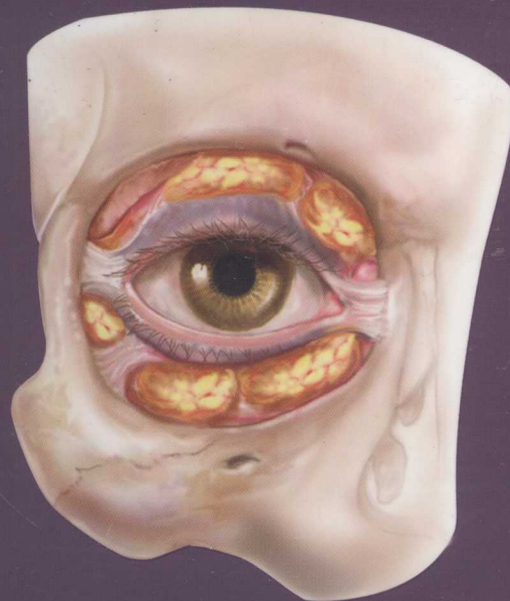


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ORAL AND MAXILLOFACIAL SURGERY

Second Edition

Orthognathic Surgery
Esthetic Surgery
Cleft and Craniofacial Surgery



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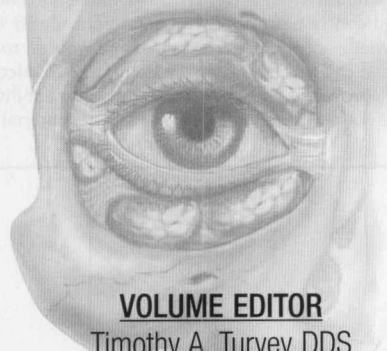
Turvey ■ Scully ■ Waite ■ Ruiz ■ Costello

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ORAL AND MAXILLOFACIAL SURGERY, VOLUME III

ISBN-13: 978-1-4160-6656-9

ISBN-10: 1-4160-6656-X

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ISBN-13: 978-1-4160-6656-9

ISBN-10: 1-4160-6656-X

Vice President and Publisher: Linda Duncan
Acquisitions Editor: John J. Dolan
Developmental Editor: Brian S. Loehr
Publishing Services Manager: Julie Eddy
Project Manager: Rich Barber
Designer: Kim Denando
Medical Illustrator: William M. Winn

Printed in the United States

Last digit is the print number: 9 8 7 6 5 4 3 2 1

Cover illustrations by William M. Winn

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DEDICATION

To my wife, Martha, and my children, Samantha, Amanda, Blake, and
Mackenzie for their patience and understanding.

Timothy A. Turvey

To Bonnie, Amanda, and Johnny for always believing in me.
And to Ray, the wind beneath my wings.

J. Robert Scully

The art and science of cosmetic maxillofacial surgery is one of the most intriguing
aspects of my clinical and academic career. I am proud of the contributors and thank
them for their hard work. I also thank my wife, Sallie, and my children for the time I
spent on this prestigious project.

Peter D. Waite

To my family—Jackie, Mia, and Michael, who inspire me every day. To my parents,
for giving me every opportunity. To my mentors, including Drs. Jeffrey Posnick,
Raymond Fonseca, and Peter Quinn, for the opportunity to experience their uncommon
knowledge, skill, and compassion. To my colleagues and students, for the ever-present
scholarly challenge.

Bernard J. Costello

To Drs. Peter D. Waite, Timothy A. Turvey, Jeffrey C. Posnick, and the late
Victor J. Matukas, for teaching me by example. To my parents, Ramon R. and
Aurora M. Ruiz, for teaching me about the beauty of intellectual pursuit. To my beautiful
daughters, Julia, Maia, and Josephine, for their love and joy. To my wife, Laura, whose
unconditional love, beauty, sweet intellect, and strength constantly inspire me.

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FOREWORD

The breadth and scope of this book in three volumes evokes wonderful memories of another era for me. When I first became head of the oral surgery residency program at our institution in 1956, there were no guidelines, as we have today, for the educational content or range of surgical procedures to be included in the curriculum. Knowledge and procedures were usually taught at the level of practice in the community. The most worthy surgeon and author at the time was Kurt Thoma, whose two volume second edition of *Oral Surgery*, 1952,¹ comprised of 10 parts that included 47 chapters on contemporary and leading-edge oral surgery, was in every respectable practitioner's library. The book included fresh information relative to everyday office needs and just enough edgy, bold surgery, such as open reductions of fractures and condyles, to make for engrossing reading. There was nothing in that age to even closely rival his monumental and inspirational work. I kept the table of contents of Thoma's book before me at all times. If a surgical procedure or treatment method was included in the book, it became a part of the training of our residents. It *became* our curriculum. And here we have the same attractiveness in Fonseca's, Marciani's, and Turvey's book, which is eerily the same—but, contemporary, with more authors and a far wider scope. There is no merit in comparing the books, which are two generations apart. But the point is, if there were a need to start a new education program in the specialty today with nothing more than this book as a guideline for a curriculum, and the program could deliver education at the level and reach described in the book, the program would be flooded with applicants.

