

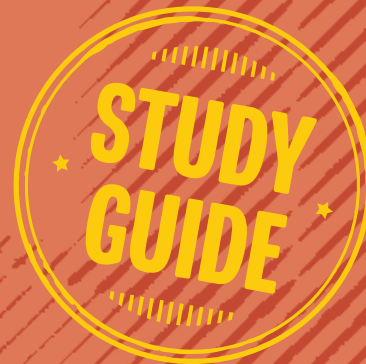
LOUIE AL-FARAJE, DDS

ORAL IMPLANTOLOGY REVIEW

SECOND EDITION

Oral Implantology Review, Second Edition





ORAL IMPLANTOLOGY REVIEW

SECOND EDITION

LOUIE AL-FARAJE, DDS

Founder and Director
California Implant Institute
San Diego, California

 **QUINTESSENCE PUBLISHING**

Berlin | Chicago | Tokyo
Barcelona | London | Milan | Mexico City | Paris | Prague | Seoul | Warsaw
Beijing | Istanbul | Sao Paulo | Zagreb



One book, one tree: In support of reforestation worldwide and to address the climate crisis, for every book sold Quintessence Publishing will plant a tree (<https://onetreepanted.org/>).

Library of Congress Control Number: 2022920494

A CIP record for this book is available from the British Library.
ISBN: 978-1-64724-156-8



© 2023 Quintessence Publishing Co, Inc

Quintessence Publishing Co, Inc
411 N Raddant Road
Batavia, IL 60510
www.quintpub.com

5 4 3 2 1

All rights reserved. This book or any part thereof may not be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, or otherwise, without prior written permission of the publisher.

Editors: Kristen Clark and Leah Huffman
Design: Sue Zubek
Production: Angelina Schmelter

Printed in Croatia

CONTENTS



Dedication *vii*
Preface *viii*
Acknowledgments *ix*
Contributors *x*

- 1** Medical Evaluation of the Implant Patient 1
- 2** Oral Evaluation and Treatment Planning 35
- 3** Head and Neck Anatomy 55
- 4** Surgical Procedures and Complications 87
- 5** Pharmacology 129



- 6 Biomechanics 163**
- 7 Implant Prosthodontics 181**
- 8 Bone Grafting 225**
- 9 Zygomatic and Pterygoid Implants 235**
- 10 Blood Concentrates and Growth Factors 241**
- Bibliography 253**

Biography

Abu-Marwan Abd-al-Malik ibn Zuhr Al Eyadi Al-Ishbily (Avenzoar) was a Muslim Arab physician and surgeon who was influential in advancing the progress of surgery. His major work, *Al-Taysir fil-Mudawāt wal-Tadbīr (Book of Simplification Concerning Therapeutics and Diet)*, reflects Ibn Zuhr's reliance on his own clinical observations, skill in differential diagnosis, and interest in clinicopathologic correlations. Based on his own experience, he staged and classified diseases in a practical way relevant to their management and prognosis. Furthermore, he enriched surgical and medical knowledge by describing many diseases never described before, including pericarditis, mediastinitis, mediastinal tumors, empyema, meningitis, intracranial thrombophlebitis, inflammation of the middle ear, pharyngeal and esophageal paralysis, verrucous malignancy of the colon, fecal fistula, Peyronie's disease, purpuric skin rash, and scabies.

Contributions

1. **Experimental surgery:** Ibn Zuhr introduced animal testing as an experimental method of testing surgical procedures before applying them to human patients to know if they would work, performing the first experimental tracheotomy on a goat before performing it on humans. He was the first surgeon of his time to apply experimental methodology in evaluating new or controversial surgical procedures. Hence, he was given the title "The Father of Experimental Surgery."
2. **Clinical anatomical knowledge:** Ibn Zuhr emphasized the great importance of a practical knowledge of anatomy for the surgical trainee. Here is a translation of his words regarding the management of inflammatory swellings of the neck that are ripe and ready for bursting/drainage:

And in case you have mastered the science of dissection then drain by the scalpel in the way that you will not come across a vein, artery or a nerve or anything that its injury will lead to an extra harm to the patient. But if you were one of the group like me and did not practice dissection but knew it only by imitation, keep away from the knife as nothing you know by mere imagination will be the same in real life; especially in the case of small organs.

According to Ibn Zuhr, only the practitioner who has practiced dissection himself and mastered the science is entitled to perform an operative intervention. He therefore advocated that mastering anatomy is essential training for a surgeon.

3. **Adequate supervised training:** Ibn Zuhr insisted on an adequately supervised and structured training program for the surgeon-to-be before allowing him to operate independently.
4. **Established limits:** Ibn Zuhr drew emphatic red lines at which a physician should stop during his general management of a surgical condition. This was a major step forward in the evolution of general surgery as a specialty of its own. Here is a translation of an example of Ibn Zuhr's demarcation:

If the wound caused by a sharp iron has taken into the bones and not extended to the interior, then the treatment I just mentioned is enough for you, so stick to it. However, if it did penetrate the bone then in such a case, the surgeon should come and see.

Legacy

Ibn Zuhr was the most well-regarded physician of his era, and his ideas about medicine and surgery helped to shape our modern concept of standard care. He is an inspiration to those of us who seek to make the best decisions for our patients and our discipline.

PREFACE



The goal of this study guide is twofold. First, it aims to serve as a comprehensive review of the topics and disciplines relevant to the field of oral implantology. The successful placement of dental implants with good long-term functional and esthetic results involves much more than just knowing the basic procedures and protocols involved in implant surgery. Of course, it is important to know what size and type of implant to choose for various clinical situations and how to drill safely into bone. But there are many other factors that influence implant treatment planning, ranging from the patient's systemic health, habits, and anatomy to pharmacology, biomechanics, and prosthodontics. Placing dental implants also requires an understanding of adjunctive methods, such as bone grafting and the use of blood concentrates and growth factors. This book synthesizes all the information a clinician must consider at each stage of oral implant treatment in order to elevate the standard of patient care they provide and round out the knowledge and skill set they bring to each dental implant case.

Second, this study guide serves as a tool for professional development, providing excellent preparation for any oral implantology certification examination. With the knowledge presented in this study guide, the dental professional can not only achieve certification but also feel confident in their ability to provide the highest level of care when treating patients.

The reason for updating this study guide, first published in 2016, is also twofold. First, many new techniques that were under development at the time the previous edition was published have now become mainstream in dental implant treatment. As a result, three new chapters have been added, covering bone grafting, zygomatic and pterygoid implants, and blood concentrates and growth factors. Knowledge of these topics is important both to provide the best and most advanced patient care and to achieve certification in oral implantology.

Second, a greater emphasis has been placed on contextualizing dental implant treatment within an understanding of the patient's general health and its influence on outcomes. For example, a systemic disease like diabetes mellitus has an enormous impact on oral implantology. Clinicians must understand and consider the biologic effects of systemic health when planning treatment in order to provide patient-centered care that achieves the highest level of success possible.

As evidenced by the advances that have occurred in the 7 years since the publication of the first edition of this guide, implant dentistry continues to evolve rapidly. Only by continuously updating our knowledge base will we be able to keep pace with current trends. This book provides an overview of the discipline of oral implantology as it is practiced today. It is my hope that it will not only prepare future implantologists to pass certification examinations but also improve the patient care provided by all practicing implantologists.



ACKNOWLEDGMENTS

To God, who made everything I have accomplished possible through his guidance and gracious love.

To my family, thank you for your support and for giving up our personal time.

To my teammates at the California Implant Institute and Novadontics, you have shown dedication to your jobs for years. You take so much off my plate so that I can have the time to write, to lecture, and to innovate. Thank you.

Special thanks to Dr James Rutkowski, Dr Mamaly Reshad, and Dr Christopher Church who unselfishly shared their knowledge and experience to contribute greatly to the development of this book.

