Definition of Terms:

**Oral and Maxillofacial Surgery** is a specialty of dentistry defined by the International Association of Oral and Maxillofacial Surgeons as “that part of surgery which deals with the diagnosis, surgical and adjunctive treatment of diseases, injuries and defects of the human jaws and associated structures”

**Oral and Maxillofacial Surgeon** is a dental specialist that diagnose, perform surgical and related adjunctive treatments of diseases, injuries, defects and esthetic aspect of the oral cavity and its surrounding structures, jaw, face, and head and neck involving hard and soft tissue.

"The Philippine Dental Act of 2007“ Sec. 4. Definition and Scope of Practice. -

(a) Dentist - refers to a person who is a holder of a valid certificate of registration and professional identification card in Dentistry who renders dental service within the meaning and intent of this Law and who, for a fee, salary, compensation or reward, paid to him/her or through another, or even without such compensation or reward, performs any operation or part of an operation, upon the human oral cavity, jaws, teeth and surrounding tissues; prescribes drugs or medicines for the treatment of oral diseases or lesions, or prevents and or corrects malpositions of the teeth or implantation of artificial substitutes for lost teeth; and teaches subjects in the licensure examination; or engages in dental research: Provided, however, That this provision shall not apply to dental technologists engaged in the mechanical construction of artificial dentures or fixtures or other oral devices, as long as none of such procedures is done inside the mouth of the patient; nor shall this provision apply to students of dentistry undergoing practical training in a legally constituted dental school or college under the direction or supervision of a member of the faculty who is duly licensed to practice dentistry in the Philippines; or to registered dental hygienists who may be allowed to perform preventive oral hygiene procedures and other procedures or to dentistry graduates working as dental assistants to licensed and registered dentist authorized to practice dentistry in the Philippines who are engaged in private practice: Provided, further, That these dentistry graduates work under their direct supervision.
Scope:
The scope of Oral and Maxillofacial Surgery in Asia as recommended by the Asian Association of Oral and Maxillofacial Surgeons is as follows:

1. Dentoalveolar surgery
2. Management of cysts and benign tumors of the mouth and jaws
3. Dental management of medically compromised patients
4. Cleft lip and palate surgery
5. Maxillary sinus surgery for odontogenic pathology
6. Management of TMJ pathology, including TMJ surgery
7. Oral medicine and oral mucosal disease management (including management of oro-facial manifestations of systemic diseases)
8. Management of maxillofacial trauma (soft and hard tissues)
9. Management of oro-facial pain
10. Preprosthetic and implant surgery
11. Management of head and neck infections
12. Reconstructive maxillofacial surgery, including harvesting of grafts
13. Orthognathic surgery
14. Management of malignant tumors of the maxillofacial region
15. Salivary gland surgery

Statement:
The Clinical Practice Guidelines adapted by the PCOMS are based on Parameters of Care: Clinical Practice Guidelines for Oral and Maxillofacial Surgery (AAOMS ParCare 2012) endorsed by the International Association of Oral and Maxillofacial Surgeons.

The guidelines, however, were modified based on the clinical significance of particular cases mostly encountered in the Philippines at least from an Oral and Maxillofacial Surgery standpoint.

The following clinical practice guidelines included herein are consolidated descriptions based on the best clinical evidence necessary for the application of the scope of OMS. These guidelines, however, must be integrated with the surgeon’s clinical expertise.
DENTOALVEOLAR SURGERY
INTRODUCTION
Dentoalveolar surgery encompasses those surgical procedures that involve teeth and supporting structures associated with the oral cavity. This section includes the management of: odontogenic infections; erupted, unerupted, and impacted teeth; third molars; periradicular pathology; and the revision, reduction, and excision of deformities and defects of the dentoalveolar complex. Implant surgery, traumatic injuries, pathologic conditions, and reconstructive surgery that are applicable to the dentoalveolar complex are not included.

GENERAL CRITERIA, PARAMETERS, AND CONSIDERATIONS FOR DENTOALVEOLAR SURGERY

INFORMED CONSENT: All surgery must be preceded by the patient’s or legal guardian’s consent, unless an emergent situation dictates otherwise. These circumstances should be documented in the patient’s record. Informed consent is obtained after the patient or the legal guardian has been informed of the indications for the procedure(s), the goals of treatment, the known benefits and risks of the procedure(s), the factors that may affect the risk, the treatment options, and the favorable outcomes.

PERIOPERATIVE ANTIBIOTIC THERAPY: In certain circumstances, the use of antimicrobial rinses and systemic antibiotics may be indicated to prevent infections related to surgery. The decision to employ prophylactic perioperative antibiotics is at the discretion of the treating surgeon and should be based on the patient’s clinical condition as well as other comorbidities that may be present.

USE OF IMAGING MODALITIES: Imaging modalities may include panoramic radiograph, periapical and/or occlusal radiographs, maxillary and/or mandibular radiographs, computed tomography, cone beam computed tomography, positron emission tomography, positron emission tomography/computed tomography, and magnetic resonance imaging. In determining studies to be performed for imaging purposes, principles of ALARA (as low as reasonably achievable) should be followed.

DOCUMENTATION:
The ultimate judgment regarding the appropriateness of any specific procedure must be made by the individual surgeon in the light of circumstances presented by each patient. Understandably, there may be good clinical reasons to deviate from these parameters. When a surgeon chooses to deviate from an applicable parameter based on the circumstances of a particular patient, he/she is well advised to note in the patient’s record the reason for the procedure followed. Moreover, it should be understood that adherence to the parameters does not guarantee a favorable outcome.
GENERAL THERAPEUTIC GOALS FOR DENTOALVEOLAR SURGERY:
• Elimination of acute and/or chronic infection
• Limitation or elimination of pain
• Restored anatomical form
• Restored masticatory function
• As an adjunct or to facilitate other restorative procedures
• Preserved vital structures
• Limited period of disability
• Elimination of existing pathology
• Appropriate understanding by patient (family) of treatment options and acceptance of treatment plan
• Appropriate understanding and acceptance by patient (family) of favorable outcomes and known risks and complications
• Prevention of future expected problems (planned radiation therapy, bisphosphonate therapy, or radiation to the jaws)
• Prophylactic treatment when access to care is expected to be limited in the future (eg, military service, service in third world country)

GENERAL FACTORS AFFECTING RISK DURING DENTOALVEOLAR SURGERY: Certain general factors will affect the outcome of dentoalveolar surgery. These severity factors increase the risk and the potential for known complications.
• Presence of acute and/or chronic infection
• Presence of coexisting major systemic conditions
• Age of patient
• Presence of local or systemic conditions that may interfere with the normal healing process and subsequent tissue homeostasis (eg, diabetes mellitus, chronic renal disease, liver disease, blood disorder, steroid therapy, immunosuppression, malnutrition, bisphosphonate therapy)
• Degree of patient and/or family understanding of the etiology and natural course of the condition or disorder and therapeutic goals and acceptance of the proposed treatment
• Presence of behavioral, psychological, neurologic, and/or psychiatric disorders, including habits (eg, substance abuse, including tobacco and alcohol), seizure disorders, self-mutilation that may affect surgery, healing, and/or response to therapy
• Degree of patient’s and/or family’s cooperation with and/or adherence to preoperative and postoperative instructions and follow-up
• Location of branches of cranial nerves
• Location of adjacent teeth and adjacent dental restorations
• Presence of associated or adjacent pathologic conditions
• History of or ongoing treatment with radiation, bisphosphonate therapy, or chemotherapy
• History of temporomandibular joint disease or disorder
• History of myofascial pain
• Limited access to oral cavity (eg, trismus, neurologic disorders, inadequate oral orifice)
• Patient decisions regarding regulatory and/or third party rules concerning access to care, indicated therapy, drugs, devices, and/or materials

GENERAL FAVORABLE THERAPEUTIC OUTCOMES FOR DENTOALVEOLAR SURGERY:
• Absence of acute and/or chronic infection
• Absence of pain
• Uncomplicated healing of surgical sites
• Restored and/or improved form and function
• Limited period of disability
• Reduced susceptibility to pathologic conditions
• Restoration, retention, and function of previously diseased tooth or teeth
• Absence of neurologic dysfunction (sensory)
• Improved host defenses
• Patient (family) acceptance of procedure and understanding of outcomes

GENERAL KNOWN RISKS AND COMPLICATIONS FOR DENTOALVEOLAR SURGERY:
• Unexpected or prolonged pain, swelling, hemorrhage, trismus
• Prolonged period of disability
• Symptoms of temporomandibular joint disease or disorder
• Symptoms of myofascial pain
• Osteomyelitis
• Osteoradionecrosis
• Osteonecrosis of the jaws
• Damage to adjacent teeth
• Soft tissue lacerations / abrasions
• Postoperative wound infection
• Unplanned admission to emergency care facility or hospital after surgery

Comment and Exception: Planned admission should be documented in the patient’s record before surgery.
• Unplanned intubation during the perioperative period
Comment and Exception: Planned intubation should be documented in the patient’s record before surgery.
• Reintubation after surgery or the necessity for a surgically created airway after surgery (for airway impairment)
• Unplanned need for parenteral drugs and fluids
Comment and Exception: Procedures where long-term parenteral drugs and/or fluids are anticipated as part of the original treatment plan should be documented in the patient’s record before surgery.
• Failure to meet proscribed discharge criteria within 6 hours of elective surgery
Comment and Exception: Anticipated delays in discharge should be documented preoperatively.
• Facial and/or trigeminal nerve dysfunction after surgery (eg, anesthesia, paresthesia of the lips, teeth, chin, or tongue)
Comment and Exception: When postoperative nerve dysfunction is a known risk, anticipated deficits should be documented in the patient’s record before surgery (eg, trigeminal nerve dysfunction after removal of a third molar documented to be close to nerves).
• Maxillary or mandibular fracture during or after surgery
Comment and Exception: A fractured bone that may be a sequela to surgery should be documented in the patient’s record before surgery.
• Unplanned Caldwell-Luc, bronchoscopy, or other exploratory procedures associated with surgery
• Dental injury and/or damage to adjacent dental restorations during surgery
Comment and Exception: When the likelihood of dental injury is possible, it should be documented in the patient’s record before surgery.
• Ocular injury during surgery
• Unanticipated tissue loss or damage to adjacent vital structures
• Repeat Oral and/or Maxillofacial Surgery
Comment and Exception: Staged procedures that are part of the original treatment plan should be documented before the initial procedure.

- Core temperature of greater than 101°F during the first 72 hours
- Presence of foreign body after surgery

Comment and Exception: Implanted materials that are anticipated as a normal course of the surgical procedures should be documented in the patient record.

- Unplanned transfusion(s) of blood or blood components during or after surgery
- Compromised airway
- Adverse systemic sequelae (eg, septicemia, endocarditis)
- Respiratory and cardiac arrest
- Death

Comment and Exception: Admissions for terminal care must be documented.

**SPECIAL CONSIDERATIONS FOR PEDIATRIC DENTOALVEOLAR SURGERY**

Management of odontogenic infections; erupted, unerupted, and impacted teeth; third molars; periradicular pathology; and defects of the dentoalveolar structures is similar in children and adults. However, certain age- and developmental-dependent variables must be considered.

Informed consent must be obtained from a parent or guardian with legal authority and should include the child as soon as he/she is old enough to understand the procedure, risks, and benefits. It is especially important to have detailed information related to who will be taking the child home after the procedure. This is absolutely mandatory in the case of separated parents.

Maxillofacial infections in children vary according to age and development. In children younger than 5 years, it is more common to have upper face (orbit, soft tissue over maxilla or zygoma) infections of nonodontogenic etiology accompanied by systemic sepsis. Also, there is a more frequent association with sinusitis and otitis in upper face infections. In children older than 5 years, lower face infections are more commonly of odontogenic origin. Non-odontogenic infections may require broad-spectrum intravenous antibiotics and hydration; odontogenic infections require antibiotics, hydration, drainage, and treatment of the underlying dental problem as indicated. Behavioral management of the child requiring a dentoalveolar procedure is determined by the patient’s age and stage of psychological development. It is important to take enough time with the parent and child to appreciate the behavioral status and make a reasonable judgment on management regarding the use of local anesthesia, sedation, or general anesthesia.

The nature of the dentoalveolar procedure to be performed is greatly affected by the child’s age. For example, the most common impacted tooth for extraction in children is the mesiodens compared with the third molar in adults. Neonatal or natal teeth are not uncommon and are often indicated for removal due to lack of alveolar bone support, poor root development, associated mobility, and aspiration risk. Neonatal teeth represent the early arrival of the primary dentition, so parents need be counseled regarding the anticipated dental deficit when these have been removed. Riga-Fede disease, a chronic, nonhealing ulceration of the midline ventral aspect of the tongue in infants, is due to the presence of newly erupted mandibular primary incisors. Simple smoothing of the incisal edges will usually suffice, but on occasion these teeth will require removal to avoid “failure to thrive” situations. Children who have late mixed dentition or early adult dentition often require exposure of impacted canines during orthodontic treatment. Timing of surgery is important in children.

In general, consideration should be given to waiting until the incisors adjacent to an impacted mesiodens have at least two-thirds root development so that extraction will present less risk to the developing teeth but still allow spontaneous eruption of the incisors. This general principle may be applied to extraction of any impacted supernumerary teeth. Trauma
and avulsion of teeth is common in children, and management is governed by the fact that open apices are associated with a better prognosis than the same injury in adults. Space maintenance is a frequent need following removal of teeth in children. The surgeon should recommend that appropriate consultation with, or referral to, the primary care dental provider or orthodontist be accomplished to address this need. Ankyloglossia release and labial frenectomy, when indicated, are ideally performed in children before detrimental effects occur. Lingual frenectomy, when indicated, is considered early for optimizing speech development. It is important to recognize that recurrent ranulae may be confused with lymphatic malformations of the floor of the mouth. Finally, hemangiomas can be seen on the alveolus in infants. These need to be differentiated from eruption cysts. Hemangiomas may undergo a rapid growth phase in the first year of life but then regress spontaneously. Eruption cysts resolve with eruption of the tooth.

**ODONTOGENIC INFECTIONS**

I. Indications for Therapy for Odontogenic Infections

A. Clinical or physical findings
   - Pain
   - Swelling
   - Soft tissue induration
   - Erythema
   - Lymphadenitis
   - Trismus
   - Purulence
   - Fistula
   - Nonvital pulp of tooth
   - Carious tooth
   - Fractured tooth
   - Tooth mobility
   - Fetor
   - Malaise
   - Fever
   - Chills
   - Diaphoresis
   - Dyspnea
   - Dysphagia
   - Altered function
   - Altered sensation
   - Soft tissue necrosis (eg, necrotizing fasciitis)
   - Systemic sepsis
   - Disseminated infection (eg, prosthetic cardiac valve)

B. Diagnostic imaging findings
   - Dental caries
   - Periodontal bone loss
   - Fractured tooth or tooth root
   - Internal resorption or external resorption of tooth
   - Periapical radiolucency (eg, osteolytic process)
   - Widening of periodontal ligament space
   - Sclerosis or reactive bone
• Osteolytic area (eg, cystic, bone radiolucency, or degeneration not associated with a tooth)
• Antral wall destruction or thickening
• Gas spaces in soft tissue
• Soft tissue mass, fluid loculation, and/or abscess cavity

C. Laboratory findings
• Abnormal complete blood count, differential count, sedimentation rate, serum electrolytes, glucose, arterial blood gas
• Positive microbiologic culture (eg, blood, purulence)
• Positive Gram stain
• Elevated temperature

II. Specific Therapeutic Goals for Odontogenic Infections
• Presence of a general therapeutic goal
• Prevention of recurrence

III. Specific Factors Affecting Outcomes From Odontogenic Infections
• Presence of a general factor affecting risk
• Extent of infection (eg, localized, diffuse)
• Direction and/or rate of extension of infection
• Presence of impending airway obstruction
• Susceptibility of organism to antibiotics
• Virulence of organism
• Presence of generalized periodontitis
• Presence of inadequate oral hygiene
• Presence of dental crowding or malocclusion
• Proximity to contiguous structures
• Presence of foreign bodies or implanted materials
• Dental management objectives that are altered and/or adversely affected by therapy

IV. Indicated Therapeutic Parameters for Odontogenic Infection

ODONTGENIC INFECTIONS
• Establishment of airway
• Elimination of source (removal of tooth, endodontic treatment, periodontal therapy, etc)
• Incision and drainage (intraorally and/or extraorally of the maxillofacial region)
• Aspiration
• Pain control
• Irrigation and debridement
• Identification of organism (eg, Gram stain, aerobic and anaerobic organism culture and sensitivity testing, culture acid-fast bacilli and fungi) when indicated
• Assessment and support of host defenses (eg, local measures, antipyretics, nutritional support, and hydration, hyperbaric oxygen treatment)
• Antimicrobial therapeutic management, if indicated (systemic or local therapy)
• Assessment and management of systemic involvement (eg, sepsis)
• Assessment and management of coexisting systemic disease (eg, diabetes mellitus)
• Instructions for posttreatment care and follow-up
V. Outcome Assessment Indices for Odontogenic Infections

A. Favorable therapeutic outcomes
   • General favorable therapeutic outcomes
   • Absence of local or systemic signs and/or symptoms of infection
   • Absence of unanticipated tissue loss
   • Restored form and function
   • Improved host defenses
   • Limited period of disability

B. Known risks and complications associated with therapy
   • Presence of a general known risk and/or complication
   • Persistence or extension of infection (intracranial extension, eg, sinusitis, cavernous sinus thrombosis, osteomyelitis, mediastinitis)
   • Airway impairment
   • Tissue loss or damage to adjacent vital structures
   • Adverse systemic sequelae (eg, septicemia, endocarditis), which could lead to organ failure and death
   • Adverse drugs reactions or interaction with existing therapeutic drug regimens
   • Facial, neck scarring, or keloid formation with need for secondary revision surgery
   • Nerve injury secondary to the infection or the surgical intervention
   • Fracture of the maxilla or mandible
   • 10. Onset or exacerbation of symptom(s) related to the temporomandibular joint (TMJ) and surrounding structures

**ERUPTED TEETH**

I. Indications for Therapy for Erupted Teeth
   • Pain
   • Clinical or imaging findings of:
     o Dental caries
     o Periodontal disease
     o Periapical pathology
     o Nonrestorable tooth
     o Split tooth
     o Tooth mobility
     o Internal or external resorption of tooth
     o Infection
     o Severe anomaly of the crown/root precluding prosthetic/restoration treatment
     o Traumatic injuries to tooth
   • Loss of pulp vitality
   • Ectopic position (eg, malposition, supraeruption, traumatic occlusion), which may cause damage to other teeth
   • Adjunct to prosthetic rehabilitation or implant placement
   • Orthodontic considerations (eg, arch length/tooth size discrepancies, interceptive extractions to obtain functional occlusion, ankylosis)
   • Teeth in line of mandibular or maxillary osseous fracture (eg, fractured teeth, abscessed teeth, periodontally involved teeth)
   • Teeth associated with pathologic lesions
   • Medical or surgical condition or treatment (eg, organ transplantation, chemotherapy, radiation therapy, placement of prosthetic heart valves, prosthetic joints, bisphosphonate administration, joint replacement) for which removal of teeth is prophylactic
• Prevention of injury (eg, natal teeth in nursing mother, psychiatric or motor disorder)
• Patient refusal of appropriate endodontic and/or periodontal therapy or appropriate surgical exposure to aid orthodontic treatment.

