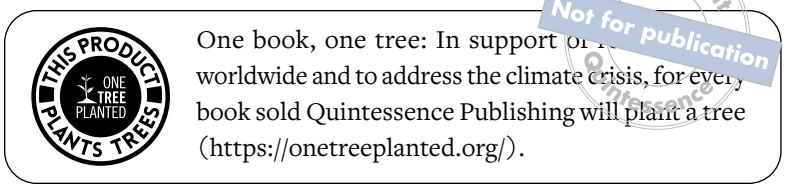
The Art of Complete [illegible]ure Therapy
for the General Practitioner



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The Art of COMPLETE DENTURE THERAPY

for the General Practitioner

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This book is dedicated to my mother, Marlene Huff, RN, PhD, who has been my first mentor and role model for ethical patient care as well as my advisor, counselor, and lifelong cheerleader and friend. It is also dedicated to my many mentors, past students, and trusted colleagues who have encouraged me throughout my career and taught me much more than I can remember. It is also dedicated to my father, Darryl, who took up a second career upon retirement from being a school principal to work with me as my in-house laboratory technician; it was an honor to train him in the laboratory skills discussed in this text and then to refine my own skills in collaboration with him. Lastly, but certainly not in the least, this work could not have been completed without the support and encouragement of my wife Stacie and my daughter Kamdyn.

Kevin D. Huff

The gratitude that I feel for being a part of a profession connected with continuous learning is incredibly energizing, and I cannot imagine this life experience without the interaction with many willing and unknowing mentors that have had influence over time—thank you all for being there! This book is a representation of the support I have been fortunate to receive from my family unit, my parents Gary and Laurel as well as my wife Gwen and daughter Isabella. Thank you for your presence and your grace!

Douglas G. Benting

CONTENTS

FOREWORD

When my friend for more than two decades, Kevin Huff, invited me to write the foreword for his new book on complete denture therapy, I was excited for many reasons, not the least of which is to witness—decades later—how the love of removable prosthetic therapy that I first observed when he was a dental student has grown throughout his career as a clinician. More pragmatically, as a dental educator, researcher, and prosthodontist, I believe that a contemporary and practical book for the general practitioner and for the dental student is long overdue. Dr Huff collaborated with Douglas Benting, a practicing prosthodontist in Phoenix, Arizona, to produce a modern book on contemporary complete denture therapy that is written in a scientific yet practical way, addressing the issues that may appear in everyday clinical practice. Both authors combine decades of experience as practitioners in the real world and as educators to dental students and practicing dentists to bring back to life an art that appears to be dying in a world where implant-supported prostheses dominate. In fact, there are many people who suffer from the handicap of edentulism for whom dental implants are contraindicated for a variety of reasons (eg, anatomical limitations, financial challenges). This textbook clearly illustrates the zeal that Drs Huff and Benting have about educating as many clinicians in the art of complete denture therapy as are willing to learn while empathetically addressing patient needs through demonstrating a method to follow the code of ethics as prescribed by Hippocrates.

Through this book, Drs Huff and Benting highlight the importance of key ethical tenets: patient autonomy, nonmaleficence, benevolence, justice, and veracity. It is common for clinicians to minimize the importance of (and sometimes to forget) the ethical treatment of patients who suffer from edentulism who may not be able to undergo dental implant therapy. Unfortunately, there may be a tendency to minimize the importance of complete denture therapy to "just plates" rather than a medical device that can greatly improve and even extend a patient's life. When complete dentures are viewed as commodities rather than life-changing prostheses for those suffering from total edentulism, corners are often cut for financial gain. Drs Huff and Benting have provided a valuable refresher on the importance of empathy and the application of dental ethics to complete denture therapy that hopefully will encourage the reader to fight this trend.

For example, through case examples and ethical decision-making sidebars, the authors emphasize that the patient must be informed about the available treatment options for their condition and have the knowledge available to decide their appropriate course of treatment while understanding the risks and benefits of their choice. Especially, the patient in a terminal dentition state has to be ethically guided to make the right decision on whether effort should be taken to save the remaining teeth, extract them and fabricate a complete denture, or extract them and fabricate an implant-supported prosthesis. Additionally, the authors highlight the fact that the general practitioner needs to be self-aware and be able to understand when to refer the patient to a more qualified specialist.

While the rates of edentulism are declining in industrialized countries, the need for quality complete denture therapy will be substantial for a long time to come due to population aging, migration, and fiscal issues. Even if a patient is going to receive full-mouth implant-supported prostheses, all the preliminary work to define the proper vertical dimension, jaw relation, occlusal plane, lip and cheek support, position of maxillary central incisor, and phonetics and esthetic evaluation should be accomplished with the tools taught in complete denture fabrication. Therefore, understanding the art of complete denture therapy is essential even for those clinicians who primarily provide fixed or fixed-detachable implant prosthetic therapy.

