Manual of Minor Oral Surgery for the General Dentist
Manual of Minor Oral Surgery for the General Dentist

Edited by Karl R. Koerner
Karl R. Koerner, BS, DDS, MS, is an editor of and contributor to Manual of Oral Surgery for General Dentists (Blackwell Publishing) and has co-authored Color Atlas of Minor Oral Surgery, 2nd ed. (Mosby) and Clinical Procedures for Third Molar Surgery, 2nd ed. (PennWell). He also is editor of and contributor to a Dental Clinics of North America (Saunders) volume on basic oral surgery. Dr. Koerner has produced video programs and contributed articles to publications such as General Dentistry, Dentistry Today, Dental Economics, and the Journal of Public Health Dentistry.

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Dr. Koerner has been teaching clinical courses on oral surgery to other dentists in the United States and abroad since 1981. In 2002, he joined Clinical Research Associates (CRA) in Provo, Utah, as an evaluator and clinician and began teaching their “Update” courses throughout the country and abroad. Since 2002, he has co-presented more than 90 courses for CRA and serves on their advisory board.

Europe and Asia
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This handbook is a guide for the general dentist who enjoys doing oral surgery. A broad range of knowledge and expertise in this area is found among dentists. Some have had extensive experience and training through general practice residencies, military or other postgraduate programs, or a mentoring experience with a more experienced dentist; others have had only minimal instruction and training in dental school.

Dental school oral surgery training varies widely based on individual school requirements for graduation. In addition, some schools offer elective or extramural experiences, others do not. Even in the same dental school class, a few students might have the opportunity to perform extensive exodontia, but others will remove only a few teeth before moving on to private practice. This handbook is meant to diminish the discrepancy between experienced and inexperienced generalists and provide an information base for the interested clinician. This book presents a review of procedures and principles in each of several clinical surgical areas; this review will enable a dentist to perform according to established standards of care.

It is assumed that the reader possesses fundamental knowledge and skills in oral anatomy, patient/operator positioning for surgery, the care of soft and hard tissue during surgery, and basic patient management techniques. Therefore, the authors have skipped to the crux of each procedure, addressing such things as case selection, step-by-step operative procedures, and the prevention and/or management of complications. This handbook will help dentists perform procedures more quickly, smoothly, easily, and safely—thereby greatly minimizing doctor frustration and patient dissatisfaction.

The procedures covered in this book are also done by oral and maxillofacial surgeons and/or periodontists and endodontists. There are times that the patient would be better served by being referred to the specialist, such as when the patient is extremely apprehensive, medically compromised, an older patient with dense bone, or has other mitigating circumstances. This book will help readers more clearly understand the scope of each procedure and more accurately define their capabilities and comfort zones.

Procedures described are mainly dentoalveolar in nature, such as “surgical” extractions, the removal of impacted wisdom teeth (mainly in younger patients), preprosthetic surgery, apicoectomy and retrofil cases, surgical crown lengthening, and biopsy. Supportive topics include patient evaluation and case selection and the management of problems such as bleeding and infection. One chapter involves logistical considerations and the use of basic surgical principles for those volunteering services in a third-world setting.

This book is a ready reference for the surgery-minded general practitioner. Within these pages, the authors share many pearls gleaned from years of experience and training to increase the readers’ confidence and competence.
Manual of
Minor Oral Surgery
for the General Dentist
Chapter 1

Patient Evaluation and Medical History

Dr. R. Thane Hales

Introduction

The purpose of this book is to provide the general dentist with specific information about oral surgery procedures that are performed daily in general dentists’ offices. Some advanced information is also given to provide the more experienced general dentist the opportunity to further his or her skills and knowledge.

The ability of a general dentist to perform these procedures is based on a number of factors. Some dentists have a great interest in surgery, while others have very little interest. Some dentists have had a general practice residency or other postgraduate training or experience; others may not have had the opportunity. Some are in areas that have little or no support from a specialist, which makes some surgery mandatory in their practices. Currently, it is accepted that regardless of who performs dental procedures, be they a generalist or a specialist, the standards of care are the same. If a general dentist wants to include the removal of third molars in his or her practice, he or she will usually need more training than that provided in dental school.

Just having the desire to do this procedure will not, in and of itself, qualify a person. The best thing a general dentist can do is to first obtain additional training. Surgical expertise is improved by taking postgraduate courses. The clinician then learns to diagnose the less complicated procedures and does them with supervision until they are performed well. State laws do not discriminate between a general dentist and a specialist. A license gives the same perogative to a generalist that an oral surgeon has to extract teeth. Therefore, the generalist has a greater responsibility to acquire training and knowledge if he or she expects to do more complex procedures. This responsibility includes not only receiving instruction in step-by-step surgical techniques, but also the medical management of such patients and any complications that might arise.