II. Specific Therapeutic Goals for Erupted Teeth
• Presence of a general therapeutic goal
• Prevention of pathology
• Improved aesthetics
• Optimization of occlusion
• Optimization of prosthetic rehabilitation
• Optimization of healing of osseous fractures
• Maintenance of functional teeth
• Enhanced orthodontic results
• Normal eruption pattern of teeth
• Healthy oral and maxillofacial environment for patient undergoing head and neck radiation therapy
• Healthy oral and maxillofacial environment for patient undergoing systemic therapy (eg, chemotherapy, bisphosphonate drugs, organ transplantation, or heart valve replacement)
• Elimination of hard and/or soft tissue pathology
• Optimize implant placement

III. Specific Factors Affecting Risk for Erupted Teeth
• Presence of a general factor affecting risk
• Presence of associated pathologic disease
• Presence of acute and/or chronic infection
• Existing active dental, endodontic, or periodontal diseases
• Presence of adjacent tooth or teeth
• Presence of extensive dental caries
• Presence of large restoration in adjacent teeth
• Presence of associated jaw fracture
• Size and density of supporting bone (eg, maxilla, mandible)
• History of endodontic therapy
• Relationship of tooth or teeth to maxillary antrum
• Approximation of tooth or teeth to inferior alveolar nerve, lingual nerve, mental nerve, maxillary sinus, or other significant structures
• Root anatomy (eg, size, shape, number, dilaceration, divergence)
• Root-to-crown ratio
• Accessibility (eg, compromised by ectopic eruption or positioning of adjacent teeth)
• Limited access to oral cavity (eg, trismus, inadequate oral orifice)

IV. Indicated Therapeutic Parameters for Erupted Teeth
• Incision, drainage, and medical management of acute infection (see the Odontogenic Infections section for indicated therapeutic parameters)
• Endodontic therapy
  • Nonsurgical
  • Periapical surgery
• Hemisection of tooth or root amputation
• Periodontal surgery
• Mucogingival surgery
• Alveolar/osseous surgery
• Grafting procedures (eg, soft and/or hard tissue, autogenous, alloplastic)
• Crown lengthening procedures
• Guided tissue augmentation
• Dental extraction
  Simple
  Surgical including root amputation
  Concomitant augmentation with alloplastic or autogenous graft to maintain alveolar form and function
• Observation
• Instructions for posttreatment care and follow-up

V. Outcome Assessment Indices for Erupted Teeth
• Favorable therapeutic outcomes
• General favorable therapeutic outcomes, as listed in the sections entitled General Criteria, Parameters and Considerations for Dentoalveolar Surgery and Special Considerations for Dentoalveolar Surgery
• Maintenance of previously diseased teeth
• Improved aesthetics
• Improved function and occlusion
• Known risks and complications associated with therapy
• Presence of a general known risk and/or complication
• Acute and/or chronic infection
• Alveolar osteitis
• Injury to adjacent teeth and/or hard and/or soft tissue
• Damage to adjacent restorations
• Presence of foreign body in surgical site
• Presence of portion of tooth intentionally left in alveolus
• Presence of portion of tooth unintentionally left in alveolus
• Presence of unattached bone fragment intentionally or unintentionally left in surgical site
• Mandibular and/or maxillary fractures
• Condition that requires unplanned additional surgery (eg, incision and drainage, curettage)
• Oroantral and/or nasal fistula formation
• Displacement of tooth, tooth fragments, or foreign bodies into adjacent anatomical sites (eg, airway, gastrointestinal tract, maxillary sinus, inferior alveolar canal, contiguous soft tissues)
• Persistent or new pathology (eg, recurrent or residual cyst or tumor)
• Osteonecrosis related to systemic bisphosphonate therapy
• Persistent exposure of alveolar bone
• Acute and/or chronic osteomyelitis
• Damage to lingual or inferior alveolar nerve
• Onset or exacerbation of symptom(s) related to the temporomandibular joint (TMJ) and surrounding structures

UNERUPTED AND IMPACTED TEETH (OTHER THAN THIRD MOLARS)
I. Indications for Therapy for Unerupted and Impacted Teeth (Other Than Third Molars)
• Pain
  Clinical findings of:
• Dental caries
• Periodontal disease
• Periapical pathology
II. Specific Therapeutic Goals for Unerupted and Impacted Teeth (Other Than Third Molars)

- Presence of a general therapeutic goal
- Prevention or elimination of pathology
- Optimization of prosthetic rehabilitation
- Optimization of management and/or healing of jaw fractures
- Optimization of orthodontic results
- Healthy oral and maxillofacial environment for patient undergoing radiation therapy, chemotherapy, bisphosphonate therapy, organ transplantation, or placement of prosthetic heart valves
- Prevention of complications in orthognathic surgery

III. Specific Factors Affecting Risk for Unerupted and Impacted Teeth (Other Than Third Molars)

**UNERUPTED AND IMPACTED TEETH (OTHER THAN THIRD MOLARS)**

- Presence of a general factor affecting risk, as listed in the section entitled General Criteria, Parameters, and
- Considerations for Dentoalveolar Surgery
- Presence of associated or adjacent pathology
- Presence of acute and/or chronic infection
- Size and density of supporting bone (eg, mandible, maxilla)
- Anatomical relationships of tooth or teeth to:
  - Maxillary antrum and nasal cavity
  - Adjacent nerves
  - Adjacent teeth
  - Other significant anatomical structures
  - Adjacent blood vessels
- Anatomical position of tooth or teeth
- Tooth root anatomy (eg, dilaceration, divergence, size, shape, number)
- Presence of gemination or fusion with adjacent tooth
- Status of adjacent teeth (eg, large restorations, fractured crown, terminal abutment for bridge)
- Ankylosis of tooth or teeth
• Presence of associated jaw fracture
• Accessibility (eg, compromised by ectopic eruption or positioning of adjacent teeth)
• Limited access to oral cavity (eg, trismus, inadequate oral orifice)
• History of radiation, chemotherapy, or bisphosphonate therapy

IV. Indicated Therapeutic Parameters for Unerupted and Impacted Teeth (Other Than Third Molars)
• Surgical removal of tooth or teeth
• Surgical exposure with or without placement of orthodontic attachments
• Coronectomy
• Surgical repositioning, reimplantation, or transplantation
• Surgical periodontics
• Surgical removal of associated cysts
• Marsupialization of defects with secondary management of associated impacted teeth
• Removal of associated neoplasms
• Instructions for post-treatment care and follow-up
• Interdental Corticotomy/Osteotomy to assist eruption
• Observation

V. Outcome Assessment Indices for Unerupted and Impacted Teeth (Other Than Third Molars)
• Favorable therapeutic outcomes
  o General favorable therapeutic outcomes
  o Absence of infection
  o Elimination of associated pathology (odontogenic cysts, neoplasms)
  o Orthodontic and/or prosthetic rehabilitation facilitated
• Known risks and complications associated with therapy
  o Presence of a general known risk and/or complication
  o Acute and/or chronic infection
  o Alveolar osteitis
  o Injury to adjacent teeth and/or hard or soft tissues
  o Injury/damage to adjacent restorations
  o Presence of foreign body in surgical site
  o Presence of portion of tooth intentionally left in alveolus, requiring secondary treatment
  o Presence of portion of tooth unintentionally left in alveolus
  o Presence of unattached bone fragment intentionally or unintentionally left in alveolus
  o Devitalization, ankylosis, and/or internal or external resorption of surgically exposed or repositioned tooth
  o Mandibular and/or maxillary fracture
  o Condition that requires unplanned additional surgery (eg, incision and drainage, curettage)
  o Oroantral and/or nasal fistula formation
  o Displacement of tooth, tooth fragments, or foreign bodies into adjacent anatomical sites (eg, airway, gastrointestinal tract, maxillary sinus, inferior alveolar canal, contiguous soft tissues)
  o Persistent or new pathology (eg, recurrent or residual cyst or tumor)
  o Bisphosphonate-related osteonecrosis or osteoradionecrosis
  o Acute or chronic osteomyelitis
Onset or exacerbation of symptom(s) related to the temporomandibular joint (TMJ) and surrounding structures

THIRD MOLARS
Given the following indications and the desire to achieve therapeutic goals, obtain positive outcomes, and avoid known risks and complications, a decision should be made before the middle of the third decade to remove or continue to observe third molars knowing that future treatment may be necessary based on the clinical situation. There is a growing body of knowledge suggesting that the retention of third molars that are erupted or partially erupted contribute to a higher incidence of periodontal disease. This persistent periodontal disease has both dental and medical consequences for the host and therefore may be an indication for prophylactic removal. An unerupted third molar is an embedded tooth that will probably erupt by the middle of the third decade. An impacted third molar is so positioned that it will probably not erupt by the middle of the third decade and may lead to disease with dental and medical consequences. To limit known risks and complications associated with surgery, it is medically appropriate and surgically prudent to remove these impacted third molars before the middle of the third decade and before complete root development. An impacted tooth with completed root formation that is totally covered by bone in a patient beyond the third decade that does not meet the following indications for removal should be monitored for change in position and/or development of disease, which may then indicate its removal.

I. Indications for Therapy for Third Molars
   • Erupted third molar tooth: an "erupted tooth" that is so positioned that the entire clinical crown is visible.
     o Pain
     o Carious tooth
     o Facilitation of the management of or limitation of progression of periodontal disease
     o Nontreatable pulpal or periapical lesion
     o Acute and/or chronic infection (eg, cellulitis, abscess)
     o Ectopic position (malposition, supraeruption, traumatic occlusion)
     o Abnormalities of tooth size or shape precluding normal function
     o Facilitation of prosthetic rehabilitation
     o Facilitation of orthodontic tooth movement and promotion of stability of the dental occlusion
     o Tooth in the line of fracture complicating fracture management
     o Tooth involved in surgical treatment of associated cysts and tumors
     o Tooth interfering with orthognathic and/or reconstructive surgery
     o Preventive or prophylactic removal, when indicated, for patients with medical or surgical conditions or treatments (eg, organ transplants, alloplastic implants, bisphosphonate therapy, chemotherapy, radiation therapy, prosthetic joint replacement)
     o Clinical findings of pulp exposure by dental caries
     o Clinical findings of fractured tooth or teeth
     o Internal or external resorption of tooth or adjacent teeth
     o Patient’s informed refusal of nonsurgical treatment options
     o Anatomical position causing potential damage to adjacent teeth
   • Partially erupted third molar tooth: a "partially erupted tooth" that is so positioned that only a portion of the clinical crown is visible.
     o Pain
     o Pericoronitis
- Carious tooth
- Facilitation of the management of or limitation of progression of periodontal disease
- Nontreatable pulpal or periapical lesion
- Acute and/or chronic infection (e.g., cellulitis, abscess)
- Ectopic position
- Abnormalities of tooth size or shape precluding normal function
- Facilitation of prosthetic rehabilitation
- Facilitation of orthodontic tooth movement and promotion of dental stability
- Tooth impeding the normal eruption of an adjacent tooth
- Tooth in the line of fracture
- Tooth involved in tumor resection
- Pathology associated with tooth (e.g., cysts, neoplasms)
- Preventive or prophylactic removal, when indicated, for patients with medical or surgical conditions or treatments (e.g., organ transplants, alloplastic implants, bisphosphonate therapy, chemotherapy, radiation therapy)
- Tooth interfering with orthognathic and/or reconstructive jaw surgery
- Clinical findings of fractured tooth or teeth
- Internal or external resorption of tooth or adjacent teeth
- Impacted tooth (as defined previously)
- Anatomical position causing potential damage to adjacent teeth
- Patient’s informed refusal of nonsurgical treatment options

**Unerupted/impacted third molar tooth:** An "unerupted/impacted tooth" that has not penetrated through bone and/or soft tissue and entered the oral cavity. Consideration should be given to removal of an unerupted/impacted third molar by the third decade when there is a high probability of disease or pathology and that the tooth will not erupt and when risks associated with early removal are less than anticipated risks of later removal (e.g., increased morbidity).

- Pain
- Pathology associated with tooth follicle (e.g., cysts, tumors)
- Abnormalities of tooth size or shape precluding normal function
- Facilitation of the management of or limitation of progression of periodontal disease
- Resorption of adjacent tooth
- Facilitation of orthodontic tooth movement and promotion of stability of the dental occlusion
- Facilitation of prosthetic rehabilitation
- Tooth impeding the normal eruption of an adjacent tooth
- Tooth in the line of fracture
- Tooth involved in tumor resection
- Tooth interfering with orthognathic and/or reconstructive jaw surgery
- Preventive or prophylactic tooth removal, when indicated, for patients with medical or surgical conditions or treatments (e.g., organ transplants, alloplastic implants, bisphosphonate therapy, chemotherapy, radiation therapy)
- Clinical findings of fractured tooth or teeth
- Pathology associated with the impacted tooth (odontogenic cysts, neoplasms)
- Internal or external resorption of tooth or adjacent teeth
- Need for donor transplant or stem cell harvest
- Facilitate harvesting of autologous graft
- Impacted tooth (as defined previously)
- Anatomical position causing potential damage to adjacent teeth
o Patient’s informed refusal of nonsurgical treatment options
• Diagnostic imaging: a panoramic radiograph is recommended for management of third molars, although periapical, maxillary, and/or mandibular radiographs and computed tomography may also be used. Indications for cone beam computed tomography for routine third molar surgery should be documented before ordering scans and follow the principles of ALARA (as low as reasonably achievable).

II. Specific Therapeutic Goals for Third Molar Removal
• Presence of a general therapeutic goal, as listed in the section entitled General Criteria, Parameters, and Considerations for Dentoalveolar Surgery
• Prevention of pathology
• Preservation of periodontal health of adjacent teeth
• Optimization of prosthetic rehabilitation
• Optimization of management and/or healing of jaw fractures
• Optimization of orthodontic results
• Aid in tumor resection
• Healthy oral and maxillofacial environment for patient undergoing radiation therapy, chemotherapy, organ transplantation, or placement of alloplastic implants
• Prevention of complications in orthognathic surgery

III. Specific Factors Affecting Risk for Third Molar Removal
• Presence of a general factor affecting risk
• Size and density of supporting bone (eg, mandible, maxilla)
• Anatomical relationships of tooth or teeth to:
  o Maxillary antrum and nasal cavity
  o Adjacent nerves
  o Adjacent teeth
  o Other significant anatomical structures
• Anatomical position of tooth
• Tooth root anatomy (eg, dilaceration, divergence, size, shape, number)
• Status of adjacent teeth (eg, large restorations, fractured crown, terminal abutment for bridge)
• Ankylosis of tooth or teeth
• Presence of associated jaw fracture
• Accessibility (eg, compromised by ectopic eruption or positioning of adjacent teeth)
• Limited access to oral cavity (eg, trismus, inadequate oral orifice)
• Patient’s informed refusal of nonsurgical treatment options
• Systemic drugs such as bisphosphonates
• Radiation therapy to surgical sites

IV. Indicated Therapeutic Parameters for Third Molar Removal
The presurgical assessment includes, at a minimum, a history and both a clinical and an imaging evaluation. Radiographs are necessary to provide appropriate treatment planning and surgery, if indicated, for the third molar patient. Growth and development of this region will impact the decision of frequency. Therefore timely radiographs are necessary and ideally would be within one year of planned surgery. In a fully-grown patient, the films may be repeated at a less frequent interval if no other clinical signs are present and a 2 year interval view may be sufficient. Observation of pathology, advancing decay, periodontal issues may necessitate radiographs at a more frequent interval but should always be dictated by the patient’s clinical presentation and the principles of ALARA. Indications for radiographs and type of radiograph should be noted prior to ordering the study. See also the Patient Assessment
The following procedures for the management of third molars are not listed in order of preference:

- Surgical removal of tooth or teeth
- Surgical exposure
- Surgical repositioning, reimplantation, or transplantation
- Surgical periodontics
- Endodontic therapy
- Coronectomy
- Marsupialization of associated soft tissue pathology with observation and possible secondary treatment
- Observation in cases of unerupted teeth completely covered by bone that do not meet indications for surgery
- Instructions for posttreatment care and follow-up

V. Outcome Assessment Indices for Third Molar Removal

- Favorable therapeutic outcomes
  - General favorable therapeutic outcomes
- Known risks and complications associated with therapy
  - Presence of a general known risk and/or complication
  - Acute and/or chronic infection
  - Alveolar osteitis
  - Acute/chronic osteomyelitis
  - Injury to adjacent teeth and/or hard or soft tissues
  - Presence of foreign body in surgical site
  - Osteonecrosis, osteoradionecrosis
  - Presence of portion of tooth intentionally left in alveolus
  - Presence of portion of tooth unintentionally left in alveolus
  - Presence of bone fragments or sequestra in surgical site
  - Exposure of alveolar bone
  - Mandibular and/or maxillary fracture
  - Condition that requires unplanned additional surgery (eg, incision and drainage, curettage)
  - Oroantral and/or nasal fistula formation
  - Displacement of tooth, tooth fragments, or foreign bodies into adjacent anatomical sites (eg, airway, gastrointestinal tract, maxillary sinus, inferior alveolar canal, contiguous soft tissues)
  - Persistent or new pathology (eg, recurrent or residual cyst or tumor)
  - Onset or exacerbation of symptom(s) related to the temporomandibular joint (TMJ) and surrounding structures

DEFORMITIES AND DEFECTS OF THE DENTOALVEOLAR COMPLEX

I. Indications for Therapy for Deformities and Defects of the Dentoalveolar Complex

- Clinical findings of osseous or soft tissue deformity or defects (eg, soft tissue abnormalities, exostosis, tori, enlarged tuberosity)
- Radiographic findings of osseous defects
- Infection, ulceration, and/or pain
- Osteomyelitis
- Speech abnormality
- Masticatory dysfunction
- Dysphagia
- Periodontal disease
• Interference with prosthetic rehabilitation or orthodontic treatment
• Diastema
• Medical or surgical condition or treatment (eg, organ transplantation, chemotherapy, radiation therapy, placement of prosthetic heart valves, prosthetic joints, bisphosphonate administration, joint replacement) for which the correction of a dentoalveolar complex defect is prophylactic
• Facilitate implant placement or subsequent implant restoration

II. Specific Therapeutic Goals for Deformities and Defects of the Dentoalveolar Complex
• Presence of a general therapeutic goal
• Absence of deformities and defects of the dentoalveolar complex
• Retention of previously diseased tooth or teeth
• Improved masticatory function
• Improved appearance
• Recovery to a degree that permits prosthetic rehabilitation or orthodontic treatment or placement of dental implants
• Improved speech

III. Specific Factors Affecting Risk for Deformities and Defects of the Dentoalveolar Complex
• Presence of a general factor affecting risk, as listed in the section entitled General Criteria, Parameters, and Considerations for Dentoalveolar Surgery
• Anatomical location, size, and extent of defect or deformity
• Anatomical relationships to:
  o Maxillary antrum and nasal cavity
  o Adjacent teeth, existing fixed prosthesis, or dental implants
  o Adjacent nerves and other significant anatomical structures
• Acute or chronic sinus disease
• Bisphosphonate or previous radiation therapy

IV. Indicated Therapeutic Parameters for Deformities and Defects of the Dentoalveolar Complex
• Surgical alteration, repair, graft, excision, reduction, or augmentation of hard and/or soft tissues, including but not limited to:
  o Reduction of tuberosity fibrous and/or osseous reduction
  o Reduction or excision of exostosis, mandibular tori, or torus palatinus
  o Maxillary, mandibular, and lingual frenotomy, frenectomy, or frenoplasty
  o Corticotomy
  o Reconstruction, repair and/or revision of hard tissue defects
  o Distraction osteogenesis
  o Reconstruction, repair, and/or revision of soft tissue defects
  o Vestibuloplasty, including extension, soft tissue grafts, muscle reattachment, revision of soft tissue, and management of hypertrophied or hyperplastic soft tissue
  o Lowering of floor of mouth with or without skin or mucosal grafting
  o Alveoloplasty and/or alveolectomy
  o Destruction of lesions of the dentoalveolar structures
  o Mucogingival surgery
  o Soft and hard tissue recontouring
  o Oronasal, oroantral, or orocutaneous fistula closure
  o Ridge preservation when implant placement is anticipated
• Ridge preservation when implant placement is not anticipated
  • Instructions for posttreatment care and follow-up

