

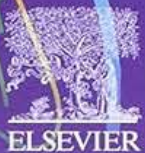
EDITION

13

MODERN **DENTAL**
ASSISTING

DONI L. **BIRD**

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13

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ASSISTING

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In addition, a sincere amount of gratitude goes to the sales associates who do all the legwork nationwide to get "MDA" to the instructors, dental assisting programs, and dental offices. You

are the ones who make that first contact with each director and faculty member. Thank you for your determined effort every day.

We sincerely appreciate and thank the reviewers who took the time to review our work carefully and provide constructive suggestions and recommendations. You are our heroes, and we listen to feedback.

Finally, a special thank you to our family, friends, and colleagues for their ongoing support that goes hand in hand with working in the publishing world.

Doni and Debbie

About the Authors

Doni L. Bird served as the director of the Allied Dental Education Programs at Santa Rosa Junior College (SRJC) in Santa Rosa, California, for many years before retiring in 2012. Before becoming a dental assisting educator, she practiced as a dental assistant in private practice and at Mount Zion Hospital and Medical Center in San Francisco. Doni holds a Bachelor's Degree in Education and Master's Degree in Education from San Francisco State University and a degree in dental hygiene from the University of New Mexico in Albuquerque. She served as a member and Chairman of the Board of Directors of the Organization for Safety, Asepsis and Prevention (OSAP). She is a member of the American Dental Assistants Association (ADAA) and has served as president of the Northern California Dental Assistants Association and as chairman of the Dental Assisting National Board (DANB). She has served on the Board of Directors of the California Association of Dental Assisting Teachers (CADAT) and serves as a consultant in dental assisting education to the Commission on Dental Accreditation (CODA) of the American Dental Association (ADA). She has served as a member and president of the California Dental Hygiene Educators Association and as a member of the Foundation Board of the California Dental Association. Doni has written many articles and presented numerous continuing education programs at major state and national meetings.

Debbie S. Robinson is currently a Research Associate Professor at the University of North Carolina, where she is involved in clinical research at the Gillings School of Global Public Health. Her educational background includes an Associate Degree in Dental Assisting from Broward Community College, Bachelor's Degree in Health Administration from Florida Atlantic University, and Master of Science Degree in Dental Auxiliary Teachers Education from the University of North Carolina. Her clinical experience includes practicing as a clinical chairside assistant in a pediatric and orthodontic dental office, dental research center, and special patient care clinic. With over 20 years of teaching, Debbie has held teaching positions in the community college setting in Florida and North Carolina and as Clinical Assistant Professor and Director of the Dental Assisting Program and Dental Assisting Specialty Program at the University of North Carolina at Chapel Hill (UNC-CH) Adams School of Dentistry. She has presented continuing education for practicing dental assistants at local, state, and international meetings. She served as a member of the Dental Assisting National Board (DANB) test construction committee for two terms and has authored and co-authored journal articles for *The Dental Assistant*. Additional endeavors include consulting with community colleges and proprietary schools in the development of curricula for dental assisting programs across the country.

Preface

Congratulations on your choice in a career in dental assisting!

When Hazel O. Torres and Ann Ehrlich published the first edition of *Modern Dental Assisting* in 1976, their intent was to provide dental assisting students and educators with the most comprehensive textbook ever for dental assisting education. It provided the background, principles, and techniques necessary to become an educationally qualified and competent dental assistant.

Since then, continuing changes have taken place in the profession of dental assisting. It is now recognized that oral health and general health are interwoven and that people cannot be healthy without good oral health. Advances in scientific research, the prevention of oral diseases, emerging technology, and regulatory changes have significantly influenced the evolving roles and responsibilities of the professional dental assistant.

In the 13th edition of *Modern Dental Assisting*, we uphold the same core educational values and goals instilled in us by Hazel Torres and Ann Ehrlich. However, the knowledge and skills necessary to reach competency in each of the many new techniques and procedures are constantly being expanded.

Chapters are revised to reflect changes resulting from evidence-based research, the increasing use of digital imaging, advancement of dental materials, and advances in technology that have allowed new clinical functions to be delegated to dental assistants in certain states and provinces. Every effort is made to create a balance to retain foundational knowledge while incorporating the most current principles and procedures to remain on the cutting edge of dental assisting practice today.

Our team of authors and editors continuously listen to dental assisting educators and students throughout the United States and Canada and has responded to their requests. Our reviewers, who represent a diverse community of dental assisting educators throughout North America and Canada, have helped us ensure inclusion of the most current knowledge.

Who Will Benefit From This Book?

Whether you are a new student to dental assisting, preparing for your state or national certification examination, or expanding your role in this profession, *Modern Dental Assisting* will provide you with the tools and resources to move forward.

Organization

The book is divided into 11 parts, from historical and scientific information to the general and specialized practice of dentistry. Each part opener provides an introduction and lists the related chapters that are found within that section.

The ease of reading each comprehensive chapter and the additional materials provides students with the maximum opportunity to learn. The driving force in the development of this package was to create a competent dental assistant. With that goal in mind, this package meets and exceeds accreditation standards and certification requirements.

The Learning Package

The 13th edition of *Modern Dental Assisting* is designed as a comprehensive learning package.

The Student Package includes the following:

- Textbook
- Evolve Resources
- Student Workbook (sold separately)
- Dental Assisting Online (sold separately)

The Faculty Package includes all student resources, plus the following:

- Evolve Resources instructor-only assets
- TEACH Instructor Resources
- Accreditation Mapping Guides

The entire package has been designed with the student and educator in mind.

New to This Edition

Textbook

- **NEW content** addresses new nutrition guidelines and the *Healthy People 2030* report, updates on the classification of waste management, the epidemic of opioids, advancement of digital imaging, and advancement of chronic diseases and access to care.
- **NEW illustrations** focus on dental instruments, clinical application, and up-to-date dental practices.
- **NEW, full-color photos** show the latest technology, instruments, and procedures.

Evolve Resources

- **Fully updated assets** for instructors and students correspond to new and updated information in the textbook.

Student Workbook

- **Updated exercises** match new content in the textbook and provide students extra opportunity to learn the material.

Dental Assisting Online

- **New art** corresponds to the textbook.
- **Updated glossary** has additional terms from the textbook.

Support

If you have questions or need assistance with ordering or adopting the *Modern Dental Assisting* learning package, contact Educator Support at 1-800-222-9570 or via email at sales.inquiry@elsevier.com.

If you have questions or need assistance with the electronic components of the *Modern Dental Assisting* learning package, you can contact Technical Support at 1-800-692-9010 (Option 2) or via email at technical.support@elsevier.com or through the Support section of the main Evolve Web site at <http://evolve.elsevier.com>.

Doni L. Bird
Debbie S. Robinson

The Learning Package

Modern Dental Assisting is the learning package for preparing students to become dental assistants. It provides a solid foundation for the basic and advanced clinical skills students must master to achieve competence. The layout is student-friendly to simplify even the most complex concepts and procedures to help prepare for Dental Assisting National Board (DANB) certification.

Textbook

- Comprehensive coverage that spans the entire dental assisting curriculum
- Cutting-edge content and approachable writing style
- Expert authorship
- Top-notch art program
- Step-by-step procedures for basic and expanded functions
- *Recall* questions throughout chapters that summarize key issues and facts
- *CDC* boxes highlighting specific recommendations of the Centers for Disease Control and Prevention
- *Legal and Ethical Implications* features
- *Patient Education* features with tips and strategies
- *Eye to the Future* features that introduce cutting-edge and evolving research and practice
- *Critical Thinking* questions and mini-scenarios that encourage content application
- *Key Terms and Definitions* with phonetic pronunciations presented at the beginning of each chapter and highlighted in boldface color within the text discussion
- A back-of-book *Glossary* with chapter cross-references
- *Learning and Performance Outcomes* at the beginning of each chapter
- *Electronic Resources* to highlight ancillary content applicable to that chapter

Evolve Resources

Elsevier has created a Web site dedicated solely to support this learning package: <http://evolve.elsevier.com/Bird/modern/>. The Web site includes a student site and an instructor site.

Student Site

- Audio Glossary
- Canadian Content to supplement topics that differ between Canada and the United States, such as nutrition and privacy regulations
- Mock dental assisting board examination
- Practice quizzes for each chapter

- Tray setup questions and identification exercises
- Video clips of dental assisting procedures
- Video scripts in English and Spanish
- Video review questions and answers
- Dentrix Practice Management Software

Plus the Interactive Dental Office Online!

The interactive portion of this learning package offers exercises for the immediate application of knowledge to help the student develop and retain critical thinking and problem-solving skills. The *Interactive Dental Office* is built around 25 in-depth patient case studies with questions, charting and tooth-numbering exercises, and radiographic mounting exercises to help students assimilate content from various chapters and apply it in a realistic, patient-centered setting. A content mapping guide indicates the corresponding chapter to each activity for every patient.

Instructor Site

- Access to all the student resources
- Chapter pretests
- Competency skill sheets for all procedures in the book
- Image collection
- Mapping guides for ADA accreditation, for the Dental Board of California, and for syllabus conversion
- Test bank with 2500 questions, answers, rationales for correct and incorrect choices, page-number references for remediation, cognitive level, CDA exam blueprint category, and chapter objectives to which the question maps; available in Exam View
- TEACH Instructor Resources (explained in more detail in the next section)
 - TEACH Lesson Plans
 - TEACH PowerPoints
 - TEACH Student Handouts
 - TEACH Answer Key

TEACH Instructor Resources

TEACH for Modern Dental Assisting stands for *Total Education and Curriculum Help* and is an all-in-one resource designed to save educators time and take the guesswork out of classroom planning and preparation. TEACH includes detailed Lesson Plans, providing a chapter teaching focus; lesson preparation checklist; materials and supply list; key terms covered in each lesson; homework assignments; lecture outline; and related class discussions, activities, and critical thinking questions, all designed to fit into 50-minute classroom increments to ease the work involved in classroom preparation. Online activities are also provided to further enhance the learning experience outside the classroom. These Lesson Plans

are centered around the mapping of textbook, ancillary, and Evolve content to specific chapter learning and performance outcomes. In addition, the lecture outlines reflect the detailed chapter lecture slides that come as part of TEACH. These PowerPoint slides provide teaching notes and talking points for educators as a ready-to-use classroom resource. A PDF file of the PowerPoint slides from each chapter is also provided. It contains the slides without the instructor talking points, so it can be distributed directly to students. Finally, an answer key is provided for the textbook *Recall* questions and the *Student Workbook* questions and exercises.

Note: If you are unable to access TEACH on the Evolve Web site, contact your Elsevier Education Solutions Consultant.

Student Workbook

The Student Workbook is an optional supplement to the learning process (sold separately). The content of the workbook matches the book chapter by chapter to help students master and apply key concepts and procedures to a clinical situation through short-answer and multiple-choice questions, as well as fill-in-the-blank statements. Case study scenarios and associated questions encourage application of key concepts. Clinical competency forms are located within appropriate chapters of the Student Workbook, allowing students to evaluate both their strengths and weaknesses in performing procedures. Dentrix practice exercises are included in relevant

chapters so that students can become familiar with working in dental office systems. As a bonus, flashcards are in the back of the workbook as a study tool, focusing on terms, instruments, and procedures.

An Externship Guide is also provided. An externship is an integral part of a dental assistant's education, and the guide includes resources for students to stay organized. These include time sheets, record of clinical activities, and student journal prompts.

Dental Assisting Online for *Modern Dental Assisting*

This online course (sold separately) contains 42 modules, each of which correlates to a specific chapter in the textbook. Modules take the most challenging content within the corresponding chapters and present it in an interactive and engaging way to help promote true content mastery. Brief summary content screens are interspersed with interactive exercises, videos, animations, and quizzes to provide a range of audio and visual learning opportunities that reach far beyond the traditional model of classroom instruction and encourage students to immerse themselves in the learning process and develop a more comprehensive understanding of the material presented in the textbook. A turnkey design makes incorporating the course into your program easy and seamless.

How to Use *Modern Dental Assisting*

Learning Outcomes assist you in achieving the cognitive objectives on completion of the chapter and guide you in exam preparation.

31

Assisting in a Medical Emergency

LEARNING AND PERFORMANCE OUTCOMES

Learning Outcomes

On completion of this chapter, the student will be able to achieve the following objectives:

1. Pronounce, define, and spell the key terms.
 2. Describe the preventive measures taken for a medical emergency that might occur during dental treatment.
 3. Describe the elements of emergency preparedness required for successful management of medical emergencies.
 4. Give the common signs and symptoms of an emergency and how to recognize them.
 5. Give the required emergency care standards, which include the following:
 - Credentials and skills that a dental assistant must have for emergency preparedness.
 - Fundamental aspects of basic life support.
- When cardiopulmonary resuscitation is initiated and the proper sequence of steps.
 - Measures to prevent airway obstruction and choking during dental treatment.
 - The use of a defibrillator in an emergency.
6. Describe the basic items included in an emergency kit.
 7. List the responsibilities of the dental assistant in an emergency.
 8. Describe medical emergencies experienced in the dental office and how to respond.
 9. Discuss the importance of proper documentation of medical emergencies.

Performance Outcomes

On completion of this chapter, the student will be able to meet competency standards in the following skills:

1. Accurately perform CPR on a simulated mannequin.
 2. Accurately perform the Heimlich maneuver on a mannequin.
 3. Demonstrate use of the automated external defibrillator.
 4. Demonstrate preparation and placement of oxygen.
 5. Demonstrate how to respond to a patient who is:
 - Unconscious.
 - Having chest pain.
- Experiencing a stroke.
 - Having a breathing problem.
 - Experiencing an allergic reaction.
 - Experiencing a seizure.
 - Experiencing a diabetic emergency.