The ambition and organization of this book—covering the full scope of oral and maxillofacial surgery—is remarkable not only for its huge content, but because it introduces a new generation of knowledgeable contributors to the specialty. The book has many known and authoritative colleagues with respected academic affiliations, who are at their best in their writings. However, it is the new breed, largely still in training or private practice with adjunct university positions bringing front-line experience to the pages, that is exciting. We are accustomed to thinking that new advances and scholarship are the provenance of seasoned workers in universities and hospitals. But it is the growing underground of dedicated, amateur scholars still in residency or fellowship training or early in private practice or academia who have discovered that the joy of learning and writing is a big reward for the revelations of their exciting, young work. Even though Fonseca, Barber, Costello, Dembo, Gregg, Jensen, Smith, Marciani, Carlson, Braun, Alpert, Dierks, Ghali, Hudson, Helman,

Indresano, McCoy, Mercuri, Ochs, Swift, Williams, Turvey, Waites, Epker, Frost, Guerrero, O'Ryan, Posnick, Prescious, Reyneke, Schendel, Van Sickels, and Wolford are rightfully big attractions of the book, be prepared for fulfillment in reading the work of a host of fresh names, which will soon be well known to you. The editor is commended for bringing this nascent talent to the book.

Beyond surgery, there is a valuable and needed section of the book devoted to practice management with expert coverage of the aggravations, which are a part of current practice. These partially include office management, accreditation of surgicenters, credentialing and hospital privileging, office design, coding, insurance, and third party payers and risk management. There is much to appreciate in this solid address of the business of the specialty.

There is always more to learn in the world of oral and maxillofacial surgery than any of us has time to achieve or do. Today's immense, expanding frontier of knowledge, procedures, and technology pertinent to the specialty is so vast that we now need a lifetime even to penetrate the body of scholarship and skills at hand. These are reasons why an encyclopedia of the kind compiled by Fonseca, with assistance from Marciani and Turvey, is so comforting as an immediate, all-embracing resource to what is current and important to everyone captivated by oral and maxillofacial surgery—even as an emergency curriculum.

This is a big book with an ambitious scope that will appeal to a large readership engaged in oral and maxillofacial surgery. It is not for the person described by Beecher:

*"If a man has come to that point where he is so content that he says,
'I do not want to know any more, or do any more or be any more,'
he is in a state in which he ought to be changed into a mummy."*²

No one will remotely suggest that the editor of this marvelous book be relegated to that state. He does things—and he does them *well*. He has an amazing and enviable record in the production of excellent, multiple-authored, surgical tomes. He has outdone himself with this one.

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¹Thoma K: *Oral Surgery*, ed. 2, St. Louis, 1952, The C.V. Mosby Co.

²Beecher HW: in *Thoughts on Leadership*, The Forbes Leadership Library, Chicago, 1995, Triumph Books, p.17.

PREFACE

It is our privilege to present the second edition of *Oral and Maxillofacial Surgery*. This multiauthored, comprehensive text will be presented in three volumes. The first edition, published in 2000, was well received; but 8 years later, with all the extensive changes in techniques and technology, we felt that a second edition was overdue. Drs. Marciani and Turvey have been brought on board to bring together the best minds to create a contemporary and comprehensive text. They have recruited section editors who have worked tirelessly to ensure that the authors submitted chapters that reflected the state of the art in their area of responsibility.

This book is a comprehensive resource on oral and maxillofacial surgery, examining the full scope of the field, including dentoalveolar surgery, orthognathic surgery, trauma surgery, surgical pathology, temporomandibular joint surgery, dental implantology, cosmetic surgery, cleft and craniofacial surgery, and reconstructive surgery. Every surgical procedure performed by oral and maxillofacial surgeons today is covered in detail. The set's greatest strength is its comprehensive grasp of the subject. This multivolume text provides solid coverage of a wide range of issues related to surgical care, such as anesthesia, diagnostic imaging, treatment planning, rehabilitation, physical therapy, and psychological considerations. We have included additional content in diagnosis, treatment planning, and surgical decision making. There are more than 80 new chapters in three volumes.

Volume I covers anesthesia, dentoalveolar and implant surgery, and office management. Although all sections have new material, the area of implant surgery has undergone the greatest change since the first edition was published. Dr. H. Dexter Barber has recruited an outstanding group of contributors who present current techniques and technology related to this discipline. Drs. John Matheson and Raymond J. Fonseca

also elicited contributions from authorities in the other sections of this volume.

Dr. Robert Marciani was in charge of editing Volume II. He recruited Dr. Eric Carlson to oversee the section on surgical pathology and Dr. Thomas Braun to edit the section on the temporomandibular joint. These three individuals recruited top-notch authors who have covered their area of responsibility comprehensively. The chapter on bisphosphonate-related osteonecrosis of the jaws is not only timely, but informative. The diagnosis and management of facial pain is presented in this section and complements Dr. John M. Gregg's chapter in Volume I on chronic maxillomandibular pain, head and neck pain, and TMJ pain. Dr. Marciani has assembled a variety of specialists to cover the complete gamut of maxillofacial and head and neck trauma.