V. Outcome Assessment Indices for Deformities and Defects of the Dentoalveolar Complex
  • Favorable therapeutic outcomes
    o General favorable therapeutic outcomes
    o Adequate soft and hard tissue base for prosthetic reconstruction and rehabilitation
    o Improved physiologic condition of supporting structures of teeth (eg, periodontium, alveolar bone)
    o Improved:
      ▪ Mastication
      ▪ Speech
      ▪ Appearance
    o Relief from pain
    o Facilitated prosthetic reconstruction
    o Aided orthodontic treatment
    o Creation of an alveolar contour and volume of bone that will allow placement of dental implants
    o Absence of oral/antral communication
  • Known risks and complications associated with therapy
    o Presence of a general known risk and/or complication
    o Acute and/or chronic infection
    o Unanticipated loss of hard and/or soft tissues
    o Condition that requires unplanned additional surgery
    o Failure to complete planned staged treatment (eg, insufficient bone for endosseous implants)
    o Oroantral and/or nasal fistula formation
    o Nerve injury
    o Vascular injury
    o Onset or exacerbation of symptom(s) related to the temporomandibular joint (TMJ) and surrounding structures
ERUPTED TEETH


UNERUPTED AND IMPACTED TEETH (OTHER THAN THIRD MOLARS)


Noffke CE, Chabikuli NJ, Nzima N: Impaired tooth eruption: a review. SADJ 60:422, 2005


THIRD MOLARS


Cade TA: Paresthesia of the inferior alveolar nerve following the extraction of the mandibular third molars: a literature review of its causes, treatment, and prognosis. Military Med 157:389, 1992


Peterson LJ: Rationale for removing impacted teeth: when to extract or not to extract. J Am Dent Assoc 123:198, 1992


Richardson M: Lower third molar space. Angle Orthod 57:155, 1987


Richardson M: The role of the third molar in the case of late lower arch crowding: a review. Orthod Dentofac Orthop 95:79, 1989


Susarla SM, Dodson TB: Preoperative computed tomographic imaging in the management of impacted mandibular third molars. J Oral
DEFORMITIES AND DEFECTS OF THE DENTOALVEOLAR COMPLEX

MANAGEMENT OF CYSTS AND BENIGN TUMORS OF THE MOUTH AND JAWS
INTRODUCTION
Management of cysts and benign tumors of the mouth and jaws addresses the diagnosis and treatment of benign lesions of the oral and maxillofacial region. Treatment of these diseases involves non-surgical, surgical management, and supportive care. The parameters of care cysts and benign tumors have their foundation in knowledge that is continuing to expand. Increased understanding of the nature of these diseases, their biologic behavior, and their response to therapy form the basis for practice parameters. Evidence-based medicine demonstrates that treatment decisions and their outcomes should be based on a definitive pathologic diagnosis obtained either by preoperative biopsy or posttreatment submission of surgical specimens. When reasonable, submission of specimens to oral and maxillofacial pathologists is encouraged because this increases the likelihood of diagnostic accuracy and, therefore, appropriate management. This document does not replace existing biomedical knowledge; it merely provides the basis for defining indications for therapy, parameters of therapy, goals of therapy, and the range of outcomes. This section will refer only to diagnostic and therapeutic surgical procedures for the management of the lesions mentioned. Other areas of pathology, including temporomandibular disorders, salivary gland pathologies, and congenital defects, are covered in other sections.

GENERAL CRITERIA, PARAMETERS, AND CONSIDERATIONS FOR DIAGNOSIS AND MANAGEMENT OF PATHOLOGICAL CONDITIONS

INFORMED CONSENT: All surgery must be preceded by the patient's or legal guardian's consent, unless an emergent situation dictates otherwise. These circumstances should be documented in the patient’s record. Informed consent is obtained after the patient or the legal guardian has been informed of the indications for the procedure(s), the goals of treatment, the known benefits, and risks of the procedure(s), the factors that may affect the risk, the treatment options, and the favorable outcomes.

PERIOPERATIVE ANTIBIOTIC THERAPY: In certain circumstances, the use of antimicrobial rinses and systemic antibiotics may be indicated to prevent infections related to surgery. The decision to employ prophylactic perioperative antibiotics is at the discretion of the treating surgeon and should be based on the patient's clinical condition as well as other comorbidities which may be present.

USE OF IMAGING MODALITIES: Imaging modalities may include panoramic radiograph, periapical and/or occlusal radiographs, maxillary and/or mandibular radiographs, computed tomography, cone beam computed tomography, and magnetic resonance imaging. In determining studies to be performed for imaging purposes, principles of ALARA (as low as reasonably achievable) should be followed.

DOCUMENTATION: Documentation of objective findings, diagnoses, and patient management interventions. The ultimate judgment regarding the appropriateness of any specific procedure must be made by the individual surgeon in light of the circumstances presented by each patient. Understandably, there may be good clinical reasons to deviate from these parameters. When a surgeon chooses to deviate from an applicable parameter based on the circumstances of a particular patient, he/she is well advised to note in the patient’s record the reason for the procedure followed. Moreover, it should be understood that adherence to the parameters does not guarantee a favorable outcome.
GENERAL THERAPEUTIC GOALS FOR DIAGNOSIS AND MANAGEMENT OF PATHOLOGICAL CONDITIONS:
• Provision of medical and/or surgical palliation or cure of the disease process
• Restoration of function
• Restoration of form
• Preservation of vital structures
• Prevention of recurrence
• Limited period of disability
• Appropriate understanding by patient (family) of treatment options and acceptance of treatment plan
• Appropriate understanding and acceptance by patient (family) of favorable outcomes and known risks and complications
• Palliation of patient’s disease in the event of disseminated disease

GENERAL FACTORS AFFECTING RISK DURING DIAGNOSIS AND MANAGEMENT OF PATHOLOGICAL CONDITIONS:
• Degree of patient’s and/or family’s understanding of the origin and natural course of the condition or disorder and therapeutic goals and acceptance of proposed treatment
• Presence of coexisting major systemic disease (eg, disease that increases a patient’s American Society of Anesthesiologists classification to II, III, or IV
• Age of patient
• Presence of acute and/or preexisting infection
• Accuracy and quality of pathologic diagnosis
• Presence of local or systemic conditions that may interfere with the normal healing process and subsequent tissue homeostasis (eg, previously irradiated tissue, diabetes mellitus, chronic renal disease, liver disease, blood disorder, steroid therapy, contraceptive medication, immunosuppression, malnutrition)
• Presence of behavioral, psychological, neurologic, and/or psychiatric disorders, including habits (eg, substance abuse, including tobacco and alcohol), seizure disorders, self-mutilation, or dementia, which may affect surgery, healing, and/or response to therapy
• Degree of patient’s and/or family’s cooperation and/or compliance
• Regulatory and/or third-party decisions concerning access to care, indicate therapy, drugs, devices, and/or materials
• Potential for risk to adjacent vital structures
• Existing drug or alcohol intoxication

GENERAL FAVORABLE THERAPEUTIC OUTCOMES FOR DIAGNOSIS AND MANAGEMENT OF PATHOLOGICAL CONDITIONS:
• Cure or palliation of disease
• Restored form
• Restored function
• Presence of intact adjacent structures (eg, no unanticipated loss or damage)
• Limited period of disability
• Patient (family) acceptance of procedure and understanding of outcomes

GENERAL KNOWN RISKS AND COMPLICATIONS OF DIAGNOSIS AND MANAGEMENT OF PATHOLOGICAL CONDITIONS:
• Unplanned admission to intensive care unit after elective surgery
  ● Comment and Exception: Planned admission should be documented in the patient’s record before surgery.
• Unplanned intubation for longer than 24 hours after surgery
Comment and Exception: Planned intubation longer than 24 hours should be documented in the patient's record before surgery.

- Reintubation or tracheostomy after surgery
- Use of parenteral drugs and/or fluids for longer than 72 hours after elective surgery
  - Comments and Exceptions: Procedures in which long-term parenteral drugs and/or fluids are indicated as part of the original treatment plan should be documented in the patient's record before surgery.
- Failure to ambulate within an acceptable period after surgery
- Facial and/or trigeminal nerve dysfunction after surgery
  - Comment and Exception: When postoperative nerve dysfunction is common, anticipated deficits should be noted in the patient's record before surgery (eg, anesthesia of inferior alveolar nerve distribution after segmental resection of the mandible for benign or malignant disease).
- Facial fracture during or after surgery (eg, pathologic fracture of mandible after marginal resection)
  - Comment and Exception: A fractured bone that may be a sequela to surgery should be documented in the patient’s record before surgery.
- Unplanned Caldwell-Luc, bronchoscopy, or other exploratory procedures associated with surgery
- Dental injury during surgery
  - Comment and Exception: Any potential dental injury should be noted in the patient’s record before surgery.
- Ocular injury during surgery

Repeat Oral and/or Maxillofacial Surgery
- Comment and Exception: Staged procedures that are part of the original treatment plan should be documented before the initial procedure.

- Postsurgical radiograph indicating presence of foreign body
  - Comment and Exception: Foreign bodies (eg, plates, screws, wires) that are anticipated as a normal course of the surgical procedures (eg, orthognathic, trauma) should be noted in the patient’s record.

- Readmission of cancer patient for repeat ablative surgery within 12 months of primary surgery
- Unplanned transfusion(s) of blood or blood components during or after surgery
- Readmission for complications or incomplete management of problems on previous hospitalization
  - Comments and Exceptions:
    - Complication or incomplete management occurring at another hospital or involving a physician who is not on the medical staff
    - Readmission for chronic disease (eg, intractable asthma, recurrent congestive heart failure, cancer); service-specific criteria required for this exception
    - Planned admissions for secondary procedures needed to complete treatment

- Respiratory and/or cardiac arrest
- Unanticipated residual functional deformity
- Unanticipated residual structural deformity
- Loss of or damage to adjacent vital structures (eg, neurosensory, dentition)
- Local sequelae, with damage to or loss of vital structures
- Loss of function
- Loss of form
- Death from tumor extension or as a result of tumor therapy
- Death
  - Comment and Exception: Admissions for terminal care must be documented.
SPECIAL CONSIDERATIONS FOR DIAGNOSIS AND MANAGEMENT OF PEDIATRIC PATHOLOGICAL CONDITIONS

The principles of management of pathological conditions in children and adults are similar. The differences are in the types of pathologic entities encountered and their frequencies. The congenital epulis, for example, is by definition a tumor found exclusively in neonates and newborns, and another example is the neuroectodermal tumor of infancy found in infants and children. Lesions may also vary in rapidity of growth, aggressiveness, and predictability with regard to biologic behavior when compared with those in adults. The biologic behavior of a lesion (eg, rapid growth, effacement of the dental crypts, root destruction, etc) must be considered in deciding the therapeutic course. We assume for most pathologic entities and processes that the biologic behavior will mimic that seen in adult patients; however, this may not always be the case. Lesions that more frequently occur in adults, when found in children, may exhibit more aggressive behavior than seen in the adult equivalent. When managing tumors, the patient’s developmental stage must be considered. Radiation therapy for head and neck malignant tumors may have devastating growth consequences, and the potential for secondary tumors occurring years after the initial treatment is a concern. Although these and other concerns should be weighed in the management of young patients, they may not always alter the recommended therapy for life-threatening or aggressively destructive lesions. Anatomical variances from the adult, along with growth implications, present significant considerations to surgical management and reconstruction in the growing child in whom abnormalities of the face or jaws are to be removed. A condyle that is resected during surgical treatment, for example, should be replaced with a graft that is responsive to growth. Dental development must be considered when planning implant replacement for missing teeth. A thorough physical evaluation, appropriate imaging studies, and vigilant monitoring of the clinical course are required for management of infections in children. Airway and hydration status are paramount in the management of severe pediatric infections because the margin of safety is less for the young patient. Also in children, it may be difficult to differentiate infection from a rapidly expanding neoplasm. Decisions regarding hospital admission must of necessity include consideration of the socioeconomic environment and the expected reliability of the child’s support system.

CYSTS OF BONE

This section includes all odontogenic and nonodontogenic cysts, including those lesions not thought to be true cysts (e.g., idiopathic bone cavity, traumatic bone cyst).

I. Indications for Therapy for Cysts of Bone

A. Clinical indications

- Pain
- Deformity (eg, swelling, expansion)
- Altered sensation
- Altered function
- Drainage
- Structures damaged or displaced from their normal position (eg, nerves, teeth, sinuses)
- Altered hue
- Crepitus
- Clinical evidence of fracture
- Secondary infection

B. Imaging indications (based on clinical and plain film assessment)

- Change in bone density (eg, radiolucency)
- Displacement of adjacent anatomical structures
- Assessment of proximity to/invasion of adjacent structures
• Evidence of pathologic fracture

C. Results of differential diagnosis

D. Results of additional studies, as indicated

• Aspiration (eg, straw-colored fluid)
• Fine-needle aspiration (eg, cytologic confirmation of cyst)
• Biopsy: incisional or excisional, depending on lesion size, extent, character, and differential diagnosis (eg, microscopic confirmation of cyst)
• Enucleation and curettage
  a. Simple, mandible
  b. Complex, mandible
  c. Maxilla
• Resection (eg, recurrent cyst)
  a. Mandible
  b. Maxilla

E. Additional presurgical studies may include:

1. Imaging
   a. Office-based scans (panoramic and/or cone beam computed tomography)
   b. Conventional or computed tomography (CT) (depending on size and character)

2. Evaluation for nevoid basal cell carcinoma syndrome in patients with multiple keratocysts (eg, complete cutaneous examination, imaging studies as indicated)

II. Specific Therapeutic Goals for Cysts of Bone

• Presence of a general therapeutic goal
• Eradication of cyst

III. Specific Factors Affecting Risk in the Treatment of Cysts of Bone

• Presence of a general factor affecting risk
• Associated teeth
• Proximity to/invasion of adjacent structures
• Type of cyst, recurrence-prone cysts (eg, odontogenic keratocyst, botryoid odontogenic cyst, glandular odontogenic cyst)
• Fracture or weakening of bone due to cyst expansion

IV. Indicated Therapeutic Parameters for Cysts of Bone

• Diagnosis by aspiration or biopsy
• Primary treatment
  1. Observation, including clinical examination and serial radiographs (eg, presumptive diagnosis of idiopathic bone cavity, traumatic bone cyst [idiopathic bone cavity], Stafne cyst, and periapical radiolucency in the endodontically treated tooth)
  2. Marsupialization and/or decompression for patients with large cysts or those unable to undergo enucleation or extirpation or for those in whom the potential for damage to adjacent vital structures is high
  3. Enucleation for lesions not prone to recurrence
  4. Enucleation and curettage for lesions in which complete removal by enucleation alone is known to be inadequate (curettage can be mechanical, physical, or chemical)
  5. Marginal or segmental resection for aggressive or recurrent cysts All specimens must be submitted for pathologic assessment.
• Adjunctive treatment (Also see the Reconstructive Surgery chapter)
  1. Fixation to reduce the potential for fracture and/or preserve function (eg, maxillomandibular, bone plates)
  2. Management of bone defect for defects likely to persist or break down (eg,
packing; autogenous, allogeneic, or alloplastic grafting)

3. Secondary reconstruction for cases with potential for infection or recurrence, if primarily reconstructed, or those with systemic or local contraindications

• Post-treatment follow-up
  1. Baseline imaging in the initial postoperative period
  2. Determination of restoration of form and function and absence of recurrence
     a. Clinical and imaging examination for nonrecurrence-prone cysts (dentigerous) until form and/or function are restored
     b. Clinical and imaging examination for recurrence-prone cysts (odontogenic keratocyst) for the patient’s lifetime, annually for 5 years, then biannually if no recurrence
  3. Instructions to return if signs or symptoms recur before regularly scheduled follow-up appointment

E. Instructions for post-treatment care and follow-up

V. Outcome Assessment Indices for Cysts of Bone

A. Favorable therapeutic outcomes
   1. General favorable therapeutic outcomes, as listed in the section entitled General Criteria, Parameters, and Considerations for Diagnosis and Management of Pathological Conditions
   2. Patient remains free of disease

B. Known risks and complications associated with therapy
   1. Presence of a general known risk and/or complication
   2. Recurrence of cyst

BENIGN TUMORS OF BONE

I. Indications for Therapy for Benign Tumors of Bone

A. Clinical indications
   • Pain
   • Deformity (eg, swelling, expansion)
   • Altered sensation
   • Altered function
   • Drainage
   • Structures damaged or displaced from their normal position (eg, nerves, teeth, sinuses)
   • Altered hue
   • Crepitus
   • Clinical evidence of fracture
   • Secondary infection
   • Pulsation, bruit, or thrill
   • Ulceration
   • Hemorrhage
   • Evidence of local tumor extension

B. Imaging indications (based on clinical and plain radiograph assessment)
   1. Change in bone architecture and/or density
   2. Displacement of adjacent anatomical structures
   3. Assessment of proximity to/invasion of adjacent structures
   4. Evidence of pathologic fracture
   5. Abnormal bone scan
   6. Altered vascularity
C. Results of differential diagnosis
D. Results of additional studies, as indicated
  1. Aspiration to rule out vascular lesions
  2. Biopsy (incisional or excisional, depending on lesion size, extent, character, and differential diagnosis)
  3. Fine-needle aspiration biopsy
E. Additional presurgical studies may include
  1. Imaging
     a. Office-based scans (panoramic and/or cone beam computed tomography)
     b. Conventional tomography or CT (depending on size and character)
     c. Magnetic resonance imaging
     d. Angiography for presumptive arteriovenous malformation
     e. Plain radiographs of the jaws
  2. Laboratory studies (eg, complete blood cell count)

II. Specific Therapeutic Goals for Benign Tumors of Bone
A. Presence of a general therapeutic goal
B. Eradication of tumor

III. Specific Factors Affecting Risk in the Treatment of Benign Tumors of Bone
Severity factors that increase risk and the potential for known complications:
A. Presence of a general factor affecting risk
B. Associated teeth
C. Proximity to/invasion of adjacent structures
D. Extent of primary tumor
E. Fracture or weakening of mandible due to presence of tumor
F. Compromised airway

IV. Indicated Therapeutic Parameters for Benign Tumors of Bone
A. Diagnosis by aspiration or biopsy
   B. Primary treatment (management modified by local or systemic factors)
      1. Observation (eg, unresectable tumors, indolent lesions in compromised patients, patients unwilling to give informed consent)
      2. Therapeutic injections or systemic therapy
      3. Enucleation for well-demarcated lesion with low potential for recurrence (eg, adenomatoid odontogenic tumor, odontoma, cementifying ossifying fibroma)
      4. Enucleation and curettage for lesions in which complete removal by enucleation alone is known to be inadequate (curettage can be mechanical, physical, or chemical)
      5. Marginal resection for tumor with propensity for recurrence (eg, ameloblastoma) and when a margin of normal bone can be removed without creating segmental defect
      6. Segmental resection of bone with adjacent structures for benign tumors with propensity for involvement, extension to adjacent structures, or when size or location mitigates a marginal resection
      7. Embolization and/or vessel ligation for vascular lesions
   All specimens must be submitted for pathologic assessment.
   C. Adjunctive treatment
      1. Reconstruction bone plates to bridge segmental defects or prevent pathologic fractures in extensive marginal resections
      2. Primary reconstruction to restore form and/or function for defects likely to persist, for weakened underlying structures with low potential for infection, or for recurrence in the
absence of systemic or local contraindications
a. Bone grafts
b. Skin grafts and soft tissue flaps (eg, local, pedicled, free)
c. Composite grafts
d. Alloplasts (bone plates)
e. Implant reconstruction
4. Secondary reconstruction to restore form and/or function for cases with high potential for infection if primarily grafted, recurrence, or with systemic or local contraindications
a. Bone grafts
b. Skin grafts and soft tissue flaps (eg, local, pedicled, free)
c. Composite grafts
d. Alloplasts (bone plates)
e. Implant reconstruction
   D. Post-treatment follow-up
1. Baseline imaging in the initial postoperative period
2. Clinical and imaging examination until form and/or function is restored for nonrecurrence-prone tumors
3. Clinical and imaging examination for recurrence-prone benign tumors for the patient’s lifetime, annually for 5 years, then biennially (eg, ameloblastoma)
4. Instructions to return if signs or symptoms recur before regularly scheduled follow-up appointment
   E. Instructions for post-treatment care and follow-up

V. Outcome Assessment Indices for Benign Tumors of Bone

A. Favorable therapeutic outcomes
   1. General favorable therapeutic outcomes
   2. Patient remains free of disease
B. Known risks and complications associated with therapy
   1. Presence of a general known risk and/or complication
   2. Death from regional extension of tumor or as a result of therapy
   3. Local recurrence of tumor

CYSTS OF SOFT TISSUE
This section excludes the management of salivary cysts.