This book has been structured in a pragmatic manner that walks the reader through the actual dental appointment workflow: examination, initial impressions, custom tray fabrication, final impressions, master casts and base plate fabrication, tooth selection and esthetic try-in, dental laboratory procedures, delivery, remount procedures, and maintenance. Alternative methods to minimize the number of clinical appointments are not forgotten nor dismissed by Drs Huff and Benting, and related reasonable approaches are described and discussed. Because some clinicians enjoy laboratory work and others prefer to outsource as much

laboratory work as possible, the authors review laboratory steps that can easily and practically be done in house. Of course, each clinician must decide to what extent they will be involved in the nonclinical stages of denture fabrication, and the authors provide valuable assistance in making this decision.

A great effort was put into presenting the concept of digital technology in compete dentures. However, this area of complete denture therapy is in its infancy at the time this book is written. Therefore, current challenges and benefits as we currently understand them are skillfully presented while the authors are fully aware that as technology improves, the information presented regarding digital denture therapy may rapidly change. With the advent of new digital technologies, the practitioner has more available tools that can potentially benefit the patient as we move into the future. Since these technologies are continually evolving, we should continue exploring them and judiciously decide what should be incorporated in our daily workflow.

Complete denture fabrication is the basis of advanced prosthetic therapy. This book will help dental students to be taught complete dentures in a new fresh way. Additionally, it is worth reading and it will assist general practitioners who may have a desire to master complete denture therapy while elucidating some of the secrets of complete denture therapy.

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PREFACE

Despite remarkable advances in technology and oral medicine that allow for earlier diagnosis, predictable treatment outcomes, and less invasive treatment, tooth decay and periodontal disease continue to be major causes of tooth loss in the aging population. As the worldwide population of those over the age of 50 years continues to grow—and is expected to continue growing over the next two to three decades—the need for quality denture care is becoming increasingly important. Practicing clinicians are faced with the challenging task of managing complete edentulism for this aging population. However, there is a recent trend in undergraduate dental education to reduce the time spent on the basic principles of removable complete denture therapy. While the ever-growing scientific knowledge about the field of general dentistry demands increasing focus on other areas of dental education (eg, CAD/CAM and digitized workflow, orofacial pain, oral medicine, implant therapy, etc) to keep pace with modern knowledge and to prepare dentists for the skill sets that they need now and going forward, removable complete denture therapy is one of the areas that cannot be forgotten. As we, the authors, have personally witnessed—and has many of you have expressed to us at various venues and through social media—a significant segment of the edentulous population, already forced to live without teeth, must also live with inadequate dentures. Removable complete denture therapy is often performed by clinicians, general dentists, and even denturists whose limited training prevents them from delivering the high quality of care required for this population. While there is a trend and a common belief—possibly even a mantra—that dental implants are a panacea for edentulous patients, we strongly believe that complete denture therapy remains a valid option for providing a reasonable quality of life for many in the edentulous population, as long as basic principles are mastered in conjunction with it.

Our experience working with undergraduate dental students as well as many practicing dentists who take continuing education workshops has made it clear to us that many general practitioners believe they have been adequately trained in complete denture therapy in dental school, but they admit that they may only have completed a complete denture for a single arch prior to beginning private practice. However, the first patient who does not present as a textbook-like case highlights their lack of understanding of many nuances of complete denture therapy, such as the patient who does not have a stable and reproducible biting position, who is psychologically compromised, or who has severe ridge atrophy. Many of these topics regarding denture care have been removed from basic complete denture training in dental schools in the past two decades due to time constraints in dental school curricula. However, they are essential for practicing clinicians to manage moderately complex and difficult cases that are routinely encountered in daily clinical practice. Unfortunately, many clinicians who choose to provide complete denture therapy default to relying on commercial laboratory technicians for key diagnostic skills like occlusal design and tooth position that approximate appropriate anatomy for each individual patient. When clinicians become frustrated with the results and patient disgruntlement that may occur because of inadequate training and diagnostic skills for complete denture therapy, many choose to give up and stop providing this valuable service, especially since continuing education is limited for complete denture therapy. Some even view this therapy as a lower-producing service. However, the principles of identifying tooth position, working with both intraoral as well as extraoral landmarks in complete denture therapy, are fundamental to the positioning and placement of dental implants. Elaborate planning for complex implant-supported prostheses without first mastering the art of complete denture therapy is, quite frankly, getting the care before the horse, so to speak.