My deepest thanks to Bill Hartman and Leah Huffman and the entire staff at Quintessence Publishing for their support and patience. They contributed tremendously to the organization and the design of this book.

To my colleagues and students at the California Implant Institute, you and your patients are the ultimate reason for this book. Elevating the standard of care for our patients and giving the best for their well-being has always been the goal of everything I have done since I started practicing dentistry.

CONTRIBUTORS

Christopher Church, MD

Professor
Department of Otolaryngology, Head and Neck Surgery
Loma Linda University School of Medicine
Loma Linda, California

Mamaly Reshad, DDS, MSc

Clinical Lecturer
Eastman Dental Institute
University College London
London, England

Former Chairman
Section of Fixed Prosthodontics and Operative Dentistry
University of Southern California
Los Angeles, California

Private Practice
Los Angeles, California

James L. Rutkowski, DMD, PhD

Adjunct Clinical Instructor
Department of Restorative Dentistry
The State University of New York at Buffalo School of Dental Medicine
Buffalo, New York

Private Practice
Clarion, Pennsylvania



MEDICAL EVALUATION OF THE IMPLANT PATIENT

1

An accurate and thorough medical evaluation is a critical component of implant therapy. This chapter discusses the many medical factors that must be considered when a patient presents for treatment, including pathologic conditions, bleeding risk, allergy, and medical contraindications. Implant therapy is not without risk, and medical emergencies can occur even when the proper precautions are followed; it is therefore imperative that all clinicians understand what to do in such situations, especially for individuals already compromised by certain medical conditions.

1. What key medical considerations must the clinician take into account when formulating a treatment plan for a dental implant patient?

- a. Hemostasis
- b. Drug actions and/or interactions
- c. Predisposition to infection
- d. All of the above

d: All of these could have a profound effect on the healing response and thereby compromise the treatment result. If there is a hemostasis problem, excessive bleeding may result. Drug actions may interfere with proper healing, and drug interactions may affect cardiovascular integrity. A compromised immune system could lead to postoperative infections.

2. The risk of a dental practitioner encountering a medical emergency during placement of a dental implant is related to:

- a. The clinician's medical training
- b. The patient's medical health
- c. Staff training
- d. Complexity of the procedure
- e. All of the above

b: The patient's systemic health will dictate how well he or she will be able to sustain the stress of the procedure and the response to administered medications.

3. Which of the following are essential components of a medical history? (MULTIPLE ANSWERS)

- a. Medications
- b. Previous hospitalizations, illnesses, and/or surgeries
- c. Information regarding prosthetic joint replacements
- d. Childhood immunizations
- e. All of the above

a, b, c: A complete medical history should include an organ systems review, height, weight, exercise tolerance, present illnesses, as well as any medications the patient is taking, any previous hospitalizations or illnesses, and information regarding prosthetic joint replacements. The medical history can be done as an interview of the patient or as a printed questionnaire that the clinician reviews with the patient.

4. According to the ASA (American Society of Anesthesiologists) Physical Status (PS) classification, what would the classification be for a patient who can walk up a flight of stairs or the equivalent of two city blocks but has to stop along the way because of distress or shortness of breath?

- a. ASA I
- b. ASA II
- c. ASA III
- d. ASA IV

c: ASA III is defined as a patient with severe systemic disease. A consultation with this patient's physician is recommended prior to initiating dental treatment for this individual. Perioperative sedation and special monitoring may be necessary in the treatment of ASA III patients.



5. What would the ASA classification be for a patient who is able to walk up a flight of stairs or the equivalent of two city blocks but has to rest at the end of the walk because of distress?

- a. ASA I
- b. ASA II
- c. ASA III
- d. ASA IV

b: ASA II is defined as a patient with mild systemic disease.

6. A healthy 38-year-old woman presents for a dental implant. She takes no medications and is not anxious about the treatment. What is her ASA classification?

- a. ASA I
- b. ASA II
- c. ASA III
- d. ASA IV

a: ASA I is defined as a normal healthy patient.

7. What would the ASA classification be for a patient with well-controlled diabetes who is insulin dependent?

- a. ASA I
- b. ASA II
- c. ASA III
- d. ASA IV

c: ASA III

8. What would the ASA classification be for a patient whose diabetes is well controlled with diet and oral hypoglycemic agents?

- a. ASA I
- b. ASA II
- c. ASA III
- d. ASA IV

b: ASA II

9. What percentage of patients, when asked "Are you in good health?", respond "yes" but are actually found to be medically compromised on closer examination?

- a. 10%
- b. 20%
- c. 30%
- d. 40%

c: Studies reveal that 30% of patients who respond in the affirmative are actually deemed medically compromised by the treating clinician. (Source: Brady WF, Martinoff JT. Validity of health history data collected from dental patients and patient perception of health status. J Am Dent Assoc 1980;101:642-645.)

10. When a patient presents with a burning mouth or tongue, which of the following could be the possible medical cause?

- a. Alcoholism
- b. Neoplasm
- c. Renal failure
- d. Primary or secondary neuropathy

d: Patients with primary or secondary neuropathy often present with the symptom of a burning mouth or tongue.

11. When a patient presents with gingival overgrowth, which of the following could be a possible medical cause?

- a. Leukemia
- b. Gastroesophageal reflux disease (GERD)
- c. Immune suppression from HIV
- d. Mouth breathing

a: Gingival overgrowth can be a sign of leukemia.

12. When a patient presents with rampant dental caries, which of the following could be a possible medical cause?

- a. Addison's disease
- b. Sjögren's syndrome
- c. Vitamin deficiency
- d. Liver cirrhosis

b: Patients with Sjögren's syndrome often present with a dry mouth that leads to rampant dental caries. In elderly patients, it often presents as root caries.

13. When a patient presents with ptosis of the chin, which of the following could be a possible medical cause?

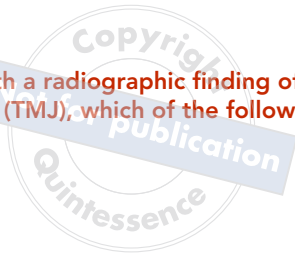
- a. Anemia
- b. Use of skeletal muscle relaxants
- c. Scleroderma
- d. Myasthenia gravis

d: Myasthenia gravis is a neuromuscular disease that results in muscle fatigue and weakness. Patients with myasthenia gravis will have decreased muscle tone that can result in ptosis.

14. When a patient presents with a radiographic finding of reduced cortical bone density, which of the following could be a possible medical cause?

- a. Primary hyperparathyroidism
- b. Scleroderma
- c. Osteoarthritis
- d. Multiple myeloma

a: Hyperparathyroidism results in the secretion of excess parathyroid hormone, which stimulates osteoclast catabolic effects on bone, resulting in the loss of calcium and density.



15. When a patient presents with a radiographic finding of degenerative damage to the condyle or temporomandibular joint (TMJ), which of the following could be a possible medical cause?

- a. Osteonecrosis
- b. Paget disease
- c. Hyperparathyroidism
- d. Rheumatoid arthritis

d: Rheumatoid arthritis has an unknown etiology; however, genetic, environmental, hormonal, and immunologic factors as well as infection are possibly involved in the process. A genetic susceptibility may provoke an autoimmune reaction that leads to hypertrophy of the synovial lining of the TMJ and endothelial cell activation that result in an uncontrolled inflammatory response and destruction of the bone.

16. When a patient presents with a radiographic finding of carotid artery calcification, which of the following could be a possible medical cause?

- a. Cardiac disease
- b. Sickle cell anemia
- c. Hyperparathyroidism
- d. Renal disease

a: Carotid artery calcium deposits have been identified as an independent predictor of coronary heart disease events. Therefore, clinicians should be surveying panoramic radiographs and computed tomography (CT) scans that are obtained for dental reasons for these calcium deposits in the coronary artery.