I. Indications for Therapy for Cysts of Soft Tissue
A. Clinical indications
   • Pain
   • Deformity (eg, swelling, expansion)
   • Altered sensation
   • Altered function
   • Drainage
   • Erythema
   • Movable discrete swelling
   • Fistula
B. Results of differential diagnosis
C. Additional presurgical studies may include:
   1. Fine-needle aspiration or incisional biopsy for confirmation of cyst
   2. Microbiologic assessment for secondarily infected lesions
   3. Imaging
      a. CT, magnetic resonance imaging, or ultrasonography for large lesions possibly
II. Specific Therapeutic Goals for Cysts of Soft Tissue
A. Presence of a general therapeutic goal, as previously described.
B. Eradication of cyst

III. Specific Factors Affecting Risk in the Treatment of Cysts of Soft Tissue
A. Presence of a general factor affecting risk, as previously described.
B. Presence of acute and/or preexisting infection
C. Proximity to/invasion of adjacent structures

IV. Indicated Therapeutic Parameters for Cysts of Soft Tissue
A. Diagnosis by aspiration or biopsy
B. Primary treatment
   1. Enucleation of cyst
All specimens must be submitted for pathologic assessment.
C. Adjunctive treatment
   1. Primary repair
   2. Repair with adjacent soft tissue transfer
D. Posttreatment follow-up
   1. Clinical follow-up until form and/or function are restored
   2. Instructions to return if signs or symptoms recur before regularly scheduled follow-up appointment
E. Instructions for posttreatment care and follow-up

V. Outcome Assessment Indices for Cysts of Soft Tissue
A. Favorable therapeutic outcomes
   1. General favorable therapeutic outcomes, as previously described.
   2. Patient remains free of disease
B. Known risks and complications associated with therapy
   1. Presence of a general known risk and/or complication, as previously described.
   2. Recurrence of cyst

BENIGN TUMORS OF SOFT TISSUE
I. Indications for Therapy of Benign Tumors of Soft Tissue
A. Clinical indications
   • Pain
   • Deformity (eg, swelling, expansion)
   • Altered sensation
   • Altered function
   • Induration
   • Elevated temperature
   • Red, white, discolored, or pigmented lesions
   • Ulceration
   • Secondary infection
B. Imaging indications
C. Results of differential diagnosis
D. Results of additional studies, as indicated
   1. Biopsy (incisional or excisional, depending on lesion size, site, extent, character, and differential diagnosis)
   2. Fine-needle aspiration
   3. Microbiologic assessment for secondarily infected lesions
E. Additional presurgical studies may include:
   1. Laboratory assessment
a. Culture and sensitivity for secondarily infected lesion

II. Specific Therapeutic Goals for Benign Tumors of Soft Tissue
   • Presence of a general therapeutic goal, as previously described.
   • Eradication of tumor or malformation

III. Specific Factors Affecting Risk in the Treatment of Benign Tumors of Soft Tissue
   A. Presence of a general factor affecting risk, as previously described.
   B. Presence of acute and/or preexisting infection
   C. Proximity to/invasion of adjacent structures
   D. Extent of tumor or malformation (e.g., limited to primary site, beyond primary site)
   E. Degree of mobility of normally mobile organ/structure (e.g., tongue, mandible)

IV. Indicated Therapeutic Parameters for Benign Tumors of Soft Tissue
   A. Diagnosis by aspiration or biopsy
      1. Primary treatment
         a. Local surgical (including laser, cryotherapy, and radiofrequency ablation) or chemical
            All specimens must be submitted for pathologic assessment.
      B. Adjunctive treatment
         1. Primary or secondary reconstruction
            a. Bone grafts
            b. Skin grafting
            c. Soft tissue flaps (e.g., local, pedicled, free)
            d. Alloplasts (bone plates)
         2. Access osteotomies
      C. Posttreatment follow-up
         1. Clinical examination until form and/or function are restored
         2. Instructions to return if signs or symptoms recur before regularly scheduled follow-up appointment
      D. Instructions for post-treatment care and follow-up

V. Outcome Assessment Indices for Benign Tumors of Soft Tissue
   A. Favorable therapeutic outcomes
      1. General favorable therapeutic outcomes, as previously described.
      2. Disease eliminated
   B. Known risks and complications associated with therapy
      1. Presence of a general known risk and/or complication, as previously described.
      2. Local recurrence of tumor
SELECTED REFERENCES - DIAGNOSIS AND MANAGEMENT OF PATHOLOGICAL CONDITIONS

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.

SPECIAL CONSIDERATIONS FOR PEDIATRIC DIAGNOSIS AND MANAGEMENT OF PATHOLOGICAL CONDITIONS


CYSTS OF BONE

Gorlin RJ: Nevoid basal cell carcinoma (Gorlin) syndrome. Genet Med 6:530, 2004

OSTEOMYELITIS


CYSTS OF SOFT TISSUE


BENIGN TUMORS OF SOFT TISSUE

DENTAL MANAGEMENT OF THE MEDICALLY COMPROMISED PATIENTS
INTRODUCTION

Dental management of medically compromised patients starts with an appropriate preoperative patient assessment. The proper method of obtaining and documenting a patient’s medical history and physical examination findings, as well as appropriate diagnostic tests (laboratory and radiologic), is essential to ascertaining an accurate diagnosis and differential diagnosis and developing an effective treatment plan algorithm. In addition, a thorough patient evaluation provides the basis for determining the surgical and anesthetic risk of each patient, minimizing morbidity and complications associated with concomitant systemic conditions, and evaluating the effectiveness of treatment. Several specific comorbid conditions require consideration by the Oral and Maxillofacial Surgeon (OMS).

The OMS has been 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 has been 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 OMS has the latitude to complete a patient assessment based on the clinical circumstances of the patient and/or institutional standards.

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 procedures, goals of treatment, factors that may affect the risk, alternative treatment options, and known risks and complications of the procedures. 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/guardian understands all components of the informed consent process and consents to treatment, must be documented in the patient medical record. 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 (cosmetic facial surgery, orthognathic surgery).

PERIOPERATIVE ANTIBIOTIC THERAPY:

➢ In certain circumstances, the use of antimicrobial rinses and systemic antibiotics may be indicated to prevent infections related to surgery. The decision to employ prophylactic perioperative antibiotics is at the discretion of the treating surgeon and should be based on the patient’s clinical condition as well as other comorbidities, which may be present.
DOCUMENTATION: If the patient refuses a portion 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 reason 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.

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 to ensure accuracy. 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 a more recent date is preferable.

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

In instances when another health care provider assesses the patient preoperatively, such as a primary care physician, cardiologist, or pediatrician. Additionally, the OMS is responsible for the risk assessment of the patient and, ultimately, the decision to perform the surgical procedure. No other provider may assume this responsibility.

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. 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 (histamine2 receptor antagonist agents), antacids, antiemetic agents, and/or anticholinergic medications (to decrease the risk of pulmonary aspiration) is not routinely recommended. Their use should be based on 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. 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.

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.

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. Perhaps the simplest and most reproducible method of ascertaining growth cessation is the use of serial cephalometric radiographs performed semiannually.

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.

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 surgeon 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.

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

Goals for Patient Assessment
- Perform a problem-focused, age-appropriate, ASA-appropriate medical history and physical examination
- Establish an accurate diagnosis
- Determine the need for care or treatment
- Identify factors affecting risk to determine patient ability to undergo safe treatment, surgery, or anesthesia
- Establish the rationale for care, treatment, or surgery of diagnosed conditions
- Develop care or treatment recommendations and alternative treatment options
- Document findings and recommendations and assign an ASA physical status
- Provide preoperative patient instructions for planned surgery
- 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)
- Document outcomes and recommendations for further care or treatment
- Confirm or refute an established diagnosis as a second opinion
- Confirm appropriateness of a planned operation or procedure
- Perform an informed consent discussion
- Psychologically prepare the patient for surgery by providing reassurance and review of perioperative expectations
- Inform the patient of the findings, diagnosis, treatment options, and risks and benefits of surgery
- Obtain documentation for predetermination of insurance coverage benefits

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

**Indicated Therapeutic Parameters for Patient Assessment**

Patient assessment may be categorized into many different forms of encounter. 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. History, examination, and medical decision-making are considered the key components in determining the level of evaluation and management services provided. Each of the components is composed of differing levels of significance and/or complexity.

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.

**Office or other outpatient services**
- New patient
- Established patient

**Hospital observation services**

**Hospital inpatient services (eg, admission)**

**Consultations**
- Office or other outpatient consultations
- Initial inpatient consultations
- Confirmatory consultation (eg, second opinion)

**Preoperative assessment for outpatient surgery**

**Emergency department services**

**Medical and dental history**
- Chief complaint
• History of present illness

• Past medical history, with elaboration of positive and significant negative findings
  o Medical, dental, and psychological conditions and/or illnesses
  o Hospitalizations
  o Anesthesia experience (adverse reactions or complications, eg, personal or family history of malignant hyperthermia)
  o Past surgical history (operations: major and minor)
  o Past dental history
  o Medications and dosages (past and present, including herbal medicines and nonprescription drugs)
  o Allergies and reactions (including latex allergy)

Review of systems (general and pertinent)
• General
• HEENT (head, ears, eyes, nose, and throat, including oral cavity)
• Cardiovascular (including exercise tolerance quantified by Metabolic Equivalent of Tasks [METs] activity)
• Respiratory
• Gastrointestinal
• Genitourinary (including date of last menstrual period)
• Musculoskeletal
• Integumentary
• Neurologic
• Psychiatric
• Endocrine
• Hematologic/lymphatic
• Allergic/immunologic
• Family history
• Social history
  o Occupation
  o Substance use (eg, tobacco [pack-years], alcohol [daily amount], illicit or recreational drugs [specific drugs and frequency of use])
  o Other issues, as indicated by the patient’s presentation (eg, religious or philosophical objections to care or treatment), infectious disease risk factors (eg, multiple sexual partners, multiple transfusions, human immunodeficiency virus disease, hepatitis, methicillin-resistant Staphylococcus aureus [MRSA])
• Physical examination
  o 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.

- General examination (Alert and Oriented [AO] x 3; well developed, well nourished [WDWN])
- Vital signs (heart rate, blood pressure [minimum for patient who will undergo anesthesia], temperature, respiratory rate)
- HEENT (head, ears, eyes, nose, and throat, including oral cavity)
- Neck, including lymph nodes
- Chest and lungs (inspection, palpation, percussion, auscultation)
- Heart and great vessels
- Breast (deferred, in most cases)
- Abdomen
- Pelvic/rectal (deferred, in most cases)
- Musculoskeletal
- Neurologic
- Skin
- Extremities

*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 are 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 the possibility of pregnancy and an uncertainty regarding the date of the last menstrual period. Routine preoperative assessment in the pediatric patient undergoing outpatient or noninvasive surgery is not clinically warranted without a specific indication. Adjunctive studies, when indicated, may include but are not limited to:

- Complete blood count (CBC), white blood cell count (WBC), hemoglobin, hematocrit
- Chemistry-7 (sodium, potassium, chloride, serum bicarbonate, blood urea nitrogen, creatinine, and glucose)
- Chest radiograph (CXR)
- Panoramic radiograph
- Periapical and/or occlusal radiographs
- Maxillary and/or mandibular radiographs
- Computed tomography
- Cone beam computed tomography
- Magnetic resonance imaging
- Electrocardiogram (12-lead ECG)
- Prothrombin time (PT), partial thromboplastin time (PTT), and international normalized ratio (INR)
- Platelet count
- Bleeding time
- Type and screen, type and cross-sensitivity
- Arterial blood gas
- Fasting blood glucose, random blood glucose, glucose tolerance test, hemoglobin A
- Pregnancy testing, serum or urine
- Pulmonary function tests
- Liver function tests
- Urinalysis
- Blood cultures

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. 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.

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, including no treatment, 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 possibly the 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.

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.

General favorable outcomes associated with patient assessment

- Determination of accurate diagnosis
- Documentation of care or treatment recommendations based on an evidence-based rationale, when feasible
- Identification and documentation of risk factors associated with the patient assessment and recommended care or treatment vs nontreatment
- Successful achievement of assessment goals
- Failure of patient to disclose adequate information contributing to incomplete obtainment of a medical history
- Failure of patient to disclose information contributing to an incomplete physical examination
• Patient-related factors contributing to incomplete or inaccurate diagnoses
• Patient-related factors contributing to incomplete or inaccurate treatment recommendations and/or treatment
• Complications resulting from inadequate assessment (eg, unrecognized risk factors, such as immunocompromised patient status)
• Failure of patient to obtain the necessary informed consent information that a prudent patient would want to know before any surgical procedure
• Failure of the patient to disclose a new or evolving condition
• Failure of patient to return for scheduled follow-up assessment and management
• Failure to obtain appropriate consultation, when indicated
• Failure to recognize the need for adjunctive studies based on patient history, physical examination, or ASA status
• Inappropriate medication prescribing (eg, allergy, drug interaction)
• Iatrogenic patient injury due to inadequate patient assessment

SPECIFIC CLINICAL SCENARIOS

➢ 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 clearance to assist the OMS in determining the appropriateness for outpatient OMS procedures that may include sedation or general anesthesia. The following guidelines are recommendations ONLY and should be individualized for each specific surgical patient at the discretion of the OMS.

I. Cardiovascular System

A. Rheumatic heart disease, valvular heart disease, heart murmurs, congenital heart disease
   • Consider cardiology consultation, if indicated
   • Consider ultrasonography or echocardiography for documentation of cardiac valvular function
B. Ischemic heart disease, hypertension, angina pectoris, myocardial infarction (MI)
   • Determine current level of control (eg, exercise-tolerance, METs, stable vs unstable angina)
   • Consider consultation with physician
   • Consider Cardiac Risk Stratification for Noncardiac Surgical Procedures
   • Use stress reduction techniques
   • Consider deferring elective treatment for 1 month, and ideally 3 months, following MI
   • Consider discontinuation of antiplatelet therapy only with a 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
   • Consider limitation of epinephrine dosage contained in local anesthetic solution
• Be prepared for Basic Life Support (BLS)/Advanced Cardiac Life Support (ACLS) in emergency situation.

C. Congestive heart failure

• Determine level of control by history and physical examination (e.g., shortness of breath, dyspnea on exertion, paroxysmal nocturnal dyspnea, orthopnea, jugular venous distention, ankle edema)
• Consider consultation with physician
• Consider ECG, CXR
• Consider oxygen supplementation

II. Respiratory System

A. Chronic obstructive pulmonary disease, emphysema

• Consider consultation with physician
• Use supplementary steroids when indicated
• Use supplemental oxygen cautiously, since that may inhibit respiratory drive
• Consider pulmonary function testing to determine the extent of the disease and degree of respiratory reserve

B. Asthma

• Consider consultation with physician
• Determine severity based on history (e.g., frequency of inhaler use, respiratory-related hospitalizations) and examination (wheezing)
• Consider prophylactic use of inhaler
• Use stress reduction techniques
• Consider pulmonary function testing

III. Endocrine System

A. Diabetes mellitus

• Determine level of diabetic control (based upon history, fasting blood glucose analysis, glucose tolerance test, hemoglobin A1c)

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.
• Avoid hypoglycemia
• Consider hypoglycemic agent scheduling adjustment
• Consider insulin reduction, as necessary
• 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.
• Consider rescheduling surgery if blood glucose level is significantly elevated, but this decision should be based on other factors as well
• Consider prophylactic antibiotics
• Consider H2 blockers and prokinetic agents to reduce aspiration risks
• Consider an extended period of NPO status due to gastroparesis
• Use stress reduction techniques

B. Adrenal insufficiency due to exogenous steroid use

• Use stress reduction techniques
• Consider steroid supplementation

IV. Hematologic Disorders

A. Coagulopathy, bleeding disorders (von Willebrand disease, hemophilia), therapeutic anticoagulation
• Determine pertinent laboratory values (eg, CBC with platelets, PT, PTT, INR)
• Consider temporary discontinuation of anticoagulation therapy (with physician consultation) to achieve a reasonable INR for surgical hemostasis based on specific procedures performed
• Consider adjustment of medication(s) for the patient on multiple anticoagulants
• Determine factor level or platelet count, if indicated, and supplement as necessary (with hematologist consultation, if indicated)
• For extended length cases or for patients at increased risk, deep vein thrombosis prophylaxis may be considered using compression stockings or subcutaneous medications (eg, heparin, enoxaparin)

B. Anemia
• Consider a CBC with platelet count
• Consider autodonation of blood or blood products if a large percentage of blood volume loss during surgery is anticipated

V. Gastrointestinal Disorders

A. Hepatitis
• Avoid medications with hepatic metabolism
• Consider liver function tests, PT/PTT, INR, platelet count, bleeding time
• Consider hepatitis B surface antigen screening
VI. Renal Disease

A. Renal Failure
   • Consider avoidance of drugs with renal metabolism
   • Consider hemodialysis or peritoneal dialysis regimen and schedule surgery accordingly
   • Consider the impact of medications removed by hemodialysis

VII. Neurologic Disorders

Some neurologic disorders, such as intellectual disability, attention-deficit/hyperactivity disorder, and 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.