There have been several excellent textbooks written on complete denture therapy. However, a book dedicated to removable complete denture therapy has not been published in the past decade. Those books that started out being dedicated to removable complete denture therapy have followed suit with dental education trends and have become filled more and more with dental implant prosthetics while minimizing the basic tenets of removable complete denture therapy that we strive to highlight here. Since many basic principles of complete denture therapy

ACKNOWLEDGMENTS

(eg, border molding and impression making, in-laboratory denture processing) have been thoroughly discussed in other texts, our goal has been to provide a review of those concepts through photographic essays. In other areas of interest, such as examination of the complete denture patient and smile design, we have gone in depth to illustrate the fact that there is still a person who wears the complete dentures—with many of the needs of the dentate patient and who may present with greater diagnostic challenges.

A key point that we strive to make throughout this book is that complete dentures are not a replacement for teeth; they are a substitute for no teeth. They do not function nor feel anything like natural teeth. If we believe this, then we also must recognize that modern complete denture patients deserve to be treated by clinicians who have current diagnostic skills, including airway considerations, conditions affecting the temporomandibular joints and denture support structure, and esthetic smile design principles. Therefore, in this book we address the concepts of ethical and evidence-based treatment planning, understanding that complete denture therapy may realistically be a transitional step to more advanced dental prosthetics.

We are passionate about the need for quality removable complete denture therapy and are empathetic to the needs of those who suffer from the loss of teeth yet cannot enjoy the benefits of implant-supported prostheses for a variety of reasons. Therefore, the primary objective of *The Art of Complete Denture Therapy for the General Practitioner* is to present realistic methods and techniques to practicing dental practitioners for providing quality removable complete denture therapy from the perspective of a practicing general dentist. Our goal for this book is to provide an interactive reference of best practices for practicing dentists and other clinical care providers who desire to serve the edentulous population through quality removable complete denture therapy.

We are extremely grateful for the meaningful contributions of our authors. Dr Gary DeWood brings a modern and well-founded method of esthetic smile design to life based on the fundamental concept of artistically positioning teeth in harmony with facial anatomy. Dr Margaret Frankel summarizes what we currently understand about the airway, especially how it relates to the edentulous population. We would also like to extend our warmest gratitude to Dr Rick Jude, the prosthodontist who originally wrote the core manuscript upon which this textbook was founded. Without his ongoing support and consultation, this book would not have been possible. Of course, we are also grateful to Dr Efstratios "Stratis" Papazoglou, who has given his time and energy to comment on and review this text.

There are two commercial dental laboratories who have graciously contributed photography and offered technical advice for this text. Bay View Dental Laboratory in Chesapeake, Virginia, is a full-service commercial dental laboratory who has built a solid reputation for quality dental prosthetics (www.bvdl.com). Lantz Dental Prosthetics, Inc, in Maumee, Ohio, is a commercial laboratory dedicated to the quality fabrication of removable partial dentures, implant-supported dentures, and removable complete dentures (www.lantzdental.com). We thank these laboratories for their contributions to this book.

Lastly, but certainly not least, we thank our wives and children for allowing us the time to spend on this project. Their support and encouragement have helped us fight writer's fatigue, provided ideas for creativity, and allowed us to manage the challenges of writing a textbook. To them we say, "Thank you. You are very special to us, and we love you."

HOW TO USE THIS BOOK

For easy reference, we have identified each step in the complete denture therapy process according to clinical and laboratory steps. Throughout this book, you will find color-coded page markers identifying clinical steps, laboratory steps, and digital solutions. We hope that you will find this format helpful as you master complete denture therapy in your practice.

Standard Sequence of Complete Denture Therapy

CLINICAL APPOINTMENT STEPS	LABORATORY STEPS	PAGE
Examination, imaging, and preliminary impressions		11
	Custom tray fabrication	55
Final impressions		59
	Boxing and pouring	67
	Baseplate and wax rim fabrication	76
Jaw records		94
	Mounting models on an articulator	116
	Setting prosthetic teeth and preparing wax-up	120
Esthetic try-in		134
	Flasking, processing, remounting, grinding in occlusion, finishing, and polishing	142
Delivery		154
Clinical remount (may be done at delivery)	Clinical remount (may be done at delivery)	152
Follow-up adjustments		156

Chapter 1

Understanding the Art of Complete Denture Therapy

I don't do many dentures, but when I do, success is a total crapshoot. At this point, I'm seriously considering sending all of my dentures down the road to one of the chain practices that do a lot of dentures, or I need some serious enlightenment on how to make a great denture. No matter how much adjusting, soft liners, or hard relines I make, I still can't make my patients comfortable. I'm losing patients, and I'm losing money. Worse yet, I'm starting to hate doing dentures!

–Paraphrased from discussions with a "millennial" dentist

Is Complete Denture Therapy Still Relevant?