17. When assessing the bleeding risk for a dental implant procedure, the clinician must consider which of the following?

- a. Inherited defects of hemostasis
- b. Medications
- c. Acquired defects of hemostasis
- d. All of the above

d: Each of these factors can interfere with coagulopathy.

18. On review of the medical history, you find that the patient has severe Addison's disease. Why is severe adrenal insufficiency significant?

- a. The stress of an extensive dental implant surgical procedure may induce cardiovascular collapse.
- b. Soft tissue healing will be severely compromised.
- c. Implants may not integrate.
- d. The patient may experience a hypertensive crisis with the administration of more than 72 µg of epinephrine within a 10-minute time period.

a: A patient with Addison's disease will not be able to release the extra cortisol needed to deal with the stress of the surgical procedure. Cortisol is a glucocorticosteroid that is responsible for glucose metabolism as well as potentiation of catecholamines that assist in maintaining circulatory pressure.

19. What oral clinical finding may indicate that a patient has adrenal insufficiency?

- a. Severe tooth erosion
- b. Sloughing of the buccal mucosal tissues
- c. Hyperpigmentation of the buccal or labial mucosal tissues
- d. Gingival hyperplasia

c: Increased diffuse melanin pigmentation is a documented sign of Addison's disease.

20. What is a medical reason for a patient to take long-term systemic glucocorticosteroids?

- a. Liver, lung, or heart transplant recipient
- b. Lupus erythematosus
- c. Inflammatory bowel disease
- d. All of the above

d: Long-term glucocorticosteroid therapy is indicated for each of these conditions. Dental clinicians should consider increasing the patient's normal daily steroid dose when the patient undergoes a surgical or stressful dental procedure.

21. Which of the following blood tests are generally thought to identify a patient with a possible bleeding disorder? (MULTIPLE ANSWERS)

- a. Complete blood count (CBC) and platelet count
- b. Prothrombin time (PT) and partial thromboplastin time (PTT)
- c. Lipoprotein panel
- d. Bleeding time
- e. White blood cell (WBC) count
- f. All of the above

a, b, d: Each of these laboratory tests will act as a screening test for possible bleeding disorders. The sum of these tests will measure platelet activity and coagulation factors.

22. Classic hemophilia (type A) is a deficiency of which clotting factor?

- a. Factor VII
- b. Factor VIIa
- c. Factor VIII
- d. Factor VIIIa

c: Factor VIII

23. Type B hemophilia is a deficiency of which clotting factor?

- a. Factor IX
- b. Factor IXb
- c. Factor X
- d. Factor Xb

a: Factor IX

24. The dental implant patient who presents with chronic liver failure should have which of the following hematology tests performed prior to the surgical procedure?

- a. CBC, platelet count, PT
- b. CBC, bleeding time, PTT
- c. Platelet activation study (PAS), platelet count, WBC
- d. PAS, bleeding time, PTT

a: Patients with chronic liver failure are likely to have problems with blood coagulation. The CBC, platelet count, and PT will evaluate the coagulation factors that can be affected by the liver. The CBC and platelet count will screen for anemia and thrombocytopenia, while the PT will confirm a deficiency of vitamin K.

25. "Ageusia" refers to which of the following?

- a. Diminished taste
- b. Altered or distorted taste
- c. Salty taste
- d. Absence of taste

d: The tongue loses the ability to taste sweetness, sourness, bitterness, and saltiness. Complete or true ageusia is rare, and what patients most often have is the partial loss of taste, known as hypogeusia.

26. "Dysgeusia" refers to which of the following?

- a. Diminished taste
- b. Altered or distorted taste
- c. Salty taste
- d. Absence of taste

b: Altered or distorted taste

27. What are the most common reasons for alteration in taste? (MULTIPLE ANSWERS)

- a. Autoimmune disease
- b. Periodontal disease
- c. Infection
- d. Poor oral hygiene
- e. GERD
- f. All of the above

b, c, d: Periodontal disease, infection, and poor oral hygiene are known to alter the sensation of taste.



28. "Tic douloureux" is also known as which of the following?

- a. Idiopathic trigeminal neuralgia
- b. Bell's palsy
- c. Facial paralysis
- d. Trigeminal dysesthesia

a: Tic douloureux, or idiopathic trigeminal neuralgia, is a condition that creates episodes of acute-onset, severe facial pain. It is most frequently found in patients of middle to old age. Intraoral or facial trigger points initiate the pain, which can be excruciating but is usually not long lasting. The trigeminal nerve's mandibular branch is most often involved, but the etiology is unknown.

29. Which of the following endogenous pigmentation sources is the most common?

- a. Melanin
- b. Bilirubin
- c. Iron
- d. Heavy metals

a: Melanin is a term used to describe natural pigments in the body. It is produced by melanocytes via the oxidation of tyrosine.

30. Which of the following diseases can cause an abnormal melanin deposit in the oral mucosa?

- a. Diabetes mellitus type 1
- b. Acute myelogenous leukemia (AML)
- c. Addison's disease
- d. Thrombocytopenia purpura

c: Patients with Addison's disease frequently have bluish-black or dark-brown areas on the buccal or labial mucosa and possibly on the gingiva.

31. Which of the following laboratory tests measures the intrinsic coagulation pathway?

- a. PT
- b. PTT
- c. International normalized ratio (INR)
- d. PAS

b: The PTT is a measure of the efficacy of the intrinsic pathway that mediates fibrin clot formation. All coagulation factors are measured by this test except factor VII. Normal values are between 25 and 40 seconds. Values that are extended by 5 to 10 seconds represent a mild bleeding disorder; values beyond 10 seconds may be an indicator of a clinically significant bleeding problem.

32. What is the recommended INR therapeutic range for standard oral anticoagulant therapy?

- a. 1.0 to 2.0
- b. 1.5 to 2.5
- c. 2.0 to 3.0
- d. 2.5 to 3.5

c: A value between 2.0 and 3.0 is the recommended therapeutic range for the prevention of deep vein thrombosis, pulmonary embolism, hypercoagulable states, transient ischemic attack, atrial fibrillation, dilated cardiomyopathy, rheumatic mitral valve disease, and stroke.



BIBLIOGRAPHY

Chapter 1

- Abubaker AO, Benson KJ. *Oral and Maxillofacial Surgery Secrets*, ed 2. St Louis: Mosby, 2007.
- Aframian DJ, Lalla RV, Peterson DE. Management of dental patients taking common hemostasis-altering medications. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2007;103(suppl 45):1–11.
- American Heart Association. Infective Endocarditis. http://www.heart.org/HEARTORG/Conditions/CongenitalHeartDefects/TheImpactofCongenitalHeartDefects/Infective-Endocarditis_UCM_307108_Article.jsp#.Vxjs7atX--l. Accessed 21 April 2016.
- American Society of Anesthesiologists. ASA Physical Status Classification System. <https://www.asahq.org/resources/clinical-information/asa-physical-status-classification-system>. Accessed 20 April 2016.
- Bagheri SC. *Clinical Review of Oral and Maxillofacial Surgery: A Case-Based Approach*, ed 2. St Louis: Mosby, 2014.
- Brady WF, Martinoff JT. Validity of health history data collected from dental patients and patient perception of health status. *J Am Dent Assoc* 1980;101:642–645.
- Brennan MT, Kent ML, Fox PC, Norton HJ, Lockhart PB. The impact of oral disease and nonsurgical treatment on bacteremia in children. *J Am Dent Assoc* 2007;138:80–85.
- Brusch JL. Infective Endocarditis. <http://emedicine.medscape.com/article/216650-overview>. Accessed 19 April 2016.
- Budtz-Jørgensen E. *Prosthodontics for the Elderly: Diagnosis and Treatment*. Chicago: Quintessence, 1999.
- Chi AC, Neville BW, Krayner JW, Gonsalves WC. Oral manifestations of systemic disease. *Am Fam Physician* 2010;82:1381–1388.
- Chung TT, Grossman A, Clark AJL. Adrenal insufficiency. In: Jameson JL, De Groot LJ (eds). *Endocrinology: Adult and Pediatric*, ed 6. Philadelphia: Saunders, 2010:1853–1863.
- Collet JP, Himbet F, Steg PG. Myocardial infarction after aspirin cessation in stable coronary artery disease patients. *Int J Cardiol* 2000;76:257–258.
- Durack DT, Beeson PB. Experimental bacterial endocarditis. II. Survival of a bacteria in endocardial vegetations. *Br J Exp Pathol* 1972;53:50–53.
- Fanning NF, Walters TD, Fox AJ, Symons SP. Association between calcification of the cervical carotid artery bifurcation and white matter ischemia. *AJNR Am J Neuroradiol* 2006;27:378–383.
- Flack JM, Adekola B. Blood pressure and the new ACC/AHA hypertension guidelines. *Trends Cardiovasc Med* 2020;30:160–164.
- Hersh EV, Moore PA. Three serious drug interactions that every dentist should know about. *Compend Contin Educ Dent* 2015;36:408–413.