Surgical skill is only part of the equation. The judgment of the practitioner in making appropriate decisions regarding the patient’s total condition is vital when doing surgical procedures. Anxiety management should be addressed before the surgical procedure is
started. Will sedation be needed to accomplish the treatment? Some patients require sedation in order to make them feel comfortable about the surgery. The dentist who doesn’t fully understand the many facets of treating an extremely anxious and medically compromised patient should find an appropriate network of specialists in medicine and/or dentistry and then use a multidisciplinary team approach.

Dentists must never forget the human elements of kindness, compassion, and caring. The patient wants to be treated just like any person would want to be treated. Dentists need to have enough insight into the patients’ fears and concerns to be able to calm and reassure them that they can handle any and all contingencies with competence. A little compassion and empathy go a long way in today’s “rushed” society.

Humanism and compassion are the two most important factors by which a patient judges a dentist’s skill. Especially in the mind of the patient, the technical aspect of surgery is secondary to the surgeon’s ability to manage pain and anxiety. It is a given that a surgeon has the ability to handle tissues with great skill, care, and judgment; the proper handling of and respect for tissues will enable them to heal more quickly and without as many complications.

**Medical History**

The most important information that a clinician can acquire is the medical history of a patient. If any problem is expressed in the history, a skilled clinician should be able to decide whether the patient is capable of undergoing the procedure. The dentist should be fully able to predict how medical problems might interfere with the patient’s ability to heal and whether they might react to the anesthetic, antibiotics, or other medications.

The doctor needs to have a detailed questionnaire that covers all major medical problems that could exist in a patient and a space on the form for any other condition not mentioned. The questionnaire must make sure that the doctor is advised of any complications a patient may have had in the past. The doctor then must be able to fully evaluate the patient’s situation relative to the procedure.

In the process of getting medical information or even biographical data, the doctor should observe the patient for any illogical statements or inconsistent responses that might need further evaluation. A bright, well-trained assistant is priceless in a private practice—especially during the filling out of patient forms and in helping to acquire accurate medical information. He/she should bring to the attention of the doctor any problem on the form that might influence the procedure. The assistant must also highlight medical problems and mark the outside of the chart with a coded warning that the patient is at medical risk.

All medical questionnaires should include a history and description of the patient’s chief complaint. Patients should fill out the form in their own words and give as much information as they can about their problems. The clarity of this information, accompanied by careful and skillful questioning by the doctor, can help him or her form a reasonable diagnosis. If the patient is unable to competently give this information, then all aspects of the information should be suspect. A diagnosis can be moved to the next step only if there is a complete and reliable review of the patient’s status. The form should include a statement of confidentiality reassuring patients that records will be protected. The only people having access to the records will be the doctors in the practice or the patient’s physician (with permission of the patient). A signature line is also required to verify that the patient has understood the questions and that they have been answered satisfactorily.

Specifically, the medical history form should include medical problems patients
might have that would compromise their safety (unless proper steps are taken by the dentist). The cardiovascular system is a main consideration. Any history of angina, myocardial infarction, murmurs, or rheumatic fever should be taken seriously, and appropriate steps should be taken to protect the patient. Other illnesses like hepatitis, asthma, diabetes, kidney disease, sexually transmitted disease, seizures, artificial joints, heart valves, and specific allergies should be noted. Allergies that should be addressed are mainly those to medications and other items used in a dental office, such as latex. The use of any anticoagulants (which now include some of the common herbal compounds), corticosteroids, hypertension medication, and other medications should be thoroughly reviewed. Female patients, even young unmarried females, should be asked whether there is any possibility that they are pregnant. The medical history should be updated annually. A good hygienist or assistant should interview the patient to find out whether there has been any change since the patient’s last visit. The hygienist should then record the changes on the chart and bring them to the attention of the doctor.

After the medical history form is filled out, the doctor sits with the patient and reviews the form in detail. It is crucial that the patient understands everything they are talking about. This is a good time to evaluate the patient’s ability to respond and comprehend his or her condition. Any signs of nervous or psychological behavior should be noted. The interview should help determine whether the patient is responsible enough for the physician to trust the information the patient has given on the medical form. If there is any doubt, a responsible family member should be consulted, and when necessary, a call to the patient’s physician should be made.

Form 1.1 shows a typical medical history form. Each provider must take responsibility for the content of his or her own forms. Another important legal paper that has proven worthwhile is the consent to proceed form (Form 1.2). It gives added protection to the office staff.

**HIPPA**

The dentist is, of course, subject to HIPPA (Health Insurance Portability and Accountability Act of 1996) regulations. HIPAA requires that all health plans, including the Employee Retirement Income Security Act (ERISA), health care clearinghouses, and any dentist who transmits health information in an electronic transaction, use a standard format. Those plans and providers that choose not to use the electronic standards can use a clearinghouse to comply with the requirement. Providers’ paper transactions are not subject to this requirement. The security regulations, which the Department of Health and Human Services released under HIPPA, were conceived to protect electronic patient health information. Protected patient health information is anything that ties a patient’s identity to that person’s health, health care, or payment for health care, such as X-rays, charts, or invoices. Transactions include claims and remittances, eligibility inquiries and response, and claim status and response. Self-training kits can be purchased from the American Dental Association. Electronic processing has become the standard and, in many ways, makes the provider’s life much easier.