VIII. Musculoskeletal System

Total joint replacement

IX. Miscellaneous

A. Obesity
   • Consider Body Mass Index (BMI) calculation
   • Consider altered airway anatomy
   • Consider decreased respiratory reserve
   • Consider medication dosage adjustment
   • Consider an extended period of NPO status

B. Pregnancy
   • Consider elective surgery in second trimester
   • Consider drug safety pregnancy profiles

C. Bisphosphonate-related osteonecrosis of the jaws
   • Consider consultation with prescribing physician
   • Consider discontinuation of oral bisphosphonate medication (based upon consultation) for a brief period before surgery
   • Consider debridement of necrotic bone to reduce the associated soft tissue trauma or inflammation
   • Consider prophylactic antibiotics and antimicrobial rinses

D. Malignant hyperthermia
   • Recognize risk factors, signs, and symptoms
   • Be prepared to manage/transfer patient for treatment

E. Radiation therapy
   • Ascertain total dosage, field of involvement, use of jaw shields, and timing of radiation therapy
   • Consider prophylactic hyperbaric oxygen to possibly decrease the incidence of osteoradionecrosis
APPENDICES

APPENDIX 1

American Society of Anesthesiologists Physical Status Patient 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


APPENDIX 2

American Society of Anesthesiologists Fasting Guidelines

<table>
<thead>
<tr>
<th>Ingested Material</th>
<th>Minimum Fasting Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clear liquids</td>
<td>2 hours</td>
</tr>
<tr>
<td>Breast milk</td>
<td>4 hours</td>
</tr>
<tr>
<td>Infant formula</td>
<td>6 hours</td>
</tr>
<tr>
<td>Nonhuman milk</td>
<td>6 hours</td>
</tr>
<tr>
<td>Light meal</td>
<td>6 hours</td>
</tr>
<tr>
<td>Fatty meal</td>
<td>8 hours</td>
</tr>
</tbody>
</table>


APPENDIX 3

Estimated Energy Requirements for Various Activities

<table>
<thead>
<tr>
<th>Can you</th>
<th>Can you</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 MET</td>
<td>4 METs</td>
</tr>
<tr>
<td>↓</td>
<td>↓</td>
</tr>
<tr>
<td>Eat, dress, or use the toilet?</td>
<td>Walk on level ground at 4 mph?</td>
</tr>
<tr>
<td>Walk indoors around the house?</td>
<td>Run a short distance?</td>
</tr>
<tr>
<td>↓</td>
<td>↓</td>
</tr>
<tr>
<td>Walk a block or 2 on level ground at 2-3 mph?</td>
<td>Do heavy work around the house like scrubbing floors or lifting or moving heavy furniture?</td>
</tr>
<tr>
<td>4 METs</td>
<td>↓</td>
</tr>
<tr>
<td>Do light work around the house like dusting or washing dishes?</td>
<td>Participate in moderate recreational activities like golf, bowling, dancing, doubles tennis or throwing a baseball or football?</td>
</tr>
<tr>
<td>↓</td>
<td>↓</td>
</tr>
<tr>
<td>&gt;10 METs</td>
<td>Participate in strenuous sports like swimming, singles tennis, football, basketball, or hiking?</td>
</tr>
</tbody>
</table>

APPENDIX 4

American Heart Association Prevention of Infective Endocarditis

Table 3. 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 inhibit endothelialization)
- Cardiac transplantation recipients who develop cardiac valveopathy

*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.
Table 4. Dental Procedures for Which Endocarditis Prophylaxis Is Recommended for Patients in Table 3

*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 prosthetics 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.*

<table>
<thead>
<tr>
<th>SUGGESTED ANTIBIOTIC PROPHYLAXIS REGIMENS⁹</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients not allergic to penicillin:</td>
</tr>
<tr>
<td>Cephalexin, cephradine, or amoxicillin</td>
</tr>
<tr>
<td>2 grams orally 1 hour prior to the dental procedure</td>
</tr>
<tr>
<td>Patients not allergic to penicillin and</td>
</tr>
<tr>
<td>unable to take oral medications:</td>
</tr>
<tr>
<td>Cefazolin or ampicillin</td>
</tr>
<tr>
<td>Cefazolin 1 g or ampicillin 2 g intramuscularly or intravenously</td>
</tr>
<tr>
<td>1 hour prior to the dental procedure</td>
</tr>
<tr>
<td>Patients allergic to penicillin:</td>
</tr>
<tr>
<td>Clindamycin</td>
</tr>
<tr>
<td>600 mg orally 1 hour prior to the dental procedure</td>
</tr>
<tr>
<td>Patients allergic to penicillin and</td>
</tr>
<tr>
<td>unable to take oral medications:</td>
</tr>
<tr>
<td>Clindamycin</td>
</tr>
<tr>
<td>600 mg IV 1 hour prior to the dental procedure</td>
</tr>
</tbody>
</table>

⁹No second doses are recommended for any of these dosing regimens.

ADA Total Joint Replacements (cont.)

<table>
<thead>
<tr>
<th>INCIDENCE STRATIFICATION OF BACTEREMIC DENTAL PROCEDURES⁸</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIGHER INCIDENCE</td>
</tr>
<tr>
<td>☐ Periodontal procedures, including surgery, subgingival placement of antibiotic fibers or strips, scaling and root planing, probing, recall maintenance</td>
</tr>
<tr>
<td>☐ Dental implant placement and replantation of avulsed teeth</td>
</tr>
<tr>
<td>☐ Endodontic (root canal) instrumentation or surgery only beyond the apex</td>
</tr>
<tr>
<td>☐ Initial placement of orthodontic bands but not brackets</td>
</tr>
<tr>
<td>☐ Intraligamentary and intraosseous local anesthetic injections</td>
</tr>
<tr>
<td>☐ Prophylactic cleaning of teeth or implants where bleeding is anticipated</td>
</tr>
<tr>
<td>LOWER INCIDENCE⁹</td>
</tr>
<tr>
<td>☐ Restorative dentistry (operative and prosthodontic) with or without retraction cord⁹</td>
</tr>
<tr>
<td>☐ Local anesthetic injections (nonintraligamentary and nonintraosseous)</td>
</tr>
<tr>
<td>☐ Intracanal endodontic treatment; post placement and buildup</td>
</tr>
<tr>
<td>☐ Placement of rubber dam</td>
</tr>
<tr>
<td>☐ Postoperative suture removal</td>
</tr>
<tr>
<td>☐ Placement of removable prosthetic or orthodontic appliances</td>
</tr>
<tr>
<td>☐ Taking of oral impressions</td>
</tr>
<tr>
<td>☐ Fluoride treatments</td>
</tr>
<tr>
<td>☐ Taking of oral radiographs</td>
</tr>
<tr>
<td>☐ Orthodontic appliance adjustment</td>
</tr>
</tbody>
</table>

Table 5. Regimens for a Dental Procedure

<table>
<thead>
<tr>
<th>Situation</th>
<th>Agent</th>
<th>Regimen: Single Dose 30 to 60 min Before Procedure</th>
<th>Adults</th>
<th>Children</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral</td>
<td>Amoxicillin</td>
<td>2 g</td>
<td>50 mg/kg</td>
<td>50 mg/kg IM or IV</td>
</tr>
<tr>
<td>Unable to take oral medication</td>
<td>Ampicillin</td>
<td>2 g IM or IV</td>
<td>50 mg/kg IM or IV</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cefazolin or ceftriaxone</td>
<td>1 g IM or IV</td>
<td>50 mg/kg IM or IV</td>
<td></td>
</tr>
<tr>
<td>Allergic to penicillins or ampicillin—oral</td>
<td>Cephalexin⁹</td>
<td>2 g</td>
<td>50 mg/kg</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Clindamycin</td>
<td>600 mg</td>
<td>20 mg/kg</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Azithromycin or clarithromycin</td>
<td>500 mg</td>
<td>15 mg/kg</td>
<td></td>
</tr>
<tr>
<td>Allergic to penicillins or ampicillin and unable to take oral medication</td>
<td>Cefazolin or ceftriaxone⁹</td>
<td>1 g IM or IV</td>
<td>50 mg/kg IM or IV</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Clindamycin</td>
<td>600 mg IM or IV</td>
<td>20 mg/kg IM or IV</td>
<td></td>
</tr>
</tbody>
</table>

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.
APPENDIX 5
American Dental Association Antibiotic Prophylaxis for Dental Patients With Total Joint Replacements

PATIENTS AT POTENTIAL INCREASED RISK OF HEMATOGENOUS TOTAL JOINT INFECTION

All Patients During the First Two Years Following Joint Replacement

Immunocompromised/Immunosuppressed Patients

☐ Inflammatory arthropathies such as rheumatoid arthritis, systemic lupus erythematosus
☐ Drug- or radiation-induced immunosuppression

Patients with Comorbidities

☐ Previous prosthetic joint infections
☐ Malnourishment
☐ Hemophilia
☐ HIV infection
☐ Insulin-dependent (Type I) diabetes
☐ Malignancy

aBased on Ching et al, Brause, Murray et al, Poss et al, Jacobson, Millard et al, Johnson and Bannister; Jacobson, Patel et al, and Berbari et al.
bConditions shown for patients in this category are examples only; there may be additional conditions that place such patients at risk of experiencing hematogenous total joint infection.

APPENDIX 6
Cardiac Risk Stratification for Noncardiac Surgical Procedures

<table>
<thead>
<tr>
<th>Risk Stratification</th>
<th>Procedure Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vascular (reported cardiac risk often more than 5%)</td>
<td>Aortic and other major vascular surgery</td>
</tr>
<tr>
<td></td>
<td>Peripheral vascular surgery</td>
</tr>
<tr>
<td>Intermediate (reported cardiac risk generally 1% to 5%)</td>
<td>Intraperitoneal and intrathoracic surgery</td>
</tr>
<tr>
<td></td>
<td>Carotid endarterectomy</td>
</tr>
<tr>
<td></td>
<td>Head and neck surgery</td>
</tr>
<tr>
<td></td>
<td>Orthopedic surgery</td>
</tr>
<tr>
<td></td>
<td>Prostate surgery</td>
</tr>
<tr>
<td></td>
<td>Endoscopic procedures</td>
</tr>
<tr>
<td></td>
<td>Superficial procedure</td>
</tr>
<tr>
<td></td>
<td>Cataract surgery</td>
</tr>
<tr>
<td></td>
<td>Breast surgery</td>
</tr>
<tr>
<td></td>
<td>Ambulatory surgery</td>
</tr>
</tbody>
</table>

☐ These procedures do not generally require further preoperative cardiac monitoring
### APPENDIX 7

**Perioperative Insulin Management**

<table>
<thead>
<tr>
<th>Insulin Regimen</th>
<th>Day before Surgery</th>
<th>Day of surgery</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insulin pump</td>
<td>No change</td>
<td>No change</td>
<td>Use &quot;sick day or &quot;sleep&quot; basal rates 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 See comments for long-acting insulins</td>
</tr>
<tr>
<td>Long-acting peakless insulins</td>
<td>No change</td>
<td>75-100% of morning dose</td>
<td></td>
</tr>
<tr>
<td>Intermediate-acting insulins</td>
<td>No change in daytime dose 75% of dose if taken in the evening</td>
<td>50-75% of morning dose</td>
<td>See comments for long-acting insulins.</td>
</tr>
<tr>
<td>Fixed combination insulins</td>
<td>No change</td>
<td>50-75% of morning dose of intermediate-acting component</td>
<td>Lispro-protamine only available in combination; therefore use NPH instead on day of surgery. See the comments for long-acting insulins.</td>
</tr>
<tr>
<td>Short- and rapid-acting insulins</td>
<td>No change</td>
<td>Hold the dose</td>
<td></td>
</tr>
<tr>
<td>Non-insulin injectables</td>
<td>No change</td>
<td>Hold the dose</td>
<td></td>
</tr>
</tbody>
</table>


### APPENDIX 8

**Pregnancy Risk Categories (FDA Current Categories)**

**FDA Pregnancy Category Definitions**

(langua summarized from 21 CFR 201.57)

<table>
<thead>
<tr>
<th>Category</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>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).</td>
</tr>
<tr>
<td>B</td>
<td>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.</td>
</tr>
<tr>
<td>C</td>
<td>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 women may be acceptable despite its potential risks OR animal studies have not been conducted and there are no AWC in humans.</td>
</tr>
<tr>
<td>D</td>
<td>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 (eg, if the drug is needed in a life-threatening situation or serious disease for which safer drugs cannot be used or are ineffective).</td>
</tr>
<tr>
<td>X</td>
<td>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).</td>
</tr>
</tbody>
</table>

Walker HK, Hall UD, Hurst JW: Clinical Methods: history, physical and laboratory examinations (ed. 3). Stoneham, MA, Butterworths, 1988
CLEFT LIP AND PALATE SURGERY
INTRODUCTION

The optimal management of patients with cleft and craniofacial deformities has traditionally been under the direction of a multidisciplinary team. The Oral and Maxillofacial Surgeon is referred to for the Special Considerations of Pediatric Cleft and Craniofacial Surgery section for the management of pediatric patients with cleft and craniofacial deformities.

Parameters of care for cleft lip and palate deformities and for craniofacial deformities are described separately. The management of cleft lip and palate deformities is divided into the following conditions:

- Primary Cleft Lip Deformities
- Primary Cleft Palate Deformities
- Velopharyngeal Dysfunction
- Residual Cleft Lip and/or Nasal Deformities Requiring Secondary Management
  - Maxillary Alveolar Cleft Deformities
- Residual Maxillofacial Skeletal Deformities Requiring Secondary Management
- Craniofacial Deformities: Those Not Requiring an Intracranial Approach for Repair
  - Craniofacial Deformities: Primary Cranial Deformities Requiring Treatment Through an Intracranial Approach
  - Craniofacial Deformities: Secondary Cranial Deformities Requiring Treatment Through an Intracranial Approach
  - Orbital and/or Naso-orbital Deformities

These parameters were prepared with the appreciation that there is more than one approach to treating certain clinical problems; consequently, flexibility has been allowed so that the practitioner may select different therapeutic options. Future changes in this area of Oral and Maxillofacial Surgery, resulting from new research findings and evolving technologic developments, will undoubtedly extend and expand the capabilities for treatment and enable even a higher quality of patient care.

The surgical correction of these deformities requires a clear understanding, by the surgeon and patient and/or family, of the therapeutic goals. In turn, the Oral and Maxillofacial Surgeon should determine through careful dialogue that the patient and/or family have realistic expectations regarding the proposed therapy.

GENERAL CRITERIA, PARAMETERS, AND CONSIDERATIONS FOR CLEFT AND MAXILLOFACIAL SURGERY

- INFORMED CONSENT: All surgery must be preceded by the patient's or legal guardian's consent, unless an emergent situation dictates otherwise. These circumstances should be documented in the patient's record. Informed consent is obtained after the patient or the legal guardian has been informed of the indications for the procedure(s), the goals of treatment, the known benefits and risks of the procedure(s), the factors that may affect the risk, the treatment options, and the favorable outcomes.
• PERIOPERATIVE ANTIBIOTIC THERAPY: In certain circumstances, the use of antimicrobial rinses and systemic antibiotics may be indicated to prevent infections related to surgery. The decision to employ prophylactic perioperative antibiotics is at the discretion of the treating surgeon and should be based on the patient’s clinical condition as well as other comorbidities which may be present.

• USE OF IMAGING MODALITIES: Imaging modalities may include panoramic radiograph, periapical and/or occlusal radiographs, maxillary and/or mandibular radiographs, computed tomography, cone beam computed tomography, computed tomography, and magnetic resonance imaging. In determining studies to be performed for imaging purposes, principles of ALARA (as low as reasonably achievable) should be followed.

• DOCUMENTATION: Documentation of objective findings, diagnoses, and patient management interventions is included. *The ultimate judgment regarding the appropriateness of any specific procedure must be made by the individual surgeon in light of the circumstances presented by each patient.* Understandably, *there may be good clinical reasons to deviate from these parameters. When a surgeon chooses to deviate from an applicable parameter based on the circumstances of a particular patient, he/she is well advised to note in the patient’s record the reason for the procedure followed.* Moreover, *it should be understood that adherence to the parameters does not guarantee a favorable outcome.*

TEAM APPROACH: Favorable therapeutic outcomes are optimized when a multidisciplinary team plans the treatment.

GENERAL THERAPEUTIC GOALS FOR CLEFT AND MAXILLOFACIAL SURGERY:

• Appropriate understanding by patient (family) of treatment options and acceptance of treatment plan
• Appropriate understanding and acceptance by patient (family) of favorable outcomes and known risks and complications
• Optimizing the psychological impact on patient and family
• Improved social and psychological development
• Limited period of disability
• Absence of infection
• Minimal scar formation
• Limited adverse maxillofacial growth and development

GENERAL FACTORS AFFECTING RISK DURING CLEFT AND MAXILLOFACIAL SURGERY:

• Degree of patient and/or family understanding of the origin and natural course of the condition or disorder and therapeutic goals and acceptance of proposed treatment
• Degree of patient’s and/or family’s cooperation and/or compliance
• Presence of coexisting major systemic disease
• Presence of local or systemic conditions that may interfere with the normal healing process and subsequent tissue homeostasis (eg, previously irradiated tissue, diabetes mellitus, chronic renal disease, liver disease, blood disorders, steroid therapy, contraceptive medication, immunosuppression, malnutrition)
• Presence of behavioral, psychological, neurologic, and/or psychiatric disorders, including habits (eg, substance
abuse), seizure disorders, and self-mutilation, that may affect surgery, healing, and/or response to therapy

- Hospital and professional staff’s familiarity and experience with pediatric anesthesia, surgery, and perioperative care
- Severity of deformity
- Presence of syndrome and/or other congenital or acquired craniofacial deformities (eg, Crouzon disease)
- Age of patient
- Inadequate nutrition and/or growth and development
- Communication problems (eg, language differences)
- Hearing impairment
- Problems with the physical environment
- Regulatory and/or third-party decisions concerning access to care, indicated therapy, drugs, devices, and/or materials

GENERAL FAVORABLE THERAPEUTIC OUTCOMES FOR CLEFT AND MAXILLOFACIAL SURGERY:

- Patient (family) acceptance of procedure and understanding of outcomes
- Satisfactory surgical wound healing
- Limited period of disability
- Minimal scar formation
- Improved nutritional status and systemic growth and development
- Limited adverse effect on maxillofacial growth and development
- Improved social and psychological status

GENERAL KNOWN RISKS AND COMPLICATIONS FOR CLEFT AND MAXILLOFACIAL SURGERY:

A. Unplanned admission to intensive care unit after elective surgery
   ● Comment and Exception: Planned admission should be documented in the patient’s record before surgery.

B. Unplanned intubation for longer than 12 hours after surgery
   ● Comment and Exception: Planned intubation longer than 12 hours should be documented in the patient’s record before surgery.

C. Reintubation or tracheostomy after surgery

D. Use of parenteral drugs and/or fluids for longer than 72 hours after elective surgery
   ● Comment and Exception: Procedures in which long-term parenteral drugs and/or fluids are anticipated as part of the original treatment plan should be documented in the patient’s record before surgery.
E. Facial and/or trigeminal nerve dysfunction after surgery
   ● Comment and Exception: When postoperative nerve dysfunction is common, anticipated
deficits should be noted in the patient’s record before surgery (eg, trigeminal nerve dysfunction
after sagittal split osteotomies, dysfunction of the temporal branch of facial nerve after
temporomandibular reconstruction procedures).

F. Facial fracture during or after surgery
   ● Comment and Exception: A fractured bone that may be a sequela to surgery should be
documented in the patient’s record before surgery.

G. Unplanned Caldwell-Luc, bronchoscopy, or other exploratory procedures associated with
surgery

H. Dental injury during surgery
   ● Comment and Exception: When the likelihood of dental injury is possible, it should be noted
in the patient’s record before surgery.

I. Ocular injury during surgery

J. Repeat oral and/or maxillofacial surgery
   ● Comment and Exception: Staged procedures that are part of the original treatment plan
should be documented before the initial procedure.

K. Core temperature of greater than 101°F 72 hours after elective surgery.

L. Postsurgical radiograph indicating presence of foreign body
   ● Comment and Exception: Foreign bodies (eg, plates, screws, wires) that are anticipated as a
normal course of the surgical procedures (eg, orthognathic, trauma) should be noted in the
patient’s record.

M. Unplanned transfusion(s) of blood or blood components during or after surgery

N. Readmission for complications or incomplete management of problems during previous
hospitalization
   ● Comments and Exceptions: Complication or incomplete management occurring at another
hospital or involving a physician who is not on the medical staff. Planned admissions for
secondary procedures needed to complete treatment.