Complete denture therapy remains a valid option for providing a reasonable quality of life for the edentulous population. The worldwide population of those over the age of 50 years is expected to continue to grow over the next two to three decades, and despite remarkable advances in technology and oral medicine that allow for earlier diagnosis, tooth decay and periodontal disease continue to be major causes of tooth loss in the aging population. As a result, predictable treatment outcomes, less invasive treatment, and the need for quality denture care will become increasingly important. However, there is a recent trend in undergraduate dental education to reduce the time spent on complete denture therapy techniques while increasing focus on other areas of dental education to keep pace with modern technology and increased demand for focus on dental medicine. While attention to these areas of dental education is essential, a significant segment of the edentulous population may be restricted to complete denture therapy provided by clinicians who are inadequately prepared to meet their basic needs. Specifically, while dental implant therapy is a valuable service and requires adequate training to meet appropriate standards of care, implants are still out of the realm of possibility for many patients for a variety of reasons (eg, financial limitations, anatomical limitations, medical contraindications).

In the United States, the National Health and Nutrition Examination Survey (NHANES) estimates that among people from 65 to 74 years of age, 23.93% are completely edentulous. Of those who are 75 years or older, over 31% are missing all teeth.[1] While it is generally accepted that the percentage of adults who are edentulous is decreasing, this is somewhat offset by the increasing number of people living past the age of 65 in the United States. Given these statistics, we believe that providing quality complete denture services should be mastered and considered essential. Unfortunately, complete denture therapy training tends to be progressively diminishing in dental school and continuing education curricula to be replaced by increased training in the field of fixed implant prosthodontics. Since understanding the biophysics and functional esthetic principles of complete denture therapy is essential to advanced therapy with dental implants, we hope that the concepts of this text are studied and implemented in general practice.

FIG 1-1 (*a to c*) Case example 1. A patient with a severely worn dentition presents requesting full-mouth exodontia and complete denture therapy. →

We have spoken with many general dentists over the years who feel that the level of patient satisfaction with complete dentures is just too low to justify the amount of time required to provide premium services. In addition, the value of complete denture therapy is increasingly minimized through a constant drive by third-party payers, the corporate marketplace, and by patient misconception, resulting in reimbursement rates and fee design that simply fail to make denture therapy profitable for many clinicians. We firmly believe that the success rate for denture therapy, including clinician and patient satisfaction, can be much higher than is generally experienced. The prerequisite for success is for the therapy to be done properly—which includes resisting the temptation to cut corners during construction of complete dentures—while charging ethical and reasonable fees commensurate with the time spent and expertise of the clinician providing the therapy.

In the pages that follow, our goal is to provide an interactive reference for general dentists who desire to serve the edentulous population through quality removable complete denture therapy. It is not our intention to minimize the benefits of nor to discredit implant dentistry but to simply provide a foundation for an alternative approach. Complete denture therapy, in our opinion, is also foundational to being able to provide excellent complex dental therapies, including implant-supported reconstruction.

How to Help Your Patients Decide if Complete Dentures Are Right for Them

Throughout our discussions with you, we will be applying ethical decision-making principles in an effort to assist you in making choices regarding diagnoses and technical procedures. While we fully understand that you may not agree with our ethical arguments, we hope and trust that they will stimulate your thought processes along the way toward excellent denture care.

For example, consider the following case: A 73-year-old man who has a very public persona presents to your office with the vague chief complaint of "My teeth are breaking, and I want dentures." He states that he has no significant financial limitations. His medical history is positive for coronary bypass within the past 5 years without complications, type 2 diabetes mellitus, and two-a-day cigar smoking for over 40 years, and he is taking anticoagulant medications. His dental history, as might be obvious from his clinical presentation, reflects a lifelong history of problem-focused dental care with a poor recall compliance history. The clinical exam reflects a nonrestorable and abscessed maxillary right lateral incisor, generalized attrition and compensatory eruption, no active caries, and no periodontal pocketing beyond 3 mm. An ethical decision-making process must be exercised before the question can be answered, "What should you do?" (Fig 1-1).

Applying an objective ethical decision-making process to this case would assist in developing an appropriate care plan[2] (Table 1-1). In this process, we would carefully weigh the possible treatment options in light of five ethical principles: patient autonomy, nonmaleficence, beneficence, justice, and veracity. As clinicians, we have a duty to respect our patient's right to decide their own course of treatment; however, this choice cannot be made without a thorough understanding of the reasonable risks and benefits of that choice. We also have a duty not to intentionally hurt our patients, including performing treatment that we know will leave them in worse condition than their initial presentation or with a higher risk of expense, discomfort, and inconvenience. Along those same lines, the principle of beneficence demands that we have a duty to promote the well-being of our patients, which may include enabling increased self-esteem as well as setting

