

*Parameters of Care:
AAOMS Clinical Practice Guidelines
for Oral and Maxillofacial Surgery
(AAOMS ParCare) Sixth Edition 2017*



PATIENT ASSESSMENT

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THIS SECTION IS 1 OF 11 CLINICAL SECTIONS INCLUDED IN *AAOMS PARCARE 2017*, WHICH IS VIEWED AS A LIVING DOCUMENT APPLICABLE TO THE PRACTICE OF ORAL AND MAXILLOFACIAL SURGERY. IT WILL BE UPDATED AT DESIGNATED INTERVALS TO REFLECT NEW INFORMATION CONCERNING THE PRACTICE OF ORAL AND MAXILLOFACIAL SURGERY

INTRODUCTION

An appropriate preoperative patient assessment is a critical component of an Oral and Maxillofacial Surgery practice. The proper method of obtaining and documenting a patient's medical history and physical examination findings, as well as appropriate diagnostic tests, is essential to ascertaining an accurate diagnosis and developing an effective treatment plan. In addition, a thorough patient evaluation provides the basis for determining the surgical and anesthetic risk of each patient, minimizing morbidity associated with concomitant systemic conditions. Several specific comorbid conditions require consideration by the Oral and Maxillofacial Surgeon (OMS).

The OMS is trained during his/her surgical residency to complete a thorough patient assessment. Therefore, this section will not describe how to perform an assessment but will attempt to organize the assessment process. The assessment process is divided into five phases: indications for patient assessment, specific goals for patient assessment, specific factors affecting risk for patient assessment, indicated therapeutic parameters for patient assessment, and outcome assessment indices for patient assessment. The patient assessment process described in this section establishes a foundation for patient assessment and management as described in subsequent sections of *AAOMS ParCare 2017*.

Specific diagnostic techniques and physical assessment protocols are purposely not defined. It is not the intent of this document to dictate the exact methods for performing a patient assessment. The OMS has the latitude to complete a patient assessment based on the clinical circumstances of the patient and/or institutional standards.

PREAMBLE

The OMS is responsible for an initial history and physical evaluation necessary to determine the risk factors associated with management of each patient. In some circumstances, the patient's primary care physician may perform the history and physical examination, but it is the responsibility of the OMS to review such information and ascertain whether it is complete to his/her level of satisfaction or whether further assessment is indicated based on the specific patient and planned procedure.

GENERAL CRITERIA, PARAMETERS, AND CONSIDERATIONS FOR PATIENT ASSESSMENT

INFORMED CONSENT PROCESS: All elective surgery must be preceded by documentation of the patient's or legal guardian's informed consent. The informed consent process occurs when the OMS initiates a discussion with the patient and/or legal guardian and reviews the indications for the procedure(s), goals of treatment, factors that may affect the risk, alternative treatment options, and known risks and complications of the procedure(s). In some cases, videotapes may be used to introduce the informed consent process before a discussion between the OMS and each patient. In life-threatening emergency situations, consent may be deferred, but such clinical circumstances must be documented adequately. Results of the informed consent process, indicating that the patient (and/or his/her guardian for minors) understands all components of the informed consent process and consents to treatment, must be documented in the patient medical record, as well as the option to refuse treatment. In general, an informed consent document is signed by the patient or guardian, but the OMS is well advised to document in the medical record that the informed consent process occurred and that the patient/guardian provided both verbal and written consent that they understand and are willing to proceed with treatment. The OMS should consider the use of individualized informed consent forms for specific surgical procedures (eg, facial cosmetic surgery, orthognathic surgery). In addition, it may be in the best interest of the OMS to consider the use of language translation versions of the surgical consent forms, when appropriate. If the office does not have the ability to complete the informed consent process in the appropriate language, then there should be an alternative approach in place, when necessary.

PERIOPERATIVE ANTIBIOTIC THERAPY: In certain circumstances, the use of oral antimicrobial rinses and systemic antibiotics may be indicated to lower the probability of infections related to surgery. The decision to employ prophylactic perioperative antibiotics is at the discretion of the treating surgeon and should be based upon the patient's clinical condition as well as other comorbidities which may be present (see Appendices for specific circumstances).

DOCUMENTATION: The *AAOMS ParCare 2017* includes documentation of objective findings, diagnoses, and patient management interventions. If the patient refuses to comply with a portion(s) of a history or physical examination, the OMS should document that the examination was not performed and state the reasons for the omissions. *The final judgment regarding the appropriateness of any specific diagnostic method or adjunctive test or the need for medical consultation must be made by the individual OMS according to circumstances presented by each patient. Understandably, there may be sound clinical reasons to deviate from these parameters. When an OMS chooses to deviate from an applicable parameter based on specific circumstances, he/she is well advised to enter a note in the patient's record stating the reason*

for the course of action. Moreover, it should be understood that adherence to the parameters does not guarantee a favorable outcome.

Documentation in a patient's medical record contains critical information and is governed by Health Insurance Portability and Accountability Act (HIPAA) regulations. The OMS is responsible for ensuring that all information contained in the medical record is complete. Any errors should be deleted with a single line accompanied by the initials of the OMS with the date of the deletion. Any additions or deletions to the medical record must be made clearly and dated and signed (or initialed) to ensure accuracy of the entry. Changes to the medical record are subject to medicolegal scrutiny and, therefore, should be made cautiously and carefully, with great attention to detail. It is advisable never to alter the medical record; an additional note with the appropriate more recent date is preferable.

The use of templates (eg, "cookie-cutter" forms) should be discouraged because each patient should be treated as an individual. A note or dictation from the OMS for each patient should be included for each specific date, time, and place of service. If templates are used to document patient care, the OMS should ensure the accuracy of each entry for the individual patient, by date and time.

In instances when another healthcare provider assesses the patient preoperatively, such as a primary care physician, cardiologist, or pediatrician, the OMS must ensure that the documented assessment meets the parameters set forth in the *AAOMS ParCare 2017*. Additionally, the OMS is responsible for the risk assessment of the patient and, ultimately, the decision to perform any surgical procedure(s). No other healthcare provider may assume this responsibility. The OMS office should be able to include any outside consultations into the OMS medical record, for referral back to the referring dentist or physician, if there are unforeseen issues in order to maintain transparency of treatment care decisions.