O. Respiratory and/or cardiac arrest

P. Wound dehiscence

Q. Infection

R. Postsurgical nasal deformity (may be predicted in some cases)

S. Residual lip and/or nose deformity (may be predicted in some cases)

T. Adverse effect on the patient’s and family’s psychological well-being

U. Impaired healing
V. Prolonged period of disability

W. Hypertrophic and/or keloid scar formation

X. Postoperative hemorrhage

Y. Pain

Z. Abnormal maxillofacial growth and development

AA. Death

SPECIAL CONSIDERATIONS FOR PEDIATRIC CLEFT AND MAXILLOFACIAL SURGERY

Cleft and Maxillofacial surgery corrects congenital and developmental deformities, most of which occur in children. In the pediatric patient with cleft/maxillofacial anomalies, particular attention must be paid to the interaction among the primary deformity, treatment, and facial growth. The Oral and Maxillofacial Surgeon must determine whether the treatment will adversely affect growth and then ascertain the ideal time for treatment. It is not uncommon for the family to push for treatment at a time that may not be ideal, and the surgeon must resist this pressure. On the other hand, timing may be altered for a child with significant psychosocial problems and the surgery undertaken at a time that is not ideal relative to facial growth. Especially in these cases, clear documentation of treatment decisions and indications must be included within the informed consent recordings.

In the pediatric patient with cleft lip/palate, the Oral and Maxillofacial Surgeon must be aware of the effects of the deformity and its treatment on middle ear function, speech-airway, and facial growth. Timing is also important relative to alveolar cleft bone grafting, placement of dental implants, and orthognathic surgery. Secondary revisions of the lip and nose may be judiciously performed at any time during growth, although final revision should be deferred until growth has ceased.

In the pediatric patient with congenital maxillofacial anomalies, genetic evaluation is critical to determine the genetic (chromosome and gene location) basis for the anomaly when possible. This provides useful information for treating professionals in regard to possible future stigmata associated with some syndromes, for the family with regard to future children, and for the patient to make decisions about having offspring in the future. Advances in molecular genetics will aid in the understanding, prevention, and molecular treatment of craniofacial defects in the future.

The most significant difference between managing children and adults with cleft and craniofacial anomalies is the need to consider the fourth dimension of time/growth and development during treatment planning. This information affects the timing of operation and choice of proper procedure and proper hardware for stabilization. Genetic evaluation and counseling are also critical, as are psychological counseling and speech therapy when indicated. Outcomes assessment must include evaluation at the end of growth, number of operations required to achieve the final result, and success of preventive measures.
PRIMARY CLEFT LIP DEFORMITIES

I. Indications for Therapy for Primary Cleft Lip Deformities

- Evidence of anatomical and/or functional lip deformity
- Evidence of anatomical and/or functional nasal deformity

II. Specific Therapeutic Goals for Primary Cleft Lip Deformities

- Presence of a general therapeutic goal, as listed in the section entitled General Criteria, Parameters, and Considerations for Cleft and Maxillofacial Surgery
- Restoration of lip function and anatomical features
- Restoration of nasal form and/or function

III. Specific Factors Affecting Risk for Primary Cleft Lip Deformities

- Presence of a general factor affecting risk, as listed in the section entitled General Criteria, Parameters, and Considerations for Cleft and Maxillofacial Surgery
- Severity of the cleft deformity (eg, width, unilateral vs bilateral, complete vs incomplete)
- Potential for hypertrophic and/or keloid scar formation

IV. Indicated Therapeutic Parameters for Primary Cleft Lip Deformities

The lip is repaired *within the first 6 months of life, if possible.*

A. Unilateral cleft lip/nose

- Presurgical orthopedics or nasal alveolar molding in selected cases
- Insertion of nasal conformers
- Lip adhesion in selected cases
- Lip/nasal repair
- Excision of lip pits
- Instructions for post treatment care and follow-up

B. Bilateral cleft lip/nose

- Presurgical orthopedics or nasal alveolar molding in selected cases
- Insertion of nasal conformers
- Lip adhesion in selected cases
- Definitive lip/nose repair
- Excision of lip pits
- Instructions for post treatment care and follow-up
V. Outcome Assessment Indices for Primary Cleft Lip Deformities

A. Favorable therapeutic outcomes
   • General favorable therapeutic outcomes, as listed in the section entitled General Criteria, Parameters, and Considerations for Cleft and Maxillofacial Surgery
   • Restoration of lip form and function
   • Lip symmetry with alignment of anatomical landmarks
   • Improved symmetry and position of nostrils/nostril sills
   • Patent nasal passages

B. Known risks and complications associated with therapy
   • Presence of a general known risk and/or complication, as listed in the section entitled General Criteria, Parameters, and Considerations for Cleft and Maxillofacial Surgery
   • Postsurgical functional or anatomical lip deformity
   • Postsurgical functional or anatomical nasal deformity
   • Hypertrophic and/or keloid scar formation

PRIMARY CLEFT PALATE DEFORMITIES

I. Indications for Therapy for Primary Cleft Palate Deformities
   • Physical evidence of palatal cleft
   • Feeding abnormality
   • Developing or existing speech abnormality
   • Abnormal oral and/or nasal function (eg, reflux)

II. Specific Therapeutic Goals for Primary Cleft Palate Deformities
   • The presence of a general therapeutic goal, as listed in the section entitled General Criteria, Parameters, and Considerations for Cleft and Craniofacial Surgery
   • Restoration of palatal form and/or function
   • Provision of mechanism for normal speech development
   • Improved feeding
   • Improved oral and/or nasal function
   • Separate oral and nasal cavities
   • Elimination of need for prosthetic appliances
   • Improved eustachian tube and middle ear function
   • Provide for improved dental management
III. Specific Factors Affecting Risk for Primary Cleft Palate

- The presence of a general factor affecting risk, as listed in the section entitled General Criteria, Parameters, and Considerations for Cleft and Craniofacial Surgery

- Severity of the cleft deformity (e.g., width, unilateral vs bilateral, complete vs incomplete)

- Potential major vascular abnormalities

- Known or suspected airway abnormalities (Robin sequence)

- Presence of a syndrome

- Concurrent systemic syndromic abnormalities

- Severity of the malformation/deformation

IV. Indicated Therapeutic Parameters for Primary Cleft Palate Deformities

- Palatal repair is performed by 18 months of age in the normally developing child. The exact age will vary according to general development, systemic abnormalities, and speech and language development. Submucous clefts should be repaired on the basis of documented evidence of speech abnormalities.

A. Primary repair of the hard and soft palate

B. Instructions for posttreatment care and follow-up

V. Outcome Assessment Indices for Primary Cleft Palate Deformities

A. Favorable therapeutic outcomes

- General favorable therapeutic outcomes, as listed in the section entitled General Criteria, Parameters, and Considerations for Cleft and Maxillofacial Surgery

- Development of an improved speech mechanism

- Improved oral and/or nasal function

- Improved feeding

B. Known risks and complications associated with therapy

- Presence of a general known risk and/or complication, as listed in the section entitled General Criteria, Parameters, and Considerations for Cleft and Maxillofacial Surgery

- Unacceptable speech development (e.g., hypernasal speech)

- Oronasal fistulae

- Airway compromise
VELOPHARYNGEAL DYSFUNCTION

I. Indications for Therapy for Velopharyngeal Dysfunction

- Hypernasal speech that has detrimental effects on communication and does not respond to a reasonable period of speech therapy
- Clinical and/or imaging evidence of velopharyngeal incompetence (e.g., nasoendoscopy)
- Hypernasal speech documented to be due to the palatal fistulae
- Enlarged tonsils and adenoids affecting velopharyngeal function

II. Specific Therapeutic Goals for Velopharyngeal Dysfunction

- Presence of a general therapeutic goal, as listed in the section entitled General Criteria, Parameters, and Considerations for Cleft and Craniofacial Surgery
- Improved mechanism for normal speech production
- Avoidance of airway obstruction
- Avoidance of hyponasality
- Reduction of hypernasality

III. Specific Factors Affecting Risk for Velopharyngeal Dysfunction

- Presence of a general factor affecting risk, as listed in the section entitled General Criteria, Parameters, and Considerations for Cleft and Maxillofacial Surgery
- Severity of velopharyngeal dysfunction
- Presence of enlarged tonsils and/or adenoids
- Known or suspected airway abnormalities
- Limited patient cognitive abilities
- Pharyngeal hypomobility disorders
- Hearing disorders
- Known obstructive sleep apnea

IV. Indicated Therapeutic Parameters for Velopharyngeal Dysfunction

The determination for surgery is made by a team that includes a speech pathologist who has assessed the patient and agrees with the need for surgical management.

- Revision palatoplasty
- Speech prosthesis
- Instructions for post-treatment care and follow-up

V. Outcome Assessment Indices for Velopharyngeal Dysfunction

Indices are used by the specialty to assess aggregate outcomes of care. Outcomes are assessed through clinical evaluation and may include an imaging evaluation.

A. Favorable therapeutic outcomes

- General favorable therapeutic outcomes, as listed in the section entitled General Criteria, Parameters, and Considerations for Cleft and Maxillofacial Surgery
- Reduction of hypernasal speech
- No hyponasal speech
- No adverse impact on the airway
- No adverse impact on swallowing

B. Known risks and complications associated with therapy

- Presence of a general known risk and/or complication, as listed in the section entitled General Criteria, Parameters, and Considerations for Cleft and Maxillofacial Surgery
• Hyponasal speech
• Persistent hypernasal speech
• Obstructive sleep apnea

RESIDUAL CLEFT LIP AND/OR NASAL DEFORMITIES REQUIRING SECONDARY MANAGEMENT

Indications for Therapy for Residual Cleft Lip and/or Nasal Deformities Requiring Secondary Management

• Patient’s and/or family’s desire for improvement of deformities
• Evidence of anatomical and/or functional lip deformities
• Evidence of anatomical and/or functional nasal deformities

Specific Therapeutic Goals for Residual Cleft Lip and/or Nasal Deformities Requiring Secondary Management

• Presence of a general therapeutic goal, as listed in the section entitled General Criteria, Parameters, and Considerations for Cleft and Craniofacial Surgery
• Restoration of lip function and anatomical features
• Restoration of nasal form and/or function

Specific Factors Affecting Risk for Residual Cleft Lip and/or Nasal Deformities Requiring Secondary Management

• Presence of a general factor affecting risk, as listed in the section entitled General Criteria, Parameters, and Considerations for Cleft and Maxillofacial Surgery
• Severity of the secondary cleft lip and/or nasal deformities
• Number of previous operative procedures in the region
• Potential for hypertrophic or keloid scar formation

Indicated Therapeutic Parameters for Residual Cleft Lip and/or Nasal Deformities Requiring Secondary Management

• Cheiloplasty
• Rhinoplasty and nasal revision
• Instructions for post-treatment care and follow-up
Outcome Assessment Indices for Residual Cleft Lip and/or Nasal Deformities Requiring Secondary Management.

A. Favorable therapeutic outcomes

- General favorable therapeutic outcomes, as listed in the section entitled General Criteria, Parameters, and Considerations for Cleft and Maxillofacial Surgery
- Restored lip form and/or function
- Restored nasal form and/or function

B. Known risks and complications associated with therapy

- Presence of a general known risk and/or complication, as listed in the section entitled General Criteria, Parameters, and Considerations for Cleft and Craniofacial Surgery
- Residual lip and/or nasal deformity
- Postsurgical functional or cosmetic lip and/or nasal deformity
- Restricted nasal airway

MAXILLARY ALVEOLAR CLEFT DEFORMITIES

I. Indications for Therapy of Maxillary Alveolar Cleft Deformities

- Clinical and imaging evidence of maxillary alveolar cleft deformity
- Inadequate bone to support erupting teeth
- Inadequate bone for orthodontic correction of dental deformity
- Inadequate ridge for prosthetic reconstruction (eg, implant placement)
- Dental arch collapse
- Oronasal communication
- Nasal deformity and/or inflammation
- Speech abnormalities
- Mobility of the premaxilla

II. Specific Therapeutic Goals for Maxillary Alveolar Cleft Deformities

- Presence of a general therapeutic goal, as listed in the section entitled General Criteria, Parameters, and Considerations for Cleft and Maxillofacial Surgery
- Maxillary alveolar ridge continuity for tooth eruption and indicated orthodontic correction of malocclusions and crossbites
- Alveolar bone support of adjacent teeth
• Restoration of alveolar ridge form
• Elimination of need for prosthetic tooth replacement in cases where teeth are present and can be brought into occlusion
• Stabilization of the premaxilla in bilateral clefts
• Alar base support
• Elimination of oronasal communication and inflammation
• Improved appearance of lip (nasolabial support)
• Improved speech
• Minimal bone graft donor site morbidity

III. Specific Factors Affecting Risk for Maxillary Alveolar Cleft Deformities

• Presence of a general factor affecting risk, as listed in the section entitled General Criteria, Parameters, and Considerations for Cleft and Maxillofacial Surgery
• Number of previous operative procedures involving this region
• Health of the gingiva and periodontium
• Teeth in the cleft region
• Exposed dental roots in the area of the bone graft
• Lack of orthodontic and/or surgical treatment coordination
• Narrow or wide defect and interdental gap
• Lack of adequate healthy cleft adjacent tissue required for closure of defect. Inferior turbinate hypertrophy into the defect
• Age-related factors

IV. Indicated Therapeutic Parameters for Maxillary Alveolar Cleft Deformities

• Maxillary expansion when indicated
• Closure of oronasal fistula with local or distant tissue
• Graft to alveolar cleft
• Stabilization of premaxilla after grafting
• Instructions for posttreatment care and follow-up

V. Outcome Assessment Indices for Maxillary Alveolar Cleft Deformities

A. Favorable therapeutic outcomes

• General favorable therapeutic outcomes, as listed in the section entitled General Criteria, Parameters, and Considerations for Cleft and Maxillofacial Surgery
• Restoration and preservation of anatomical form
• Elimination of the oronasal fistulae
• Primary soft tissue healing
• Healthy periodontal bone and soft tissue support for teeth
• Maintenance of bone
• Improved nasal aesthetics and function
• Ability of the patient to undergo indicated orthodontic treatment
• Minimal donor site morbidity
• Stabilization of the premaxilla
• Adequate bone for implant placement
• Improved speech

B. Known risks and complications associated with therapy

• Presence of a general known risk
• Partial or complete loss of bone graft
• Residual oronasal fistulae
• Lack of adequate periodontal bone and/or soft tissue support
• Soft tissue necrosis
• External root resorption
• Failure of dental eruption into and through graft
• Donor site morbidity
• Collapse of dentoosseous segments
• Loss of vestibular depth
• Inadequate attached gingiva adjacent to teeth in bone graft area

RESIDUAL MAXILLOFACIAL SKELETAL DEFORMITIES REQUIRING SECONDARY MANAGEMENT

Indications for Therapy for Residual Maxillofacial Skeletal Deformities Requiring Secondary Management

- Physical evidence of musculoskeletal, dento-osseous, and/or soft tissue deformity
- Imaging evidence of musculoskeletal, dento-osseous, and/or soft tissue deformity
  - Deviation from cephalometric norms
  - Other imaging disclosure of abnormality
- Malocclusions that cannot be reasonably corrected by orthodontic and/or prosthetic means alone
- Social and psychological impairment
- Masticatory and/or swallowing abnormalities
- Speech pathology (eg, defects in articulation)
- Incomplete correction or unstable result of previous treatment
- Dental and/or periodontal pathology
- Airway obstruction (eg, peripheral obstructive sleep apnea, snoring)
- Chin deformity (eg, microgenia, macrogenia, asymmetry)
- Associated soft tissue deformities (eg, paranasal, labiomental fold, chin-neck contour, nasolabial and melolabial folds)
I. Specific Therapeutic Goals for Residual Maxillofacial Skeletal Deformities Requiring Secondary Management

- Presence of a general therapeutic goal, as listed in the section entitled General Criteria, Parameters, and Considerations for Cleft and Maxillofacial Surgery
- Improved musculoskeletal, dento-osseous, and/or soft tissue relationships
- Improved mastication and/or swallowing
- Improved occlusion
- Improved dental and periodontal health
- Improved appearance
- Improved quality of speech
- Improved airway
- Improved self-esteem
- Closed oronasal fistulae and residual maxillary alveolar cleft
- Stabilization of maxillary segments

II. Specific Factors Affecting Risk for Residual Maxillofacial Skeletal Deformities Requiring Secondary Management

- Presence of a general factor affecting risk, as listed in the section entitled General Criteria, Parameters, and Considerations for Cleft and Maxillofacial Surgery
- Presence and severity of coexisting maxillary and/or mandibular skeletal, dento-osseous, or soft tissue deformities (eg, vertical maxillary hypoplasia, congenital absence of dentition, neuromuscular disorders)
- Presence and severity of localized conditions or disorders (eg, nasal airway)
- Active maxillofacial growth
- Number of previous operations
- Severity of lip, palate, or vestibular scarring
- Presence of parafunctional habits (eg, bruxism, clenching, tongue thrusting, finger sucking)
- Because of the higher incidence of morbidity in orthognathic surgery performed in the cleft patient, evaluation of the following factors is indicated:
  - Presence of a pharyngeal flap
  - Marginal velopharyngeal function
  - Severely scarred soft tissues
  - Unrepaired alveolar cleft and/or oronasal fistulae
  - Nasal septal deformity
  - Number of previous palatal and/or maxillary procedures performed
  - Severity of anterior-posterior discrepancy
  - Tight upper lip and vestibular deformity
  - Status of the dentition
  - Vascular supply to maxilla
  - Bilateral vs unilateral cleft
III. Indicated Therapeutic Parameters for Residual Maxillofacial Skeletal Deformities Requiring Secondary Management

The presurgical evaluation includes, at a minimum, a history, physical examination, and diagnostic records, including a panoramic radiograph, cephalometric radiograph and analysis, photographic documentation, and dental model assessment, and speech evaluation. After evaluation of factors affecting risk, an orthognathic surgical approach should be developed that takes into account the identified risk factors, thereby maximizing favorable outcomes and minimizing known risks and complications.

IV. Outcome Assessment Indices for Residual Maxillofacial Skeletal Deformities Requiring Secondary Management
Indices are used by the specialty to assess aggregate outcomes of care. Outcomes are assessed through clinical evaluation and may include an imaging evaluation.

A. Favorable therapeutic outcomes

• General favorable therapeutic outcomes, as listed in the section entitled General Criteria, Parameters, and Considerations for Cleft and Maxillofacial Surgery
• Permanent improvement in the musculoskeletal, dento-osseous, and/or soft tissue relationships
• Improved function
  o Improved masticatory function (eg, mastication, swallowing, deglutition)
  o Improved speech
  o Improved airway
• Enhanced orthodontic result
• Improved dental and periodontal health
• Improved appearance

B. Known risks and complications associated with therapy

• Presence of a general known risk and/or complication, as listed in the section entitled General Criteria, Parameters, and Considerations for Cleft and Maxillofacial Surgery
• Impaired masticatory function
• Impaired dental occlusion
• Impaired speech
• Deterioration of facial appearance
• Onset or exacerbation of temporomandibular disorders, restricted mandibular range of motion
• Clinically significant neurologic deficit
• Failure of bone to heal (eg, delayed or nonunion)
• Unanticipated loss of teeth, bone, and/or soft tissue
• Dental pathology requiring treatment
• Skeletal relapse
• Onset of parafunctional habits
• Development of hypernasal speech
• Increased incidence of skeletal relapse
• Increased potential for avascular sequelae when maxillary surgery is performed, especially in bilateral cleft with a mobile premaxilla
• Failure to correct oronasal communications
• Creation and/or enlargement of oronasal communications
• Airway obstruction
• Adverse psychological sequelae
REFERENCES

PRIMARY CLEFT LIP DEFORMITIES


PRIMARY CLEFT PALATE DEFORMITIES


VELOPHARYNGEAL INCOMPETENCE


RESIDUAL CLEFT LIP AND/OR NASAL DEFORMITIES REQUIRING SECONDARY MANAGEMENT


MAXILLARY ALVEOLAR CLEFT DEFORMITIES


RESIDUAL MAXILLOFACIAL SKELETAL DEFORMITIES REQUIRING SECONDARY MANAGEMENT


MAXILLARY SINUS SURGERY FOR ODONTOGENIC PATHOLOGY
INTRODUCTION
The maxillary sinus called also Antrum Highmore, is the largest of the paranasal sinuses. Very important for the drainage to the nasal cavity of sinus is fact that the ostium lies in the middle meatus of the nasal cavity, between inferior and middle nasal concha. This is the reason of difficulties in sufficient drainage for self-cleaning. The mucosa of sinuses is susceptible to infectious, allergic and neoplastic diseases. Anatomic position of upper molar and premolar teeth which are in close contact with the sinus predispose the spread of infection from the teeth pulp or periodontium to the sinus. Such a state of infection, when inflammation develops in maxillary sinuses and is caused by teeth is called ODONTOGENIC MAXILLARY SINUSITIS. Odontogenic sinusitis is a well-recognized condition and accounts for approximately 10% to 12% of cases of maxillary sinusitis. An odontogenic source should be considered in patients with symptoms of maxillary sinusitis who give a history positive for odontogenic infection or dentoalveolar surgery or who are resistant to standard sinusitis therapy.