- Kahn MA, Hall JM. *The ADA Practical Guide to Soft Tissue Oral Disease*. Hoboken, NJ: Wiley-Blackwell, 2014.
- Kandel ER, Schwartz JH, Jessell TM, Siegelbaum SA, Hudspeth AJ. *Principles of Neural Science*, ed 5. New York: McGraw-Hill, 2012:318–319.
- Kostis WJ, Shetty M, Chowdhury YS, Kostis JB. ACE inhibitor-induced angioedema: A review. *Curr Hypertens Rep* 2018;20:55.
- Lam D, Laskin D (eds). *Oral and Maxillofacial Surgery Review: A Study Guide*. Chicago: Quintessence, 2015.
- Lavelle CLB. *Applied Oral Physiology*, ed 2. London: John Wright & Sons, 1988.
- Little JW, Falace D, Miller C, Rhodus NL. *Dental Management of the Medically Compromised Patient*, ed 7. St Louis: Mosby, 2008:240–250.
- Little JW, Miller CS, Rhodus NL. *Little and Falace's Dental Management of the Medically Compromised Patient*, ed 9. St Louis: Elsevier, 2018.
- Lockhart PB (ed). *Oral Medicine and Medically Complex Patients*, ed 6. Hoboken, NJ: Wiley-Blackwell, 2013.
- Lucas VS, Lytra V, Hassan T, Tatham H, Wilson M, Roberts GJ. Comparison of lysis filtration and an automated blood culture system (BACTEC) for detection, quantification, and identification of odontogenic bacteremia in children. *J Clin Microbiol* 2002;40:3416–3420.
- Mayo Clinic. Factor V Leiden. <http://www.mayoclinic.org/diseases-conditions/factor-v-leiden/basics/symptoms/con-20032637>. Accessed 20 April 2016.
- Mergenhausen KA, Wattengel BA, Skelly MK, Clark CM, Russo TA. Fact versus fiction: A review of the evidence behind alcohol and antibiotic interactions. *Antimicrob Agents Chemother* 2020;64:e02167-19.
- Minneman KP, Wecker L. *Brody's Human Pharmacology: Molecular to Clinical*, ed 4. St Louis: Mosby, 2006.
- Mougeot FKB, Saunders SE, Brennan MT, Lockhart PB. Associations between bacteremia from oral sources and distant-site infections: Tooth brushing versus single tooth extraction. *Oral Surg Oral Med Oral Pathol Oral Radiol* 2015;119:430–435.
- Napeñas JJ, Hong CH, Brennan MT, Furney SL, Fox PC, Lockhart PB. The frequency of bleeding complications after invasive dental treatment in patients receiving single and dual antiplatelet therapy. *J Am Dent Assoc* 2009;140:690–695.
- Neville BW, Damm DD, White DK, Waldron CA. *Color Atlas of Clinical Oral Pathology*. Philadelphia: Lea & Febiger, 1990.
- Ogle OE, Dym H, Weinstock RJ (eds). *Medical Emergencies in Dental Practice*. Chicago: Quintessence, 2016.
- Patton LL, Glick M (eds). *The ADA Practical Guide to Patients with Medical Conditions*, ed 2. Hoboken, NJ: Wiley-Blackwell, 2016.
- Regezi JA, Sciubba JJ. *Oral Pathology: Clinical-Pathologic Correlations*, ed 2. Philadelphia: Saunders, 1993.
- Rhodus NL, Little JW. Dental management of the patient with cardiac arrhythmias: An update. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2003;96:659–668.
- Roberts HW, Redding SW. Coronary artery stents: Review and patient-management recommendations. *J Am Dent Assoc* 2000;131:797–801.
- Roerecke M, Kaczorowski J, Myers MG. Comparing automated office blood pressure readings with other methods of blood pressure measurement for identifying patients with possible hypertension: A systematic review and meta-analysis. *JAMA Intern Med* 2019;179:351–362.
- Salam S, Yusuf H, Milosevic A. Bleeding after dental extractions in patients taking warfarin. *Br J Oral Maxillofac Surg* 2007;45:463–466.
- Schimmer BP, Parker KL. Adrenocorticotrophic hormone; Adrenocortical steroids and their synthetic analogs; Inhibitors of the synthesis and actions of adrenocortical hormones. In: Brunton LL, Lazo JS, Parker KL (eds). *Goodman and Gilman's The Pharmacologic Basis of Therapeutics*, ed 11. New York: McGraw-Hill, 2005:1587–1612.
- Seymour RA, Thomason JM, Ellis JS. The pathogenesis of drug-induced gingival overgrowth. *J Clin Periodontol* 1996;23:165–175.
- Sonis ST, Fazio RC, Fang LS. *Oral Medicine Secrets*. Philadelphia: Hanley & Belfus, 2003.
- Streiff MB. Recommended Therapeutic Range and Duration of Warfarin Therapy. <http://silkview.com/refs/Warfarin%20INR%20Range%20and%20duration-5-31-05%20card%20version.pdf>. Accessed 19 April 2016.

- T-cell Modulation Group. http://www.tcells.org/scientific/tcell_activation. Accessed 19 April 2016.
- Weber C. Guide to High Blood Pressure Stages and Classes. http://highbloodpressure.about.com/od/newlydiagnosed/p/stage_pro.htm. Accessed 21 April 2016.
- Wilson WR, Gewitz M, Lockhart PB, et al. Prevention of viridans group streptococcal infective endocarditis: A scientific statement from the American Heart Association. *Circulation* 2021;143:e963–e978.
- Wilson W, Taubert KA, Gewitz M, et al. Prevention of infective endocarditis: Guidelines from the American Heart Association: A guideline from the American Heart Association Rheumatic Fever, Endocarditis, and Kawasaki Disease Committee, Council on Cardiovascular Disease in the Young, and the Council on Clinical Cardiology, Council on Cardiovascular Surgery and Anesthesia, and the Quality of Care and Outcomes Research Interdisciplinary Working Group. *Circulation* 2007;116:1736–1754.
- Wood NK, Goaz PW. *Differential Diagnosis of Oral and Maxillofacial Lesions*, ed 5. St Louis: Mosby, 1997.
- Yagiela JA, Dowd FJ, Johnson B, Mariotti A, Neidle EA. *Pharmacology and Therapeutics for Dentistry*. St Louis: Mosby, 2011:623.