KEY TERMS

acute referring to a difficult or severe condition with sudden onset
allergen (AL-ur-jen) a substance that causes an allergic reaction
allergy (AL-ur-jee) response by the body to a foreign substance or an allergen
anaphylaxis (an-uh-fi-LAK-sis) extreme hypersensitive reaction to an antigen that can lead to life-threatening response
angina (an-JYE-nuh) chest pain caused by inadequate oxygen to the heart
antibodies protein produced by the immune system in response to the presence of a foreign substance
antigen (AN-ti-jen) a substance introduced into the body to stimulate the production of an antibody
aspiration (as-pi-RAY-shun) the act of inhaling or ingesting, such as a foreign object
asthma (AZ-muh) a respiratory disease often associated with allergies and characterized by sudden recurring attacks of labored breathing, chest constriction, and coughing

cardiopulmonary resuscitation (CPR)
(kahr-dee-oe-PUL-muh-nar-ee-ree-suh-si-TAY-shun) a plan of action for restoring consciousness or life
convulsion (kun-VUL-shun) medical condition in which involuntary contraction of muscles take place; common with seizure disorders
epilepsy (EH-pi-lep-see) neurologic disorder with sudden recurring seizures of motor, sensory, or psychic malfunction
erythema (er-i-THEE-muh) redness of the skin, often caused by injury or irritation
gait a particular way of walking, or ambulating
hypersensitivity state of being excessively sensitive to a substance, often with allergic reactions
hyperventilation abnormally fast or deep breathing
hypotension (hye-poe-TEN-shun) an abnormal low blood pressure reading

Performance Outcomes help you master the clinical skills necessary to become a competent dental assistant.

Key Terms and a complete **Glossary** with definitions and pronunciations reinforce new terminology. In the pronunciations, the main accented syllable is capitalized.

Patient Education provides tips and strategies to help interact and share information with patients.

Critical Thinking questions and scenarios at the end of each chapter reinforce your ability to solve problems and make appropriate decisions.

Legal and Ethical Implications help you focus on the legal and ethical behaviors you will need to know to protect yourself, your patients, and the practice for which you work.

Eye to the Future introduces you to cutting-edge research, future trends, and topics relating to the chapter content.

Electronic Resources link together the locations of the electronic components of the learning package.

Outstanding artwork abounds throughout the text, with a mixture of high-quality color illustrations, clinical photographs, and radiographs.

Recall Questions are interspersed throughout each chapter to help you retain the previous information before going on to the next topic. The answers to the Recall questions are available to instructors in the TEACH resources, available on the Evolve Web site.

CHAPTER 31 Assisting in a Medical Emergency 439

◆ Patient Education
Patients are more aware of their own health status today than ever before. Most patients can follow through with their personal care plan and know when to seek professional help. Throughout the media, such as television and social media, you may see a report of a child who saved a person's life because the child saw a TV show that discussed CPR or the Heimlich maneuver. The more the healthcare sector discusses the importance of individual awareness through workshops and patient education, the better able patients are to help themselves or others at a time of need.

◆ Legal and Ethical Implications
As a dental healthcare professional, you often will be asked for dental and medical advice from your patients, family, and friends. You must be very careful about what you say to people. You are not in the position to diagnose an illness, and you must not do so under any circumstance. In the case of an emergency, however, the situation is different. You are protected under the "Good Samaritan Law," which states that if you try your best to do what can reasonably be done by others with the same training, the victim cannot legally hold you responsible if something goes wrong.

◆ Eye to the Future
New technology is allowing individuals with serious medical conditions to live a normal life with confidence that the emergency medical system will be alerted when the need arises. Furthermore, the Internet has dramatically changed the way America communicates with individuals, emergency systems, and hospitals. Advances in digital and compression technology mean that vast amounts of information can be stored on ever-smaller chips. Important applications of this technology include the creation of digital medical libraries and medical databases. The potential also exists to develop *electronic medical record systems* and credit card-sized "smart cards" that store personal medical information.

◆ Critical Thinking

1. You are escorting a patient to the treatment area and notice that she appears flushed and is perspiring. You take her vital signs and note a rapid heart rate and a decrease in her blood pressure. What warning sign does this represent regarding a medical emergency?
2. How would the dental team respond to the patient described in question 1?
3. The dentist has just finished administering local anesthesia when a patient complains of shortness of breath and "not feeling well." What medical emergency would you suspect, and how should the dental team respond?
4. What should be kept available in the dental office for a patient with hypoglycemia?
5. Why would you not place anything in a patient's mouth during a grand mal seizure?

◆ ELECTRONIC RESOURCES
Additional information related to content in Chapter 31 can be found on the companion Evolve Web site.
• Practice Quiz

EMERGENCY PROCEDURE 31.1
Performing Cardiopulmonary Resuscitation (One Person)
Consider the following with this procedure: The procedure is to be documented in the patient record.
Equipment and Supplies
Mandragon approved by the American Heart Association (AHA) and equipped with a protocol for demonstration of proper technique (for instruction purposes and mock emergency drills).
Procedural Steps for Adult, Child, and Infant CPR
Determine Unresponsiveness
Approach the victim and check for signs of circulation, such as normal breathing, coughing, or movement in response to stimulation. Touch or tap the victim and ask, "Are you OK?"
Assessment
1. Firmly place your hand on the person's shoulder and ask, "Are you OK?"
2. Confirm if the person is breathing by holding your ear close to the person's mouth and watch for chest to rise and fall. If the person is not breathing, activate the emergency response system.
Response and Get AED
If the person is breathing, call for assistance and ask someone to call an AED/defibrillator if available. If the person is not breathing, if the patient is an adult, phone 9-1-1 first, and begin CPR. If the patient is a child or infant, begin CPR first, then call for help.

CPR is as easy as C-A-B

Compressions
Push hard and fast on the center of the chest.

Airway
Tilt the victim's head back and lift the chin to open the airway.

Breathing
Give mouth-to-mouth rescue breaths.

American Heart Association
Learn and Live

412 PART 6 Patient Information and Assessment

Fig. 29.5 Darkened teeth associated with secondary dentin and aging.

Fig. 29.6 Bone resorption with loss of teeth and alveolar ridge.

Bone Resorption
When teeth are missing, the patient is partially to fully edentulous. Portions of the alveolar ridge will become compromised and lost. Bone resorption can affect whether the patient will wear a removable prosthesis, as well as the patient's speech and diet (see Chapter 52).

The Special Needs Patient
Providing dental care to patients with a physical or medical disorder will require increased awareness and attention and possibly modification of clinical care by the dentist and dental staff. Once the health and medication histories have been obtained from the patient, this information should be reviewed at each appointment. Each patient should be assessed before treatment is provided.
An easy technique to use with your patients is to categorize each patient according to how treatment is anticipated to proceed and what changes are to be made by the dental team.
• **Category I:** Healthy patients who require no special modifications.
• **Category II:** Patients with medical conditions who require scheduling changes or shorter appointments.
• **Category III:** Patients with medical conditions who have lifelong implications; these patients require modifications in dental treatment planning, including alterations in anesthetic, types of dental materials, and patient positioning.

Assistance From Organizations
Many organizations can provide information to assist you in updating and educating the dental staff. To better prepare you, the patient, and the family, seek guided assistance from these groups. The American Speech-Language-Hearing Association, for example, offers information on hearing loss and communication problems in older people and provides a list of certified audiologists and speech pathologists.

RECALL
3. In what category would you assess a patient who has experienced a stroke and is wheelchair bound?
4. What is xerostomia?
5. What are the most common oral health conditions that affect the aging population?

Specific Disorders of the Medically Compromised Patient
A basic understanding of how a disorder can affect a person's oral health is important to prevent tooth loss or other complications. Symptoms of more than 100 diseases can indirectly affect a patient by causing a person to be less capable of caring for his or her mouth.
Medical and physical disorders are categorized to help you learn and understand each disease and how to care for that patient in your practice.

Developmental Disorders
Developmental disorders are the result of an impairment that occurred during a person's developmental phase (prenatal through age 18). This impairment can occur prenatally, during birth, or postnatally. Disorders causing a developmental disability can be chromosomal abnormalities such as intellectual disability and Down syndrome, autism, cerebral palsy, fetal alcohol syndrome, and phenylketonuria, or brain anoxia. Many patients with developmental disorders are routinely seen in a pediatric dental office. The dentist receives extensive education and training on seeing and treating these types of special patients. For more information on oral conditions and clinical management, refer to Chapter 57.

Intellectual Disability
Intellectual disability is the impairment in intellectual and adaptive functioning. The cause is not always known, and multiple causes are commonly identified. Some of the known reasons are chromosomal abnormalities, prenatal conditions (rubella, alcohol use, malnutrition), perinatal events (anoxia), and perinatal conditions (meningitis, encephalitis, trauma, cultural deprivation, severe malnutrition).
Intellectual disability occurs at many levels, and it is important to understand a patient's level of communication.

Step-by-step procedures in the textbook include illustrations, the equipment and supplies you will need, and the rationale behind certain steps. At the end of many procedures are samples of how you would enter the procedure in the patient's chart.

- Mr. Jones, a patient of the practice, has diabetes and is taking metformin. How would Mr. Jones' type of diabetes be classified? What dental considerations might apply to Mr. Jones?
- You are preparing Mrs. Rodriguez for a dental procedure when she mentions that pollen has been bothering her lately. You review her medical-dental history and notice that she has asthma. What type of drugs should be minimized for an asthmatic patient such as Mrs. Rodriguez?
- Describe three ways to help treat a patient with coronary artery disease in the dental office.
- Describe a personal experience you may have had with a medically or physically compromised patient and what techniques you found to be helpful in daily care.

ELECTRONIC RESOURCES

Additional information related to content in Chapter 29 can be found on the companion Evolve Web site.

- Practice Quiz

PROCEDURE 29.1

Transferring a Patient From a Wheelchair

Equipment

- Gait belt

Procedural Steps

- Clear all items from the pathway of the wheelchair to the dental chair.
- When entering the treatment room, determine whether it is best to go forward or to back the patient into the area.
PURPOSE You want the patient to be positioned the same way he or she would be seated in the dental chair.
- Move the wheelchair as close to the dental chair as possible so that it is at a 45-degree angle to the dental chair.
PURPOSE Allows the patient to move closer to the chair without having to pivot as much.
- Lock the wheelchair and raise the footrests.
- Ask the patient to scoot forward in the wheelchair so a gait belt can be placed around the waist. Make sure the belt is positioned over the clothing and that the clip is in front. This will allow for easier belt adjustments and removal. Bring the patient to the edge of the wheelchair if possible.



- Stand facing the patient with your feet slightly apart and knees bent.
- Place your fingers between the gait belt and the patient, using an underhand motion to grasp the gait belt. Ask the patient to stand as you lift him or her with the belt and guide the patient to the transfer location.



- Help the patient stand slowly.
- Pivot the patient so that the patient's backside is where the patient should be seated in the dental chair.
- Help the patient to safely sit down. Ask the patient to slide back a bit so not in danger of falling from the seated location. Once the patient is safely seated on the transfer location, remove the gait belt.
- Swing the patient's legs over and onto the dental chair.

Photos courtesy Kathleen Murray and Bobi Padden, Dallas, TX.

- Ask the patient to slide forward to the edge of the wheelchair seat, making sure the patient's feet are placed flat on the floor.

- Know the surfaces of teeth.
 - Know charting symbols.
- If you chart the wrong tooth or the wrong condition, you initiate a compromising legal situation.

Eye to the Future

With increased intake of fluoridation in the population, dentists are finding it challenging to detect decay in areas of the teeth that are more difficult to examine. New devices are being designed that use laser light energy (wavelengths) that can be directed to a specific area of a tooth surface. When illuminated, the carious lesion will become fluorescent. These devices will measure the laser fluorescence and calculate a value. Calculated values will be used to determine a course of action ranging from no action, to preventive therapy, to monitoring of caries development, to placement of sealants, and, finally, to restoration of the tooth.

Critical Thinking

- During which portion of the diagnosis and treatment planning examination would tooth mobility be evaluated?
- Describe two areas of the face that would be included in the soft tissue examination.
- What instruments and supplies are included in the tray setup for the charting of teeth?

- When the periodontium is charted, tooth #4 has a reading of a 5-mm pocket on the mesiofacial surface and a 6-mm pocket on the mesiolingual surface with bleeding. Should these areas be charted? If so, how is the bleeding indicated on the chart?
- With a charting form in front of you, chart the following conditions:
 - Tooth 1 is missing.
 - Tooth 2 has occlusal decay.
 - Tooth 7 has a porcelain-fused-to-metal (PFM) crown.
 - Tooth 11 has an MI composite.
 - Tooth 13 has disto-occlusal decay.
 - Tooth 16 is missing.
 - Tooth 19 has a root canal.
 - Tooth 21 has a sealant.
 - Teeth 23 to 26 have a bridge to replace teeth 24 and 25.
 - Tooth 29 has a periapical abscess.
 - Tooth 32 is impacted.

ELECTRONIC RESOURCES

Additional information related to content in Chapter 28 can be found on the companion Evolve Web site.

- Denrix Exercise
- Practice Quiz
- Video: Extraoral and Intraoral Photography

PROCEDURE 28.1

Extraoral and Intraoral Photography (Expanded Function)

Consider the following with this procedure: Confirm with state guidelines before performing this procedure.

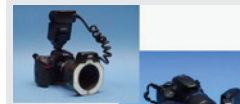
Equipment and Supplies

- Camera setup
- Cheek retractors
- Mouth mirror
- Reflection mirror

Procedural Steps

Readying Your Camera

- Calibrate the camera system so that you become familiar with the settings for intraoral and extraoral photographs.
- NOTE** For intraoral photography, set your camera to landscape mode, and for extraoral photography, use the portrait mode.