**Physical Examination**

The clinician or a well-trained hygienist or assistant should begin the exam with the measurement of vital signs. This both serves as a screening device for unsuspected medical problems and gives a good baseline for future evaluations. The technique of measuring blood pressure and pulse rate is shown in Figure 1.1.

Despite elevated blood pressure being common, the devices to examine this critical
### Medical History

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Do you consider yourself to be in good health?</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>2. Are you now or have you been under a physician’s care within the past year?</strong></td>
<td></td>
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<tr>
<td><strong>3. Do you take any medication, including birth control pills?</strong></td>
<td></td>
<td></td>
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<tr>
<td><strong>4. Do you have or have you ever had any heart or blood problems?</strong></td>
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<tr>
<td><strong>5. Have you ever been told that you have a heart murmur?</strong></td>
<td></td>
<td></td>
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<tr>
<td><strong>6. Do you require antibiotic medication before treatment for a heart condition?</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>7. Do you now have or have you ever had high blood pressure?</strong></td>
<td></td>
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<tr>
<td><strong>8. Have you ever been diagnosed as being HIV positive or having AIDS?</strong></td>
<td></td>
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</tr>
<tr>
<td><strong>9. Have you ever had hepatitis or liver disease?</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>10. Have you ever had rheumatic fever, asthma, blood disorder, diabetes; rheumatism; arthritis; tuberculosis; venereal disease; heart attack; kidney disease; immune system disorder; any other diseases</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>11. Do you bleed easily?</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>12. Have you ever had any severe or unusual reaction to, or are you allergic to, any drugs, including the following:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Penicillin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ibuprofen</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aspirin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Codeine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acetaminophen</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Barbiturates</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Are you taking any of the following medications?</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Antibiotics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digitalis or heart medication</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anticoagulants (Blood thinners)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nitroglycerin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aspirin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Antihistamine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tranquilizers</td>
<td></td>
<td></td>
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<tr>
<td>Oral contraceptives</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insulin</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>13. Do you faint easily?</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>14. Have you ever had a reaction to dental treatment or local anesthetic?</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>15. Are you allergic to any local anesthetic?</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>16. Do you have any other allergies?</strong></td>
<td></td>
<td></td>
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<tr>
<td><strong>17. Have you ever had a nervous breakdown or undergone psychiatric treatment?</strong></td>
<td></td>
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<tr>
<td><strong>18. Have you ever had an addiction problem with alcohol or drugs?</strong></td>
<td></td>
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</tr>
<tr>
<td><strong>19. Women: Are you or could you be pregnant</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are you breast feeding now?</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>20. Are you in pain now?</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>21. When did you last see a dentist?</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>22. Who was your last dentist?</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>23. Are your teeth affecting your general health?</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>24. Do you have or have you had bleeding or sensitive gums?</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>25. Have you ever taken Fen Phen or similar appetite-suppressant drugs?</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>26. Do you smoke?</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>If yes, how many cigarettes a day</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>27. Do you drink alcohol?</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>If yes, how often</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

I hereby certify that the answers to the foregoing questions are accurate to the best of my ability. Since a change in my medical condition or in medications I take can affect dental treatment, I understand the importance of and agree to take the responsibility for notifying the dentist of any changes at any subsequent appointment.

Signature ___________________________ Date __________________

(Patient, legal guardian, or authorized agent of patient)
Consent to Proceed

I hereby authorize Dr._________________________ and/or such associates or assistants as s/he may designate to perform those procedures as may be deemed necessary or advisable to maintain my dental health or the dental health of any minor or other individual for which I have responsibility, including arrangement and/or administration of any sedative (including nitrous oxide), analgesic, therapeutic, and/or other pharmaceutical agent(s) including those related to restorative, palliative, therapeutic, or surgical treatments.

I understand that the administration of local anesthetics may cause an untoward reaction or side effects, which may include, but are not limited to, bruising; hematoma; cardiac stimulation; muscle soreness; and temporary or, rarely, permanent numbness. I understand that occasionally needles break and may require surgical retrieval.

I understand that as part of dental treatment, including preventive procedures such as cleanings and basic dentistry including fillings of all types, teeth may remain sensitive or even possibly quite painful both during and after completion of treatment. After lengthy appointments, jaw muscles may also be sore and tender. Gums and surrounding tissues may also be sensitive or painful during and/or after treatment. Although rare, it is also possible for the tongue, cheek, or other oral tissues of the mouth to be inadvertently abraded or lacerated during routine dental procedures. In some cases sutures or additional treatment may be required.