AMERICAN SOCIETY OF ANESTHESIOLOGISTS (ASA) PHYSICAL STATUS CLASSIFICATION SYSTEM: On the basis of a thorough patient assessment, an ASA physical status should be assigned to all surgical patients, according to the most recent guidelines set forth by the ASA ([Appendix 1](#)).

PREOPERATIVE FASTING GUIDELINES: All healthy patients without a risk of gastroparesis who will undergo a sedation or general anesthetic procedure should maintain a "nothing per mouth" (NPO) status ([Appendix 2](#)). The ASA recommends a 2-hour fasting period of clear liquids for all patients. The ASA recommends a fasting period for breast milk of 4 hours, and infant formula or non-human milk of 6 hours for neonates and infants. For solid foods in most adult patients, the ASA recommends fasting periods of at least 6 hours (light meal such as toast and clear liquid) and 8 hours (fatty or fried foods or meat). For infants and children, the fasting period for solids should be at least 6 hours.

The preoperative use of gastric stimulants, gastric acid secretion blockers (histamine-2 receptor antagonist agents), antiacids, antiemetic agents, and/or anticholinergic medications (to decrease the risk of pulmonary aspiration) is not routinely recommended. Their use should be based upon the individual patient assessment.

DISCHARGE CRITERIA: All patients who have had outpatient surgery using sedation or general anesthesia must meet minimal criteria to permit safe discharge from the office or outpatient surgical facility. Such criteria may include either the use of an Aldrete, modified-Aldrete Score, Post-Anesthesia Discharge Scoring System (PADSS or modified PADSS), or equivalent. Also see the *Anesthesia in Outpatient Facilities* chapter. In addition, the patient must arrive at the office or surgical facility with a responsible adult escort for discharge after surgery and anesthesia.

SPECIAL CONSIDERATIONS FOR PEDIATRIC PATIENT ASSESSMENT

As for the adult patient, initial assessment of the child begins with a careful history, followed by physical examination and radiographic and laboratory evaluation. However, the information may, of necessity, be provided by the parents (for infants and toddlers) or by both the patient and the parents (older children and teenagers). Informed consent for all children, who are considered minors, must be obtained from the parents, although it is advisable to have the child assent if he/she is old enough to understand the risks and complications of the procedure. Furthermore, it is critical to ascertain that the parent or adult giving the consent is the legal guardian and has the legal authority to do so. This is especially critical when the parents are divorced or when the child is living with guardians other than the biologic parents. Special conditions when a minor may have legal autonomy (liberated) are state or province specific and should be determined before treatment.

Several important aspects of the initial patient assessment are unique to children. The OMS must deal with both the parent(s) and the patient. The parent may have different goals for treatment and may not appreciate or accept any psychological or physical barriers to treatment. The surgeon must be the advocate for the minor patient and ensure that all concerned parties understand the procedure, the risks, the benefits, and alternative treatment options. Female patients of child bearing age should be questioned and tested for the possibility of pregnancy in all circumstances where a general anesthetic is considered. Sensitivity in performing this assessment is necessary, but the subject should not be ignored.

Indicated therapeutic parameters are affected by the patient's chronologic age and stage of psychological, physical, and dental development. These factors affect not only the indications for therapy but also the timing of treatment and must be considered in the final assessment of the pediatric patient. A history of continued growth (height), change in shoe size, status on standardized growth charts, studies such as the hand-wrist radiograph, cervical vertebral maturation, and technetium bone scan of the condyles and mandible; and a careful menstrual history for female patients are helpful in evaluating growth. Perhaps the simplest and most reproducible method of ascertaining growth cessation is the use of serial cephalometric radiographs performed semiannually. In some cases, serum hormone markers may be helpful in determining the stage of maturation.

The family history, particularly the mother's obstetric history and the existence of similar conditions in other relatives or siblings, is important when evaluating pediatric patients who have congenital or developmental anomalies. Exposure to known teratogens during pregnancy or in the early developmental years is a key component in the initial evaluation of children who exhibit growth abnormalities.

When performing the physical examination, it is critical to remember the differences between children at various ages and adults with regard to anatomy (eg, airway), vital signs (eg, heart and respiratory rates), and physiology (greater body surface area or mass and cardiac output). For example, cardiac output is more heart rate dependent in the child than in the adult.

An examination not often performed is to determine whether or not there has been a recent/past history of abuse/neglect. Fearfulness of an oral exam, as well as unusual redness/tenderness in the oro-pharyngeal areas, sores that appear “not normal,” and precociousness can be signals of a more serious circumstance. Inability to open the mouth except under sedation, poor hygiene, and fractures in various stages of wound healing, especially in the younger population, warrant further questioning. It must be remembered that it is mandated in 50 states to report both child and elder abuse even though it may be a false positive finding. Failure results in the potential for fines and loss of both licenses and malpractice coverage. The Board of Trustees of AAOMS supported AMA Opinion 2.02 on “Physicians' Obligations in Preventing, Identifying, and Treating Violence and Abuse” adopted in November 2007 and issued in June 2008, supporting the pivotal role of the OMS in identifying and treating victims of violence and abuse.

When assessing the child for anesthesia, the surgeon must pay particular attention to the patient's allergy history for the common childhood precipitants of asthmatic attacks: pollen, other indoor or outdoor airborne irritants, animal hair, physical exercise, and/or anxiety. Upper respiratory tract infections that produce airway irritability are exceedingly common in young children. Specific reactions to suspected drug allergens should be ascertained through allergy testing with, for example, an anergy panel.

Outcomes assessment indices in children must include not only those surrounding the procedure but also those related to future growth and development. The surgeons must consider the effects of the child's growth on the ultimate outcome of treatment.

PATIENT ASSESSMENT

This section addresses the assessment of the patient's medical history and physical status in all patient care settings, including the documentation of examination findings. The results of the patient assessment are used as a foundation for subsequent clinical sections throughout the remainder of this book.