Expanded Function procedures feature a different color background to further differentiate them from the more foundational procedures and include a list of prerequisite skills required of dental assistants.

CDC feature boxes highlight the latest guidelines developed by the Centers for Disease Control and Prevention for safe dental practice.

CDC RECOMMENDATIONS FOR ENVIRONMENTAL INFECTION CONTROL

General Recommendations

- Follow the manufacturers' instructions for correct use of cleaning and EPA-registered hospital disinfecting products. (Categories IB and IC.)
- Do not use liquid chemical disinfectants/high-level disinfectants for disinfection of environmental surfaces (clinical contact or housekeeping). (Categories IB and IC.)
- Use PPE, as appropriate, when cleaning and disinfecting environmental surfaces. (Category IC.)

Clinical Contact Surfaces

- Use surface barriers to protect clinical contact surfaces, particularly those that are difficult to clean, and change barriers between patients. (Category I.)
- Clean and disinfect clinical contact surfaces that are not barrier protected by using an EPA-registered hospital disinfectant with low-level (e.g., human immunodeficiency virus [HIV] and hepatitis B virus [HBV] label claims) to intermediate-level (e.g., tuberculocidal claim) activity after each patient. Use an intermediate-level disinfectant if visibly soiled with blood. (Category IB.)

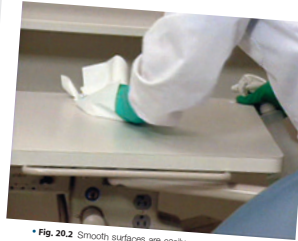
Housekeeping Surfaces

- Clean housekeeping surfaces (e.g., floors, walls, sinks) with a detergent and water or an EPA-registered hospital disinfectant/detergent on a routine basis, depending on the nature of the surface and the type and degree of contamination, and as appropriate according to location within the facility, and when visibly soiled. (Category B.)
- Clean mops and cloths after use and allow to dry before reuse, or use single-use disposable mop heads or cloths. (Category II.)
- Prepare fresh cleaning or EPA-registered disinfecting solutions daily and as instructed by the manufacturer. (Category II.)
- Clean walls, blinds, and window curtains in patient care areas when they are visibly dusty or soiled. (Category II.)

EPA, Environmental Protection Agency; HBV, hepatitis B virus; HIV, human immunodeficiency virus; PPE, personal protective equipment.



• Fig. 20.1 Touch surfaces (A); transfer surfaces (B); and splash, spatter, and droplet surfaces (C).



• Fig. 20.2 Smooth surfaces are easily sprayed and wiped.

TABLE 20.1 Comparison of Surface Barriers and Precleaning/Disinfection

	Advantages	Disadvantages
Surface barrier	<ul style="list-style-type: none"> Protects surfaces that are not easily cleaned and disinfected Prevents contamination when properly placed Less time consuming Reduces handling and storage of chemicals Provides patient with visual assurance of cleanliness Does not damage equipment or surfaces 	<ul style="list-style-type: none"> Adds plastics to the environment after disposal May be more expensive than precleaning and disinfecting Requires a variety of sizes and shapes May become dislodged during treatment
Precleaning and disinfecting	<ul style="list-style-type: none"> May be less expensive than surface barriers Does not add plastic to the environment Some dentists do not like the appearance of plastic barriers 	<ul style="list-style-type: none"> Requires more time and therefore may not be done properly Not all surfaces can be adequately precleaned Over time, some chemicals are destructive to dental equipment surfaces No method to determine whether the microbes have been removed or killed Some disinfectants must be prepared fresh daily Chemicals are added to the environment upon disposal

This edition is dedicated to the Dental Assisting National Board (DANB) and its 40 years of longevity. Today, there are more than 37,000 dental assistants currently certified nationwide. DANB has strived since its inception to enhance the profession of dental assisting to meet the needs of its profession. A big reason for the advancement and its reputation is the work of Cynthia Durley, Executive Director of DANB and the DALE Foundation. She has continuously risen to the occasion to better the profession of dental assisting, and we thank her for all her contributions.

Contents

Part 1 The Dental Assisting Profession, 1

1 History of Dentistry, 2

- Early Times, 3
- The Renaissance, 5
- Early America, 6
- Educational and Professional Development in the United States, 6
- Women in Dental History, 7
- African Americans in Dental History, 8
- American Indians in Dental History, 8
- History of Dental Assisting, 9
- History of Dental Hygiene, 11
- Dental Accreditation, 11
- National Museum of Dentistry, 12
- ◆ Legal and Ethical Implications, 12
- ◆ Eye to the Future, 12
- ◆ Critical Thinking, 12

2 The Professional Dental Assistant, 13

- Characteristics of a Professional Dental Assistant, 13
- Educational Requirements, 15
- Career Opportunities, 15
- Professional Organizations, 15
- ◆ Eye to the Future, 18
- ◆ Critical Thinking, 18

3 The Dental Healthcare Team, 19

- Dentist, 19
- Dental Specialist, 20
- Registered Dental Hygienist, 21
- Dental Assistant, 21
- Sterilization Assistant, 22
- Expanded-Functions Dental Assistant, 23
- Business Assistant, 23
- Dental Laboratory Technician, 23
- Supporting Services, 24
- ◆ Legal and Ethical Implications, 24
- ◆ Eye to the Future, 24
- ◆ Critical Thinking, 24

4 Dental Ethics, 26

- Sources for Ethics, 26
- Basic Principles of Ethics, 26

- Professional Code of Ethics, 28
- Applying Ethical Principles, 28
- ◆ Legal and Ethical Implications, 29
- ◆ Eye to the Future, 29
- ◆ Critical Thinking, 29

5 Dentistry and the Law, 30

- Statutory Law, 31
- State Dental Practice Act, 32
- Dentist-Patient Relationship, 33
- Malpractice, 34
- Risk Management, 35
- Patients Records, 37
- Reporting Abuse and Neglect, 37
- ◆ Legal and Ethical Implications, 39
- ◆ Eye to the Future, 40
- ◆ Critical Thinking, 40

Part 2 Sciences in Dentistry, 41

6 General Anatomy, 42

- Planes and Body Directions, 43
- Structural Units, 43
- Body Cavities, 49
- Body Regions, 50
- ◆ Legal and Ethical Implications, 50
- ◆ Eye to the Future, 50
- ◆ Critical Thinking, 50

7 General Physiology, 51

- Physiology and Dental Assisting, 52
- Body Systems, 52
- Skeletal System, 52
- Muscular System, 56
- Cardiovascular System, 58
- Nervous System, 62
- Respiratory System, 63
- Digestive System, 65
- Endocrine System, 67
- Urinary System, 68
- Integumentary System, 69
- Reproductive System, 70
- Interaction Among the Ten Body Systems, 70
- ◆ Legal and Ethical Implications, 71

- ◆ Eye to the Future, 71
- ◆ Critical Thinking, 71

8 Oral Embryology and Histology, 73

- Oral Embryology, 74
- Oral Histology, 83
- ◆ Legal and Ethical Implications, 93
- ◆ Eye to the Future, 93
- ◆ Critical Thinking, 93

9 Head and Neck Anatomy, 94

- Regions of the Head, 95
- Bones of the Skull, 95
- Temporomandibular Joints, 104
- Muscles of the Head and Neck, 106
- Salivary Glands, 108
- Blood Supply to the Head and Neck, 109
- Nerves of the Head and Neck, 112
- Lymph Nodes of the Head and Neck, 116
- ◆ Eye to the Future, 116
- ◆ Critical Thinking, 117

10 Landmarks of the Face and Oral Cavity, 118

- Landmarks of the Face, 119
- The Oral Cavity, 120
- The Oral Cavity Proper, 123
- ◆ Eye to the Future, 125
- ◆ Critical Thinking, 125

11 Overview of the Dentitions, 126

- Dentition Periods, 127
- Dental Arches, 130
- Types and Functions of Teeth, 132
- Tooth Surfaces, 133
- Anatomic Features of Teeth, 134
- Angles and Divisions of Teeth, 135
- Occlusion and Malocclusion, 136
- Stabilization of the Arches, 138
- Tooth-Numbering Systems, 138
- ◆ Legal and Ethical Implications, 140
- ◆ Eye to the Future, 140
- ◆ Critical Thinking, 140

12 Tooth Morphology, 141

- Anterior Permanent Dentition, 142
- Posterior Permanent Dentition, 146
- Primary Dentition, 151
- ◆ Eye to the Future, 156
- ◆ Critical Thinking, 156

Part 3 Oral Health and Prevention of Dental Disease, 157

13 Dental Caries, 158

- Bacterial Infection, 159
- The Caries Process, 160

Early Childhood Caries, 162

Caries Diagnosis, 164

Caries Management by Risk Assessment, 164

Methods of Caries Intervention, 165

Caries Risk Assessment Tests, 166

◆ Legal and Ethical Implications, 168

◆ Eye to the Future, 168

◆ Critical Thinking, 168

Procedure 13.1 Performing Caries Detection Using the KaVo DIAGNOdent Caries Detection Device (Expanded Function), 169

Procedure 13.2 Performing Caries Risk Assessment (Expanded Function), 170

14 Periodontal Diseases, 173

Definition and Prevalence of Periodontal Disease, 173

The Systemic Connection, 173

Causes of Periodontal Disease, 175

Description of Periodontal Disease, 178

Dental Perioscopy, 178

◆ Legal and Ethical Implications, 178

◆ Critical Thinking, 180

15 Preventive Dentistry, 181

Partners in Prevention, 181

Early Dental Care, 182

Dental Sealants, 183

Oral Health and Aging, 183

Fluoride, 183

Nutrition and Dental Caries, 188

Plaque Control Program, 190

◆ Patient Education, 198

◆ Legal and Ethical Implications, 198

◆ Critical Thinking, 198

Procedure 15.1 Applying Topical Fluoride Gel or Foam (Expanded Function), 199

Procedure 15.2 Applying Fluoride Varnish (Expanded Function), 201

Procedure 15.3 Assisting the Patient with Dental Floss (Expanded Function), 202

16 Nutrition, 203

Healthy People 2020 Report, 204

Nutrient Recommendations, 204

MyPlate, 205

Canada's Food Guide, 205

Carbohydrates, 205

Proteins, 208

Fats (Lipids), 209

Vitamins, 209

Minerals, 210

Water, 210

Diet Modification, 210

Dietary Analysis, 213

Reading Food Labels, 213

Eating Disorders, 216

Healthy Habits, 217

- ◆ Patient Education, 217
- ◆ Legal and Ethical Implications, 218
- ◆ Eye to the Future, 218
- ◆ Critical Thinking, 218

17 Oral Pathology, 219

- Making a Diagnosis, 220
- Acute and Chronic Inflammation, 222
- Oral Lesions, 223
- Diseases of the Oral Soft Tissues, 223
- Conditions of the Tongue, 225
- Oral Cancer, 226
- Human Immunodeficiency Virus and Acquired Immunodeficiency Syndrome, 229
- Developmental Disorders, 231
- Miscellaneous Disorders, 236
- ◆ Patient Education, 237
- ◆ Legal and Ethical Implications, 238
- ◆ Eye to the Future, 238
- ◆ Critical Thinking, 238

Part 4 Infection Prevention in Dentistry, 239

18 Microbiology, 240

- Pioneers in Microbiology, 241
- Koch's Postulates, 241
- Major Groups of Microorganisms, 242
- Viral Diseases, 246
- Bacterial Diseases, 250
- Pandemic Diseases, 253
- ◆ Legal and Ethical Implications, 253
- ◆ Eye to the Future, 253
- ◆ Critical Thinking, 253

19 Disease Transmission and Infection Prevention, 254

- The Chain of Infection, 255
- Types of Infections, 256
- Modes of Disease Transmission, 256
- The Immune System, 258
- Disease Transmission in the Dental Office, 259
- Roles and Responsibilities of the CDC and OSHA in Infection Control, 260
- CDC Guidelines for Infection Control in Dental Health-Care Settings, 260
- OSHA Blood-Borne Pathogens Standard, 261
- Infection Control Practices, 264
- High-Tech Equipment, 272
- Latex Allergies, 273
- Waste Management in the Dental Office, 274
- Additional Infection Control Practices, 276
- ◆ Legal and Ethical Implications, 278
- ◆ Eye to the Future, 278
- ◆ Critical Thinking, 278
 - Procedure 19.1 Applying First Aid After an Exposure Incident, 279
 - Procedure 19.2 Handwashing Before Gloving, 279

- Procedure 19.3 Applying Alcohol-Based Hand Rubs, 281
- Procedure 19.4 Putting on Personal Protective Equipment, 282
- Procedure 19.5 Removing Personal Protective Equipment, 284
- Procedure 19.6 Disinfecting an Alginate Impression, 285

20 Principles and Techniques of Disinfection, 286

- Environmental Infection Control, 287
- ◆ Legal and Ethical Implications, 298
- ◆ Eye to the Future, 298
- ◆ Critical Thinking, 298
 - Procedure 20.1 Placing and Removing Surface Barriers, 299
 - Procedure 20.2 Performing Treatment Room Cleaning and Disinfection, 300

21 Principles and Techniques of Instrument Processing and Sterilization, 301

- Classification of Patient Care Items, 302
- Transporting and Processing Contaminated Patient Care Items, 302
- Instrument-Processing Area, 303
- Precleaning and Packaging Instruments, 304
- Methods of Sterilization, 309
- Sterilization Monitoring, 315
- Handpiece Sterilization, 317
- Flushing Techniques, 318
- ◆ Legal and Ethical Implications, 318
- ◆ Eye to the Future, 318
- ◆ Critical Thinking, 318
 - Procedure 21.1 Operating the Ultrasonic Cleaner, 319
 - Procedure 21.2 Autoclaving Instruments, 319
 - Procedure 21.3 Sterilizing Instruments With Unsaturated Chemical Vapor, 321
 - Procedure 21.4 Sterilizing Instruments With Dry Heat, 321
 - Procedure 21.5 Sterilizing Instruments With Liquid Chemical Sterilants, 322
 - Procedure 21.6 Following a Sterilization Failure, 322
 - Procedure 21.7 Performing Biologic Monitoring, 323
 - Procedure 21.8 Sterilizing the Dental Handpiece, 323