Volume III has been organized by Dr. Timothy Turvey. He recruited Drs. Bernard J. Costello and Ramon L. Ruiz to oversee the cleft and craniofacial sections, and Dr. Peter D. Waite to oversee the esthetic surgery section. Dr. J. Robert Scully assisted Dr. Turvey in editing the orthognathic surgery section. Perhaps the greatest improvement in this volume is an added emphasis on diagnostic and treatment planning. The esthetic surgery and cleft and craniofacial surgery sections have been expanded in scope and depth.

After an analysis of the changing field of oral and maxillofacial surgery, we strove to present a comprehensive, current book that defined the present scope of our specialty. We hope that the reader appreciates and agrees with our efforts. We stated in the preface of the first edition that we hoped that our future attempts will present an even broader scope of oral and maxillofacial surgery. The fact that this edition has succeeded in that regard is a testament to the individuals who are constantly expanding the envelope.

ACKNOWLEDGMENTS

The second edition of *Oral and Maxillofacial Surgery* is a team effort. Drs. Robert Marciani and Timothy Turvey were tireless in their efforts to improve on the first edition. They brought numerous authors on board who added depth and breadth to this edition. The section editors were equally invaluable contributors to the success of this effort. Drs. H. Dexter Barber, Thomas W. Braun, Eric R. Carlson, Bernard J. Costello, John Matheson, Ramon L. Ruiz, J. Robert Scully, and Peter D. Waite diligently pestered authors so that deadlines could be *almost* met. This edition attempts to comprehensively define the scope of oral and maxillofacial surgery

and could not have come to fruition without all these contributors.

Residents are the lifeblood of our specialty. Many have contributed portions of chapters in this book. They also have provided us with friendship, dedication, intellectual stimulation, and humility, without which this book would not have been written.

Last, we would like to thank all the staff who helped prepare these manuscripts and the editorial staff at Elsevier, who were so patient with our procrastination, and meticulous in their development and editing of this book.

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EVALUATION OF THE FACE

Bruce N. Epker

The face is a complex and dynamic structure that must be carefully evaluated before any surgical intervention. Appreciation of the composition of the soft tissues, the importance of supporting skeletal and dental structures, and the interrelationship between static and functioning positions adds to the complexity. Compounding this complexity is the effect of the growth and aging process of the facial tissues. Surgical intervention at any time during the life cycle makes changes based on the surgical time referent, but other natural effects continue to mold the result over time. Understanding the predicted soft- and hard-tissue changes occurring during life is critical for surgeons responsible for making facial changes.

It is the purpose of this chapter to discuss the contributions of soft tissues and skeletal and dental structures to facial appearance and to provide insight into the evaluation of each, including the effects of aging on the soft tissues and skeletal and dental supporting structures. Also included in this chapter is a section on facial growth.

This chapter is divided into four basic sections: clinical evaluation of the face, cephalometric evaluation of the facial skeleton, evaluation of the occlusion, and evaluation of facial-skeletal growth. In each of these sections I will discuss evaluation in a pragmatic fashion. At the end of each of the first three sections I will conclude with a discussion of how the various tissues of the face change with aging.

It is of relevance that not every patient seen undergoes all four levels of evaluation. Level 4, Facial Skeletal Growth, is obviously confined to those younger than 18 years of age. Similarly, when an adult with a retrusive mandible is being evaluated, the performance of the Detailed Regional Facial Features assessment is relevant only with regard to the perioral evaluation. Also, most patients who undergo cosmetic facial surgery are candidates for an inclusive clinical evaluation of the face but not usually a level 2, 3, or 4 evaluation.

In sum, the specific concerns and patient presentation guide the judicious use of the four levels of evaluation discussed herein.

Finally, a brief evaluation of the face form is used to record only abnormalities detected during these examinations.

■ CLINICAL EVALUATION OF THE FACE

The clinical evaluation of the face is the most important of all evaluations of the face because the clinical evaluation is always the primary determinant of basic treatment recommendations.

Clinical examination of the face is separated into four basic evaluations: facial skin type, facial skin health, general facial anthropometric proportions, and detailed regional facial evaluations, such as the periorbital, nose, and perioral areas.

EVALUATION OF FACIAL SKIN TYPE

Although different proposals have been made over time with regard to classification of skin type, the Fitzpatrick skin typing system is the standard. This skin typing system categorizes skin as type 1 through type 6, based primarily on skin color and the skin's response to sunshine. To simplify skin typing, Table 1-1 is used. The importance of skin typing relates primarily to the following practical matters:

- Level of sun protection recommended for the patient
- Patient's susceptibility to actinic photodamage (aging)
- The modalities of therapy that are appropriate for the patient's type of skin

For example, skin type 1 is extremely sensitive to actinic photodamage, and therefore individuals with this type of skin ideally would use a higher sun protection factor (SPF) sunscreen daily for sun protection. Moreover, with a skin type 5 or 6 it would not be generally recommended that CO₂ laser resurfacing or deep chemical peels be done, owing to the high incidence of problems with hypopigmentation and/or hyperpigmentation.