I. Indications for Patient Assessment

- A. Presentation of a patient to an OMS for evaluation, diagnosis, continuing care, and/or treatment
- B. Referral to an OMS for a second opinion regarding diagnosis and management
- C. Planning for inpatient or outpatient surgery or procedure
- D. Scheduled follow-up visit for assessment of outcomes resulting from a treatment, surgery, or procedure
- E. Return of a patient for new condition, evolving condition, and continuing evaluation

II. Specific Goals for Patient Assessment

- A. Perform a problem-focused, age-appropriate, ASA-appropriate medical history and physical examination based upon both the HPI (history of present illness) and the observations of the OMS (see above)
- B. Establish an accurate diagnosis
- C. Determine the need for care or treatment
- D. Identify factors affecting risk to determine patient ability to undergo safe treatment, surgery, and/or anesthesia
- E. Establish the rationale for care, treatment, or surgery of diagnosed conditions
- F. Develop care or treatment recommendations and alternative treatment options, including no treatment
- G. Document findings and recommendations and assign an ASA physical status ([Appendix 1](#))
- H. Provide preoperative patient instructions for planned surgery
- I. Identify new or previously unrecognized conditions and determine the need for further assessment (eg, laboratory or radiographic) or consultation (eg, with primary care physician or specialist), treatment, surgery, or procedure and perioperative management (eg, autologous blood products)

PATIENT ASSESSMENT (continued)

- J. Document outcomes and recommendations for further care or treatment
- K. Confirm or refute an established diagnosis as a second opinion
- L. Confirm appropriateness of a planned operation or procedure
- M. Perform an informed consent discussion
- N. Psychologically prepare the patient for surgery by providing reassurance and review of perioperative expectations
- O. Inform the patient of the findings, diagnosis, treatment options, and risks and benefits of surgery
- P. Obtain documentation for predetermination of insurance coverage benefits using the coding according to the ICD-10 standards (as of October 2015)

III. Specific Factors Affecting Risk for Patient Assessment

Factors that increase the potential for inadequate assessment:

- A. Incomplete initial assessment
- B. Patient's failure to return for scheduled follow-up assessment
- C. Communication barriers (eg, language or cultural barriers, communication disorders, altered mental status, or level of consciousness)
- D. Psychological barriers
- E. Patient's, legal guardian's, or responsible party's failure to disclose information regarding patient history
- F. Degree of patient's and/or family's cooperation and/or compliance
- G. Physical barriers (eg, obesity, trismus, trauma)
- H. Situational barriers (eg, life-threatening emergency, pending litigation)
- I. Regulatory and/or third-party decisions concerning access to care, indicated therapy, drugs, devices, and/or materials

IV. Indicated Therapeutic Parameters for Patient Assessment

Patient assessment may be categorized into many different forms of encounter. Please refer to both the ICD-10 and the current Current Procedural Terminology (CPT) coding manuals, as necessary. These encounters may be either initial or subsequent and may include but are not limited to the following:

The level of patient assessment is determined by the severity of the problem or complexity of the disease entity and may include any or all of the components of a comprehensive history and physical examination. According to CPT criteria, the levels of evaluation and management services are determined by multiple components of the patient encounter, including the history, examination, medical decision-making, counseling, coordination of care, nature of presenting problem, and time. History, examination, and medical decision-making are considered the key components in determining the level of evaluation and management. The CPT published by the American Medical Association should be referred to for details of those factors required when determining the level of evaluation and management services.

Patient assessment should be documented in the medical record. The medical history obtained from the patient, legal guardian, or responsible party; and the physical examination findings form the basis of this document. Documentation of a patient's condition and planned surgery or procedure includes the following elements of information, as indicated by the patient's presentation or form of encounter. A comprehensive history and physical examination may not be appropriate for all patients, and the components of the history and physical examination should be individualized for each patient's specific needs.

- A. Office or other outpatient services
 - 1. New patient
 - 2. Established patient
- B. Hospital observation services
- C. Hospital inpatient services (eg, admission)
- D. Consultations
 - 1. Office or other outpatient consultations
 - 2. Initial inpatient consultations
 - 3. Confirmatory consultation (eg, second opinion)
- E. Preoperative assessment for outpatient surgery
- F. Emergency department services

PATIENT ASSESSMENT (continued)

- G. Other: nursing home
- H. Medical and dental history
 - 1. Chief complaint
 - 2. History of present illness
 - 3. Past medical history, with elaboration of positive and significant negative findings
 - a. Medical, dental, and psychological conditions and/or illnesses
 - b. Hospitalizations
 - c. Anesthesia experience (adverse reactions or complications, eg, personal or family history of malignant hyperthermia)
 - d. Past surgical history (operations: major and minor)
 - e. Past dental history
 - f. Medications and dosages (past and present, including herbal medicines and nonprescription drugs)
 - g. Allergies and reactions (including latex allergy)
 - 4. Review of systems (general and pertinent)
 - a. General
 - b. HEENT (head, ears, eyes, nose, and throat, including oral cavity)
 - c. Cardiovascular (including exercise tolerance quantified by Metabolic Equivalent of Tasks (METs) activity (See [Appendix 3](#)))
 - d. Respiratory
 - e. Gastrointestinal
 - f. Genitourinary (including date of last menstrual period)
 - g. Musculoskeletal
 - h. Integumentary
 - i. Neurologic
 - j. Psychiatric
 - k. Endocrine
 - l. Hematologic/lymphatic
 - m. Allergic/immunologic
 - 5. Family history
 - 6. Social history
 - a. Occupation
 - b. Substance use (eg, tobacco [pack-years], alcohol [daily amount], illicit or recreational drugs [specific drugs and frequency of use]), e-cigarette usage (vaping)
 - c. Other issues, as indicated by the patient's presentation (eg, religious or philosophical objections to care or treatment)
 - d. History of violence and abuse; present or past PTSD (post-traumatic stress disorder) issues
 - e. Co-inhabitants (eg, partner, children)
- I. Physical examination

The surgeon is responsible for documenting the performance of an appropriate history and physical examination, although the patient may be referred to another qualified professional for an examination. In general, the physical examination may be focused for the OMS patient, and several areas may be deferred, but such deferrals should be documented in the medical record. For most ASA class I and II patients undergoing outpatient surgery, the history and physical examination may be focused. For the surgical inpatient (depending on individual institutional requirements) and/or patients of advanced ASA status, a more comprehensive history and physical examination may be necessary. A patient's refusal to consent to a medical history and physical examination must be documented in the medical record and co-signed by the patient so that there is no misinterpretation of the treatment options offered.

