in two points: the central lower eyelid and at the lower eyelid at the *lateral canthus*; maximum 2.5 units per eyelid.