Chapter 2

- Kourkouta S, Dedi KD, Paquette DW, Mol A. Interproximal tissue dimensions in relation to adjacent implants in the anterior maxilla: Clinical observations and patient aesthetic evaluation. *Clin Oral Implants Res* 2009;20:1375–1385.
- Tarnow DP, Cho SC, Wallace SS. The effect of inter-implant distance on the height of inter-implant bone crest. *J Periodontol* 2000;71:546–549.
- Teughels W, Merheb J, Quirynen M. Critical horizontal dimensions of interproximal and buccal bone around implants for optimal aesthetic outcomes: A systematic review. *Clin Oral Implants Res* 2009; 20(suppl 4):134–145.

Chapter 3

- Al-Faraje L. *Surgical and Radiologic Anatomy for Oral Implantology*. Chicago: Quintessence, 2013.
- Avery JK. *Oral Development and Histology*. Baltimore: Williams & Wilkins, 1987.
- Cho SC, Wallace SS, Froum SJ, Tarnow DP. Influence of anatomy on Schneiderian membrane perforations during sinus elevation surgery: Three-dimensional analysis. *Pract Proced Aesthet Dent* 2001;13:160–163.
- Craigmyle MBL. *A Colour Atlas of Histology*, ed 2. Chicago: Year Book Medical, 1995.
- Hall-Craggs ECB. *Anatomy as a Basis for Clinical Medicine*. Munich: Urban & Schwarzenberg, 1985.
- Kalpidis CD, Setayesh RM. Hemorrhaging associated with endosseous implant placement in the anterior mandible: A review of the literature. *J Periodontol* 2004;75:631–645.
- Logan BM, Reynolds PA. *McMinn's Color Atlas of Head & Neck Anatomy*, ed 4. St Louis: Mosby, 2010.
- McMinn RMH, Hutchings RT. *A Colour Atlas of Human Anatomy [in Arabic]*. St Louis: Mosby, 1980.
- Miles DA. *Color Atlas of Cone Beam Volumetric Imaging for Dental Applications*. Chicago: Quintessence, 2008.
- Norton NS. *Netter's Head and Neck Anatomy for Dentistry*. Philadelphia: Saunders, 2006.
- Piper SN, Maleck WH, Kumle B, Deschner E, Boldt J. Massive postoperative swelling of the tongue: Manual decompression and tactile intubation as a life-saving measure. *Resuscitation* 2000;43:217–220.
- Shah JT. *Color Atlas of Head and Neck Surgery: Mouth, Pharynx, Larynx, Thyroid, Parotid, Soft Tissues & Reconstructive Surgery*. London: Wolfe Medical, 1990.
- Ten Cate AR. *Oral Histology: Development, Structure, and Function*, ed 5. St Louis: Mosby, 1998.
- Timmenga NM, Raghoobar GM, Liems RS, van Weissenbruch R, Manson WL, Vissink A. Effects of maxillary sinus floor elevation on maxillary sinus physiology. *Eur J Oral Sci* 2003;111:189–197.

Chapter 4

- Agliardi EL, Tetè S, Romeo D, Malchiodi L, Gherlone E. Immediate function of partial fixed rehabilitation with axial and tilted implants having intrasinus insertion. *J Craniofac Surg* 2014;25:851–855.
- Al-Faraje F. *Surgical Complications in Oral Implantology: Etiology, Prevention, and Management*. Chicago: Quintessence, 2011.

- Anavi Y, Allon DM, Avishai G, Calderon S. Complications of maxillary sinus augmentations in a selective series of patients. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2008;106:34–38.
- Boyne PJ. *Osseous Reconstruction of the Maxilla and the Mandible*. Chicago: Quintessence, 1997.
- Briggs RD, Wright ST, Cordes S, Calhoun KH. Smoking in chronic rhinosinusitis: A predictor of poor longterm outcome after endoscopic sinus surgery. *Laryngoscope* 2004;114:126–128.
- Buser D, Dahlin C, Schenk RK. *Guided Bone Regeneration in Implant Dentistry*. Chicago: Quintessence, 1994.
- Cranin AN, Klein M, Simons A. *Atlas of Oral Implantology*, ed 2. St Louis: Mosby, 1999.
- Das S, Becker AM, Perakis H, Prosser JD, Kountakis SE. The effects of smoking on short-term quality of life outcomes in sinus surgery. *Laryngoscope* 2007;117:2229–2232.
- de Papp A, Bone HG, Caulfield MP, et al. A cross-sectional study of bone turnover markers in healthy premenopausal women. *Bone* 2007;40:1222–1230.
- Devani P, Lavery KM, Howell CJ. Dental extractions in patients on warfarin: Is alteration of anticoagulant regime necessary? *Br J Oral Maxillofac Surg* 1998;36:107–111.
- Edwards BJ, Hellstein JW, Jacobsen PL. Updated recommendations for managing the care of patients receiving oral bisphosphonate therapy: An advisory statement from the American Dental Association Council on Scientific Affairs. *J Am Dent Assoc* 2008;139:1674–1677 [erratum 2009;140:522].
- Francischone CE, Vasconcelos LW, Brånemark PI. *Osseointegration and Esthetics in Single Tooth Rehabilitation*. Chicago: Quintessence, 2000.
- Granström G, Tjellström A, Albrektsson T. Postimplantation irradiation for head and neck cancer treatment. *Int J Oral Maxillofac Implants* 1993;8:495–501.
- Guler N, Delilbasi C. Ectopic dental implants in the maxillary sinus. *Quintessence Int* 2007;38:e238–e239.
- Ihde S, Kopp S, Gundlach K, Konstantinovic VS. Effects of radiation therapy on craniofacial and dental implants: A review of the literature. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2009;107:56–65.
- Jensen OT. *The Sinus Bone Graft*, ed 2. Chicago: Quintessence, 2006.
- Jensen OT, Shulman LB, Block MS, Iacono VJ. Report of the sinus consensus conference of 1996. *Int J Oral Maxillofac Implants* 1998;13(suppl):11–45.
- Jiménez-López V. *Oral Rehabilitation with Implant-Supported Protheses*. Chicago: Quintessence, 1999.
- Johnsson K, Hansson A, Granström G, Jacobsson M, Turesson I. The effects of hyperbaric oxygenation on bone-titanium implant interface strength with and without preceding irradiation. *Int J Oral Maxillofac Implants* 1993;8:415–419.
- Kim YK, Hwang JY, Yun PY. Relationship between prognosis of dental implants and maxillary sinusitis associated with the sinus elevation procedure. *Int J Oral Maxillofac Implants* 2013;28:178–183.
- Lynch SE, Genco RJ, Marx RE. *Tissue Engineering: Applications in Maxillofacial Surgery and Periodontics*. Chicago: Quintessence, 1999.
- Nilsson P, Albrektsson T, Granström G, Röckert HO. The effect of hyperbaric oxygen treatment on bone regeneration. An experimental study using the bone harvest chamber in the rabbit. *Int J Oral Maxillofac Implants* 1988;3:43–48.
- Nolan PJ, Freeman K, Kraut RA. Correlation between Schneiderian membrane perforation and sinus lift graft outcome: A retrospective evaluation of 359 augmented sites. *J Oral Maxillofac Surg* 2014;72:47–52.
- Oh E, Kraut RA. Effect of sinus membrane perforation on dental implant integration: A retrospective study on 128 patients. *Implant Dent* 2011;20:13–19.
- Pal US, Sharma NK, Singh RK, et al. Direct vs. indirect sinus lift procedure: A comparison. *Natl J Maxillofac Surg* 2012;3:31–37.
- Palacci P. *Esthetic Implant Dentistry: Soft and Hard Tissue Management*. Chicago: Quintessence, 2001.
- Renouard F, Rangert B. *Risk Factors in Implant Dentistry: Simplified Clinical Analysis for Predictable Treatment*, ed 2. Chicago: Quintessence, 2008.
- Ruggiero S, Gralow J, Marx RE, et al. Practical guidelines for the prevention, diagnosis, and treatment of osteonecrosis of the jaw in patients with cancer. *J Oncol Pract* 2006;2:7–14.
- Si MS, Zhuang LF, Gu YX, Mo JJ, Qiao SC, Lai HC. Osteotome sinus floor elevation with or without grafting: A 3-year randomized controlled clinical trial. *J Clin Periodontol* 2013;40:396–403.