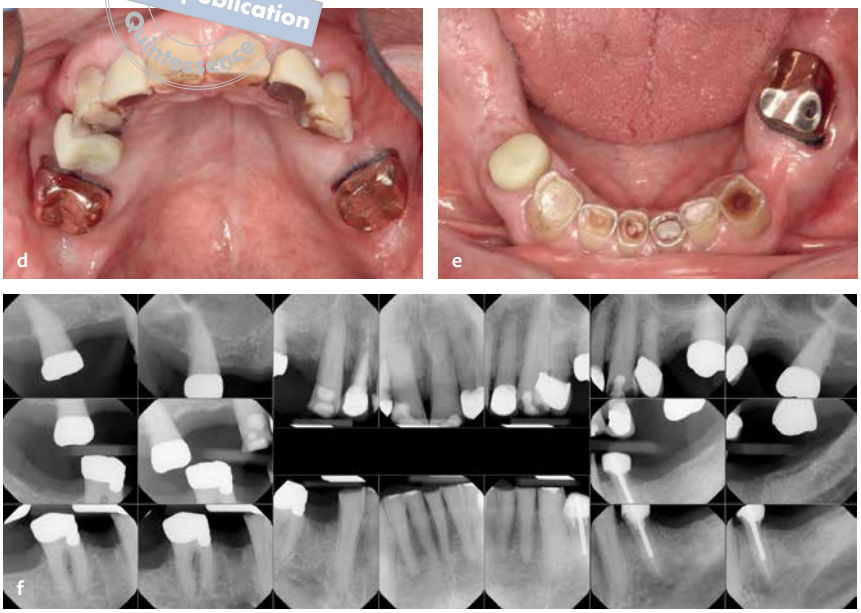

FIG 1-1 (CONT) (*d to f*) Case example 1. A patient with a severely worn dentition presents requesting full-mouth exodontia and complete denture therapy.

Table 1-1 Ethical decision-making considerations for Case 1

Autonomy	Options to be considered included (1) full-mouth reconstruction, (2) accommodative simple dentistry to maintain dentition with extraction and replacement of the failing maxillary lateral incisor, (3) maxillary phased complete denture therapy with or without implant support over mandibular reconstruction with or without single-tooth implants, (4) complete denture therapy, and (5) complete exodontia with complex immediate implant reconstruction. Benefits and risks, including loss of proprioception, bone resorption, medical complications, relative fees, and long-term anticipated maintenance costs, need to be clearly presented to the patient. Only then can he make an informed decision for care.
Nonmaleficence	The patient would best benefit from saving the majority of his existing dentition in order to preserve bone, improve mastication through proprioception, and minimize the medical risks of full-mouth exodontia. Long-term maintenance costs may likely be lower by restoring the natural dentition than the other options. Exodontia with or without implant therapy would require reduction of healthy crestal cortical bone to create prosthetic space.
Benevolence	There is no apparent medical or dental health benefit to extracting any more teeth than the maxillary right lateral incisor. This patient's periodontal status is healthy, and he has excellent bone support for his dentition. The prognosis of a full-mouth reconstruction would be good if performed by an adequately trained clinician.
Justice	Because the patient states that he is not limited financially and cites no significant time constraints, there is no justification for anything but a full-mouth reconstruction of the natural dentition. All of the other reasonable options have compromises to the patient's health and well-being that are unjustifiable. Even if the patient desires complete exodontia, the clinician may be at risk of battery because willfully crippling a patient is not something to which a patient can legally consent.
Veracity	All reasonable options with risks and benefits must be clearly discussed with the patient, and the patient's questions must be answered truthfully. It is the clinician's duty to express the benefits of maintaining the natural dentition in this particular case, and consideration should be given to referral to a prosthodontist if the primary clinician is not appropriately trained to diagnose and manage a case such as this.

Box 1-1 Influential factors for complete denture prognosis

- Patient expectations
- Expectations of the patient's significant other(s)
- Previous complete denture history
  - What was successful?
  - What was not successful?
- Anatomical challenges
  - Are there any epuli (hyperplastic tissues)?
  - What is the extent of ridge resorption?
  - Is there a significant skeletal overbite, underbite, or crossbite?
  - Is there an abnormal gag reflex?
- Patient attitude
  - Does he or she value new complete denture therapy?
  - Is the patient requesting care because he or she wants it or because someone else wants them to have it?
- Personality compatibility between the patient and the clinician
- Financial considerations
- Patient selection
- Clinician confidence

the stage for improved physical health through care that we render. The principle of justice demands that we treat our patients fairly, as we would our own friends and families, independent of their financial abilities. Of course, we also need to inform our patients fully and truthfully about all of their reasonable treatment options, which in the case of a general dentist or denturist should also include the option of referral to a qualified specialist. The principles of justice and veracity require us to develop and discuss fair and reasonable fees for each reasonable treatment alternative so that the patient can weigh his or her financial abilities against the risks and benefits of each treatment option in order to make an educated reasonable choice of care.