I understand that as part of dental treatment, items including, but not limited to, crowns, small dental instruments, drill components, etc. may be aspirated (inhaled into the respiratory system) or swallowed. This unusual situation may require a series of x-rays to be taken by a physician or hospital and may, in rare cases, require a bronchoscope or other procedures to ensure safe removal.

I do voluntarily assume any and all possible risks, including the risk of substantial and serious harm, if any, that may be associated with general preventive and operative treatment procedures in hopes of obtaining the potential desired results, which may or may not be achieved, for my benefit or the benefit of my minor child or ward. I acknowledge that the nature and purpose of the foregoing procedures have been explained to me if necessary and that I have been given the opportunity to ask questions.

Patient Name______________________________________________________________

Signature________________________________________________________________________

(Patient, legal guardian, or authorized agent of patient)

Witness__________________________________________________________________

Form 1–2
vital sign are frequently not accurate. The dentist must routinely calibrate blood pressure equipment against a standard mercury instrument and update the training of staff members periodically to ensure accuracy. Even when automated devices are used, those responsible for recording blood pressure must be properly trained, to reduce human error.

Of the millions of people who have hypertension, a large percentage are unaware. The dental team can be instrumental in discovering this significant and life-threatening health problem. Current studies note that nearly one-third of the U.S. population has hypertension—defined as a systolic blood pressure higher than 139 mm Hg or a diastolic blood pressure higher than 89 mm Hg. Another one-quarter of the U.S. population has prehypertension—defined by a systolic blood pressure between 120 and 139 mm Hg and a diastolic blood pressure between 80 and 89 mm Hg.4 (Note: Recent public health trends are in the direction of advocating even more conservative values than those mentioned here and in Table 1.1.)

Normal to various high values are illustrated in Table 1.1.

Systolic and diastolic blood pressures, as opposed to pulse pressure, remain the best means to classify hypertension. The risk of stroke begins to increase steadily as blood pressure rises from 115/75 mm Hg to higher values.

About 15 to 20 percent of patients with stage I hypertension have elevated blood pressure only in the office setting of a health care provider. This type of transient hypertension is more common in older men and women, and antihypertensive treatment in these patients may reduce office blood pressure but not affect ambulatory blood pressure.

When the blood pressure reading is mild to moderately high, the patient should be referred to their primary care physician for hypertensive therapy. The patient should be monitored on each subsequent visit before treatment. If needed, the operator can use anxiety control protocol (see Table 1.2 later in this chapter).

When severe hypertension exists, defer treatment and refer the patient to a primary care or emergency room physician. These patients can be walking potential stroke victims.

A pulse rate should be taken and recorded. The most common method is to use the tips of the middle and index fingers of the right hand to palpate the radial artery at the patient’s wrist. See Figure 1.1.

The heart rate is determined by counting the number of pulses for 30 seconds and

<table>
<thead>
<tr>
<th>Systolic BP</th>
<th>Diastolic BP</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;120</td>
<td>&lt;80</td>
<td>Normal</td>
</tr>
<tr>
<td>120–139</td>
<td>80–89</td>
<td>Prehypertension</td>
</tr>
<tr>
<td>140–159</td>
<td>90–99</td>
<td>Stage 1 mild hypertension</td>
</tr>
<tr>
<td>&gt;160</td>
<td>&gt;100</td>
<td>Stage 2 moderate hypertension</td>
</tr>
<tr>
<td>&gt;200</td>
<td>&gt;110</td>
<td>Stage 3 severe hypertension</td>
</tr>
</tbody>
</table>

BP = blood pressure.
then multiplying that number by two. This yields the number of beats per minute. If there is a weakened pulse or irregular rhythm, elective treatment should not be performed unless the operator has received clearance by the patient’s physician.

**HEAD AND NECK EXAMINATION**

The physical evaluation of a dental patient will focus on the oral cavity and surrounding head and neck region, but the clinician should also carefully visually evaluate the rest of the patient for abnormalities.

The physical evaluation is usually accomplished in four primary ways: inspection, palpation, percussion, and auscultation (listening with a stethoscope to the sounds made by the heart, lungs, and blood). The dentist should also examine skin texture and look for possible skin lesions on the head, neck, and any other exposed parts of the body. Submandibular lymph nodes and those on the neck should be palpated. Include examination of the hair, facial symmetry, eye movements and conjunctiva color, and facial masses. Inspect the oral cavity thoroughly, including the oropharynx, tongue, floor of the mouth, and oral mucosa for any abnormal-looking tissue or indurated areas.

**SUSPICIOUS LESIONS**

All suspicious lesions should have a biopsy. According to the guidelines of the American Dental Association, any lesion that has an abnormal appearance and a duration of 14 days or more should be biopsied. The specimen should be sent to an oral pathology laboratory. Labs that specialize in the histological examination of excisional and incisional biopsies usually provide specimen jars at no charge. Dentists must take the lead in this effort. Red and white lesions or a combination of both types are particularly suspicious and must be taken seriously. See Figure 1.2. Oral cancer is usually very invasive and destructive. It can be found in people without the characteristic risk factors of tobacco and alcohol use and even in children. A thorough exam is mandatory.