Part 5 Occupational Health and Safety, 325

22 Regulatory and Advisory Agencies, 326

- Associations and Organizations, 326
- Government Agencies, 328
- ◆ Legal and Ethical Implications, 331
- ◆ Eye to the Future, 331
- ◆ Critical Thinking, 331

23 Chemical and Waste Management, 332

- Hazardous Chemicals, 333
- Hazard Communication Program, 337
- Dental Office Waste Management, 341
- ◆ Legal and Ethical Implications, 343

- ◆ Eye to the Future, 343
- ◆ Critical Thinking, 343
 - Procedure 23.1 Creating an Appropriate Label for a Secondary Container, 344

24 Dental Unit Waterlines, 345

- Microorganisms in Dental Unit Waterlines, 346
- Methods for Reducing Bacterial Contamination, 347
- Infection Control and Dental Unit Water, 349
- ◆ Legal and Ethical Implications, 350
- ◆ Eye to the Future, 350
- ◆ Critical Thinking, 350
 - Procedure 24.1 Testing Dental Unit Waterlines, 351

25 Ergonomics, 352

- Ergonomics in the Dental Office, 352
- Posture, 353
- Repetition and Force, 354
- Muscle-Strengthening Exercises, 355
- ◆ Legal and Ethical Implications, 358
- ◆ Eye to the Future, 358
- ◆ Critical Thinking, 358

Part 6 Patient Information and Assessment, 359

26 The Patient's Dental Record, 360

- Permanent Record, 360
- Electronic Dental Record, 362
- Patient Record Forms, 362
- ◆ Legal and Ethical Implications, 369
- ◆ Eye to the Future, 370
- ◆ Critical Thinking, 370
 - Procedure 26.1 Registering a New Patient, 371
 - Procedure 26.2 Obtaining a Medical-Dental Health History, 372
 - Procedure 26.3 Entering Treatment in a Patient Record, 372
 - Procedure 26.4 Correcting a Chart Entry, 372

27 Vital Signs, 373

- Factors That Can Affect Vital Sign Readings, 374
- Pulse, 375
- Respiration, 376
- Blood Pressure, 377
- Advanced Monitoring Procedures, 379
- ◆ Patient Education, 380
- ◆ Legal and Ethical Implications, 381
- ◆ Eye to the Future, 381
- ◆ Critical Thinking, 381
 - Procedure 27.1 Taking an Oral Temperature Reading With a Digital Thermometer, 382
 - Procedure 27.2 Taking a Patient's Pulse, 382
 - Procedure 27.3 Taking a Patient's Respiration, 382
 - Procedure 27.4 Taking a Patient's Blood Pressure, 383
 - Procedure 27.5 Taking a Patient's Pulse Oximetry (Expanded Function), 384

- Procedure 27.6 Taking a Patient's ECG (Expanded Function), 384

28 Oral Diagnosis and Treatment Planning, 385

- Examination and Diagnostic Techniques, 386
- Recording the Dental Examination, 387
- Clinical Examination of the Patient, 398
- The Treatment Plan, 398
- ◆ Patient Education, 399
- ◆ Legal and Ethical Implications, 399
- ◆ Eye to the Future, 402
- ◆ Critical Thinking, 402
 - Procedure 28.1 Extraoral and Intraoral Photography (Expanded Function), 402
 - Procedure 28.2 The Soft Tissue Examination (Expanded Function), 404
 - Procedure 28.3 Charting of Teeth, 406
 - Procedure 28.4 Periodontal Screening: Examination of the Gingival Tissues, 407

29 The Special Needs and Medically Compromised Patient, 409

- Role of the Dental Assistant, 410
- The Aging Population, 410
- The Special Needs Patient, 412
- Specific Disorders of the Medically Compromised Patient, 412
- ◆ Legal and Ethical Implications, 420
- ◆ Eye to the Future, 420
- ◆ Critical Thinking, 420
 - Procedure 29.1 Transferring a Patient From a Wheelchair, 421

30 Principles of Pharmacology, 422

- Overview of Drugs, 422
- Dispensing of Drugs, 423
- Drug Reference Materials, 425
- Drug Dosage, 425
- Drugs Commonly Prescribed in Dentistry, 427
- Drugs Commonly Prescribed in Medicine, 428
- Adverse Drug Effects, 430
- ◆ Patient Education, 430
- ◆ Legal and Ethical Implications, 431
- ◆ Eye to the Future, 431
- ◆ Critical Thinking, 431

31 Assisting in a Medical Emergency, 432

- Preventing a Medical Emergency, 433
- Emergency Preparedness, 433
- Recognizing a Medical Emergency, 434
- Emergency Care Standards, 435
- Emergency Equipment and Supplies, 435
- Emergency Responses, 437
- Common Medical Emergencies Experienced in the Dental Office, 437
- Documentation of an Emergency, 438
- ◆ Patient Education, 439

- ◆ Legal and Ethical Implications, 439
- ◆ Eye to the Future, 439
- ◆ Critical Thinking, 439
 - Emergency Procedure 31.1 Performing Cardiopulmonary Resuscitation (One Person), 439
 - Emergency Procedure 31.2 Operating the Automated External Defibrillator, 440
 - Emergency Procedure 31.3 Responding to the Patient With an Obstructed Airway, 442
 - Emergency Procedure 31.4 Preparing the Oxygen System, 443
 - Emergency Procedure 31.5 Responding to the Unconscious Patient, 444
 - Emergency Procedure 31.6 Responding to the Patient With Chest Pain, 444
 - Emergency Procedure 31.7 Responding to the Patient Who Is Experiencing a Cerebrovascular Accident (Stroke), 445
 - Emergency Procedure 31.8 Responding to the Patient With Breathing Difficulty, 445
 - Emergency Procedure 31.9 Responding to the Patient Who Is Experiencing an Allergic Reaction, 446
 - Emergency Procedure 31.10 Responding to the Patient Who Is Experiencing a Convulsive Seizure, 446
 - Emergency Procedure 31.11 Responding to the Patient Who Is Experiencing a Diabetic Emergency, 446

Part 7 Foundation of Clinical Dentistry, 448

32 The Dental Office, 449

- Design of the Dental Office, 449
- Office Environment, 452
- Clinical Equipment, 453
- Care of Dental Equipment, 458
- Morning and Evening Routines for Dental Assistants, 458
 - ◆ Patient Education, 459
 - ◆ Eye to the Future, 459
 - ◆ Critical Thinking, 459
 - Procedure 32.1 Performing the Morning Routine (Opening the Office), 459
 - Procedure 32.2 Performing the Evening Routine (Closing the Office), 459

33 Delivering Dental Care, 460

- Know Your Patients, 460
- Reviewing the Patient Record, 461
- Preparing the Treatment Area, 461
- Greeting and Seating the Patient, 461
- Team Dentistry, 461
- Motion Economy, 462

- Operating Zones, 463
- Expanded Function Dental Auxiliary, 465
- ◆ Patient Education, 468

- ◆ Legal and Ethical Implications, 468

- ◆ Eye to the Future, 468

- ◆ Critical Thinking, 468

- Procedure 33.1 Admitting and Seating of the Patient, 469
- Procedure 33.2 Transferring Instruments With the Single-Handed Technique, 470
- Procedure 33.3 Transferring Instruments With the Two-Handed Technique, 471
- Procedure 33.4 Using the Dental Mirror Intraorally, 472
- Procedure 33.5 Using an Instrument Intraorally (Expanded Function), 472

34 Dental Hand Instruments, 473

- Identifying Hand Instruments, 473

- Instrument Classification, 475

- ◆ Legal and Ethical Implications, 483

- ◆ Eye to the Future, 483

- ◆ Critical Thinking, 484

- Procedure 34.1 Identifying Examination Instruments, 484
- Procedure 34.2 Identifying Hand (Manual) Cutting Instruments, 484
- Procedure 34.3 Identifying Restorative Instruments, 484
- Procedure 34.4 Identifying Accessory Instruments and Items, 484

35 Dental Handpieces and Accessories, 485

- Evolution of Rotary Equipment, 485

- Dental Handpieces, 486

- Rotary Cutting Instruments, 490

- Dental Burs, 490

- Abrasive Rotary Instruments, 493

- Laboratory Rotary Instruments, 493

- ◆ Legal and Ethical Implications, 493

- ◆ Eye to the Future, 493

- ◆ Critical Thinking, 493

- Procedure 35.1 Identifying and Attaching Dental Handpieces, 495
- Procedure 35.2 Identifying and Attaching Burs for Rotary Cutting Instruments, 497

36 Moisture Control, 498

- Oral Evacuation Systems, 498

- Rinsing the Oral Cavity, 500

- Isolation of Teeth, 501

- The Dental Dam, 502

- ◆ Patient Education, 509

- ◆ Legal and Ethical Implications, 509

- ◆ Eye to the Future, 509

- ◆ Critical Thinking, 509

- Procedure 36.1 Positioning the High-Volume Evacuator During a Procedure, 509
- Procedure 36.2 Performing a Mouth Rinse, 510

- Procedure 36.3 Placing and Removing Cotton Rolls, 511
- Procedure 36.4 Preparing, Placing, and Removing the Dental Dam (Expanded Function), 512

37 Anesthesia and Pain Control, 515

- Topical Anesthesia, 516
- Local Anesthesia, 516
- Electronic Anesthesia, 522
- Inhalation Sedation, 522
- Antianxiety Agents, 525
- Intravenous Sedation, 525
- General Anesthesia, 526
- Mind-Body Medicine, 526
- Documentation of Anesthesia and Pain Control, 527
 - ◆ Patient Education, 527
 - ◆ Legal and Ethical Implications, 527
 - ◆ Eye to the Future, 527
 - ◆ Critical Thinking, 527
 - Procedure 37.1 Applying a Topical Anesthetic, 528
 - Procedure 37.2 Assembling the Local Anesthetic Syringe, 528
 - Procedure 37.3 Assisting in the Administration of Local Anesthesia, 530
 - Procedure 37.4 Assisting in the Administration and Monitoring of Nitrous Oxide/Oxygen Sedation (Expanded Function), 531

Part 8 Radiographic Imaging, 533

38 Foundations of Radiography, Radiographic Equipment, and Radiation Safety, 534

- Discovery of X-Radiation, 535
- Radiation Physics, 537
- The Dental X-Ray Machine, 539
- X-Ray Production, 543
- Types of Radiation, 544
- Characteristics of X-Ray Beam, 545
- Radiation Effects, 547
- Radiation Measurement, 549
- Radiation Safety, 549
 - ◆ Patient Education, 553
 - ◆ Legal and Ethical Implications, 553
 - ◆ Eye to the Future, 553
 - ◆ Critical Thinking, 553

39 Digital Imaging, Dental Film, and Processing Radiographs, 554

- Digital Radiography, 555
- Types of Digital Imaging Systems, 556
- X-Ray Film and Film Processing, 558
- Positioning Instruments, 558
- Dental Film, 558
- Film Composition, 562
- Types of Film, 562
- Film Processing, 566
 - ◆ Legal and Ethical Implications, 570
 - ◆ Eye to the Future, 570

- ◆ Critical Thinking, 573
 - Procedure 39.1 Duplicating Dental Radiographs, 573
 - Procedure 39.2 Processing Dental Films Manually, 574
 - Procedure 39.3 Processing Dental Films in an Automatic Film Processor, 575

40 Legal Issues, Quality Assurance, and Infection Prevention, 576

- Legal Considerations, 577
- Quality Assurance in the Dental Office, 578
- Infection Control, 582
 - ◆ Legal and Ethical Implications, 587
 - ◆ Eye to the Future, 588
 - ◆ Critical Thinking, 588
 - Procedure 40.1 Practicing Infection Control During Film Exposure, 588
 - Procedure 40.2 Practicing Infection Control in the Darkroom, 589
 - Procedure 40.3 Practicing Infection Control With Use of Daylight Loader, 590
 - Procedure 40.4 Practicing Infection Control With Digital Sensors, 592
 - Procedure 40.5 Practicing Infection Control With Phosphor Storage Plates (PSPs), 592

41 Intraoral Imaging, 595

- Full-Mouth Survey, 596
- Intraoral Imaging Techniques, 596
- Paralleling Technique, 596
- Bitewing Technique, 604
- Occlusal Technique, 605
- Patients With Special Medical Needs, 606
- Patients With Special Dental Needs, 606
- Dental Imaging Technique Errors, 609
- Mounting Dental Radiographs, 609
 - ◆ Legal and Ethical Implications, 609
 - ◆ Eye to the Future, 612
 - ◆ Critical Thinking, 612
 - Procedure 41.1 Preparing the Patient for Dental Imaging, 612
 - Procedure 41.2 Assembling the Extension-Cone Paralleling (XCP) Instruments, 613
 - Procedure 41.3 Producing Full-Mouth Radiographic Survey Using Paralleling Technique, 615
 - Procedure 41.4 Producing Full-Mouth Radiographic Survey Using Bisecting Technique, 624
 - Procedure 41.5 Producing Four-View Radiographic Survey Using Bitewing Technique, 633
 - Procedure 41.6 Producing Maxillary and Mandibular Radiographs Using Occlusal Technique, 635
 - Procedure 41.7 Mounting Dental Radiographs, 637