Unfortunately, the example patient from Case 1 opted to seek care from another clinician who did not seem to follow an effective ethical decision-making process that would likely have led the patient toward a full-mouth reconstruction, saving most of his teeth (see Table 1-1). The patient ended up having all of his teeth extracted and dentures made from a chain dental practice, being told that at a later date that implants would solve his problems. While complete exodontia may in fact have been a reasonable option for someone who was limited financially, many arguments against removing multiple teeth with sound bone structure, minimal pulpal pathology, and no dental caries in a patient with a complicated medical history would have

en overcome by the benefits of amputating teeth and replacing them with removable prostheses.

Complete dentures are not a replacement for natural teeth; they are a substitute for no teeth.

Patient Selection

While we believe that quality complete denture therapy can be completed by any clinician who seeks, engages in, and applies adequate education to acquire the necessary skill set, we also believe that it is incumbent on every clinician to evaluate whether he or she is the most appropriate person to provide the treatment. Understanding where the line is drawn between whether you should refer to a more qualified professional or not is the hallmark of an excellent clinician. Being clear about key elements of the patient's psychosocial, medical, and dental histories are essential to our prognosis for complete denture therapy (Box 1-1). Through discussion during this first visit, it is important for you as a clinician to decide whether the patient is someone whom you will enjoy treating. Let's face it ... some people are very difficult. However, we need to remember that every clinician has a unique personality, and you may enjoy treating patients who do not necessarily interact well with another colleague with similar skills. This is why it is also important to find out what type of denture therapy has been done previously and by whom—what has been successful for your particular patient and what has not. Along those lines, why did the patient come to you? Did they respond to an advertisement; did a colleague refer them; did another patient refer them? These are important considerations because patient selection can dramatically affect the prognosis of complete denture therapy. As dentists, sometimes we think that we must treat anyone who presents to us for care; however, this is not true. Most of the time, denture patients are not critical emergency cases that we are obligated to manage.

Managing patients' and others' expectations

When we find the patient who we would like to treat with complete denture therapy, it is essential to clarify expectations—the patient's, ours, and those who directly affect our patient's perspective (spouse, children, hypercritical friend, etc), which comes through careful and detailed

discussion with the patient. Clearly, it is essential to understand our patient's own attitude about their therapy; if he or she does not have a desire to be successful with complete dentures, the prognosis is challenged. However, we need to understand that many patients are influenced heavily by others whose opinions they value, whether correctly or incorrectly. For example, many if not all of us who have experience treating edentulous patients have provided complete denture therapy for at least one patient that ended badly with a disgruntled patient despite appropriate function, esthetics, and stability of the prostheses. Maybe the patient him- or herself initially loved the denture and even brought in cookies or donuts to thank us. However, a week later, they presented to the practice complaining that a significant other has commented, "Those teeth look fake; they don't make you look like you." Therefore, it is important that we ascertain to the best extent possible who the key influencers of our patient are so that we may attempt to involve them in the process, especially at the esthetic try-in stage, if the patient will consent to their involvement.

Other considerations

Additional factors that can affect the success of complete denture therapy include the financial ability of the patient to pay for care, anatomical challenges, and the confidence level of the clinician to provide the complete denture therapy to that particular patient. If a patient cannot pay for or value the fees that you feel are appropriate for the level of care that you are providing, then the prognosis of care can be challenged. In fact, this goes back to patient expectations. Identification of anatomical challenges, which will be discussed in chapter 2, is critical so that an informed consent discussion can be had with the patient that clearly establishes mutual realistic expectations. Lastly, you as a clinician must be confident that you are comfortable providing care for the level of difficulty with which your patient presents. Too often, dentists attempt complete denture cases that are simply too difficult for their skill set, only to discover their limitations when the patient becomes disgruntled.

Is There a "Right Way" to Provide Complete Denture Therapy?

We have reviewed many articles and textbooks covering complete denture therapy in addition to our own observations and experience through years of providing this therapy. Unfortunately, to date, there is no formally identified standard for providing complete denture therapy that has met the levels of moderate or severe evidence for support in the literature. However, a validated method, the Delphi method, has been used to obtain a consensus opinion to establish minimally acceptable complete denture therapy.[3,4] We have found that these guidelines are consistent with our experience; therefore, we endeavor to share techniques and principles in the following pages that are consistent with these guidelines with additional pearls and acceptable variations that we have found to be valuable through our practice of complete denture therapy.