GENERAL CRITERIA, PARAMETERS, AND CONSIDERATIONS FOR MAXILLARY SINUS SURGERY FOR ODONTOGENIC PATHOLOGY

INFORMED CONSENT: All surgery must be preceded by the patient’s or legal guardian’s consent, unless an emergent situation dictates otherwise. These circumstances should be documented in the patient’s record. Informed consent is obtained after the patient or the legal guardian has been informed of the indications for the procedure(s), the goals of treatment, the known benefits and risks of the procedure(s), the factors that may affect the risk, the treatment options, and the favorable outcomes.

PERIOPERATIVE ANTIBIOTIC THERAPY: In certain circumstances, the use of antimicrobial rinses and systemic antibiotics may be indicated to prevent infections related to surgery. The decision to employ prophylactic perioperative antibiotics is at the discretion of the treating surgeon and should be based on the patient’s clinical condition as well as other comorbidities that may be present.

USE OF IMAGING MODALITIES: Imaging modalities may include panoramic radiograph, periapical and/or occlusal radiographs, maxillary and/or mandibular radiographs, computed tomography, cone beam computed tomography, positron emission tomography, positron emission tomography/computed tomography, and magnetic resonance imaging. In determining studies to be performed for imaging purposes, principles of ALARA (as low as reasonably achievable) should be followed.

DOCUMENTATION:
The ultimate judgment regarding the appropriateness of any specific procedure must be made by the individual surgeon in light of the circumstances presented by each patient. Understandably, there may be good clinical reasons to deviate from these parameters. When a surgeon chooses to deviate from an applicable parameter based on the circumstances of a particular patient, he/she is well advised to note in the patient’s record the reason for the procedure followed. Moreover, it should be understood that adherence to the parameters does not guarantee a favorable outcome.

GENERAL THERAPEUTIC GOALS MAXILLARY SINUS SURGERY FOR ODONTOGENIC PATHOLOGY
• Elimination of acute and/or chronic infection
• Limitation or elimination of pain
• Restored anatomical form
• Restored masticatory function
• As an adjunct or to facilitate other restorative procedures
• Preserved vital structures
• Limited period of disability
• Elimination of existing pathology
• Appropriate understanding by patient (family) of treatment options and acceptance of treatment plan
• Appropriate understanding and acceptance by patient (family) of favorable outcomes and known risks and complications
• Prevention of future expected problems (planned radiation therapy, bisphosphonate therapy, or radiation to the jaws)
• Prophylactic treatment when access to care is expected to be limited in the future (eg, military service, service in third world country)

GENERAL FACTORS AFFECTING RISK DURING MAXILLARY SINUS SURGERY FOR ODONTOGENIC PATHOLOGY: Certain general factors will affect the outcome of dentoalveolar surgery. These severity factors increase the risk and the potential for known complications.
• Presence of acute and/or chronic infection
• Presence of coexisting major systemic
• Age of patient
• Presence of local or systemic conditions that may interfere with the normal healing process and subsequent tissue homeostasis (eg, diabetes mellitus, chronic renal disease, liver disease, blood disorder, steroid therapy, immunosuppression, malnutrition, bisphosphonate therapy)
• Degree of patient and/or family understanding of the etiology and natural course of the condition or disorder and therapeutic goals and acceptance of the proposed treatment
• Presence of behavioral, psychological, neurologic, and/or psychiatric disorders, including habits (eg, substance abuse, including tobacco and alcohol), seizure disorders, self-mutilation that may affect surgery, healing, and/or response to therapy
• Degree of patient’s and/or family’s cooperation with and/or adherence to preoperative and postoperative instructions and follow-up
• Location of branches of cranial nerves
• Location of adjacent teeth and adjacent dental restorations
• Presence of associated or adjacent pathologic conditions
• History of or ongoing treatment with radiation, bisphosphonate therapy, or chemotherapy
• History of temporomandibular joint disease or disorder
• History of myofascial pain
• Limited access to oral cavity (eg, trismus, neurologic disorders, inadequate oral orifice)
• Patient decisions regarding regulatory and/or third party rules concerning access to care, indicated therapy, drugs, devices, and/or materials

GENERAL FAVORABLE THERAPEUTIC OUTCOMES FOR MAXILLARY SINUS SURGERY FOR ODONTOGENIC PATHOLOGY:
• Absence of acute and/or chronic infection
• Absence of pain
• Uncomplicated healing of surgical sites
• Restored and/or improved form and function
• Limited period of disability
• Reduced susceptibility to pathologic conditions
• Restoration, retention, and function of previously diseased tooth or teeth
• Absence of neurologic dysfunction (sensory)
• Improved host defenses
• Patient (family) acceptance of procedure and understanding of outcomes

GENERAL KNOWN RISKS AND COMPLICATIONS FOR MAXILLARY SINUS SURGERY FOR ODONTOGENIC PATHOLOGY:
• Unexpected or prolonged pain, swelling, hemorrhage, trismus
• Prolonged period of disability
• Symptoms of temporomandibular joint disease or disorder
• Symptoms of myofascial pain
• Osteomyelitis
• Osteoradionecrosis
• Osteonecrosis of the jaws
• Postoperative wound infection
• Unplanned admission to emergency care facility or hospital after surgery

Comment and Exception: Planned admission should be documented in the patient’s record before surgery.
• Unplanned intubation during the perioperative period

Comment and Exception: Planned intubation should be documented in the patient’s record before surgery.
• Reintubation after surgery or the necessity for a surgically created airway after surgery (for airway impairment)
• Unplanned need for parenteral drugs and fluids

Comment and Exception: Procedures where long-term parenteral drugs and/or fluids are anticipated as part of the original treatment plan should be documented in the patient’s record before surgery.
• Failure to meet procribed discharge criteria within 6 hours of elective surgery

Comment and Exception: Anticipated delays in discharge should be documented preoperatively.
• Facial and/or trigeminal nerve dysfunction after surgery (eg, anesthesia, paresthesia of the lips, teeth, chin, or tongue)

Comment and Exception: When postoperative nerve dysfunction is a known risk, anticipated deficits should be documented in the patient’s record before surgery (eg, trigeminal nerve dysfunction after removal of a third molar documented to be close to nerves).
• Maxillary or mandibular fracture during or after surgery

Comment and Exception: A fractured bone that may be a sequela to surgery should be documented in the patient’s record before surgery.
• Unplanned Caldwell-Luc, bronchoscopy, or other exploratory procedures associated with surgery
• Dental injury and/or damage to adjacent dental restorations during surgery

Comment and Exception: When the likelihood of dental injury is possible, it should be documented in the patient’s record before surgery.
• Ocular injury during surgery
• Unanticipated tissue loss or damage to adjacent vital structures
• Repeat Oral and/or Maxillofacial Surgery

Comment and Exception: Staged procedures that are part of the original treatment plan should be documented before the initial procedure.
• Core temperature of greater than 101°F during the first 72 hours
• Presence of foreign body after surgery
Comment and Exception: Implanted materials that are anticipated as a normal course of the surgical procedures should be documented in the patient record.

- Unplanned transfusion(s) of blood or blood components during or after surgery
- Compromised airway
- Adverse systemic sequelae (eg, septicemia, endocarditis)
- Respiratory and cardiac arrest
- Death

Comment and Exception: Admissions for terminal care must be documented.

ODONTOGENIC SINUSITIS

I. Indications for Therapy for Odontogenic Sinusitis

A. Clinical or physical findings

- Pain
- Swelling
- Soft tissue induration
- Erythema
- Lymphadenitis
- Trismus
- Purulence
- Fistula
- Nonvital pulp of tooth
- Carious tooth
- Fractured tooth
- Tooth mobility
- Fetor
- Malaise
- Fever
- Chills
- Diaphoresis
- Dyspnea
- Dysphagia
- Altered function
- Altered sensation
- Soft tissue necrosis (eg, necrotizing fasciitis)
- Systemic sepsis
- Disseminated infection (eg, prosthetic cardiac valve)

B. Diagnostic imaging findings

- Dental caries
- Periodontal bone loss
- Fractured tooth or tooth root
- Internal resorption or external resorption of tooth
- Periapical radiolucency (eg, osteolytic process)
- Widening of periodontal ligament space
- Sclerosis or reactive bone
- Osteolytic area (eg, cystic, bone radiolucency, or degeneration not associated with a tooth)
- Antral wall destruction or thickening
- Gas spaces in soft tissue
• Soft tissue mass, fluid loculation, and/or abscess cavity

C. Laboratory findings
• Abnormal complete blood cell count, differential count, sedimentation rate, serum electrolytes, glucose, arterial blood gas
• Positive microbiologic culture (eg, blood, purulence)
• Positive Gram stain
• Elevated temperature

II. Specific Therapeutic Goals for Odontogenic Sinusitis
Presence of a general therapeutic goal
• Prevention of recurrence

III. Specific Factors Affecting Outcomes From Odontogenic Sinusitis
• Presence of a general factor affecting risk
• Extent of infection (eg, localized, diffuse)
• Direction and/or rate of extension of infection
• Presence of impending airway obstruction
• Susceptibility of organism to antibiotics
• Virulence of organism
• Presence of generalized periodontitis
• Presence of inadequate oral hygiene
• Presence of dental crowding or malocclusion
• Proximity to contiguous structures
• Presence of foreign bodies or implanted materials
• Dental management objectives that are altered and/or adversely affected by therapy

IV. Indicated Therapeutic Parameters for Odontogenic Sinusitis
• Establishment of airway
• Elimination of source (removal of tooth, endodontic treatment, periodontal therapy, etc)
• Incision and drainage (intraorally and/or extraorally of the maxillofacial region)
• Aspiration
• Pain control
• Irrigation and debridement
• Identification of organism (eg, Gram stain, aerobic and anaerobic organism culture and sensitivity testing, culture acid-fast bacilli and fungi) when indicated
• Assessment and support of host defenses (eg, local measures, antipyretics, nutritional support, and hydration, hyperbaric oxygen treatment)
• Antimicrobial therapeutic management, if indicated (systemic or local therapy)
• Assessment and management of systemic involvement (eg, sepsis)
• Assessment and management of coexisting systemic disease (eg, diabetes mellitus)
• Instructions for posttreatment care and follow-up

V. Outcome Assessment Indices for Odontogenic Sinusitis
A. Favorable therapeutic outcomes
• General favorable therapeutic outcomes
• Absence of local or systemic signs and/or symptoms of infection
• Absence of unanticipated tissue loss
• Restored form and function
• Improved host defenses
• Limited period of disability
B. Known risks and complications associated with therapy

- Presence of a general known risk and/or complication
- Persistence or extension of infection (intracranial extension, e.g., sinusitis, cavernous sinus thrombosis, osteomyelitis, mediastinitis)
- Airway impairment
- Tissue loss or damage to adjacent vital structures
- Adverse systemic sequelae (e.g., septicemia, endocarditis), which could lead to organ failure and death
- Adverse drugs reactions or interaction with existing therapeutic drug regimens
- Facial, neck scarring, or keloid formation with need for secondary revision surgery
- Nerve injury secondary to the infection or the surgical intervention
- Fracture of the maxilla or mandible
- Onset or exacerbation of symptom(s) related to the temporomandibular joint (TMJ) and surrounding structures

OROANTRAL COMMUNICATION

- Indications for Therapy of Oroantral Communication
  - Impaired masticatory function, speech, and/or swallowing
  - Malocclusion
  - Nutritional deficiencies
  - Inadequate bone support for soft tissue, oral and maxillofacial structures, teeth, and prosthetic appliances
  - Obstructed airway
  - Oronasal, oroantral, and/or oral-orbital communication
  - Quantitative or qualitative soft tissue deficiencies (e.g., cheeks, lips)
  - Impaired functional mobility (e.g., scar contracture)
  - Facial asymmetry and disfigurement
  - Drooling
  - Orocutaneous fistula
  - Nutritional deficiencies
  - Provision of soft tissue coverage of vital structures (e.g., eyes, paranasal sinuses)
  - Facial asymmetry and disfigurement
  - Soft tissue dehiscence with exposure of bone plate or bone graft
  - Periodontal disease
  - Mucocutaneous and systemic pathology
  - Presence of foreign bodies

- Specific Therapeutic Goals for Oroantral Communication
  - Presence of a general therapeutic goal, as listed in the section entitled General Criteria, Parameters, and Considerations for Reconstructive Surgery
  - Improved functional mobility
  - Improved swallowing and prevention of aspiration and/or regurgitation
  - Improved facial symmetry
  - Adequate coverage of vital structures
  - Closure of oroantral fistulae
  - Improved appearance
  - Identification of occult or previously unrecognized disease during therapy
• Improved masticatory and/or prosthetic function
• Improved speech
• Improved nutrition
• Improved airway
• Closure of oronasal, oroantral, and/or cutaneous fistulae
• Improved environment for maintenance of periodontal health
• Diagnosis and control of mucocutaneous diseases and systemic disease
• Corrected or limited effects of abnormal growth

• Specific Factors Affecting Risk for Oroantral Communication
  o Presence of a general factor affecting risk
  o Compromises in the health and positioning of remaining teeth or bone
  o Functional deficiencies in mastication and/or swallowing
  o Presence of muscular disorders
  o Airway compromise (eg, presence of obstructive sleep apnea syndrome, tumors)
  o Abnormal speech (eg, presence or absence of hypernasal or hyponasal speech, velopharyngeal incompetence, articulatory speech dysfunction, tongue volume and immobility)
  o Compromised osseous and/or soft tissue anatomy

• Indicated Therapeutic Parameters for Oroantral Communication
  o Access for repair
    ▪ Transoral
  o Modalities for repair
    ▪ Soft tissue reconstruction of oroantral communication
      o Buccal fat pad flaps
      o Adjacent local soft tissue flaps (Palatal, Buccal)
      o Membranes
    ▪ Soft tissue
      o Local flaps
        ▪ Regional flaps
      o Microvascular flaps (eg, radial forearm flap)
      o Full- or split-thickness skin and mucosal grafts
      o Tissue expanders
    ▪ Hard tissue
      o Autogenous bone
        ▪ Free grafts
          ▪ Ilium (eg, anterior and posterior)
          ▪ Tibial, maxillofacial (eg, mandible) for alveolar or maxillary sinus reconstruction before prosthetic and/or implant rehabilitation
        ▪ Rib
        ▪ Osteomyocutaneous pedicle flaps
      o Microvascular flaps
        ▪ Fibula
        ▪ Osteomyocutaneous
      o Alloplastic materials
        ▪ Metallic plates, screws, and trays
- Synthetic bone substitutes
- Guided tissue regeneration materials
- Polymeric materials
- Xenogeneic bone (e.g., bovine bone)
- Bone morphogenetic protein
- Implant placement and/or prosthetic reconstruction
- Adjunctive therapy
  - Fixation and/or stabilization of skeletal segments
  - Hyperbaric oxygen
  - Growth factors (e.g., fibrin adhesive, autologous platelet-rich plasma)
- Fixation and/or stabilization devices
  - Rigid internal plates
  - Wire osteosynthesis
  - Maxillomandibular fixation
  - Intraoral splints
- Instructions for post treatment care and follow-up

**Outcome Assessment Indices for Defects of Oroantral Communication**
- Favorable therapeutic outcomes
  - General favorable therapeutic outcomes
  - Replaced missing hard tissue
  - Improved maxillary function, mastication, speech, swallowing, nutritional status, and/or airway
  - Replaced missing or qualitatively deficient soft tissue
  - Improved functional mobility
  - Improved swallowing and prevention of aspiration and/or regurgitation
  - Adequate coverage of vital structures
  - Closure of orocutaneous fistulae
  - Control secretions
  - Identification of occult or previously unrecognized disease during therapy
  - Improved environment for maintenance of periodontal health
- Diagnosis and control of mucocutaneous diseases and systemic disease
- Corrected or limited effects of abnormal growth and development
- Known risks and complications associated with therapy
  - Presence of a general known risk and/or complication, as listed in the section entitled General Criteria, Parameters, and Considerations for Reconstructive Surgery
  - Recipient site
    - Oroantral and/or nasal communication
    - Inability to wear a prosthetic appliance
  - Specific known risks and complications for selected commonly used donor sites:
    - Ilium
      - Persistent gait disturbance
      - Hernia
      - Ileus
      - Peritonitis
      - Retroperitoneal hematoma
- Rib
  - Pneumothorax and/or hemothorax
  - Chondritis
- Fibula free flap
  - Persistent gait disturbance
  - Knee and/or angle instability
  - Excessive scarring and/or donor site cosmetic defects
  - Neurologic disturbance
  - Compartment syndrome
  - Extremity ischemia
- Radial forearm free flap
  - Excessive scarring and/or donor site cosmetic defects
  - Fine motor disturbances
  - Neurologic disturbance
  - Compartment syndrome
  - Extremity ischemia
  - Excessive scarring and/or donor site cosmetic defects
  - Upper extremity range of motion disturbance
SELECTED REFERENCES

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.

ODONTOGENIC SINUSITIS

OROANTRAL COMMUNICATION
MANAGEMENT OF TMJ PATHOLOGY, INCLUDING TMJ SURGERY
GENERAL CRITERIA, PARAMETERS, AND CONSIDERATIONS FOR TEMPOROMANDIBULAR JOINT SURGERY

INFORMED CONSENT:
• All surgery must be preceded by the patient’s or legal guardian’s consent, unless an emergent situation dictates otherwise.
• These circumstances should be documented in the patient’s record.
• Informed consent is obtained after the patient or the legal guardian has been informed of the indications for the procedure(s), the goals of treatment, the known benefits and risks of the procedure(s), the factors that may affect the risk, the treatment options, and the favorable outcomes.

PERIOPERATIVE ANTIBIOTIC THERAPY:
• In certain circumstances, the use of antimicrobial rinses and systemic antibiotics may be indicated to prevent infections related to surgery.
• The decision to employ prophylactic perioperative antibiotics is at the discretion of the treating surgeon and should be based on the patient’s clinical condition as well as other comorbidities which may be present.

USE OF IMAGING MODALITIES:
• Imaging modalities may include panoramic radiograph, periapical and/or occlusal radiographs, maxillary and/or mandibular radiographs, computed tomography, cone beam computed tomography, positron emission tomography, positron emission tomography/computed tomography, and magnetic resonance imaging

DOCUMENTATION:
Documentation includes objective findings, diagnoses, and patient management interventions. The ultimate judgment regarding the appropriateness of any specific procedure must be made by the individual surgeon in light of the circumstances presented by each patient. Understandably, there may be good clinical reasons to deviate from these parameters. When a surgeon chooses to deviate from an applicable parameter based on the circumstances of a particular patient, he/she is well advised to note in the patient’s record the reason for the procedure followed. Moreover, it should be understood that adherence to the parameters does not guarantee a favorable outcome.