- Siervo S. *Suturing Techniques in Oral Surgery*. Chicago: Quintessence, 2008:211.
- Valerin MA, Brennan MT, Noll JL, et al. Relationship between aspirin use and postoperative bleeding from dental extractions in a healthy population. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2006;102:326.
- Wallace SS, Mazor Z, Froum SJ, Cho SC, Tarnow DP. Schneiderian membrane perforation rate during sinus elevation using piezosurgery: Clinical results of 100 consecutive cases. *Int J Periodontics Restorative Dent* 2007;27:413–419.
- Weinberg LA. *Atlas of Tooth- and Implant-Supported Prosthodontics*. Chicago: Quintessence, 2003.
- Weiss CM, Weiss A. *Principles and Practice of Implant Dentistry*. St Louis: Mosby, 2001.
- White LC, Kazi AA, Jang DW, Gurrola J, Kountakis SE. The effect of smoking on quality of life following sinus surgery: 10-year follow-up. *ORL J Otorhinolaryngol Relat Spec* 2015;77:39–43.
- Zarb GA, Bolender CL. *Prosthodontic Treatment for Edentulous Patients: Complete Dentures and Implant-Supported Protheses*, ed 12. St Louis: Mosby, 2004.

Chapter 5

- Babbini M, Thomas ML. *Pharmacology Test Prep: 1500 USMLE-Style Questions & Answers*. New York: Thieme Medical, 2015.
- Bell WE. *Orofacial Pains: Classification, Diagnosis, Management*, ed 4. Chicago: Year Book Medical, 1989.
- Constantinides F, Rizzo R, Pascasio L, Maglione M. Managing patients taking novel oral anticoagulants (NOAs) in dentistry: A discussion paper on clinical implications. *BMC Oral Health* 2016;16:5.
- Cunha BA, Ortega AM. Antibiotic failure. *Med Clin North Am* 1995;79:633–672.
- Davis VL, Abukabda AB, Radio NM, et al. Platelet-rich preparations to improve healing. Part II: Platelet activation and enrichment, leukocyte inclusion, and other selection criteria. *J Oral Implantol* 2014;40:511–521.
- deShazo RD, Nelson HS. An approach to the patient with a history of local anesthetic hypersensitivity: Experience with 90 patients. *J Allergy Clin Immunol* 1979;63:387–394.
- Dionne RA, Phero JC, Becker DE. *Management of Pain & Anxiety in the Dental Office*. Philadelphia: Saunders, 2002.
- Fonseca RJ, Marciani R, Turvey T. *Oral and Maxillofacial Surgery*, ed 2. Philadelphia: Saunders, 2008.
- Gandy W. Severe epinephrine-propranolol interaction. *Ann Emerg Med* 1989;18:98–99.
- Gómez-Moreno G, Guardia J, Cutando A. Interaction of paracetamol in chronic alcoholic patients. Importance for odontologists. *Med Oral Patol Oral Cir Bucal* 2008;13:E235–E238.
- Goodman SB, Jiranek W, Petrow E, Yasko AW. The effects of medications on bone. *J Am Acad Orthop Surg* 2007;15:450–460.
- Jeffcoat MK, Reddy MS, Wang IC, Meuninghoff LA, Farmer JB, Koth DL. The effect of systemic flurbiprofen on bone supporting dental implants. *J Am Dent Assoc* 1995;126:305–311.
- Kalafutova S, Juraskova B, Vlcek J. The impact of combinations of non-steroidal anti-inflammatory drugs and anti-hypertensive agents on blood pressure. *Adv Clin Exp Med* 2014;23:993–1000.
- Kozody R, Ready LB, Barsa JE, Murphy TM. Dose requirement of local anesthetic to produce grand mal seizure during stellate ganglion block. *Can Anaesth Soc J* 1982;29:489–491.
- Lang NP, Wilson TG, Corbet EF. Biological complications with dental implants: Their prevention, diagnosis and treatment. *Clin Oral Implants Res* 2000;11(suppl 1):146–155.
- Lee Y, Le CH, Oh U. Painful channels in sensory neurons. *Mol Cells* 2005;20:315–324.
- Li XJ, Jee WS, Li YL. Flurbiprofen enhances growth and cancellous and cortical bone accumulation in rapidly growing long bone. *Bone* 1989;10:35–44.
- Lorenz K, Bruhn G, Heumann C, Netuschil, Brex M, Hofmann T. Effect of two new chlorhexidine mouth-rinses on the development of dental plaque, gingivitis, and discoloration: A randomized, investigator-blind, placebocontrolled, 3-week experimental gingivitis study. *J Clin Periodontol* 2006;33:561–567.
- Marx RE. *Oral & Intravenous Biphosphonate-Induced Osteonecrosis of the Jaws: History, Etiology, Prevention, and Treatment*. Chicago: Quintessence, 2007.

- Moeintaghavi A, Talebi-ardakani MR, Haerian-ardakani A, et al. Adjunctive effects of systemic amoxicillin and metronidazole with scaling and root planing: A randomized, placebo controlled clinical trial. *J Contemp Dent Pract* 2007;8(5):51–59.
- Mombelli A. Microbiology and antimicrobial therapy of peri-implantitis. *Periodontol 2000* 2002;28:177–189.
- Mombelli A, Lang NP. The diagnosis and treatment of peri-implantitis. *Periodontol 2000* 1998;17:63–76.
- Munson ES, Wagman IH. Diazepam treatment of local anesthetic-induced seizures. *Anesthesiology* 1972;37:523–528.
- Newman MG, van Winkelhoff AJ (eds). *Antibiotic and Antimicrobial Use in Dental Practice*, ed 2. Chicago: Quintessence, 2001.
- Nishizawa Y, Nakamura T, Ohta H, et al. Guidelines for the use of biochemical markers of bone turnover in osteoporosis (2004). *J Bone Miner Metab* 2005;23:97–104.
- Ogle OE, Dym H, Weinstock RJ (eds). *Medical Emergencies in Dental Practice*. Chicago: Quintessence, 2016.
- Pallasch TJ. Clostridium difficile-associated diarrhea and colitis. *J Calif Dent Assoc* 1999;27:405–413.
- Pallasch TJ. Global antibiotic resistance and its impact on the dental community. *J Calif Dent Assoc* 2000;28:215–233.
- Parsons SE. *Pharmaceutical Calculations*. Pittsburgh: Parsons, 2012.
- Schneider JP, Miller A. Oxycodone to oxymorphone metabolism. *Practical Pain Management*. <http://www.practicalpainmanagement.com/treatments/pharmacological/opioids/oxycodone-oxymorphone-metabolism>. Accessed 21 April 2016.
- Simon AM, O'Connor JP. Dose and time-dependent effects of cyclooxygenase-2 inhibition on fracture-healing. *J Bone Joint Surg Am* 2007;89:500–511.
- Simon LS. Role and regulation of cyclooxygenase-2 during inflammation. *Am J Med* 1999;106(5B suppl):375–425.
- Sorsa T, Tjäderhane L, Konttinen YT, et al. Matrix metalloproteinases: Contribution to pathogenesis, diagnosis and treatment of periodontal inflammation. *Ann Med* 2006;38:306–321.
- Trevor AJ, Katzung BG, Masters SB. *Katzung & Trevor's Pharmacology Examination and Board Review*, ed 7. New York: McGraw-Hill, 2003.
- Wang GK. Binding affinity and stereoselectivity of local anesthetics in single batrachotoxin-activated Na⁺ channels. *J Gen Physiol* 1990;96:1105–1127.
- Weinstein RD. True strength. *J Bone Miner Res* 2000;15:621–625.
- Wu X, Al-Abedalla K, Rastikerdar E, et al. Selective serotonin reuptake inhibitors and the risk of osseointegrated implant failure: A cohort study. *J Dent Res* 2014;93:1054–1061.
- Yagiela JA, Dowd FJ, Johnson BS, Mariotti AJ, Neidle EA. *Pharmacology and Therapeutics for Dentistry*, ed 6. St Louis: Mosby, 2011.