Logistical Considerations for Complete Denture Therapy

If you have decided to provide complete denture therapy, you will also need to decide if, or how much, lab work you plan to do in house and which steps in the process you will be sending to an outside dental laboratory (Table 1-2). We have found that many of the steps are more efficient and less costly to do in house with a small investment in some basic lab equipment—most of which can be purchased used through online resources—and a small laboratory space with approximately 12 square feet of counter space and a laboratory sink with appropriately wired ground fault interrupter (GFI) circuitry to accommodate approximately six 110-volt outlets. While many of the procedures during the process of providing complete denture therapy can be referred to an outside laboratory, nearly every step except for final processing can be done by trained clinical assistants within the dental office without compromising—and maybe even improving—the quality of care that you can provide. See page x at the beginning of this book for a quick reference to the list of steps and where they are discussed. The actual processing of acrylic takes space, time, and significant equipment that is commonly not available in a typical dental office to perform properly. The basic

Table 1-2 Standard sequence of complete denture therapy

CHAIRSIDE	LABORATORY
Appointment 1: Examination, imaging, and preliminary impressions	
	Custom tray fabrication
Appointment 2: Final impressions	
	Boxing and pouring
	Baseplate and wax rim fabrication
Appointment 3: Jaw records	
	Mounting models on an articulator
	Setting prosthetic teeth and preparing wax-up
Appointment 4: Esthetic try-in	
	Flasking, processing, remounting, grinding in occlusion, finishing, polishing*
Appointment 5: Delivery	
Clinical remount (may be done at delivery)	Clinical remount (may be done at delivery)
Follow-up adjustments	

Blue blocks indicate clinical appointments; *green blocks* indicate laboratory procedures that may be performed easily in house by trained auxiliaries.
*This step indicates what may be most practical to refer to an outside laboratory.

FIG 1-2 A basic laboratory for in-house denture fabrication.

armamentarium that we need for a basic in-house denture laboratory includes the following (Fig 1-2):

- Stone vibrator
- Vacuum mixer and mixing bowl
- Sink with plaster trap
- Model trimmer with safety shield
- Graduated cylinder(s)
- Rubber mixing bowls and spatulas
- Laboratory knife
- Laboratory scalpel
- Dental lathe with rag wheel
- Electric handpiece
- Light box
- Flame source (Bunsen burner or butane torch)

If you do not have the facility, space, or interest to perform many of the steps of making complete dentures in house, you can still provide excellent denture therapy as long as you understand the process and can troubleshoot when challenges arise. Unfortunately, it is common for the dentist to be blamed when there is a problem with work provided by an outside laboratory. While occasionally this may in fact be the case, it is essential that you accept the

licensed professional can troubleshoot with knowledge and make corrections objectively. Just like any other procedure in healthcare, we need to be confident with the skills and knowledge of our lab technicians because ultimately, the quality of the final product and the therapy that it provides for the patient is our responsibility as the licensed clinician.

How Do You Get Reimbursed for Denture Therapy?

There are many different ways to determine fees. For those who are contracted with third-party payers, fees may be contractually established. However, it is important that you evaluate the actual costs that it takes for you to provide complete denture therapy to determine whether or not it is fiscally reasonable to provide denture therapy for preestablished third-party fee schedules.[5] While our fees can generally be compared with fee survey analyses to assess where our fees fall with other surrounding providers,[6] we suggest that you set ethical and fair fees based on a cost analysis, including your personally desired earnings. While fee determination is outside the scope of this text, we encourage you to meet with a certified public accountant who understands dental practices to establish a break-even fee per hour, which must include your wage as a fixed expense. In general, the fee should include the laboratory fees (including applicable taxes) and associated shipping costs plus the number of anticipated clinical hours multiplied by the hourly break-even fee. Remember that your fee should also take into consideration an ethical self-assessment of the level of care that you believe you can provide based on your experience, training, and skill set. If you are not able to make the same income from providing denture therapy as you do for any other dental therapy or procedure, it will likely be difficult to enjoy providing complete denture therapy except in altruistic cases.

What Happens Once You Have Decided to Provide Denture Therapy?

Let's take look at a realistic case example of a patient who presents for new complete denture therapy. A 75-year-old gentlemen has worn this particular set of dentures for over 30 years. To his recollection, he has not had any problems with his denture until recently, when he started to get "a few sore spots" on his lower arch. His initial request is for a reline of his mandibular denture because one of his friends told him that a reline would fix his sore spots. Suffice it to say that you have determined that new dentures are indicated and that a reline would be woefully inadequate to address his needs appropriately (Figs 1-3a to 1-3h).

Would you feel comfortable managing this case? At this point, you may or may not recognize what makes this a challenging case. However, we will endeavor to not only make those challenges clear to you, but also to demonstrate how those challenges can be managed to provide a favorable outcome. To get you started in your thought process, let's break down this case to assess whether ethically it is appropriate to treat this case (Table 1-3) and to answer the questions that were posed earlier about the considerations for this case (Table 1-4).