42 Extraoral Imaging, 638

- Panoramic Imaging, 639
- Three-Dimensional Digital Imaging, 645
- Specialized Extraoral Imaging, 648
 - ◆ Legal and Ethical Implications, 651

- ◆ Eye to the Future, 651
- ◆ Critical Thinking, 653
 - Procedure 42.1 Preparing the Equipment for Panoramic Imaging, 655
 - Procedure 42.2 Preparing the Patient for Panoramic Imaging, 656
 - Procedure 42.3 Positioning the Patient for Panoramic Imaging, 657

Part 9 Dental Materials, 658

43 Restorative and Esthetic Dental Materials, 659

- Standardization of Dental Materials, 660
- Properties of Dental Materials, 660
- Direct Restorative and Esthetic Materials, 663
- Temporary Restorative Materials, 671
- Tooth-Whitening Materials, 672
- Indirect Restorative Materials, 673
 - ◆ Patient Education, 674
 - ◆ Legal and Ethical Implications, 674
 - ◆ Eye to the Future, 674
 - ◆ Critical Thinking, 674
 - Procedure 43.1 Mixing and Transferring Dental Amalgam, 675
 - Procedure 43.2 Preparing Composite Resin Materials, 676
 - Procedure 43.3 Mixing Intermediate Restorative Materials, 677
 - Procedure 43.4 Preparing Acrylic Resin for the Fabrication of Provisional Coverage, 678

44 Dental Liners, Bases, and Bonding Systems, 679

- Prepared Tooth Structures, 680
- Pulpal Responses, 680
- Cavity Liners, 680
- Cavity Sealers, 681
- Desensitizer, 682
- Dental Bases, 682
- Dental Etchant, 683
- Dental Bonding, 683
 - ◆ Patient Education, 685
 - ◆ Legal and Ethical Implications, 685
 - ◆ Eye to the Future, 685
 - ◆ Critical Thinking, 685
 - Procedure 44.1 Applying Calcium Hydroxide (Expanded Function), 686
 - Procedure 44.2 Applying Dental Varnish (Expanded Function), 686
 - Procedure 44.3 Applying a Desensitizer (Expanded Function), 687
 - Procedure 44.4 Mixing and Placing Zinc Oxide–Eugenol Cement as a Base (Expanded Function), 688
 - Procedure 44.5 Mixing and Placing Zinc Phosphate Cement as a Base (Expanded Function), 689
 - Procedure 44.6 Mixing and Placing Polycarboxylate Cement as a Base (Expanded Function), 690

- Procedure 44.7 Applying an Etchant Material (Expanded Function), 691
- Procedure 44.8 Applying a Bonding System (Expanded Function), 692

45 Dental Cements, 693

- Classification of Dental Cement, 693
- Variables Affecting Final Cementation, 694
- Types of Cement, 695
- Cement Removal, 698
 - ◆ Patient Education, 698
 - ◆ Legal and Ethical Implications, 699
 - ◆ Eye to the Future, 699
 - ◆ Critical Thinking, 699
 - Procedure 45.1 Mixing Glass Ionomer for Permanent Cementation, 699
 - Procedure 45.2 Mixing Composite Resin for Permanent Cementation, 700
 - Procedure 45.3 Mixing Zinc Oxide–Eugenol for Temporary Cementation, 700
 - Procedure 45.4 Mixing Zinc Oxide–Eugenol for Permanent Cementation, 701
 - Procedure 45.5 Mixing Polycarboxylate for Permanent Cementation, 702
 - Procedure 45.6 Mixing Zinc Phosphate for Permanent Cementation, 702
 - Procedure 45.7 Removing Cement From Permanent or Temporary Cementation (Expanded Function), 704

46 Impression Materials and Techniques, 705

- Classification of Impressions, 705
- Impression Trays, 706
- Hydrocolloid Materials, 707
- Elastomeric Materials, 711
- Occlusal (Bite) Registration, 715
 - ◆ Patient Education, 716
 - ◆ Legal and Ethical Implications, 716
 - ◆ Eye to the Future, 716
 - ◆ Critical Thinking, 716
 - Procedure 46.1 Mixing Alginate Impression Material, 716
 - Procedure 46.2 Taking a Mandibular Preliminary Impression (Expanded Function), 717
 - Procedure 46.3 Taking a Maxillary Preliminary Impression (Expanded Function), 719
 - Procedure 46.4 Mixing a Two-Paste Final Impression Material, 720
 - Procedure 46.5 Preparing an Automix Final Impression Material, 721
 - Procedure 46.6 Taking a Wax Bite Registration (Expanded Function), 722
 - Procedure 46.7 Mixing Polysiloxane Material for a Bite Registration, 723
 - Procedure 46.8 Mixing Zinc Oxide–Eugenol Bite Registration Material, 724

47 Laboratory Materials and Procedures, 725

- Safety in the Dental Laboratory, 726
- Dental Laboratory Equipment, 726

- Dental Models, 729
- Custom Impression Trays, 731
- Dental Waxes, 732
- ◆ Patient Education, 734
- ◆ Legal and Ethical Implications, 734
- ◆ Eye to the Future, 734
- ◆ Critical Thinking, 734
 - Procedure 47.1 Taking a Face-Bow Registration (Expanded Function), 735
 - Procedure 47.2 Mixing Dental Plaster, 736
 - Procedure 47.3 Pouring Dental Models Using the Inverted-Pour Method, 737
 - Procedure 47.4 Trimming and Finishing Dental Models, 739
 - Procedure 47.5 Constructing an Acrylic Resin Custom Tray, 740
 - Procedure 47.6 Creating a Light-Cured Custom Tray, 742
 - Procedure 47.7 Constructing a Vacuum-Formed Custom Tray, 744

Part 10 Assisting in Comprehensive Dental Care, 745

48 General Dentistry, 746

- Restoration Process, 747
- Permanent Restorations, 748
- Complex Restorations, 751
- Intermediate Restorations, 751
- Veneers, 751
- Tooth Whitening, 752
- ◆ Patient Education, 754
- ◆ Legal and Ethical Implications, 754
- ◆ Eye to the Future, 754
- ◆ Critical Thinking, 755
 - Procedure 48.1 Assisting in a Class I Restoration, 755
 - Procedure 48.2 Assisting in a Class II Amalgam Restoration, 757
 - Procedure 48.3 Assisting in a Class III or IV Restoration, 759
 - Procedure 48.4 Assisting in a Class V Restoration, 761
 - Procedure 48.5 Placing and Carving an Intermediate Restoration (Expanded Function), 762
 - Procedure 48.6 Assisting in the Placement of a Direct Veneer, 763

49 Matrix Systems for Restorative Dentistry, 765

- Posterior Matrix Systems, 765
- Anterior Matrix Systems, 768
- Alternative Matrix Systems, 769
- Patient Education, 770
- ◆ Legal and Ethical Implications, 770
- ◆ Eye to the Future, 770
- ◆ Critical Thinking, 770
 - Procedure 49.1 Assembling a Matrix Band and Universal Retainer, 771
 - Procedure 49.2 Placing and Removing a Matrix Band and Wedge for a Class II Restoration (Expanded Function), 772

- Procedure 49.3 Placing a Plastic Matrix for a Class III or Class IV Restoration (Expanded Function), 774

50 Fixed Prosthodontics, 775

- Plan of Care, 776
- Indirect Restorations, 776
- Role of the Dental Laboratory Technician, 778
- Overview of a Crown Procedure, 779
- Overview of a Bridge Procedure, 784
- Computer-Assisted Restorations, 784
- ◆ Patient Education, 785
- ◆ Legal and Ethical Implications, 785
- ◆ Eye to the Future, 786
- ◆ Critical Thinking, 786
 - Procedure 50.1 Placing and Removing Gingival Retraction Cord (Expanded Function), 787
 - Procedure 50.2 Assisting in the Delivery and Cementation of a Cast Restoration, 789
 - Procedure 50.3 Assisting in a Crown or Bridge Preparation, 790
 - Procedure 50.4 Assisting in a CAD/CAM Procedure (Expanded Function), 791

51 Provisional Coverage, 793

- Expanded Function, 793
- Categories of Provisional Coverage, 793
- Criteria for Provisional Fabrication, 794
- Home Care Instructions, 797
- Removal of the Provisional Crown or Bridge, 798
- ◆ Patient Education, 798
- ◆ Legal and Ethical Implications, 798
- ◆ Eye to the Future, 798
- ◆ Critical Thinking, 798
 - Procedure 51.1 Fabricating and Cementing a Custom Acrylic Provisional Crown (Expanded Function), 799
 - Procedure 51.2 Fabricating and Cementing a Custom Acrylic Provisional Bridge (Expanded Function), 801
 - Procedure 51.3 Fabricating and Cementing a Preformed Provisional Crown (Expanded Function), 802

52 Removable Prosthodontics, 804

- Factors Influencing the Choice of a Removable Prosthesis, 805
- Removable Partial Denture, 806
- Full (Complete) Denture, 808
- Immediate Dentures, 813
- Denture Adjustment and Relining, 814
- Denture Repairs, 814
- Denture Duplication, 815
- ◆ Patient Education, 815
- ◆ Legal and Ethical Implications, 815
- ◆ Eye to the Future, 815
- ◆ Critical Thinking, 815

- Procedure 52.1 Assisting in the Delivery of a Partial Denture, 816
- Procedure 52.2 Assisting in a Wax Denture Try-in, 816
- Procedure 52.3 Assisting in the Delivery of a Full Denture, 817
- Procedure 52.4 Repairing a Fractured Denture (Expanded Function), 817

53 Dental Implants, 818

- Indications for Implants, 818
- Contraindications to Implants, 819
- The Dental Implant Patient, 820
- Preparation for Implants, 820
- Types of Dental Implants, 821
- Maintenance of Dental Implants, 824
 - ◆ Patient Education, 825
 - ◆ Legal and Ethical Implications, 825
 - ◆ Eye to the Future, 825
 - ◆ Critical Thinking, 825
 - Procedure 53.1 Assisting in an Endosteal Implant Surgery, 826

54 Endodontics, 829

- Pulpal Damage, 830
- Endodontic Diagnosis, 830
- Diagnostic Conclusions, 832
- Endodontic Procedures, 833
- Instruments and Accessories, 833
- Microscopic Endodontics, 836
- Medicaments and Dental Materials in Endodontics, 837
- Overview of Root Canal Therapy, 838
- Surgical Endodontics, 839
 - ◆ Patient Education, 840
 - ◆ Legal and Ethical Implications, 840
 - ◆ Eye to the Future, 840
 - ◆ Critical Thinking, 840
 - Procedure 54.1 Assisting in Electric Pulp Vitality Test, 842
 - Procedure 54.2 Assisting in Root Canal Therapy, 843

55 Periodontics, 845

- The Periodontal Examination, 846
- Periodontal Instruments, 850
- Hand Scaling and Ultrasonic Scaling, 852
- Nonsurgical Periodontal Treatment, 854
- Surgical Periodontal Treatment, 856
- Lasers in Periodontics, 861
 - ◆ Patient Education, 864
 - ◆ Legal and Ethical Implications, 864
 - ◆ Eye to the Future, 864
 - ◆ Critical Thinking, 864
 - Procedure 55.1 Assisting With a Dental Prophylaxis, 865
 - Procedure 55.2 Assisting With Gingivectomy and Gingivoplasty, 866

- Procedure 55.3 Preparing and Placing a Noneugenol Periodontal Dressing (Expanded Function), 867
- Procedure 55.4 Removing a Periodontal Dressing (Expanded Function), 868

56 Oral and Maxillofacial Surgery, 869

- Members of the Oral and Maxillofacial Surgical Team, 870
- The Surgical Setting, 870
- Specialized Instruments and Accessories, 871
- Surgical Asepsis, 877
- Surgical Procedures, 877
- Sutures, 878
- Postoperative Care, 879
- Postsurgical Complications, 880
 - ◆ Patient Education, 880
 - ◆ Legal and Ethical Implications, 880
 - ◆ Eye to the Future, 880
 - ◆ Critical Thinking, 880
 - Procedure 56.1 Preparing a Sterile Field for Instruments and Supplies, 881
 - Procedure 56.2 Performing a Surgical Scrub, 881
 - Procedure 56.3 Performing Sterile Gloving, 883
 - Procedure 56.4 Assisting in Forceps Extraction, 884
 - Procedure 56.5 Assisting in Multiple Extractions and Alveoplasty, 885
 - Procedure 56.6 Assisting in Removal of an Impacted Tooth, 886
 - Procedure 56.7 Assisting in Suture Placement, 887
 - Procedure 56.8 Performing Suture Removal (Expanded Function), 888
 - Procedure 56.9 Assisting in the Treatment of Alveolar Osteitis, 889

57 Pediatric Dentistry, 890

- The Pediatric Dental Team and Office, 891
- The Pediatric Patient, 892
- Patients With Special Needs, 894
- Diagnosis and Treatment Planning, 895
- Preventive Dentistry for Children, 896
- Pediatric Procedures, 900
- Dental Trauma, 901
- Child Abuse and Neglect, 903
 - ◆ Patient Education, 904
 - ◆ Legal and Ethical Implications, 904
 - ◆ Eye to the Future, 904
 - ◆ Critical Thinking, 904
 - Procedure 57.1 Assisting in Pulpotomy of a Primary Tooth, 904
 - Procedure 57.2 Assisting in Placement of a Stainless Steel Crown, 905

58 Coronal Polishing, 907

- Coronal Polishing, 907
- Dental Stains, 909
- Handpieces and Attachments for Coronal Polishing, 911
- Polishing Agents, 913