- 1. General Examination (Alert and Oriented [AO] x 3)
- 2. Vital signs (heart rate, blood pressure [minimum for patient who will undergo anesthesia], temperature, respiratory rate)
- 3. HEENT (head, ears, eyes, nose, and throat, including oral cavity)
- 4. Neck, including lymph nodes, trachea, and thyroid
- 5. Chest and lungs (inspection, palpation, percussion, auscultation)
- 6. Heart and great vessels

PATIENT ASSESSMENT (continued)

7. Breast (deferred, in most cases)
 8. Abdomen
 9. Pelvic/rectal (deferred, in most cases)
 10. Musculoskeletal
 11. Neurologic
 12. Skin
 13. Extremities
- J. Adjunctive studies

The decision to obtain any adjunctive studies must be based on results of the preoperative patient assessment data, ASA physical status, and surgical risk classification. Laboratory or radiologic testing without specific clinical indications is not medically necessary, clinically beneficial, or cost-effective. In determining studies to be performed for imaging purposes, principles of ALARA (as low as reasonably achievable) should be followed. For women of child bearing age, the decision to perform urine or blood pregnancy testing prior to surgery and anesthesia should be based on an equivocal history of sexual activity and possibility of pregnancy and an uncertainty regarding the date of the last menstrual period. Routine urine or blood pregnancy testing of the pediatric patient is not clinically warranted without a specific indication. Adjunctive studies, when indicated, may include but are not limited to:

Laboratory evaluation:

1. Complete blood count (CBC), white blood cell count (WBC), hemoglobin, hematocrit
2. Chemistry-7 (sodium, potassium, chloride, serum bicarbonate, blood urea nitrogen, creatinine, and glucose)
3. Prothrombin time (PT), partial thromboplastin time (PTT), and international normalized ratio (INR)
4. Platelet count
5. Bleeding time
6. Type and screen, type and cross-sensitivity
7. Arterial blood gas
8. Fasting blood glucose, random blood glucose, glucose tolerance test, hemoglobin A_{1c}
9. Pregnancy testing, serum or urine
10. Pulmonary function tests
11. Liver function tests
12. Urinalysis
13. Blood cultures

Radiologic examination:

1. Chest radiograph (CXR)
2. Panoramic radiograph
3. Periapical and/or occlusal radiographs
4. Maxillary and/or mandibular radiographs
5. Computed tomography (CT)
6. Computed tomographic angiography (CTA)
7. Cone beam computed tomography
8. Positron emission tomography (PET)
9. Positron emission tomography/computed tomography (PET-CT)
10. Positron emission tomography/magnetic resonance imaging (PET-MRI)
11. Magnetic resonance imaging (MRI)
12. Magnetic resonance angiography (MRA) (gadolinium, non-iodine based)
13. Ultrasound imaging
14. Electrocardiogram (12-lead ECG)
15. Echocardiogram

K. Assessment

The OMS should compile all of the information related to the results of the patient assessment, ASA status, surgical risk classification, and planned surgical procedure to determine an appropriate differential diagnosis and alternative treatment options, including an option of no treatment. The decisions made at this point in the patient assessment may include a review of the literature and/or consultations with other professionals, such as physicians, dentists and specialists.

PATIENT ASSESSMENT (continued)

L. Treatment plan

The OMS may make treatment recommendations based on his/her assessment of the patient's needs and ability to undergo surgery. In general, there are several options for management, and these should be presented to the patient and discussed in terms of risks and benefits of treatment and nontreatment, material risks of the procedures, possible complications, risk of recurrence, and the possible need for additional procedures. The treatment plan may involve the need to submit a letter to a third-party company for predetermination of benefits for each patient before surgery. As such, it is important to properly code the diagnosis and treatment procedure using the latest ICD-10/CPT terminology.

V. Outcome Assessment Indices for Patient Assessment

Outcomes indices are used by the OMS and Oral and Maxillofacial Surgery specialty to assess aggregate outcomes of care. Outcomes are assessed through clinical functional evaluation of patients and laboratory and radiographic measures.

A. General favorable outcomes associated with patient assessment

1. Determination of accurate diagnoses
2. Documentation of care or treatment recommendations based on an evidence-based rationale, when feasible
3. Identification and documentation of risk factors associated with the patient assessment and recommended care or treatment vs nontreatment
4. Successful achievement of assessment goals
5. Careful coding strategies

B. General unfavorable outcomes associated with patient assessment

1. Failure of OMS to perform a complete history and physical examination, except in urgent/emergent situations when this is not possible.
2. Failure of patient to disclose adequate information contributing to incomplete obtainment of a medical history
3. Failure of patient to disclose information contributing to an incomplete physical examination
4. Patient-related factors contributing to incomplete or inaccurate diagnoses
5. Patient-related factors contributing to incomplete or inaccurate treatment recommendations and/or treatment
6. Complications resulting from inadequate assessment (eg, unrecognized risk factors, such as immunocompromised patient status)
7. Failure of patient to obtain the necessary informed consent information that a prudent patient would want to know before any surgical procedure, including consideration for non-English speaking patients
8. Failure of the patient to disclose a new or evolving condition
9. Failure of patient to return for scheduled follow-up assessment and management
10. Failure to obtain appropriate consultation, when indicated
11. Failure to recognize the need for adjunctive studies based on patient history, physical examination, or ASA status
12. Failure to adhere to American Heart Association (AHA) guidelines regarding subacute bacterial endocarditis ([Appendix 4](#)) and American Dental Association (ADA) guidelines for total joint replacement ([Appendix 5](#)) prophylaxis regimes in at-risk patients undergoing at-risk procedures
13. Inappropriate medication prescribing (eg, allergy, drug interactions, overprescribing)
14. Failure to recognize prescription medication abuse (eg, narcotics)
15. Iatrogenic patient injury due to inadequate patient assessment

SPECIFIC CLINICAL SCENARIOS

On occasion, the OMS must perform an assessment of patients of advanced ASA status. The following clinical scenarios represent several of the more commonly seen disease processes organized by system and provide recommendations for assessment and management. These are only recommendations, and definitive patient assessment and management must be correlated clinically for each patient. In all cases of ASA class II or greater patients, consideration should be given to consultation with a physician for medical clarification of the patient's physiologic condition, and obtainment of a written medical clearance to assist the OMS in determining the appropriateness for outpatient OMS procedures that may include sedation or general anesthesia. The following parameters are recommendations ONLY and should be individualized for each specific surgical patient at the discretion of the OMS.