**ANXIETY CONTROL**

The incorporation of good anxiety-reducing methods is essential. See Table 1.2.

**Common Diseases and Conditions Affecting Dental Patients**

When the evaluation is completed, the clinician should have a good idea of the condition of the patient. As dental treatment poses no risk to most people, the dentist may become complacent when presented with a high-risk patient and not perform the necessary steps to completely analyze the situation. A careful and systematic approach must be used to deal with medically compromised patients. Only in this way can potential
complications be managed or avoided. Following are a few of the most common diseases and conditions that a clinician will encounter.

**CARDIOVASCULAR DISEASE**

The progressive narrowing of the arteries to the heart leads to a difference in myocardial oxygen demand and supply. This demand can be further increased by exertion, digestion, or anxiety during surgical procedures. When the muscle of the heart becomes ischemic, it can produce pressure in the chest with pain radiating to the arms, neck, or jaw. Other symptoms include sweating and a slowed heart rate. This condition is called **angina pectoris**. Angina is usually reversible if the proper medications and oxygen are administered quickly. Oxygen, nitroglycerin, and aspirin should be available in the office.

If, during the examination, the dentist determines that the patient has experienced obstruction of the arterial blood flow to the heart, certain precautions must be taken. The practitioner’s responsibility to the patient is to have necessary medications on hand and initiate preventive measures even before treatment is begun. This will reduce the chance that a surgical procedure will precipitate an anginal episode. If the patient is easily prone to this condition, supplemental oxygen is recommended. Oral sedation or nitrous oxide can be helpful to relax these patients. If anginal pain is a problem during a dental appointment, the operator should activate the Emergency Medical System (call 911). The patient’s physician should be consulted prior to subsequent appointments.

Giving a local anesthetic with epinephrine to a patient with a history of cardiac problems has always been controversial, but generally, the benefits outweigh the risks. Endogenous adrenaline surges in response to pain stimulation can be equal to or more dangerous than the small amount of vasoconstrictor. It is recommended, however, that with these patients, the dose not exceed 4 ml of local anesthetic and an epinephrine concentration of 1:100,000, for a total adult dose of .04 mg in any 30-minute period.1

Monitoring of the vital signs should be done at regular intervals during surgery. Verbal contact should be ongoing and unforced. Always have a fresh bottle of nitroglycerin and a good supply of oxygen available.

| 01. Administration of a hypnotic agent to promote sleep the night before the appointment for surgery. (Ambien 10 mg) |
| 02. Administer sedative agent for anxiety control 2 hours before surgery. |
| 03. Make a morning appointment with little or no waiting. |
| 04. Give frequent verbal reassurances with other distracting conversations not related to the surgery. |
| 05. Warn the patient before doing anything that is uncomfortable. |
| 06. Keep surgical instruments and needles out of sight. |
| 07. Administer nitrous oxide oxygen. |
| 08. Administer local anesthetics carefully and use those of sufficient duration and intensity. |
| 09. Use epinephrine 1:100,000, but no more than 4 ml, for a total adult dose of 0.04 mg in any 30-minute period. |
| 10. Administer intravenous sedation if available, with sufficient monitoring incorporated by licensed personnel. |
| 11. After surgery give verbal and written instructions on postoperative care. |
| 12. Write prescriptions for effective analgesics. |
| 13. Give reassurance and get information about whom to call if problems arise. |
| 14. Call the patient at home that evening to see how they are doing and whether there are any questions or problems. |
Many scenarios should alert the dentist that the patient is having more than angina. The following symptoms could indicate a heart attack or myocardial infarction (MI). Among them are the following:

1. The chest pain does not go away.
2. The chest pain goes away but comes back.
3. The chest pain worsens.5

If these symptoms persist, the dentist must get the patient to an emergency room or call the Emergency Medical System (911).

**Myocardial Infarction (MI)**

Care must be taken with patients who have a history of MI. The blockage of a coronary artery must be recognized and treated immediately. The infarcted area dies, becomes nonfunctional, and eventually necrotic. The myocardium around the infarction is slightly damaged but usually heals. It may form a nidus that can precipitate abnormal rhythms.

The management of a patient with a history of MI is as follows (as recommended by the American Heart Association):

1. Consult the patient’s physician.
2. Defer all elective procedures for at least six months after an infarction. After clearance from the patient’s physician, implement the antianxiety protocol. Give supplemental oxygen during each dental appointment.
3. Have nitroglycerin available. If oral surgery is needed, consider referring the patient to an oral and maxillofacial surgeon.6

**Heart Bypass Grafts**

Bypass graft patients should also be scheduled for dental treatment no sooner than six months after surgery. This is the routine unless there have been complications during healing—then it could be longer. Always keep the anxious patient as relaxed as possible. Carefully monitor the vital signs throughout treatment. A pulse oximeter is a great instrument to have attached to any patient with a history of heart disease. If the office is equipped with a heart monitoring device (or EKG), it should be used to detect any arrhythmias.