Chapter 6

- Borie E, Orsi IA, de Araujo CP. The influence of the connection, length and diameter of an implant on bone biomechanics. *Acta Odontol Scand* 2015;73:321–329.
- Goiato MC, Shibayama R, Gennari Filho H, et al. Stress distribution in implant-supported prostheses using different connection systems and cantilever lengths: Digital photoelasticity. *J Med Eng Technol* 2016;40(2):35–42.
- Romeed SA, Malik R, Dunne SM. Marginal bone loss influence on the biomechanics of single implant crowns. *J Craniofac Surg* 2013;24:1459–1465.
- Siadat H, Hashemzadeh S, Geramy A, Bassir SH, Alikhasi M. Effect of offset implant placement on the stress distribution around a dental implant: A three-dimensional finite element analysis. *J Oral Implantol* 2015;41:646–651.

Chapter 7

- Aquilino SA, Shugars DA, Bader JD, White BA. Ten-year survival rates of teeth adjacent to treated and untreated posterior bounded edentulous spaces. *J Prosthet Dent* 2001;85:455–460.
- Baldissara P, Llukacej A, Ciocca L, Valandro FL, Scotti R. Translucency of zirconia copings made with different CAD/CAM systems. *J Prosthet Dent* 2010;104:6–12.
- Beumer J III, Faulkner RF, Shah KC, Moy PK. *Fundamentals of Implant Dentistry, Volume 1: Prosthodontic Principles*. Chicago: Quintessence, 2015.
- Brånemark PI (ed). *The Brånemark Novum Protocol for Same-Day Teeth: A Global Perspective*. Chicago: Quintessence, 2001.
- Burns DR, Unger JW, Coffey JP, Waldrop TC, Elswick RK Jr. Randomized, prospective, clinical evaluation of prosthodontic modalities for mandibular implant overdenture treatment. *J Prosthet Dent* 2011;106:12–22.
- Cantor R, Curtis TA, Shipp T, Beumer J 3rd, Vogel BS. Maxillary speech prostheses for mandibular surgical defects. *J Prosthet Dent* 1969;22:253–260.
- das Neves FD, Fones D, Bernardes SR, do Prado CJ, Neto AJF. Short implants: An analysis of longitudinal studies. *Int J Oral Maxillofac Implants* 2006;21:86–93.
- Davis DM, Packer ME, Watson RM. Maintenance requirements of implant-supported fixed prostheses opposed by implant-supported fixed prostheses, natural teeth, or complete dentures: A 5-year retrospective study. *Int J Prosthodont* 2003;16:521–523.
- Duyck J, Van Oosterwyck H, Vander Sloten J, De Cooman M, Puers R, Naert I. Magnitude and distribution of occlusal forces on oral implants supporting fixed prostheses: An in vivo study. *Clin Oral Implants Res* 2000;11:465–475.
- Garber DA, Salama MA. The aesthetic smile: Diagnosis and treatment. *Periodontol* 2000 1996;11:18–28.
- Heitz-Mayfield LJ, Huynh-Ba G. History of treated periodontitis and smoking as risks for implant therapy. *Int J Oral Maxillofac Implants* 2009;24(suppl):39–68.
- Jiménez-López V. *Oral Rehabilitation with Implant-Supported Prostheses*. Chicago: Quintessence, 1999.
- Johnsson AA, Sawaii T, Jacobsson M, Granström G, Turesson I. A histomorphometric study of bone reactions to titanium implants in irradiated bone and the effect of hyperbaric oxygen treatment. *Int J Oral Maxillofac Implants* 1999;14:699–706.
- Kim JH, Kim KR, Kim S. Critical appraisal of implant impression accuracies: A systematic review. *J Prosthet Dent* 2015;114:185.e1–192.e1.
- Kim JS, Raigrodski AJ, Flinn BD, Rubenstein JE, Chung KH, Mancl LA. In vitro assessment of three types of zirconia implant abutments under static load. *J Prosthet Dent* 2013;109:255–263.
- Misch CE, Judy KW. Classification of partially edentulous arches for implant dentistry. *Int J Oral Implantol* 1987;4:7–13.
- Murray C, Herson J, Daly T, Zimmerman S. Radiation necrosis of the mandible: A 10-year study. *Int J Radiat Oncol Biol Phys* 1980;6:549–553.
- Ogiso M, Tabata T, Kuo PT, Borgese D. A histologic comparison of the functional loading capacity of an occluded dense apatite implant and the natural dentition. *J Prosthet Dent* 1994;71:581–588.
- Parel SM, Sullivan DY. *Esthetics and Osseointegration*. Dallas: Osseointegration Seminars Inc, 1989.
- Phoenix RD, Cagna DR, DeFreest CF. *Stewart's Clinical Removable Partial Prosthodontics*, ed 3. Chicago: Quintessence, 2003.
- Preiskel HW. *Overdentures Made Easy: A Guide to Implant and Root Supported Prostheses*. Chicago: Quintessence, 1996.
- Renvert S, Quirynen M. Risk indicators for peri-implantitis. A narrative review. *Clin Oral Implants Res* 2015;26(suppl 11):15–44.
- Salama M, Ishikawa T, Salama H, Funato A, Garber D. Advantages of the root submergence technique for pontic site development in esthetic implant therapy. *Int J Periodontics Restorative Dent* 2007;27:521–527.
- Shugaa-Addin B, Al-Shamiri HM, Al-Maweri S, Tarakji B. The effect of radiotherapy on survival of dental implants in head and neck cancer patients. *J Clin Exp Dent* 2016;8:e194–e200.

- Stevens PJ, Frederickson EJ, Gress ML. *Implant Prosthodontics: Clinical and Laboratory Procedures*, ed 2. St Louis: Mosby, 2000.
- Tarnow D, Elian N, Fletcher P, et al. Vertical distance from the crest of bone to the height of the interproximal papilla between adjacent implants. *J Periodontol* 2003;74:1785–1788.
- Tarnow DP, Magner AW, Fletcher P. The effect of the distance from the contact point to the crest of bone on the presence or absence of the interproximal dental papilla. *J Periodontol* 1992;63:995–996.
- ten Bruggenkate CM, Asikainen P, Foitzik C, Krekeler G, Sutter F. Short (6-mm) nonsubmerged dental implants: Results of a multicenter clinical trial of 1 to 7 years. *Int J Oral Maxillofac Implants* 1998;13:791–798.
- Tsagkalidis G, Tortopidis D, Mpikos P, Kaisarlis G, Koidis P. Accuracy of 3 different impression techniques for internal connection angulated implants. *J Prosthet Dent* 2015;114:517–523.
- Venezia P, Torsello F, Cavalcanti R, D'Amato S. Retrospective analysis of 26 complete-arch implant-supported monolithic zirconia prostheses with feldspathic porcelain veneering limited to the facial surface. *J Prosthet Dent* 2015;114:506–512.
- Williams BH, Ochiai KT, Hojo S, Nishimura R, Caputo AA. Retention of maxillary implant overdenture bars of different designs. *J Prosthet Dent* 2001;86:603–607.
- Williamson EH, Lundquist D. Anterior guidance: Its effect on electromyographic activity of the temporal and masseter muscles. *J Prosthet Dent* 1983;49:816–823.
- Zarb GA, Bolender CL. *Prosthodontic Treatment for Edentulous Patients: Complete Dentures and Implant-Supported Prostheses*, ed 12. St Louis: Mosby, 2004.