SPECIFIC CLINICAL SCENARIOS (continued)

I. Cardiovascular System

- A. Rheumatic heart disease, valvular heart disease, heart murmurs, congenital heart disease
 1. Consider cardiology consultation, if indicated
 2. Consider ultrasonography or echocardiography for documentation of cardiac valvular function
 3. Follow AHA subacute bacterial endocarditis prophylaxis regimens for the at-risk patients undergoing at-risk procedures ([Appendix 4](#))
- B. Ischemic heart disease, hypertension, angina pectoris, myocardial infarction (MI)
 1. Determine current level of control (eg, exercise-tolerance, METs, stable vs unstable angina)
 2. Consider consultation with physician
 3. Consider *Cardiac Risk Stratification for Noncardiac Surgical Procedures* ([Appendix 6](#))
 4. Use stress reduction techniques
 5. Consider deferring elective treatment for 1 month, and ideally 3 months, following MI
 6. Consider discontinuation of antiplatelet therapy only with cardiology consultation. For bare metal stents, the period of antiplatelet therapy is typically 6 months, while drug-eluting stents require 1 year of antiplatelet therapy after MI
 7. Consider limitation of epinephrine dosage contained in local anesthetic solution
 8. Be prepared for Basic Life Support (BLS)/Advanced Cardiac Life Support (ACLS) in emergency situations, as well as Pediatric Advanced Life Support for pediatric patients (see section on pediatric anesthesia outpatient sedation).
- C. Congestive heart failure
 1. Determine level of control by history and physical examination (eg, shortness of breath, dyspnea on exertion, paroxysmal nocturnal dyspnea, orthopnea, jugular venous distention, ankle edema)
 2. Consider consultation with physician
 3. Consider ECG, CXR
 4. Consider oxygen supplementation

II. Respiratory System

- A. Chronic obstructive pulmonary disease, emphysema
 1. Consider consultation with physician
 2. Use supplementary steroids when indicated (Note: patients receiving therapeutic doses of corticosteroids who undergo a surgical procedure do not routinely require stress steroids if they continue their usual daily dose. Patients receiving physiologic replacement steroid doses due to primary hypothalamic pituitary adrenal axis disease do require perioperative supplementation)
 3. Use supplemental oxygen cautiously, since that may inhibit respiratory drive
 4. Consider pulmonary function testing to determine the extent of the disease and degree of respiratory reserve
- B. Asthma
 1. Consider consultation with physician
 2. Determine severity based on history (eg, childhood asthma that has resolved; frequency of inhaler use, respiratory-related hospitalizations) and careful physical examination including respiratory rate and lung auscultation
 3. Consider prophylactic use of inhaler
 4. Use stress reduction techniques
 5. Consider pulmonary function testing

III. Endocrine System

- A. Diabetes mellitus (DM)
 1. Determine level of diabetic control (based upon history, fasting blood glucose analysis, glucose tolerance test, hemoglobin A_{1c})

Note: The decision to obtain a finger stick glucose level depends on many variables, including patient factors and surgical factors, such as clinical signs and symptoms of hypoglycemia or hyperglycemia, whether the patient is taking insulin or oral hypoglycemic agents only, presurgical NPO status, plan for local vs intravenous sedation, general anesthesia, length of planned surgery, and patient's self-reporting of level of glucose control
 2. Avoid hypoglycemia
 3. Consider hypoglycemic agent scheduling adjustment
 4. Consider insulin reduction, as necessary (see [Appendix 7](#))

SPECIFIC CLINICAL SCENARIOS (continued)

5. Consider discontinuation or reduction of oral hypoglycemic agents before surgery, although second generation sulfonylureas may be continued. Metformin should be discontinued 48 hours before surgery only in patients with compromised renal function or those having IV contrast due to the risk of lactic acidosis
 6. Consider rescheduling surgery if blood glucose level is significantly elevated, but this decision should be based on other factors as well
 7. Consider prophylactic antibiotics
 8. Consider H₂ blockers and prokinetic agents to reduce aspiration risks
 9. Consider an extended period of NPO status due to gastroparesis with careful prophylaxis with agents that inhibit acid reflux, as necessary
 10. Use stress reduction techniques
 11. Consider cardiac evaluation since DM patients have “silent” heart disease
- B. Adrenal insufficiency due to exogenous steroid use
1. Use stress reduction techniques
 2. Consider steroid supplementation, although evidence does not support this for the majority of patients on chronic steroid usage

IV. Hematologic Disorders

- A. Coagulopathy, bleeding disorders (eg, von Willebrand disease, hemophilia), therapeutic anticoagulation
1. Determine pertinent laboratory values (eg, CBC with platelets, PT, PTT, INR)
 2. Consider temporary discontinuation of anticoagulation or antiplatelet therapy (with physician consultation) to achieve a reasonable INR for surgical hemostasis based on specific procedures performed
 3. Consider discontinuation of anticoagulants (eg, rivaroxaban [Xarelto[®]], dabigatran [Pradaxa[®]], and apixaban [Eliquis[®]]) up to 48 hours prior to surgery, based on manufacturer recommendations (see [Appendix 8](#))
 4. Consider adjustment of medication(s) for the patient on multiple anticoagulants or anti-platelet medications (eg, clopidogrel [Plavix[®]])
 5. Determine factor level or platelet count, if indicated, and supplement as necessary (with hematologist consultation, if indicated)
 6. For extended length cases or for patients at increased risk, deep vein thrombosis prophylaxis maybe considered using compression stockings or subcutaneous medications (eg, heparin, enoxaparin)
 7. Consider workup for hypercoagulable states: Factor V Leiden, Protein C and S deficiency, Prothrombin G20210 mutation, and Antithrombin III deficiency
 8. The provider should have a detailed history of systemic comorbidities (eg, diabetes, liver failure and/or kidney failure) when evaluating the INR prior to surgical intervention since studies have suggested that the INR window of range should be lower than in patients without comorbid disease
- B. Anemia
1. Consider a CBC with platelet count
 2. Consider auto-donation of blood or blood products if a large percentage of blood volume loss during surgery is anticipated