**Congestive Heart Failure**

This disease of the heart occurs when the myocardium is unable to act as an efficient pump. The heart cannot deliver the output necessary to maintain the circulatory system, and the blood begins to pool and back up. The major effect is seen in the pulmonary system, the hepatic system, and the mesenteric vascular beds.

The symptoms of congestive heart failure are orthopnea, ankle swelling, and dyspnea. Orthopnea is a shortness of breath when the patient is lying down. The patient feels some comfort in sleeping with the upper body elevated to enhance breathing. These patients are usually on a variety of medications to reduce fluids. Diuretics and digitoxin are administered to increase cardiac output. The patient may also be taking beta blockers or calcium channel antagonists to control the workload of the heart.

Patients who are generally well controlled with their medication can undergo routine dental surgery or other treatments. The dentist should initiate anxiety control and give supplemental oxygen during surgery.

Any clinician who serves the medically compromised heart patient must be well qualified to handle emergencies. If not, he or she should refer the patient to a specialist.

**Liver Dysfunction**

The patient who suffers from hepatic damage, usually from some infectious disease or alcohol abuse, will need to be given special
consideration. This would include a reduction in dose or total avoidance of drugs that are metabolized in the liver. This requires the prescribing dentist to be cognizant of the metabolic processes of the drug he or she prescribes. The patient may be prone to bleeding because of the fact that many coagulation factors produced in the liver are diminished. A partial prothrombin time (PTT) or a prothrombin time (PT) is useful in evaluation, especially in the severely liver-damaged patient. Many patients with liver disease are infectious but can be managed with routine universal precautions.

**Diabetes**

Diabetes is classified into insulin-dependent and non-insulin-dependant patients. Insulin-dependent diabetics usually have a history of diabetes from childhood or early adulthood. The underproduction of insulin is the major problem.

Elevated serum glucose short-term is not dangerous to the diabetic, but hypoglycemia from not eating after an insulin load can cause disorientation and possible diabetic or insulin shock. This state must be treated with a glucose load in order to stabilize the patient. A drink of orange juice when the patient is conscious is effective. Emergency kits should provide a safe mode of delivery for the needed glucose. To manage an insulin-dependent diabetic, do the following:

1. Make certain the diabetes is well controlled. Consult the patient’s physician before treatment is initiated.
2. Place the patient on an anxiety reduction protocol if necessary but do not use deep sedation.
3. Do not schedule long procedures and make short morning appointments.
4. Ask the patient before proceeding what he or she has eaten and whether he or she has balanced it with insulin.
5. Monitor the patient’s vital signs continuously.
6. Have the patient eat a normal breakfast with the normal insulin dose.
7. Make sure that the patient is advised to adjust the insulin dose to the caloric intake after the surgery. Difficulty in eating may cause some alteration in balance. Consult the patient’s physician if necessary.
8. Watch for signs of hypoglycemia.
9. Keep in touch with the patient on the development of infection. Do what is necessary to prevent infection. If any is noticed, treat it aggressively.
10. Have a source of glucose available in the office (orange juice, glucose package, etc.)

In a non-insulin-dependant diabetic, all dental procedures can be performed without special precautions—unless the diabetes becomes uncontrolled. Table 1.3 shows the symptoms of hypoglycemia.

**Bleeding**

Bleeding disorders are discussed in Chapter 10.

**Epilepsy**

The most common type of seizure an epileptic patient will have is a grand mal episode. These episodes occur when an area of the brain is depolarizing (firing) spontaneously. Ask the patient the following questions before treatment:

- What type of seizures do you have?
- What is the medication you are taking?
- What is the aura you experience before the seizure?

The drugs that are taken by an epileptic are CNS depressants. The most common are Dilantin, Phenobarbital, Tegretol, and Depakote.
During the medical history find out the frequency, severity, and duration of the episodes from the patient and family members. Usually, the seizures last one to three minutes. If one lasts five minutes or more, it can be life-threatening. After an epileptic episode of one or two minutes, the patient will be extremely tired and usually disoriented. The only thing you can do during the convulsions is protect the patient from injury. No attempt is to be made to move the patient to the floor. Insert any mouth props before the procedure (tied with floss). Do not try to insert a mouth prop during an episode, as you may damage the teeth or gingiva. These patients should be scheduled for treatment within a reasonable time after the seizure-control medicine is taken. Consult with a family member and release them to a responsible adult.

PREGNANCY

The concern for the pregnant female is not only her welfare but the care of the fetus. Potential genetic damage from drugs and radiation are serious concerns. It is always best to defer surgery for the pregnant patient until after delivery.