Chapter 8

- Cha HS, Kim JW, Hwang JH, Ahn KM. Frequency of bone graft in implant surgery. *Maxillofac Plast Reconstr Surg* 2016;38:19.
- Deeb GR, Deeb JG. Soft tissue grafting around teeth and implants. *Oral Maxillofac Surg Clin North Am* 2015;27:425–448.
- Dense-PTFE Membrane vs. Expanded-PTFE Membrane? <https://www.osseonews.com/dense-ptfe-membrane-vs-expanded-ptfe-membrane/> Accessed 10 November 2022.
- Louise F, Dragan O. *Essentials of Maxillary Sinus Augmentation*. London: Quintessence, 2018:17.
- Stimmelmayer M, Allen EP, Reichert TE, Iglhaut G. Use of a combination epithelized-subepithelial connective tissue graft for closure and soft tissue augmentation of an extraction site following ridge preservation or implant placement: Description of a technique. *Int J Periodontics Restorative Dent* 2010;30:375–381.
- Third-Generation PTFE Barriers Break the Stigma in Bone Regeneration Cases. <https://decisionsindentistry.com/article/unicare-biomedical/> Accessed 10 November 2022.
- Tolstunov L. *Vertical Alveolar Ridge Augmentation in Implant Dentistry: A Surgical Manual*. Hoboken, NJ: Wiley-Blackwell, 2016.
- Zhao R, Yang R, Cooper PR, Khurshid Z, Shavandi A, Ratnayake J. Bone grafts and substitutes in dentistry: A review of current trends and developments. *Molecules* 2021;26:3007.

Chapter 10

- Alberti A, Francetti L, Taschieri S, Corbella S. The applications of enamel matrix derivative in implant dentistry: A narrative review. *Materials (Basel)* 2021;14:3045.
- Ankrum JA, Ong JF, Karp JM. Mesenchymal stem cells: Immune evasive, not immune privileged. *Nat Biotechnol* 2014;32:252–260.
- Cervera-Maillo JM, Morales-Schwarz D, Morales-Melendez H, Mahesh L, Calvo-Guirado JL. Autologous tooth dentin graft: A retrospective study in humans. *Medicina (Kaunas)* 2021;58:56.
- Difference Between Amnion and Chorion. <http://www.differencebetween.net/science/health/difference-between-amnion-and-chorion/> Accessed 10 November 2022.
- Dwek JR. The periosteum: What is it, where is it, and what mimics it in its absence? *Skeletal Radiol* 2010;39:319–323.

- Freitas RM, Spin-Neto R, Marcantonio E Jr, Pereira LAVD, Wikesjö UME, Susin C. Alveolar ridge and maxillary sinus augmentation using rhBMP-2: A systematic review. *Clin Implant Dent Relat Res* 2015;17(suppl 1):e192–e201.
- Gupta A, Kedige SD, Jain K. Amnion and chorion membranes: Potential stem cell reservoir with wide applications in periodontics. *Int J Biomater* 2015;2015:274082.
- Harrison S, Vavken P, Kevy S, Jacobson M, Zurakowski D, Murray MM. Platelet activation by collagen provides sustained release of anabolic cytokines. *Am J Sports Med* 2011;39:729–734.
- Hassan M, Prakasam S, Bain C, Ghoneima A, Liu SSY. A randomized split-mouth clinical trial on effectiveness of amnion-chorion membranes in alveolar ridge preservation: A clinical, radiologic, and morphometric study. *Int J Oral Maxillofac Implants* 2017;32:1389–1398.
- He L, Lin Y, Hu X, Zhang Y, Wu H. A comparative study of platelet-rich fibrin (PRF) and platelet-rich plasma (PRP) on the effect of proliferation and differentiation of rat osteoblasts in vitro. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2009;108:707–713.
- Herford AS, Stoffella E, Stanford CM. Bone grafts and bone substitute materials. In: Torabinejad M, Sabeti MA, Goodacre CJ (eds). *Principles and Practice of Single Implant and Restoration*. Philadelphia: Saunders, 2014:75–86.
- Ikawa T, Akizuki T, Shujaa Addin A, Fukuba S, Stavropoulos A, Izumi Y. Enamel matrix derivative in liquid form as adjunct to natural bovine bone grafting at buccal bone dehiscence defects at implant sites: An experimental study in beagle dogs. *Clin Oral Implants Res* 2019;30:989–996.
- James AW, LaChaud G, Shen J, et al. A review of the clinical side effects of bone morphogenetic protein-2. *Tissue Eng Part B Rev* 2016;22:284–297.
- Kobayashi E, Flückiger L, Fujioka-Kobayashi M, et al. Comparative release of growth factors from PRP, PRF, and advanced-PRF. *Clin Oral Investig* 2016;20:2353–2360.
- Lynch Biologics website. <https://www.lynchbiologics.com/gem-21s/> Accessed 10 November 2022.
- Matichescu A, Ardelean LC, Rusu LC, et al. Advanced biomaterials and techniques for oral tissue engineering and regeneration—A review. *Materials (Basel)* 2020;13:5303.
- Pallesen L, Schou S, Aaboe M, Hjørting-Hansen E, Nattestad A, Melsen F. Influence of particle size of autogenous bone grafts on the early stages of bone regeneration: A histologic and stereologic study in rabbit calvarium. *Int J Oral Maxillofac Implants* 2002;17:498–506.
- Park SY, Kim KH, Kim S, Lee YM, Seol YJ. BMP-2 gene delivery-based bone regeneration in dentistry. *Pharmaceutics* 2019;11:393.
- Paz AG, Maghaireh H, Mangano FG. Stem Cells in Dentistry: Types of intra- and extraoral tissue-derived stem cells and clinical applications. *Stem Cells Int* 2018; 2018:4313610.
- Rutkowski JL, Thomas JM, Bering CL, et al. Analysis of a rapid, simple, and inexpensive technique used to obtain platelet-rich plasma for use in clinical practice. *J Oral Implantol* 2008;34:25–33.
- Singh P, Suresh DK. Clinical evaluation of GEM 21S(®) and a collagen membrane with a coronally advanced flap as a root coverage procedure in the treatment of gingival recession defects: A comparative study. *J Indian Soc Periodontol* 2012;16:577–583.
- Soudi A, Yazdani M, Ranjbar R, et al. Role and application of stem cells in dental regeneration: A comprehensive overview. *EXCLI J* 2021;20:454–489.
- Wakefield LM, Winokur TS, Hollands RS, Christopherson K, Levinson AD, Sporn MB. Recombinant latent transforming growth factor beta 1 has a longer plasma half-life in rats than active transforming growth factor beta 1, and a different tissue distribution. *J Clin Invest* 1990;86:1976–1984.
- Woo EJ. Adverse events reported after the use of recombinant human bone morphogenetic protein 2. *J Oral Maxillofac Surg* 2012;70:765–767.
- Zhang W, Wang N, Yang M, et al. Periosteum and development of the tissue-engineered periosteum for guided bone regeneration. *J Orthop Translat* 2022;33:41–54.



CONTENTS

- 1** Medical Evaluation of the Implant Patient
- 2** Oral Evaluation and Treatment Planning
- 3** Head and Neck Anatomy
- 4** Surgical Procedures and Complications
- 5** Pharmacology
- 6** Biomechanics
- 7** Implant Prosthodontics
- 8** Bone Grafting
- 9** Zygomatic and Pterygoid Implants
- 10** Blood Concentrates and Growth Factors

978-1-64724-156-8



9 781647 241568