V. Gastrointestinal Disorders

- A. Hepatitis
1. Avoid medications with hepatic metabolism, such as acetaminophen (Tylenol[®])
 2. Consider liver function tests, PT/PTT, INR, platelet count, bleeding time
 3. Consider hepatitis B surface antigen screening
 4. Monitor the use of NSAIDs and OTC medications

VI. Renal Disease

- A. Renal Failure
1. Consider avoidance of drugs with renal metabolism
 2. Consider hemodialysis or peritoneal dialysis regimen and schedule surgery accordingly
 3. Consider the impact of medications removed by hemodialysis
 4. Monitor the use of NSAIDs and OTC medications

VII. Neurologic Disorders

Some neurologic disorders, such as intellectual disability, attention-deficit/hyperactivity disorder, autism, and their associated medical treatments may affect the ability of an OMS to perform an adequate patient assessment and subsequent management. Consideration should be given to comprehensive dental and oral surgical management in an operating facility under sedation or general anesthesia.

SPECIFIC CLINICAL SCENARIOS (continued)**VIII. Musculoskeletal System****A. Total joint replacement**

1. Follow ADA recommendations regarding prophylaxis with antibiotics ([Appendix 5](#))

IX. Miscellaneous**A. Obesity**

1. Consider Body Mass Index (BMI) calculation
2. Consider altered airway anatomy
3. Consider decreased respiratory reserve
4. Consider medication dosage adjustment
5. Consider an extended period of NPO status

B. Pregnancy

1. Consider elective surgery in second trimester
2. Consider drug safety pregnancy profiles ([Appendix 9](#))

C. Medication related osteonecrosis of the jaws (MRONJ) (Also see *Diagnosis and Management of Pathological Conditions* chapter)

1. Consider consultation with prescribing physician
2. Consider discontinuation of oral bisphosphonate medication, as well as other anti-resorptive agents (based upon consultation) for a brief period before surgery
3. Consider Rank-L inhibitors such as denosumab (Xgeva[®])
4. Consider VEGF inhibitors such as bevacizumab (Avastin[®])
5. Consider debridement of necrotic bone to reduce the associated soft tissue trauma or inflammation
6. Consider prophylactic antibiotics and antimicrobial rinses
7. Consider pentoxifylline (Trental[®]) and tocopherol (Vitamin E)

D. Malignant hyperthermia

1. Recognize risk factors, signs, and symptoms
2. Be prepared to manage/transfer patient for treatment

E. Radiation therapy (RT)

1. Ascertain total dosage, field of involvement, use of jaw shields, and timing of radiation therapy
2. Consider prophylactic hyperbaric oxygen to possibly decrease the incidence of osteoradionecrosis
3. Consider pentoxifylline (Trental[®]) and tocopherol (Vitamin E)
4. Communicate with general practitioner colleagues about the necessity of oral cavity preparation and rehabilitation prior to any treatments of RT and chemotherapy to avoid complications after treatment

F. Elderly (>65 years old) patients

1. Consider progressive functional decline of all major organ systems
2. Consider altered cardiac function, and reduced METs
3. Consider increased perioperative morbidity and mortality with preexisting history of cardiovascular disease or myocardial infarction
4. Consider decreased pulmonary reserve and function
5. Consider advanced age as predictor of postoperative pulmonary complications
6. Consider increased sensitivity to the respiratory-depressant effects of opioids and benzodiazepines
7. Consider impaired hepatic and renal function
8. Consider altered drug metabolism
9. Consider increased sensitivity to the central depressant effects of anesthetic agents and medications
10. Consider increased perioperative morbidity and mortality with inability to achieve acceptable levels of pain control
11. Consider increased incidence of adverse drug reactions and interactions due to poly-pharmacy
12. Consider increased susceptibility to postoperative delirium
13. Consider increased risk for nutritional deficiencies
14. Consider cognitive impairment
15. Consider declines in motor function and occupational tasks

APPENDICES

APPENDIX 1

American Society of Anesthesiologists Physical Status Classification System

ASA Class I	A normal healthy patient
ASA Class II	A patient with mild systemic disease
ASA Class III	A patient with severe systemic disease
ASA Class IV	A patient with severe systemic disease that is a constant threat to life
ASA Class V	A moribund patient who is not expected to survive without an operation
ASA Class VI	A declared brain-dead patient whose organs are being removed for donor purposes

Note: If a surgical procedure is performed emergently, an "E" is added to the previously defined ASA classification

American Society of Anesthesiologists. <https://www.asahq.org/resources/clinical-information/asa-physical-status-classification-system>. Accessed January 5, 2017. Reprinted with permission.

APPENDIX 2

American Society of Anesthesiologists Fasting Guidelines

Ingested Material	Minimum Fasting Period
Clear liquids	2 hours
Breast milk	4 hours
Infant formula	6 hours
Nonhuman milk	6 hours
Light meal	6 hours
Fatty meal	8 hours

American Society of Anesthesiologists: Practice guidelines for preoperative fasting and the use of pharmacologic agents to reduce the risk of pulmonary aspiration: application to healthy patients undergoing elective procedures. *Anesthesiology* 114:495, 2011. Reprinted with permission.