The patient who requires surgery and/or medication during pregnancy is at best in a high-risk situation and should be treated as such. Drugs are rated by the FDA as to their possible effect on the fetus. These classifications are A, B, C, D, and X. A classification drugs are the safest. D and X are the least safe. The most likely to have a teratogenic effect are the D and X drugs, but doses of C and even B drugs should be used with extreme caution.

Drugs considered the safest are acetaminophen, penicillin, codeine, erythromycin, and cephalosporin. Aspirin and ibuprofen are contraindicated because of the possibility of postpartum bleeding and prolonging of the pregnancy.

Avoid keeping the near-term patient in a supine position, as that position can compress the vena cava and limit blood flow. Do not treat any pregnant patients in their first or last trimester unless absolutely necessary. Even then, it is prudent to consult the patient’s physician.

BREAST-FEEDING

Obviously, the doctor must not prescribe medications that are known to enter breast milk and potentially affect infants. Only a few drugs commonly used in dentistry could harm an infant. Some of these include hydrocortisones, tetracyclines, metronidazole, and aminoglycosides.

Acceptable drugs delivered during breast-feeding can be administered according to the age and size of the baby. The older the child, the less chance of a problem with the drug. The duration of the medication is also a factor. Any drug given long-term must be avoided unless prescribed by the mother’s physician. Any drug that is commonly administered to an infant should be fine to administer to a breast-feeding mother, but the duration should be shortened. See Table 1.4 for a list of drugs that can be used sparingly and of those that would harm a breastfed infant.

Basic Life Support

It is essential that all office personnel attend a training program in basic life support. A brief review of the technique is appropriate here.

The acronym for treating emergencies is
PABC and D. This acronym is used in all emergencies—not just heart attacks.

A, Airway

The second letter in the acronym is for airway. Airway management is critical in an unconscious patient. The head is tilted back, and the chin is lifted. One hand is placed on the forehead, with two fingers of the other hand on the mandible to rotate the head back. The tongue is attached to the mandible so that when you pull the mandible forward, the tongue also moves forward. This opens the airway so the patient can breathe, or so you can breathe for the patient. Make sure that no obstructions are in the mouth or throat.

B, Breathing

The person attending must place his or her ear one inch away from the patient’s nose. Watch the chest and see whether it is moving. The chest may move, indicating that the patient is trying to breathe, but it does not mean the patient is breathing. The patient might have an obstruction. It is crucial that you feel air coming through the mouth or nose. In a cardiac arrest, the patient must be supine but not have the heart higher than the head. The legs can be elevated slightly to increase the blood flow to the brain, but if the heart is higher than the head, breathing becomes more difficult.

If the patient is not breathing, it is called apnea. The rescuer must provide supplemental breathing to the victim to oxygenate the blood.

C, Circulation

Maintain the head tilt and check for the carotid pulse. Knowing how to check the carotid pulse is critical. Studies have shown that the carotid pulse is missed 40 percent of the time by medical personnel and paramedics. To locate the carotid artery, maintain head tilt and place the fingers on the Adam’s apple or thyroid cartilage. The fingers are

### Table 1-4. Breast-feeding mothers and drugs

<table>
<thead>
<tr>
<th>Drugs that can be used sparingly</th>
<th>Drugs that are potentially harmful to the infant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetaminophen</td>
<td>Ampicillin</td>
</tr>
<tr>
<td>Antihistamines</td>
<td>Aspirin</td>
</tr>
<tr>
<td>Codiene</td>
<td>Atropine</td>
</tr>
<tr>
<td>Erythromycin</td>
<td>Barbiturates</td>
</tr>
<tr>
<td>Flouride</td>
<td>Chloral hydrate</td>
</tr>
<tr>
<td>Lidocaine</td>
<td>Diazepam</td>
</tr>
<tr>
<td>Meperidine</td>
<td>Metronidazol</td>
</tr>
<tr>
<td>Oxacillin</td>
<td>Penicillin</td>
</tr>
<tr>
<td>Clindamycin</td>
<td>Tetracyclines</td>
</tr>
</tbody>
</table>

### P, Positioning the Patient

Positioning the patient is the first step. The right position is the one that is most comfortable for the patient, if conscious. For cardiac arrest, the patient needs to be flat on his or her back. If asthmatic, patients probably will want to sit up, which helps their ability to breathe. If a patient is conscious, he or she can tell you what position feels the best. If the patient is unconscious, place the patient horizontally with the feet slightly elevated. The most common reason the patient loses consciousness is low blood pressure. With the feet elevated slightly, the patient can receive a larger flow of blood to the head and, thus, stimulate the brain. The patient can still breathe in the horizontal or supine position, but the head must be on the same plane as the heart, not lower.
then, with moderate pressure, slid down the neck toward the rescuer, into a groove on the side of the neck formed by the sternocleidomastoid muscle. The carotid artery is located in that groove. See Figure 1.3. The pulse should be checked for 10 seconds. If a pulse is not felt, start compressions immediately. You are now circulating oxygenated blood to the victim’s brain. With the 2005 American Heart Association changes, a lay rescuer does not assess signs of circulation before beginning chest compressions.