- Polishing Esthetic Restorations, 913
- Coronal Polishing Steps, 914
- ◆ Patient Education, 916
- ◆ Legal and Ethical Implications, 916
- ◆ Eye to the Future, 916
- ◆ Critical Thinking, 916
 - Procedure 58.1 Rubber Cup Coronal Polishing (Expanded Function), 917

59 Dental Sealants, 920

- How Sealants Work, 920
- Indications for Sealants, 921
- Contraindications to Sealants, 922
- Types of Sealant Materials, 922
- Preventing Problems With Sealants, 924
- Precautions for Dental Personnel and Patients, 925
- Factors in Sealant Retention, 925
- ◆ Legal and Ethical Implications, 925
- ◆ Eye to the Future, 925
- ◆ Critical Thinking, 925
 - Procedure 59.1 Application of Dental Sealants (Expanded Function), 926

60 Orthodontics, 928

- Benefits of Orthodontic Treatment, 929
- The Orthodontic Team and Office, 929
- Understanding Malocclusion, 929
- Malocclusion, 930
- Management of Orthodontic Problems, 932
- Orthodontic Records and Treatment Planning, 932
- Case Presentation, 935
- Specialized Instruments and Accessories, 936
- Orthodontic Treatment, 936
- Clear Aligner Treatment, 941
- Adjustment Visits, 942
- Oral Hygiene and Dietary Instructions, 942
- Headgear, 942
- Completed Treatment, 943
- ◆ Patient Education, 944
- ◆ Legal and Ethical Implications, 944
- ◆ Eye to the Future, 944
- ◆ Critical Thinking, 944
 - Procedure 60.1 Placing and Removing Steel Separating Springs (Expanded Function), 945
 - Procedure 60.2 Placing and Removing Elastomeric Ring Separators (Expanded Function), 947
 - Procedure 60.3 Assisting in the Fitting and Cementation of Orthodontic Bands (Expanded Function), 948
 - Procedure 60.4 Assisting in the Direct Bonding of Orthodontic Brackets, 949
 - Procedure 60.5 Placing Arch Wires (Expanded Function), 950
 - Procedure 60.6 Placing and Removing Ligature Ties (Expanded Function), 951
 - Procedure 60.7 Placing and Removing Elastomeric Ties (Expanded Function), 952

Part 11 Dental Administration and Communication Skills, 953

61 Communication in the Dental Office, 954

- Cultural Diversity, 954
- Understanding Human Behavior, 955
- Communication Pathways, 955
- Communicating With Colleagues, 957
- Communicating With Patients, 958
- Phone Skills, 960
- Written Communications, 963
- Marketing Your Dental Practice, 965
- ◆ Patient Education, 969
- ◆ Legal and Ethical Implications, 969
- ◆ Eye to the Future, 969
- ◆ Critical Thinking, 969
 - Procedure 61.1 Answering the Phone, 969
 - Procedure 61.2 Composing a Business Letter, 970

62 Business Operating Systems, 971

- Operating Procedure Manual, 972
- Computer Applications in the Dental Office, 972
- Cyber Security, 973
- Record Keeping, 973
- Filing Systems, 974
- Appointment Scheduling, 978
- Preventive Recall Programs, 984
- Inventory Management, 985
- Dental Supply Budget, 991
- Equipment Repairs, 991
- ◆ Legal and Ethical Implications, 991
- ◆ Eye to the Future, 992
- ◆ Critical Thinking, 992

63 Financial Management in the Dental Office, 993

- Accounts Receivable, 994
- Collections, 999
- Accounts Payable Management, 1004
- Writing Checks, 1006
- Payroll, 1007
- Dental Insurance, 1009
- ◆ Patient Education, 1018
- ◆ Legal and Ethical Implications, 1018
- ◆ Eye to the Future, 1018
- ◆ Critical Thinking, 1018

64 Marketing Your Skills, 1020

- Your Professional Career, 1020
- Locating Employment Opportunities, 1022
- Seeking Employment, 1023
- Salary Negotiations, 1026
- Employment Agreement, 1026
- Americans With Disabilities Act, 1028

Job Termination, 1029
Achieving Career Objectives, 1029
◆ Patient Education, 1030
◆ Legal and Ethical Implications, 1030
◆ Eye to the Future, 1030
◆ Critical Thinking, 1030
 Procedure 64.1 Preparing a Professional Résumé, 1030

Bibliography, 1031

Glossary, 1032

Index, 1047

MODERN DENTAL
ASSISTING

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The Dental Assisting Profession

- 1 History of Dentistry, 2
- 2 The Professional Dental Assistant, 13
- 3 The Dental Healthcare Team, 19
- 4 Dental Ethics, 26
- 5 Dentistry and the Law, 30

The dental assistant is a significant member of the dental healthcare team, and the profession of dental assisting can be exciting, challenging, and very rewarding. The credentialed dental assistant can look forward to job satisfaction, a challenging career, and financial reward. It is a career that offers opportunities for someone just graduating from high school, as well as to the individual looking for a career change at any age.

Professionalism is difficult to define, but it is an attitude that is apparent in everything a person says and does, at and away from the office. Professionalism distinguishes people who “have a job” from those who “pursue a career.” By always behaving in a professional manner, the dental assistant earns respect and recognition as a dental healthcare professional.

The chapters in this section are designed to provide an overview of the dental profession. The section begins with a look at the history of dentistry through the ages, introduces the other members of the dental healthcare team, and explains the legal and ethical responsibilities expected of a dental professional.

1

History of Dentistry

LEARNING OUTCOMES

On completion of this chapter, the student will be able to achieve the following objectives:

1. Pronounce, define, and spell the key terms.
2. Compare and contrast the early contributions in dentistry of ancient cultures in Egypt, Greece, China, and Rome, which include:
 - The role of Hippocrates in history.
 - The basic premise of the Hippocratic Oath.
 - The culture that first developed a silver amalgam paste for filling teeth.
 - Important Romans who contributed to oral hygiene and dentistry.
3. Identify the important contributors and their contributions during the Renaissance period in dental history.
4. Identify the important contributions of early America in dental history, including the individual credited with beginning the science of forensic dentistry.
5. List the important contributions in dental education and professional development, which include:
 - The contributions of Horace H. Hayden and Chapin A. Harris.
 - Two major contributions of G. V. Black.
 - The scientist who discovered x-rays.
 - The physician who first used nitrous oxide for tooth extractions.
6. Identify key women in dental history, which include:
 - The woman dentist who discovered oral hairy leukoplakia.
 - The first woman to graduate from a college of dentistry.
 - The first woman to practice dentistry in the United States.
7. Identify key African Americans in dental history, including the first African American woman to receive a dental degree and the first African American to receive the DMD degree.
8. Identify key American Indians in dental history, including the first male and female American Indians to receive a dental degree.
9. Identify key historical contributors in the field of dental assisting and dental hygiene, who include:
 - The first dentist to employ a dental assistant.
 - The contributions of Ann Ehrlich and Hazel Torres to dental assisting education.
 - The first person to become a dental hygienist.
 - The contribution of Dr. Alfred C. Fones to the dental profession.
10. Explain the process of dental accreditation and its importance.
11. Discuss the purpose and activities of the National Museum of Dentistry.

KEY TERMS

Commission on Dental Accreditation of the American Dental Association Commission that accredits dental, dental assisting, dental hygiene, and dental laboratory educational programs

dental treatise (TREE-tis) formal article or book based on dental evidence and facts

forensic (fuh-REN-zik) dentistry area of dentistry that establishes the identity of an individual on the basis of dental evidence such as dental records, impressions, bite marks, and so forth

periodontal (per-ee-oe-DON-tul) disease infections and other conditions of the structures that support the teeth (gums and bone)

preceptorship (PREE-sep-tor-ship) study under the guidance of a dentist or other professional

Saint Apollonia recognized as the “Patroness of Dentistry”

silver amalgam (uh-MAL-gum) paste a mixture of mercury, silver, and tin

teledentistry the process of using electronic transfer of images and other information for consultation and/or insurance purposes in dentistry

Dentistry has a long and fascinating history. From the earliest times, humans have suffered from dental pain and have sought a variety of resources to alleviate it. As they developed tools, humans also cleaned and cared for their teeth and oral cavity. Early toothbrushes ranged from wooden sticks

with frayed ends for scraping the tongue to ivory-handled brushes with animal-hair bristles for cleaning the teeth.

It is easy to believe that the ideas and techniques used in dentistry today are new or have been recently discovered or invented. Actually, many of the remarkable techniques in modern dentistry can be

traced to the earliest times in every culture. People may think of “cosmetic dentistry” as a relatively new field, but skulls of ninth-century BC Mayans have numerous inlays of decorative jade and turquoise on the front teeth. Skulls of the Incas discovered in Ecuador have gold pounded into prepared holes in the teeth, similar to modern gold inlay restorations. As early as the sixth century BC, the Etruscans were able to make false teeth using gold and cattle teeth (Fig. 1.1). More than 2200 years ago, a cleft palate was repaired on a child in China. Muhammad introduced basic oral hygiene into the ritual of Islam in the seventh century AD. He recognized the value of Siwak, a tree twig containing natural minerals, as an oral hygiene device.

As B. W. Weinberger noted in *Dentistry: An Illustrated History* (Ring, 1985), a profession that is ignorant of its past experiences has lost a valuable asset because “it has missed its best guide to the future.” Table 1.1 lists major highlights in the history of dentistry.



• **Fig. 1.1** Ancient Etruscan gold-banded bridge with built-in calf's tooth. (Courtesy Musée de l'École Dentaire de Paris.)

Early Times

The Egyptians

As long as 4600 years ago in Egypt, physicians began to specialize in healing certain parts of the body. A physician named *Hesi-Re* was the earliest dentist whose name is known. He practiced about 3000 BC and was called “Chief of the Toothers and the Physicians.” Three teeth fastened together with gold wire, apparently an early fixed bridge, were found with the remains of an Egyptian who lived about 3100 BC.

A radiograph of the skull of Thuya, mother-in-law of Pharaoh Amenhotep III, showed bone loss in her jaws, an indication of **periodontal disease**. Some dental problems have been attributed to the Egyptian diet, which was primarily vegetarian. Grain was ground with stone pestles, which mixed sand and grit into the food, resulting in severe wear of the *occlusal* (biting) tooth surfaces and exposure of the pulp.

RECALL

1. Who was Hesi-Re?
2. How long has dental disease existed?

The Greeks

During the fifth century BC in Greece, the practice of medicine and dentistry was based on the worship practices of the priesthood. Priests would give patients a sleeping potion and perform healing rituals. During this period, *Hippocrates* (460–377 BC) began to outline a rational approach to treating patients. He suggested that

TABLE 1.1 Highlights in the History of Dentistry

Date	Group/Individual	Event
3000–2151 BC	Egyptians	Hesi-Re is earliest dentist known by name.
2700 BC	Chinese	Chinese Canon of Medicine refers to dentistry.
900–300 BC	Mayans	Teeth receive attention for religious reasons or self-adornment.
460–322 BC	Greeks	Hippocrates and Aristotle write about tooth decay.
166–201 AD	Romans	Restore decayed teeth with gold crowns.
570–950	Muslims	Use Siwak as a primitive toothbrush.
1510–1590	Ambroise Paré	Writes extensively about dentistry, including extractions.
1678–1761	Pierre Fauchard	Becomes “Father of Modern Dentistry.”
1728–1793	John Hunter	Performs first scientific study of teeth.
1826	M. Taveau	Introduces amalgam as “silver paste.”
1844	Horace Wells	Uses nitrous oxide for relief of dental pain.
1859		American Dental Association is founded.
1885	C. Edmund Kells	Employs first dental assistant.
1895	G. V. Black	Becomes “Grand Old Man of Dentistry” and perfects amalgam.
1895	W. C. Roentgen	Discovers x-rays.

TABLE 1.1 Highlights in the History of Dentistry—cont'd

Date	Group/Individual	Event
1908	Frederick McKay	Discovers that fluoride is connected with prevention of dental caries.
1913	Alfred C. Fones	Establishes first dental hygiene school in Bridgeport, Connecticut.
1923		American Dental Hygiene Association is founded.
1924		American Dental Assistants Association is founded.
1948		Dental Assisting National Board is founded.
1970	Congress	Creates Occupational Safety and Health Administration.
1978	<i>Journal of the American Dental Association</i>	Publishes a report on infection control for dental offices.
1980		First cases of what later became known as acquired immunodeficiency syndrome (AIDS) are reported.
1982		First hepatitis B vaccine becomes commercially available.
1983		Human immunodeficiency virus (HIV) is identified as the cause of AIDS.
2000		<i>Oral Health in America: A Report of the Surgeon General</i> is released.
2003	Centers for Disease Control and Prevention	Releases <i>Guidelines for Infection Control in Dental Health-Care Settings—2003</i> .

four main fluids in the body—blood, black bile, yellow bile, and phlegm—along with heat, cold, dry air, and wet air, must remain in balance, or disease would occur. His approach to treatment of patients earned him the title “Father of Medicine.”

Hippocrates stressed the importance of keeping the teeth in good condition. His writings described the teeth, their formation, and their eruption, as well as diseases of the teeth and methods of treatment. He also developed a dentifrice and mouthwash. The famous Hippocratic Oath, a solemn obligation to refrain from wrongdoing and to treat patients with confidentiality and to the best of one’s ability, still serves as the basis of the code of ethics for medical and dental professions.

Aristotle (384–322 BC), the great philosopher, referred to teeth in many of his writings. However, he mistakenly stated that the gingiva was responsible for tooth formation, and that men had 32 teeth and women had only 30. Many of his erroneous ideas were not corrected until the Renaissance.

Diocles of Carystus, an Athenian physician of Aristotle’s time, recommended rubbing the gums and teeth with bare fingers and “finely pulverized mint” to remove adherent food particles. Other materials used to clean the teeth included pumice, talc, emery, ground alabaster, coral powder, and iron rust.