APPENDIX 3

Estimated Energy Requirements for Various Activities

Can you		Can you	
1 MET	Take care of yourself?	4 METs	Climb a flight of stairs or walk up a hill?
↓	Eat, dress, or use the toilet?	↓	Walk on level ground at 4 mph?
↓	Walk indoors around the house?	↓	Run a short distance?
↓		↓	
↓	Walk a block or 2 on level ground at 2-3 mph?	↓	Do heavy work around the house like scrubbing floors or lifting or moving heavy furniture?
↓	Do light work around the house like dusting or washing dishes?	↓	Participate in moderate recreational activities like golf, bowling, dancing, doubles tennis or throwing a baseball or football?
4 METs		↓	
		>10 METs	Participate in strenuous sports like swimming, singles tennis, football, basketball, or skiing?

Fleisher LA, Beckman JA, Brown KA, et al: ACC/AHA 2007 guidelines on perioperative cardiovascular evaluation and care for noncardiac surgery. *J Am Coll Cardiol* 50:e159, 2007

APPENDIX 4

American Heart Association Prevention of Infective Endocarditis

Cardiac Conditions Associated with the Highest Risk of Adverse Outcome from Endocarditis for Which Prophylaxis with Dental Procedures is Recommended

Prosthetic cardiac valve
Previous IE
Congenital Heart disease (CHD)*
Unrepaired cyanotic CHD, including palliative shunts and conduits
Completely repaired congenital heart defect with prosthetic material or device, whether placed by surgery or by catheter intervention, during the first 6 months after the procedure†
Repaired CHD with residual defects at the site or adjacent to the site of a prosthetic patch or prosthetic device (which inhibits endothelialization)
Cardiac transplantation recipients who develop cardiac valvulopathy

* Except for the conditions listed above, antibiotic prophylaxis is no longer recommended for any other form of CHD.

† Prophylaxis is recommended because endothelialization of prosthetic material occurs within 6 months after the procedure.

Dental Procedures for Which Endocarditis Prophylaxis is Recommended for Patients

*All dental procedures that involve manipulation of gingival tissue or the periapical region of teeth or perforation of the oral mucosa**

* The following procedures and events do not need prophylaxis: routine anesthetic injections through noninfected tissue, taking dental radiographs, placement of removable prosthodontic or orthodontic appliances, adjustment of orthodontic appliances, placement of orthodontic brackets, shedding of deciduous teeth, and bleeding from trauma to the lips or oral mucosa.

Regimens for a Dental Procedure

Situation	Regimen: Single Dose 30 to 60 min Before Procedure		
	Agent	Adults	Children
Oral Unable to take oral medication	Amoxicillin	2 g	50 mg/kg
	Ampicillin	2 g IM or IV	50 mg/kg IM or IV
Allergic to penicillins or ampicillin-oral	OR		
	Cefazolin or Ceftriaxone	1g IM or IV	50 mg/kg IM or IV
	Cephalexin*†	2 g	50 mg/kg
	OR		
Allergic to penicillins or ampicillin and unable to take oral medication	Clindamycin	600 mg	20 mg/kg
	OR		
	Azithromycin or Clarithromycin	500 mg	15 mg/kg
	Cefazolin or Ceftriaxone†	1g IM or IV	50 mg/kg IM or IV
	OR		
	Clindamycin	600 mg IM or IV	20 mg/kg IM or IV

IM indicates intramuscular; IV, intravenous

* Or other first- or second-generation oral cephalosporin in equivalent adult or pediatric dosage

† Cephalosporins should not be used in an individual with a history of anaphylaxis, angioedema, or urticaria with penicillins or ampicillin. Wilson W, Taubert KA, Gerwitz M, et al: Prevention of infective endocarditis: guidelines from the American Heart Association. *Circulation* 116:1736, 2007.

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APPENDIX 5**American Dental Association Antibiotic Prophylaxis for Dental Patients with Total Joint Replacements**

Management of patients with prosthetic joints undergoing dental procedures

Clinical Recommendation:

In general, for patients with prosthetic joint implants, prophylactic antibiotics are not recommended prior to dental procedures to prevent prosthetic joint infection.

For patients with a history of complications associated with their joint replacement surgery who are undergoing dental procedures that include gingival manipulation or mucosal incision, prophylactic antibiotics should only be considered after consultation with the patient and orthopedic surgeon.* To assess a patient's medical status, a complete health history is always recommended when making final decisions regarding the need for antibiotic prophylaxis.

Clinical Reasoning for the Recommendation:

- There is evidence that dental procedures are not associated with prosthetic joint implant infections.
- There is evidence that antibiotics provided before oral care do not prevent prosthetic joint implant infections.
- There are potential harms of antibiotics including risk for anaphylaxis, antibiotic resistance, and opportunistic infections like *Clostridium difficile*.
- The benefits of antibiotic prophylaxis may not exceed the harms for most patients.
- The individual patient's circumstances and preferences should be considered when deciding whether to prescribe prophylactic antibiotics prior to dental procedures.

* In cases where antibiotics are deemed necessary it is most appropriate that the orthopedic surgeon recommend the appropriate antibiotic regimen and when reasonable write the prescription.

Sollecito TP, Abt E, Lockhart PB, et al: The use of prophylactic antibiotics prior to dental procedures in patients with prosthetic joints: Evidence-based clinical practice guidelines for dental practitioners. A report of the American Dental Association Council on Scientific Affairs. *J Am Dent Assoc* 146:11, 2015

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APPENDIX 6

Cardiac Risk* Stratification for Noncardiac Surgical Procedures

Risk Stratification	Procedure Examples
Vascular (reported cardiac risk often more than 5%)	Aortic and other major vascular surgery Peripheral vascular surgery
Intermediate (reported cardiac risk generally 1% to 5%)	Intraperitoneal and intrathoracic surgery Carotid endarterectomy Head and neck surgery Orthopedic surgery Prostate surgery
Low [†] (reported cardiac risk generally less than 1%)	Endoscopic procedures Superficial procedure Cataract surgery Breast surgery Ambulatory surgery

* Combined incidence of cardiac death and nonfatal myocardial infarction

† These procedures do not generally require further preoperative cardiac monitoring

Fleisher LA, Beckman JA, Brown KA, et al. ACC/AHA 2007 guidelines on perioperative cardiovascular evaluation and care for noncardiac surgery. *J Am Coll Cardiol* 50:e159, 2007