D, DEFINITIVE TREATMENT

The final part of the equation is the diagnosis of the problem. If the doctor can diagnose the problem, then, if trained to do so, he or she can give the patient the appropriate medication. However, remember that drugs do not save the patient; proper life support does. If the dentist is not trained in Advanced Cardiac Life Support (ACLS), then it is best to continue with basic life support until help arrives.

Clinical signs are what the doctor can see, and symptoms are what the patient tells you. Signs and symptoms of concern are as follows:

1. Altered consciousness
2. Respiratory depression
3. Allergic reaction
4. Chest pain

BASIC LIFE SUPPORT, CPR

The following is a step-by-step outline of cardiopulmonary resuscitation. This list is for review but is not intended to replace formal training.

Cardiopulmonary Resuscitation (CPR)

1. Call 911
   Check the victim for unresponsiveness. If there is no response, call 911 and return to the victim. Ask for assistance. In most locations, the emergency dispatcher can assist you with CPR instructions. If you are not alone, have someone else call and you begin CPR.

2. Breathe
   Clear the mouth of any foreign objects. Tilt the head back, lift the chin up, and listen for breathing. Put your ear one inch from the victim’s nose and mouth. If the patient is not breathing normally, pinch his or her nose, cover the mouth with yours, and blow until you see the chest rise. Give two breaths. All breaths should be given over 1 second with sufficient volume to achieve visible chest rise.

Figure 1-3. Carotid pulse. The carotid pulse is missed 40 percent of the time.

Figure 1-4. Listen for breathing.
3. **Chest Compressions**

If the victim is unconscious and unresponsive, begin chest compressions. Push down on the chest 1 1/2 to 2 inches, 30 times right between the nipples. On a small child or infant, compress the chest 1 to 1.5 inches. Compress the chest at the rate of 100/minute. The rescuer should then breathe twice for every 30 compressions.

Continue administering CPR until help arrives. Paramedics will continue life support and transport to a medical center or emergency room.

**CHOKING**

When a patient has a foreign body lodged in the throat, it is important to act immediately. Most of the time the dentist is able to quickly remove the object before it gets too far into the trachea to see. If patients struggle, they will usually grab the throat. This is the universal sign for choking. The following steps are to be followed for adults as well as children.

**First Aid for a Choking Conscious Adult and for Children (1–8 years old)**

Determine whether the person can speak or cough. If not, proceed to the next step. Perform an abdominal thrust (Heimlich maneuver) repeatedly until the foreign body is expelled. See Figures 1.7 and 1.8. A chest thrust may be used for markedly obese persons or those in the late stages of pregnancy. If the adult or child becomes unresponsive, perform CPR; if you see an object in the throat or mouth, remove it.
Several emergency kits on the market contain the basic drugs and apparatus to help in certain emergencies.

Epinephrine is the only drug that is of immediate help with anaphylaxis but it must be given within the first few minutes of symptoms. This is the only drug you should have in a preloaded syringe. See Figure 1.9.

**Emergency Kit**

Several emergency kits on the market contain the basic drugs and apparatus to help in certain emergencies.

Epinephrine is the only drug that is of immediate help with anaphylaxis but it must be given within the first few minutes of symptoms. This is the only drug you should have in a preloaded syringe. See Figure 1.9.
Epinephrine can be administered into the thigh muscle right through the clothing if necessary. Each minute that passes without epinephrine when a patient is experiencing anaphylactic shock considerably lessens the chances of recovery. You can give 1 cc of 1:1000 epinephrine up to three times in intervals of five minutes. Also administer oxygen. Do not leave the patient until help arrives.

A good emergency kit should include the following:

1. Ammonia inhalants
2. Tourniquet
3. CPR pocket mask
4. Epinephrine in a preloaded syringe (1:1000)
5. Diphenhydramine
6. Albuterol inhaler
7. Syringes
8. Nitrolingual spray or nitroglycerin tablets
9. Aspirin
10. Glucose
11. CPR pocket mask

**Conclusion**

Many medical problems can and do occur with dental treatment. Prevention is the key to successful and uneventful procedures. We must know our patients and be clearly aware of their health status. Each patient who has health concerns in their medical history must be evaluated thoroughly. If the clinician is not aware of the effect surgery or routine dental treatments will have on the patient, then a consultation with the patient’s physician is mandatory. We must be prepared for possible medical problems and have a good understanding of basic life support measures.

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2. Adapted from Professional Insurance Exchange standard consent to proceed form, March, 2005.
3. American Dental Association Health Insurance Portability and Accountability Act, HIPPA requirements at ADA.org.