The Chinese

By 2000 BC, the Chinese were practicing dentistry. They used arsenic to treat decayed teeth. This probably relieved the toothache. About the second century AD, the Chinese developed a **silver amalgam** paste for fillings, more than a thousand years before dentists in the West used a similar substance. In the eleventh century, *T’ing To-r’ung* and *Yu Shu* described the entire process of chewing and swallowing. Their description of the process was accurate, but they were incorrect about what happened to the food when it reached the stomach. They believed that digestion was a result of vapors arising from the spleen.

The Romans

When the medical profession in Rome was just beginning, dentistry was already being practiced. Several Roman physicians wrote extensively about dental treatment, although many people still believed that a “toothworm” was responsible for toothaches. In addition to extracting teeth, the Romans were skilled in restoring decayed teeth with gold crowns and replacing missing teeth by means of fixed bridgework.

The Romans had a high regard for oral hygiene and developed tooth-cleaning powders made from eggshells, bones, and oyster shells mixed with honey. Dinner guests of upper-class Romans picked their teeth between courses with elaborately decorated toothpicks of metal, often gold, and were invited to take their gold toothpicks home as gifts.

Saint Apollonia was one of a group of virgin martyrs who suffered in Alexandria during a local uprising against the Christians before the persecution of Decius. According to legend, her torture included having all of her teeth violently pulled out or shattered. For this reason, she is popularly regarded as the patroness of dentistry and those suffering from toothache or other dental problems (Fig. 1.2).

Cornelius Celsus (25 BC–50 AD) wrote *De Medicina*, a digest of medical and surgical science from the earliest times to the period of Augustus Caesar. This book contains the earliest record of orthodontic treatment.

Claudius Galen (130–200 AD) is considered to be the greatest physician after Hippocrates. In his writings, Galen listed the teeth as bones of the body. He is the first author to mention the nerves in the teeth: “The teeth are furnished with nerves both because as naked bones they have need of sensitivity so that the animal may avoid being injured or destroyed by mechanical or physical agencies, and because the teeth, together with the tongue and other parts of the mouth, are designed for the perception of various flavors” (Guerini, 1909).



• **Fig. 1.2** Saint Apollonia is an oil-on-canvas picture painted by Spanish artist Francisco de Zurbarán in 1636. It is currently held and exhibited at the Louvre in Paris. (By Francisco de Zurbarán, via Wikimedia Commons.)

RECALL

3. Who is the “Father of Medicine”?
4. What is the Hippocratic Oath?
5. Who is the Patroness of Dentistry?
6. Were Western dentists the first to use silver amalgam as fillings?

The Renaissance

One of the most important achievements of the Renaissance was the separation of science from theology and superstition. During the fifteenth and sixteenth centuries, new interest arose in the study of anatomy and the human body. Artists became more aware of human anatomy and used it to enhance their artwork. *Leonardo da Vinci* (1452–1519) sketched every internal and external structure of the body. He also studied the skull in great detail and was the first anatomist to describe the differences between molars and premolars.

Ambroise Paré (pah-RAY) (1510–1590) began his career in Paris in about 1525 as an apprentice to a barber surgeon. His extensive writings describe dental extraction methods and reimplantation of teeth. He described a toothache as “the most atrocious pain that can torment a man without being followed by death” (Ring 1985). At that time, the practice was to treat soldiers with gunshots by washing the wound with boiling oil, which caused extreme pain. After one battle, the supply of oil was depleted, and Paré had to treat a soldier’s wounds with a mixture of egg whites, oil of roses, and turpentine. After using this soothing mixture,



• **Fig. 1.3** Pierre Fauchard, the “Father of Modern Dentistry.” (From Fauchard P: *Le Chirurgien dentiste ou traité des dents*, Paris, 1746, Pierre-Jean Mariette.)

Paré vowed that he would “never so cruelly burn poor wounded men.” He is also credited with being the first to use artificial eyes, hands, and legs. Paré is known as the “Father of Modern Surgery.”

Pierre Fauchard (fo-SHAR) (1678–1761), a physician who earned great fame and respect in his lifetime, willingly shared his knowledge at a time when physicians typically guarded their knowledge and skills (Fig. 1.3). Fauchard developed dentistry as an independent profession and originated the title of “surgeon dentist,” a term the French still use today. In the United States, the degree conferred on dentists is Doctor of Dental Surgery (DDS).

Fauchard dispelled the theory that tooth decay was caused by a toothworm. He was ahead of his time in understanding periodontal disease and recognized that scaling the teeth could prevent gum disease. In his book, *Le Chirurgien Dentiste*, Fauchard covered the entire field of dentistry and described his method of removing caries from a tooth and filling the cavity with lead or tin. He suggested using either human teeth or teeth carved from hippopotamus or elephant ivory to make denture teeth. Although advanced in his thinking, Fauchard firmly believed that to ensure good health, people should rinse their mouth every morning with several spoonfuls of their own fresh urine.

Chapin A. Harris, the great American dentist, said of Fauchard: “Considering the circumstances under which he lived, Fauchard deserves to be remembered as a noble pioneer and sure founder of dental science. That his practice was crude was due to his times, that it was scientific and comparatively superior and successful was due to himself” (Ring 1985). Fauchard is known as the “Father of Modern Dentistry.”

RECALL

7. Which artist first distinguished molars from premolars?
8. Who is the “Father of Modern Surgery”?
9. Who is the “Father of Modern Dentistry”?

Early America

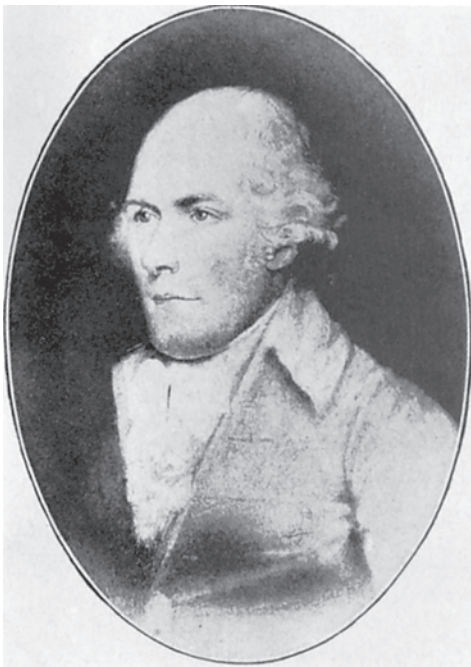
In 1766 *Robert Woofendale* was one of the first dentists to travel throughout the American colonies. His advertisement in *The New York Mercury* stated that he “performs all operations upon the teeth, sockets, gums and palate, likewise fixes artificial teeth, so as to escape discernment” (Ring 1985). A short time later, *John Baker* arrived from Cork County, Ireland, where he studied dentistry. Although he was a physician, Baker practiced dentistry in Boston, New York, Philadelphia, and many other colonial cities. He was one of George Washington’s dentists (Fig. 1.4).

Paul Revere (1735–1818), the famous colonial patriot, was a silversmith by trade, but he studied dentistry as an apprentice under Dr. Baker in Boston. When Baker moved to New York in 1768, Revere took over his practice. However, Revere was primarily interested in using his skills as a silversmith to make artificial teeth and surgical instruments. After 6 years of part-time work, he gave up his dental practice.

Paul Revere is credited with beginning the science of **forensic dentistry** and performed the first identification of a corpse recorded in dental history. Dr. Joseph Warren was killed at the Battle of Bunker Hill in 1775 and was buried by the British in a mass grave. A year later, the bodies were exhumed but were unrecognizable. Revere studied the skulls and identified Warren’s body on the basis of a two-unit bridge he had made.

RECALL

10. Who was John Baker’s famous patient?
11. Which famous colonial patriot first used forensic evidence?
12. Who was Robert Woofendale?



• **Fig. 1.4** John Greenwood, dentist to George Washington, was the second son of Isaac Greenwood, who is regarded as the first native-born American dentist. John Greenwood served in the colonial army at age 14 during the Revolutionary War and later became a dentist. (From Kock CRD: *History of dental surgery*, vol 3, Fort Wayne, Indiana, 1910, National Art Publishing.)

Educational and Professional Development in the United States

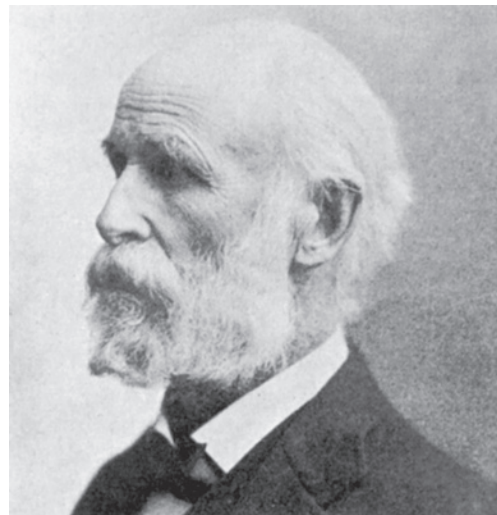
In the early days, no colleges for dentistry existed in the United States. Dentists learned their profession through a **preceptorship** while studying and learning under the direction of a skilled professional. During 1839 and 1840 *Horace H. Hayden* and *Chapin A. Harris* set the foundation for the profession of dentistry.

Horace H. Hayden (1769–1844) was inspired by his own dentist, John Greenwood, and became a reputable dentist. He lectured to medical students on the topic of dentistry and wrote for professional journals. Chapin A. Harris (1806–1860), a student of Hayden, was instrumental in establishing the first nationwide association of dentists in the United States. His book, *The Dental Art: A Practical Treatise on Dental Surgery*, was reissued over 74 years in 13 editions; no other **dental treatise** can match this record. Together, in 1840 Hayden and Harris established the first dental college in the world, the *Baltimore College of Dental Surgery*, which is now the University of Maryland School of Dentistry.

Dr. Green Vardiman Black (1836–1915), known worldwide as *G. V. Black*, earned the title of the “Grand Old Man of Dentistry” through his unmatched contributions to the profession (Figs. 1.5 and 1.6). Dr. Black thought that dentistry should stand as a profession independent from and equal to that of medicine. He invented numerous machines for testing metal alloys and dental instruments. He taught in dental schools, became a dean, and wrote more than 500 articles and several books. Two of his major contributions to dentistry were (1) the principle of *extension for prevention*, in which the margins of a filling were extended to within reach of a toothbrush for cleaning the tooth, and (2) standardized rules of cavity preparation and filling.

A man of vision, Black told his dental students at Northwestern University, “The day is surely coming, and perhaps within the lifetime of you young men before me, when we will be engaged in practicing preventive, rather than reparative, dentistry” (Ring 1985).

Wilhelm Conrad Roentgen (RENT-ken) (1845–1923) was a Bavarian physicist who discovered x-rays in 1895 (Fig. 1.7). His discovery revolutionized diagnostic capabilities and forever changed the practice of medicine and dentistry (see Chapter 38).



• **Fig. 1.5** G. V. Black, the “Grand Old Man of Dentistry.” (From Kock CRD: *History of dental surgery*, vol 1, Chicago, 1909, National Art Publishing.)



• **Fig. 1.6** Black's dental treatment room, as reconstructed in a Smithsonian exhibit.



• **Fig. 1.7** W. C. Roentgen discovered the early potential of an x-ray beam in 1895. (Courtesy Carestream Health, Inc.)

Horace Wells (1815–1848) is the dentist credited with the discovery of inhalation anesthesia in 1844, one of the most important medical discoveries of all time. Before this innovation, the only remedies for pain were brute force, alcohol (brandy, rum, whiskey), and opium. Oral drugs could not be properly dosed, and patients were generally undermedicated or overmedicated. If an operation lasted longer than 20 minutes, it was possible for the patient to die of exhaustion or shock. Realizing the potential for pain-free dental surgery with the use of nitrous oxide, Wells said, “Let it be as free as the air we breathe” (Ring, 1985) (see Chapter 37).

Women in Dental History

In the eighteenth and early nineteenth centuries, dental schools throughout the world did not accept women. Yet women such as Nellie E. Pooler Chapman and Lucy B. Hobbs-Taylor broke those



• **Fig. 1.8** Dental instrument kit belonging to Nellie E. Pooler Chapman. She practiced dentistry in Nevada City, California. She died in 1906. (Courtesy School of Dentistry, University of California San Francisco.)



• **Fig. 1.9** Lucy B. Hobbs-Taylor, the first female graduate of dental school. (Courtesy Kansas State Historical Society, Topeka, KS.)

barriers and led the way for other women to follow as dental professionals (Figs. 1.8 and 1.9).

Today, women represent almost 50% of students in some dental schools and are active in dental associations, specialty organizations, public health, and the military (Table 1.2).

Dr. Deborah Greenspan is recognized worldwide for her research into the dental issues related to the human immunodeficiency virus (HIV) and acquired immunodeficiency syndrome (AIDS). She discovered oral “hairy” leukoplakia (see Chapter 17) and opened a new arena of research into both HIV/AIDS and Epstein-Barr virus. Her work has influenced oral healthcare worldwide. She is a professor and Chair of the Oral Facial Sciences Department at the University of California San Francisco School of Dentistry.



• **Fig. 1.10** Dr. Faith Sai So Leong, the first female graduate at the College of Physicians and Surgeons (now the University of Pacific Arthur A. Dugoni School of Dentistry).

Dr. Faith Sai So Leong was 13 years old and spoke no English when she immigrated to the United States in 1894. When she was 24 years old, she became the first woman to graduate from the College of Physicians and Surgeons (now the University of the Pacific Arthur A. Dugoni School of Dentistry) in 1904. She practiced dentistry in San Francisco (Fig. 1.10).