APPENDIX 7

Perioperative Insulin Management

Insulin Regimen	Day before Surgery	Day of Surgery	Comments
Insulin Pump	No change	No change	Use “sick day” or “sleep” basal rates
Long-acting peakless insulins	No change	75-100% of morning dose	Reduce nighttime dose if history of nocturnal or morning hypoglycemia On day of surgery, the morning dose of basal insulin may be administered on arrival to the ambulatory surgery facility
Intermediate-acting insulins	No change in daytime dose 75% of dose if taken in the evening	50-75% of morning dose	See comments for long-acting insulins
Fixed combination insulins	No change	50-75% of morning dose of intermediate-acting component	Lispro-protamine only available in combination, therefore use NPH instead on day of surgery. See the comments for long-acting insulins
Short- and rapid-acting insulins	No change	Hold the dose	
Non-insulin injectables	No change	Hold the dose	

Joshi GP, Chung F, Vann MA, et al. Society for Ambulatory Anesthesia consensus statement on perioperative blood glucose management in diabetic patients undergoing ambulatory surgery. *Anesth Analg* 111:1378, 2010. Reprinted with permission.

Antiplatelet and Anticoagulant Drugs

Anticoagulants (DOAC)			Renal Function Cr/Cl/min	Discontinue (D/C) or Not (N)	Antiplatelet Medication (NOAP/others)			Renal Function CR/Cl/min	Discontinue (D/C) or Not (N)
Generic	Proprietary	Mechanism of Action			Generic	Proprietary	Mechanism of Action		
Warfarin Half-life: 20-60 hours	Coumadin®	Antagonist of vitamin K ₂ and affecting II,VII,IX,X	>80 ml/min: Hold 48 hr 50-80 ml/min: Hold 72 hr	D/C based upon INR (If >4 no surgery)	Acetyl salicylic acid Half-life:15-20 min	Aspirin, BioPak, Adira	Inhibits TXA ₂ and platelet aggregation		D/C depends upon dosing: 325 mg vs. 81 mg
Dabigatran Half-life: 12-17 hours	Pradaxa®	Inhibitor of free thrombin. Thrombin bound to fibrin; inhibits activity of IIa (INR not required)	≥80 ml/min	N based upon number of teeth to be removed (>2 discuss with physician)	Dipyridamole	Persantine®	Blocks adenosine transport in platelets, erythrocytes and endothelial cells. Acts on platelet A ₂ -receptors increasing cAMP and blocks platelet aggregation		Works with ASA and not usually used alone. Short half-life D/C based upon dual effects with other antiplatelet drugs
Rivaroxaban Half-life: 9-13 hours	Xarelto®	Selective Factor Xa inhibitors (INR not required)	≥50 ml/min	N based upon the number of teeth; ie >2-3	Clopidogrel bisulfate Half-life:7-9 hours	Plavix®, Iscover®	Inhibit platelet aggregation by blocking ADP binding to platelet receptors (P ₂ Y ₁₂) and activation of GPIIb- IIIa complex		Do not D/C up to 1 year. After 1 year check with physician prior to D/C based upon complexity of procedure
Apixaban Half-life: 9-14 hours	Eliquis®	Selective factor Xa inhibitors (INR not required)	≥50 ml/min	N based upon the number of teeth; ie >2-3	Ticlopidine hydrochloride	Ticlid®, Ticlodone®	Inhibits platelet binding to ADP- fibrinogen as well as platelet aggregation		D/C 10-14 days prior to elective surgery
Heparin (LMWH) Enoxaparin Half-life:4.5hours Dalteparin Half-life: 2.2 hours	Lovenox® Fragmin®	Inhibit activity of Xa and IIa		Used for bridging to avoid undue thromboembolic events	Cilostazol	Pletal®	Prevents platelet aggregation and induces vasodilatory effects		Must D/C 10-14 days prior to elective surgery
					Prasugrel Half-life: 7 hours	Effient®	A thieno-pyridine that binds irreversibly to P ₂ Y ₁₂ platelet receptors		N: do not D/C for elective surgery
					Ticagrelor Half-life: 7-9 hours	Brilique®	A thieno-pyridine that binds irreversibly to P ₂ Y ₁₂ platelet receptors		N: do not D/C for elective surgery

APPENDIX 9

Pregnancy Risk Categories (FDA Categories)

FDA Pregnancy Category Definition (Language Summarized from 21 CFR 201.57)

Category	Definition
A	Adequate and well-controlled (AWC) studies in pregnant women have failed to demonstrate a risk to the fetus in the first trimester of pregnancy (and there is no evidence of a risk in later trimesters).
B	Animal reproduction studies have failed to demonstrate a risk to the fetus and there are no AWC studies in humans AND the benefits from the use of the drug in pregnant women may be acceptable despite its potential risks OR animal studies have not been conducted and there are no AWC studies in humans.
C	Animal reproduction studies have shown an adverse effect on the fetus, there are no AWC studies in humans, AND the benefits from the use of the drug in pregnant woman may be acceptable despite its potential risks OR animal studies have not been conducted and there are no AWC in humans.
D	There is positive evidence of human fetal risk based on adverse reaction data from investigational or marketing experience or studies in humans, BUT the potential benefits from the use of the drug in pregnant women may be acceptable despite its potential risks (e.g., eg, if the drug is needed in a life-threatening situation or serious disease for which safer drugs cannot be used or are ineffective).
X	Studies in animals or humans have demonstrated fetal abnormalities OR there is positive evidence of fetal risk based on adverse reaction reports from investigational or marketing experience, or both, AND the risk of the use of the drug in a pregnant woman clearly outweighs any possible benefit (eg, safer drugs or other forms of therapy are available).

Food and Drug Association (FDA) Website. Available at:

<http://www.fda.gov/downloads/advisorycommittees/committeesmeetingmaterials/pediatricadvisorycommittee/ucm272377.pdf>. Accessed January 11, 2017

Current FDA labeling has changed to remove these categories. Table is presented for reference purposes only.

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This list of selected references is intended only to acknowledge some of the sources of information drawn on in the preparation of this document. Citation of the reference material is not meant to imply endorsement of any statement contained in the reference material. The list is not an exhaustive compilation of information on the topic. Readers should consult other sources to obtain a complete bibliography.

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