Ultimately, the question for each patient that we encounter in our practices should be, "Is this a case that I would like to treat?" If so, we believe that with the appropriate experience and following many of the principles outlined in these pages, you may be able to provide excellent complete denture therapy for even challenging cases like Case 2 (Figs 1-3j to 1-3m). In fact, you might want to develop a basic screening questionnaire to use when you evaluate a complete denture therapy, such as the one shown in Fig 1-4. However, if you have challenges answering more than one or two of the questions mentioned previously (see page 4), even after mastering this text, then a referral to an appropriate prosthodontist should be considered.

FIG 1-3 Case example 2. (*a to h*) An experienced denture wearer requests new complete dentures. (*i to m*) New complete dentures were completed to reestablish appropriate esthetics and function.

Table 1-3 Ethical decision-making considerations for Case 2

Autonomy	Options to be considered include (1) maxillary and mandibular relines, (2) maxillary and mandibular rebases, (3) new maxillary and mandibular complete dentures, (4) implant-supported prostheses of several types, and (5) reline or rebase of the maxillary denture and new mandibular denture. The patient presented with misinformation about what relining only the mandibular denture would do. Informed consent involves a thorough discussion about expectations, norms, and risks of compromising optimal practice. Although implants should be discussed as an option, the patient first needs to accept the fact that new dentures are indicated.
Nonmaleficence	Providing reline therapy for prostheses that present with significant functional and esthetic compromise is not in the patient's best interest and will likely create further discomfort by changing the patient's adaptation to his existing dentures. Making a new mandibular denture against a compromised maxillary complete denture is generally unpredictable and may create further discomfort.
Benevolence	It is in the patient's best interest to provide new maxillary and mandibular denture therapy. Since any compromise to this solution is unpredictable, that is not in his best interest. Dental implant therapies, while they should be discussed as an option, should not be prematurely initiated without first establishing appropriate new complete dentures for improved prognosis.
Justice	Because this patient clearly has many functional indications for new complete denture therapy, it is just to recommend new denture therapy. Because the patient has not expressed interest in advanced implant therapy, implants should not be overly presented except in discussion as a potential option.
Veracity	Because this patient has adapted over many years to a severe compromise in esthetics, vertical dimension, and function, it is essential that he understands the adaptation to new complete dentures that will be necessary and to understand that this is a challenging case due to anatomical considerations, advanced ridge resorption, and many other variables. His attitude and open communication are essential to the prognosis of therapy.

Table 1-4 Consideration for prognosis of Case 2

Expectations of the patient's significant others	The patient reports that he lives alone and states that he is very independent.
Patient expectations	The patient wants to be able to chew without pain. He appears to be reasonable.
Previous complete denture history	This is his second set of dentures, and they are 30+ years old. He was completely edentulated over 50 years ago in his early 20s.
What was successful?	Two previous sets of dentures have been successful. His only difficulties have occurred in the past few months with denture sores.
What was not successful?	Nothing that the patient can recall.
Anatomical challenges	Severe ridge resorption is present on the maxillary and mandibular arches.
Patient attitude	Reasonable; he desires improved function.
Financial considerations	The patient reports a moderate financial challenge, but he can afford to finance complete denture therapy over time.

Complete Denture Screening

Patient: _____ Date: _____

Location of complete dentures: ☐ Maxilla ☐ Mandible

Complaint/brief history:

Condition of dentures: ☐ Acceptable ☐ Unacceptable

Retention/stability: ☐ Inadequate ☐ Adequate ☐ Adhesive used

Flanges: ☐ Overextended ☐ Inadequate ☐ Overcontoured

Teeth: ☐ Heavily worn ☐ Broken ☐ Ceramic ☐ Resin ☐ Occlusal instability

Occlusion relative to ridge anatomy: ☐ Appropriate ☐ Inappropriate

Occlusal plane: ☐ Improper ☐ Appropriate

VDO: ☐ Excessive ☐ Insufficient

Maxillary anterior tooth display: ☐ Appropriate ☐ Excessive ☐ Inadequate

Implants: ☐ None ☐ Discussed Present in area of:

Soft tissue/oral cancer screening: ☐ No obvious concerns ☐ Epulis fissuratum ☐ Concerns warranting further investigation

TMJ/muscle concerns:

Anatomical challenges: ☐ Tori ↑↓ ☐ Soft tissue attachment ☐ Severe ridge atrophy

Tx plan: ☐ New CDs ☐ Rebase ☐ Reline ☐ Repair ☐ Prepros surgery ☐ Tissue cond

Next visit:

Referrals made:

Assistant: _____ Dentist: _____

FIG 1-4 An example complete denture screening form that may be used to document basic findings of a denture examination.

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