RECALL

13. Who founded the first dental school in America?
14. Who earned the title of “Grand Old Man of Dentistry”?
15. Who was the first dentist to use nitrous oxide?
16. Who was the first woman in the United States to graduate from a dental school?
17. Who was the first person to discover oral “hairy” leukoplakia?

African Americans in Dental History

African Americans were not accepted for training at any dental schools until 1867, when Harvard University initiated its first dental class and accepted *Robert Tanner Freeman* as its first African American student (Fig. 1.11). *George Franklin Grant* graduated from Harvard in 1870 and later was appointed to the school’s dental faculty.

Ida Gray-Rollins (1867–1953) was the first African American woman in the country to earn a formal DDS degree and the first African American woman to practice dentistry in Chicago. She graduated from the University of Michigan School of Dentistry and practiced dentistry in Chicago until she retired in 1928. In 1929 she married William Rollins and used the name Dr. Ida Gray-Rollins for the rest of her life (see Table 1.2).

TABLE 1.2 Highlights of Women in Dentistry

Date	Group/Individual	Event
1859	Emeline Robert Jones	First woman to establish a regular dental practice in the United States.
1866	Lucy B. Hobbs-Taylor	First woman to graduate from a recognized dental college in the United States; received credit for time as a preceptor in her husband’s practice.
1869	Henriette Hirschfeld	First woman to complete the full dental curriculum in a U.S. dental school.
1870	Nellie E. Pooler Chapman	First woman to practice dentistry in California.
1873	Emilie Foeking	First female graduate of the Baltimore College of Dental Surgery. Wrote a thesis titled <i>Is Woman Adapted to the Dental Profession?</i>
1876	Jennie D. Spurrier	First female dentist in Illinois. Her first patient needed an extraction, for which she was paid 50 cents. She had the coin engraved with the date and “My first.”
1885	Malvina Cueria	First female dental assistant.
1890	Ida Gray-Rollins	First African American female dental graduate from a U.S. dental college.
1892	Mary Stillwell-Kuedsel	Founded the Women’s Dental Association of the United States with 12 charter members.
1906	Irene Newman	First dental hygienist.
1927	M. Evangeline Jordan	Author of the first textbook on pediatric dentistry.
1951	Helen E. Myers	U.S. Army’s first female dentist.
1984	Deborah Greenspan	Discovered and published first paper on oral “hairy” leukoplakia.
1991	Geraldine T. Morrow	First female president of the American Dental Association.

African Americans have been appointed deans and faculty members at a number of American dental schools (Table 1.3).

American Indians in Dental History

Dr. George Blue Spruce, Jr., is the first American Indian dentist in the United States. He graduated dental school from Creighton University in 1956, where he was the only American Indian on campus (Fig. 1.12). He began treating patients on American Indian reservations and later in his career became an Assistant Surgeon General in the United States Public Health Service. He is currently the Assistant Dean for American Indian Affairs at the Arizona School of Dentistry and Oral Health.



• **Fig. 1.11** Robert Tanner Freeman, the first African American graduate of Harvard School of Dental Medicine. (Courtesy Harvard Medical Library in the Francis A. Countway Library of Medicine, Boston, MA.)



• **Fig. 1.12** Dr. George Blue Spruce, Jr. (Courtesy Dr. George Blue Spruce, Jr.)

“Never be afraid to go after your dream. You, too, can meet and beat the challenges that come your way. Sometimes simply discovering and sharing your dreams can be a big step forward.”

DR. GEORGE BLUE SPRUCE, JR.

Jessica A. Rickert became the first recognized American Indian female dentist in 1975. She attended the University of Michigan

TABLE 1.3 Highlights of African Americans in Dentistry

Date	Individual	Event
1765	Peter Hawkins	Native-born, an itinerant preacher in Richmond, Virginia, did extractions for parishioners.
1851	John S. Rock	Awarded a silver medal for making artificial teeth. Examples of his work were exhibited by the Benjamin Franklin Institute.
1869	Robert Tanner Freeman	First African American dentist to receive the DMD degree from Harvard University.
1963	Andrew Z. Kellar	Published “The Epidemiology of Lip, Oral and Pharyngeal Cancers” in <i>American Journal of Public Health</i> .
1967	Van E. Collins	First African American dentist in regular military service to be promoted to the rank of colonel.
1973	Konneta Putman	Installed as the president of the American Dental Hygienists Association.
1975	Jeanne C. Sinkford	First African American female dean of a U.S. dental school.
1989	Raymond J. Fonseca	Appointed dental dean at the University of Pennsylvania.
1994	Juliann Bluit	The first woman dentist elected president of the American College of Dentists.
1994	Caswell A. Evans	The first African American dentist elected president of the American Public Health Association.
	Eugenia Mobley	The first African American woman dentist to earn a degree in public health and the second female dean of a U.S. dental school.
	Clifton O. Dummett	Distinguished professor emeritus of the University of Southern California School of Dentistry and author and historian for the National Dental Association.

School of Dentistry, and she was the only American Indian in a class of approximately 150 students. During this time there were very few female dentists or female dental students. She received the 2005 Access Recognition Award from the American Dental Association (ADA) for leadership in helping people in need gain access to dental care. In particular, she was nominated for her work in educating American Indians on dental care and encouraging them to pursue careers in the dental field. In 2009 she was honored for her work by being inducted into the Michigan Women’s Hall of Fame (Fig. 1.13).

History of Dental Assisting

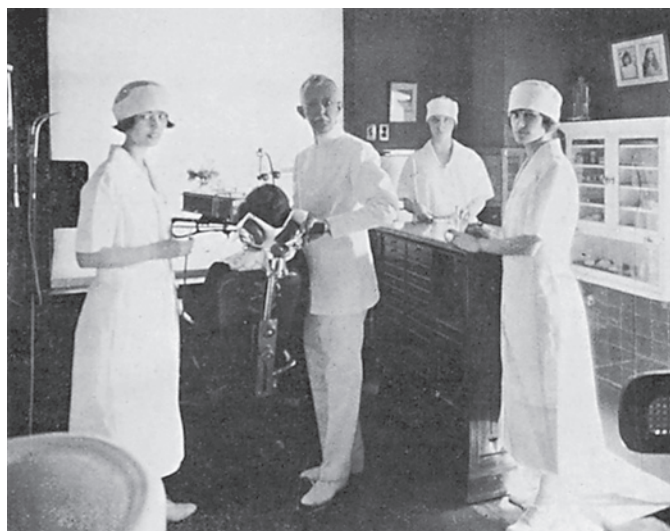
C. Edmund Kells (1856–1928), a New Orleans dentist, is usually credited with employing the first dental assistant (Fig. 1.14). In 1885



• **Fig. 1.13** Dr. Jessica Rickert. (Courtesy Dr. Jessica Rickert/William A. Strait Photography.)



• **Fig. 1.15** Hazel O. Torres, CDA, RDAEF, MA, founding coauthor of the *Modern Dental Assisting* textbook, shown here with her husband, Carl.



• **Fig. 1.14** C. Edmund Kells and his “working unit,” about 1900. Assistant on the left is keeping cold air on the cavity, while assistant on the right mixes materials, and “secretary” records details. (From Kells CE: *The dentist’s own book*, St Louis, 1925, Mosby.)

the first “lady assistant” was really a “lady in attendance,” who made it respectable for a woman patient to visit a dental office unaccompanied. The assistant helped with office duties, and by 1900 Kells was working with both a chairside dental assistant and a secretarial assistant. Soon other dentists saw the value of dental assistants and began to train dental assistants in their own offices.

In 1930 a curriculum committee was formed to draft courses of training to be used as educational guides. In 1948 the Certifying

Board of the American Dental Assistants Association was established (now the Dental Assisting National Board [DANB]). By 1950, 1- and 2-year programs were available for dental assisting education.

Hazel O. Torres and *Ann Ehrlich* forever set the standard for dental assisting textbooks in 1976, when their coauthored *Modern Dental Assisting* became the first major textbook written by dental assistants for dental assistants. Now in its eleventh edition, *Modern Dental Assisting* is the premier international learning system for dental assisting education.

Hazel Torres (Fig. 1.15) described herself as a sponge for knowledge. She began her career as an on-the-job trained dental assistant, continued her education, and later developed and taught in two dental assisting programs at community colleges in California. Among her many contributions to the profession of dental assisting, she was the first dental assistant to serve as a member of the California Board of Dental Examiners and served as a commissioner on the Commission of Dental Accreditation of the American Dental Association. She served as president of the American Dental Assistants Association (ADAA) and was awarded the Lifetime Achievement Award.

Ann Ehrlich (Fig. 1.16) began her career as a “wet-fingered” dental assistant in New Jersey. She had a passion for dental assisting and later completed her master’s degree, became an educator, and taught dental assisting full time at the University of North Carolina. As a member of the ADAA, for years she assumed an important role in the authoring and publication of the *Journal of the American Dental Assistants Association*. She also served as a consultant to the Dental Assisting National Board.



• **Fig. 1.16** Ann Ehrlich, CDA, MA, founding coauthor of the *Modern Dental Assisting* textbook.

RECALL

18. Who was the first African American to graduate from the dental school at Harvard University?
19. Who was the first African American female dentist in the United States?
20. Who was the first American Indian dentist in the United States?

History of Dental Hygiene

The first person to become a dental hygienist was *Irene Newman*, a dental assistant in Bridgeport, Connecticut, in the early 1900s. At that time *Alfred C. Fones*, a dentist, thought women could be trained to provide preventive services and thus give the dentist time to perform more complex procedures. Dr. Fones trained Irene Newman in dental hygiene and then developed a school for dental hygienists in 1913 (Fig. 1.17). The school exists today in Connecticut as the University of Bridgeport Fones School of Dental Hygiene.

Dental Accreditation

By 1900 the profession of dentistry had become well established and dental schools were being founded across the country (Fig. 1.18). Educational requirements for dentists, dental hygienists, and dental assistants have increased dramatically over the years.

Today, the **Commission on Dental Accreditation of the American Dental Association** is responsible for the evaluation and accreditation of dental educational programs in the United States. These include graduate dental programs, postgraduate



• **Fig. 1.17** Dental hygienist during the 1960s working in a standing position. (Digital/print image courtesy of University of Detroit Mercy Archives and Special Collections.)



• **Fig. 1.18** Dental students at the University of California San Francisco School of Dentistry treat patients in the dental clinic in the early 1900s. (Courtesy School of Dentistry, University of California San Francisco.)



• **Fig. 1.19** Modern dental-assisting students practicing chairside skills with their instructor in an accredited dental-assisting program.

specialty programs, and residency programs for dentists. The Commission also sets standards for educational programs in dental assisting, dental hygiene, and dental laboratory technology.

To maintain accreditation status, schools are reviewed every 7 years through comprehensive self-study and a visit by members of an accreditation team. The accreditation process provides assurance to students and to the public that the program continues to meet the high standards set forth by the dental profession (Fig. 1.19).

National Museum of Dentistry

The *Dr. Samuel D. Harris National Museum of Dentistry* is an affiliate of the Smithsonian Institution and is the largest and most comprehensive museum of dentistry in the world. In 2003 it was declared the nation's official dental museum by a joint resolution of the U.S. Congress. The museum is located on the grounds of the Baltimore College of Dental Surgery in Baltimore, Maryland, the world's first dental college. The museum's name honors Dr. Samuel D. Harris, a retired pediatric dentist who in 1992 was instrumental in founding the museum (Fig. 1.20).

The museum provides many interactive exhibits, historic artifacts, and engaging educational programs. Visitors learn about the heritage and future of dentistry, achievements of dental professionals, and the importance of oral health in a healthy life. To obtain more information, visit the Web site at <http://www.dental.umaryland.edu/museum>.

RECALL

21. Who was the first dentist to use a dental assistant?
22. Who founded dental hygiene education in America?
23. Where is the Dr. Samuel D. Harris National Museum of Dentistry located?

◆ Legal and Ethical Implications

The public views the profession of dentistry with respect and trust. As important members of the oral healthcare profession, dental assistants should remember the trials and errors, struggles, and contributions made over the years to advance the dental profession.

Remember: To learn, we must stand on the shoulders of those who went before us.



• **Fig. 1.20** Dr. Samuel D. Harris National Museum of Dentistry. (Courtesy National Museum of Dentistry, Baltimore, MD.)

◆ Eye to the Future

Teledentistry uses information technology and telecommunications to provide oral healthcare to patients in remote or underserved areas by collaborating with dentists and specialists in other areas. It is also used in providing oral health education and public awareness.

Teledentistry also can be used by general dentists to consult with specialists in other states or other areas of the world. It can also improve services to underserved populations such as in rural or less developed areas.

Dentists, dental hygienists, and dental assistants are equipped with portable imaging equipment and electronic patient record systems, which they use to gather radiographs, photographs, medical histories, and dental charts that are uploaded to a secure Web site, where they are reviewed by a dentist or specialist in another location. Teledentistry is especially useful in providing oral healthcare in underserved areas such as geographically remote areas, nursing homes, schools, and facilities for the disabled.

The expanding use of teledentistry makes this an exciting time to be entering the dental healthcare profession.

◆ Critical Thinking

1. What would you say to a 50-year-old patient who was reluctant to come to the dentist because of his negative experiences in the dental office as a child?
2. What would you tell the mother of a child who believes dental decay began when soft drinks and candy were discovered?
3. Who can serve as historic role models for young women today who face any type of discrimination in their career choices?
4. What would you say to someone who does not understand why you are studying the history of dentistry?
5. Do you think that the Hippocratic Oath is important today? Why?

ⓔ ELECTRONIC RESOURCES

Additional information related to content in Chapter 1 can be found on the companion Evolve Web site.

- Practice Quiz
- Canadian Content Corner