GENERAL THERAPEUTIC GOALS FOR TEMPOROMANDIBULAR JOINT SURGERY:
• Improve function and form
• Limited period of disability
• Improved range of jaw motion and/or function
• Appropriate understanding by patient (family) of treatment options and acceptance of treatment plan
• Appropriate understanding and acceptance by patient (family) of favorable outcomes and known risks and complications

GENERAL FACTORS AFFECTING RELATIVE RISK DURING TEMPOROMANDIBULAR JOINT SURGERY:
• Degree of patient and/or family understanding of the origin and natural course of the condition or disorder and therapeutic goals and acceptance of proposed treatment
• Presence of coexisting major systemic disease
• Age of patient
• Presence of concomitant facial pain (eg, dental pain, earache, headache)
• Presence of parafunctional habit
• Existing drug or alcohol dependence
• Issues of secondary gain (eg, pending litigation)
• Chronic pain disorders (eg, pain in excess of 6 months duration)
• Presence of malocclusion
• Presence of deformity or pathology of the TMJ
• Presence of concomitant skeletal deformity
• History of previous orthodontics, orthognathic surgery, or TMJ surgery
• History of sensory or motor nerve abnormality (eg, temporary or permanent)
• History of infection of surgical site
• Presence of local or systemic conditions that may interfere with the normal healing process and subsequent tissue homeostasis (eg, previously irradiated tissue, diabetes mellitus, chronic renal disease, liver disease, blood disorder, pregnancy, steroid therapy, contraceptive medication, immunosuppression, malnutrition, Ehlers-Danlos syndrome, fibromyalgia)
• Prolonged period of TMJ disuse (eg, ankylosis)
• History of maxillofacial trauma

GENERAL FAVORABLE THERAPEUTIC OUTCOMES FOR TEMPOROMANDIBULAR JOINT SURGERY:
• Improved masticatory function and facial form
• A level of pain that is of little or no concern to the patient and preferably measured objectively (eg, visual analog scale)
• Improved mandibular function that is compatible with mastication, deglutition, speech, and oral hygiene
• A stable occlusion
• Limited period of disability
• Limit further morbidity
• Patient (family) acceptance of procedure and understanding of outcomes

GENERAL KNOWN RISKS AND COMPLICATIONS OF TEMPOROMANDIBULAR JOINT SURGERY:
• Unplanned admission to intensive care unit after elective surgery
  * Comment and Exception: Planned admission should be documented in the patient’s record before surgery.
• Unplanned intubation for longer than 12 hours after surgery
  * Comment and Exception: Planned intubation longer than 12 hours should be documented in the patient’s record before surgery.
• Reintubation or tracheostomy after surgery
• Emergency tracheostomy (eg, ankylosis, trismus, unable to maintain airway).
• Use of parenteral drugs and/or fluids for longer than 72 hours after elective surgery
  *Comment and Exception: Procedures in which long-term parenteral drugs and/or fluids are indicated as part of the original treatment plan should be documented in the patient’s record.
• Failure to ambulate within 48 hours of elective surgery
• Facial and/or trigeminal nerve dysfunction after surgery (eg, temporary or permanent facial muscle weakness resulting from surgery). The most common resulting problems are an inability to wrinkle the brow, raise the eyebrow, or gain tight closure of the eyelids and numbness (temporary or permanent) of certain areas of the skin in the region of the joint and sometimes in more remote areas of the face and scalp.
Comment and Exception: When postoperative nerve dysfunction is common, anticipated deficits should be noted in the patient’s record before surgery (eg, trigeminal nerve dysfunction after sagittal split osteotomies, dysfunction of the temporal branch of facial nerve after TMJ procedures).

- Facial fracture during or after surgery
  * Comment and Exception: A fractured bone that may be a sequela to surgery should be documented in the patient’s record before surgery.
- Unplanned exploratory procedures associated with surgery
- Dental injury during surgery
- Ocular injury during surgery and postoperative sequelae (eg, corneal abrasion, keratoconjunctivitis, blindness)

Repeat Oral and/or Maxillofacial Surgery
* Comment and Exception: Staged procedures that are part of the original treatment plan should be documented before the initial procedure.
- Core temperature of greater than 101°F 72 hours after elective surgery
- Postsurgical radiograph indicating presence of foreign body
  * Comment and Exception: Foreign bodies (eg, plates, screws, wires, prosthetic replacements) that are anticipated as a normal course of the surgical procedures (eg, total joint replacement) should be noted in the patient’s record.
- Unplanned transfusion(s) of blood or blood components during or after surgery
- Readmission for complications or incomplete management of problems on previous hospitalization
  * Comments and Exceptions:
    - Complication or incomplete management occurring at another hospital or involving a physician who is not on the medical staff.
    - Readmission for chronic disease (eg, intractable asthma, recurrent congestive heart failure, cancer); service-specific criteria required for this exception.
    - Planned admissions for secondary procedures needed to complete treatment.
    - Development of chronic pain disorder
    - Increased and/or persistent pain
    - Post-operative development of adhesions, heterotopic bone (reactive bone), or ankylosis within the joint space, which may cause continued jaw dysfunction, decreased range of jaw movement, difficulty chewing, and pain requiring further treatment
    - Development of TMJ internal derangement
    - New or worsened malocclusion
    - Imaging evidence of further degenerative joint changes and development of adhesions (scar tissue), joint arthritis (contralateral joint in unilateral cases), or osteomyelitis of the jaw (bone infection)
    - Significant joint noise associated with increased pain and/or dysfunction
    - Ear pain and/or dysfunction
    - Development

- Abnormal mandibular growth (eg, excessive, restricted)
- Prolonged period of disability
- Infection
- Development of complex regional pain syndrome
- Foreign body reaction or allergic reaction and rejection of the implant, wear, displacement, breakage, or loosening of alloplastic device components
• Ear problems, including inflammation of the canal, middle or inner ear infections, perforation of the ear drum, temporary or permanent hearing loss, ringing in the ears, or equilibrium problems
• Post-operative and/or future treatments are not limited to but may include the following: physical therapy, bite splint therapy, restorative or reconstructive dentistry, orthodontia, orthognathic surgery (jaw repositioning surgery), and further reconstructive TMJ surgery
• Respiratory and/or cardiac arrest
• Death

MASTICATORY MUSCLE DISORDERS
Masticatory muscle disorders can result in myofascial pain and/or muscle splinting. These disorders are the most common expression of temporomandibular disorders and may occur in combination with joint abnormalities or other pathologic conditions. Management of these disorders is nonsurgical, especially in children. When masticatory muscle disorders occur in combination with joint abnormalities or other pathologic conditions, the management of these disorders must be incorporated into the overall treatment plan. Pre-treatment therapeutic goals are determined individually for each patient.

I. Indications for Therapy for Masticatory Muscle Disorders
• Extra-articular pain related to muscles of the head and neck region
• Earaches, headaches, masticatory or facial myalgias
• Restricted masticatory function
• Restricted range of jaw motion
• Associated TMJ abnormalities or pathology

II. Specific Therapeutic Goals for Masticatory Muscle Disorders
• Presence of a general therapeutic goal, as listed in the section entitled General Criteria, Parameters, and Considerations for Temporomandibular Joint Surgery
• Improved range of jaw motion and/or function
• Adequate control of pain in muscles of the head and neck region

III. Specific Factors Affecting Risk for Masticatory Muscle Disorders
• Presence of a general factor affecting risk, as listed in the section entitled General Criteria, Parameters, and Considerations for Temporomandibular Joint Surgery
• History of previous maxillofacial trauma

IV. Indicated Therapeutic Parameters for Masticatory Muscle Disorders
Some reduction in symptoms is expected within 3 months. If the symptoms persist or escalate during this period, further assessment of contributing etiologic and risk factors should be considered.
• The pretreatment assessment includes, at a minimum:
  o General history and physical examination
  o A focused history and physical examination of the TMJ region to determine if pathology is present
  o An imaging examination, if indicated, based on the history and physical findings. The examination may include but is not limited to the following: screening panoramic radiography, cephalometric radiography, conventional tomography, arthrography, computed tomography (CT), cone beam computed tomography, and magnetic resonance imaging (MRI).
The following procedures for the management of masticatory muscle disorders are not listed in order of preference:

Nonsurgical Management
- Patient education (eg, stress reduction, dietary recommendations, jaw rest, control of parafunctional jaw habits)
- Medication (eg, nonsteroidal anti-inflammatory drugs [NSAIDs], analgesics, muscle relaxants)
- Physical medicine (eg, physical therapy, massage, heat, cold, ultrasonography, trigger point injections, neuromuscular blocking agents)
- Behavioral modification (eg, stress reduction, work modification, counseling, biofeedback, psychotherapy)
- Orthopedic appliances (eg, splints)
- Management of dental abnormalities
- Surgery, other than manipulative treatment therapy, is not indicated for these disorders.
- Instructions for posttreatment care and follow-up

IV. Outcome Assessment Indices for Masticatory Muscle Disorders
Indices are used by the specialty to assess aggregate outcomes of care. Outcomes are assessed through clinical evaluation and may include an imaging evaluation.
- Favorable therapeutic outcomes General favorable therapeutic outcomes, as listed in the section entitled General Criteria, Parameters, and Considerations for Temporomandibular Joint Surgery
- Known risks and complications associated with therapy Presence of a general known risk and/or complication, as listed in the section entitled General Criteria, Parameters, and Considerations for Temporomandibular Joint Surgery

INTERNAL DERANGEMENT
Surgical intervention for internal derangement is indicated only when nonsurgical therapy has been ineffective and pain and/or dysfunction are moderate to severe. Surgery is not indicated for asymptomatic or minimally symptomatic patients. Surgery also is not indicated for preventive reasons in patients without pain and with satisfactory function. Pretreatment therapeutic goals are determined individually for each patient.

I. Indications for Therapy for Internal Derangement
May include one or more of the following:
- Moderate-to-severe pain
  - Temporomandibular pain
  - Preauricular pain
  - Referred pain (eg, earaches)
  - Masticatory muscle pain
- Dysfunction that is disabling and characterized by any of the following:
  - Restricted range of jaw motion (eg, locking of the joint: acute, chronic, intermittent, persistent)
  - Excessive range of jaw motion (eg, hypermobility; chronic dislocation: acute, chronic, intermittent, persistent)
  - Joint noises (eg, clicking, popping, crepitation) associated with pain
  - Abnormal masticatory function (eg, painful chewing)
- Imaging evidence of internal derangement
- Arthroscopic evidence of internal derangement

II. Specific Therapeutic Goals for Internal Derangement
The goal of therapy is to restore form and/or function. However, risk factors and potential complications may preclude complete restoration of form and/or function.

- Presence of a general therapeutic goal
- Improved function
- Limited pain in the joint
- Elimination or reduction of noise in the joint

### III. Specific Factors Affecting Risk for Internal Derangement
- Presence of a general factor affecting risk
- Presence of alloplast or autograft
- History of previous temporomandibular operative procedures
- History of previous maxillofacial trauma

### IV. Indicated Therapeutic Parameters for Internal Derangement

#### The pretreatment assessment includes, at a minimum:
- General history and physical examination
- A focused history and physical examination of the TMJ region to determine the presence of indications for care for internal derangement and to identify factors affecting risks
- An imaging examination, if indicated, based on the history and physical findings. The examination may include but is not limited to the following: panoramic radiography, cephalometric radiography, conventional tomography, CT, cone beam computed tomography, and/or MRI.

#### The following procedures for the management of internal derangement are not listed in order of preference:

- **Nonsurgical management**
  - Patient education (eg, stress reduction, dietary recommendations, jaw rest)
  - Medication (eg, NSAIDs, analgesics, muscle relaxants)
  - Physical medicine (eg, physical therapy, massage, heat, cold, ultrasonography, trigger point injections)
  - Intracapsular diagnostic and therapeutic injections
  - Behavioral modification (eg, stress reduction, work modification, counseling)
  - Orthopedic appliances (eg, splints)
  - Management of dental abnormalities
  - Diagnostic records to determine progression of the disease (eg, serial bite registration and models, imaging studies in selected cases)

- **Surgical management**
  - Examination and observation under anesthesia
  - Manipulation
  - Arthrocentesis
  - Arthroscopic surgery

- **Posttreatment management**
  - Wound care
  - Physical therapy
  - Pain management
  - Diet and oral hygiene management
  - Orthotic appliance
Patient reassessment

Instructions for posttreatment care and follow-up

V. Outcome Assessment Indices for Internal Derangement

- Favorable therapeutic outcomes
  - General favorable therapeutic outcomes, as listed in the section entitled General Criteria, Parameters, and Considerations for Temporomandibular Joint Surgery
  - Improved mandibular function
  - Acceptable clinical appearance (e.g., absence of motor deficits, absence of hypertrophic scar formation, absence of facial asymmetry or deformity)

- Known risks and complications associated with therapy
  - Presence of a general known risk and/or complication
  - Removal of autograft or alloplast
  - Ankylosis
  - Need for additional surgical intervention

DEGENERATIVE JOINT DISEASE

Surgical intervention is indicated only when nonsurgical therapy has been ineffective and pain and/or dysfunction are moderate to severe. Surgery is not indicated for asymptomatic or minimally symptomatic patients. Surgery also is not indicated for preventive reasons in patients without pain and with satisfactory function. Pretreatment therapeutic goals are determined individually for each patient.

I. Indications for Therapy of Degenerative Joint Disease

- Moderate-to-severe pain
  - Temporomandibular pain
  - Preauricular pain
  - Referred pain (e.g., earaches)
  - Masticatory muscle pain

- Dysfunction that is disabling and characterized by any of the following:
  - Restricted range of jaw motion (e.g., locking of the joint: acute, chronic, intermittent, persistent)
  - Excessive range of jaw motion (e.g., hypermobility; chronic dislocation: acute, chronic, intermittent, and persistent)
  - Joint noises (e.g., clicking, popping, crepitation)
  - Abnormal masticatory function (e.g., painful chewing)

- Imaging evidence of arthritic condition
- Arthroscopic evidence of arthritic condition
- Failed alloplastic implants
- Failed prior TMJ surgery

II. Specific Therapeutic Goals for Degenerative Joint Disease

- Presence of a general therapeutic goal
- Improved function
- Improved pain in the joint
- Improved maxillomandibular relationship
- Limited progression of the disease
III. Specific Factors Affecting Risk for Degenerative Joint Disease

- Presence of a general factor affecting risk, as listed in the section entitled General Criteria, Parameters, and Considerations for Temporomandibular Joint Surgery
- Presence of an alloplast or autograft
- History of previous maxillofacial trauma
- Degenerative disease affecting other joints
- Prior temporomandibular joint surgery

IV. Indicated Therapeutic Parameters for Degenerative Joint Disease

- The pretreatment assessment includes, at a minimum:
  - General history and physical examination
  - Focused history and physical examination of the TMJ region to determine the presence of indications for care for degenerative joint disease and to identify factors affecting risks
  - An imaging examination, if indicated, based on the history and physical findings. The examination may include but is not limited to the following: panoramic radiography, cephalometric radiography, conventional tomography, arthrography, CT, cone beam computed tomography, radionuclide scanning, and/or MRI.

- The following procedures for the management of degenerative joint disease are not listed in order of preference:

  - Nonsurgical management
    - Patient education (eg, stress reduction, dietary recommendations, jaw rest)
    - Medication (eg, NSAIDs, analgesics, muscle relaxants, antiarthritics, steroids)
    - Physical medicine (eg, physical therapy, massage, heat, cold, ultrasonography, trigger point injections)
    - Intracapsular diagnostic and therapeutic injections
    - Behavioral modification (eg, stress reduction, work modification, counseling)
    - Orthopedic appliances (eg, splints)
    - Management of dental abnormalities
    - Appropriate diagnostic records to determine progression of the disease (eg, serial bite registration and models, imaging studies in selected cases)

  - Surgical management
    - Manipulation
    - Arthrocentesis

  - Posttreatment management
    - Wound care
    - Pain management
    - Diet and oral hygiene management
    - Physical therapy
    - Occlusal management

  - Patient reassessment
  - Instructions for posttreatment care and follow-up

V. Outcome Assessment Indices for Degenerative Joint Disease

Indices are used by the specialty to assess aggregate outcomes of care. Outcomes are assessed through clinical evaluation and may include an imaging evaluation.

- Favorable therapeutic outcomes
  - General favorable therapeutic outcomes
• Acceptable clinical appearance (eg, absence of motor deficits, absence of hypertrophic scar formation, absence of facial asymmetry or deformity)
• Improved mandibular function (eg, maximum incisal opening, lateral and protrusive excursions)

• Known risks and complications associated with therapy
  o Presence of a general known risk and/or complication
  o Removal of autograft or alloplast
  o Ankylosis

**RHEUMATOID ARTHRITIS**
Rheumatoid arthritis is one of a constellation of systemic autoimmune diseases that may affect the TMJ. In many cases, these conditions should be managed with the close cooperation of the patient’s physician and/or rheumatologist. It is important to distinguish whether the condylar resorption is active (progressive) or stable (nonprogressive). In its most severe form, rheumatoid arthritis may result in ankylosis and/or condylar destruction with resultant mandibular retrognathism, anterior skeletal open bite, and painful limitation of function. Surgical intervention for arthritic conditions is indicated only when nonsurgical therapy has been ineffective and pain and/or dysfunction are moderate to severe. Surgery is not indicated for asymptomatic or minimally symptomatic patients. Surgery also is not indicated for preventive reasons in patients without pain and with satisfactory function. Pretreatment therapeutic goals are determined individually for each patient.

I. Indications for Therapy for Rheumatoid Arthritis
• Moderate-to-severe pain
  o Temporomandibular pain
  o Preauricular pain
  o Referred pain (eg, earaches)
  o Masticatory muscle pain

• Dysfunction that is disabling and characterized by any of the following:
  o Restricted range of jaw motion (eg, locking of the joint: acute, chronic, intermittent, persistent)
  o Excessive range of jaw motion (eg, hypermobility, chronic dislocation: acute, chronic, intermittent, persistent)
  o Joint noises (eg, clicking, popping, crepitation)
  o Abnormal masticatory function (eg, painful chewing, malocclusion)
  o Joint swelling and/or effusion

• Imaging evidence of arthritic process
• Maxillofacial deformity

II. Specific Therapeutic Goals for Rheumatoid Arthritis
• Presence of a general therapeutic goal, as listed in the section entitled General Criteria, Parameters, and Considerations for Temporomandibular Joint Surgery
• Limited pain in the joint
• Improved maxillomandibular function
• Corrected or improved associated maxillofacial relationship
• Limited progression of the disease

III. Specific Factors Affecting Risk for Rheumatoid Arthritis
• Presence of a general factor affecting risk, as listed in the section entitled General Criteria, Parameters, and Considerations for Temporomandibular Joint Surgery
• Active process of resorption
• Ankylosis
• Presence of alloplast or autograft
• Rheumatoid disease affecting other joints

IV. Indicated Therapeutic Parameters for Rheumatoid Arthritis
• The pretreatment assessment includes, at a minimum:
  o General history and physical examination
  o Focused history and physical examination of the TMJ region to determine the presence of indications for care for rheumatoid arthritis and to identify factors affecting risks
  o Appropriate laboratory studies to confirm the diagnosis of rheumatoid arthritis
  o An imaging examination, if indicated, based on the history and physical findings. The examination may include but is not limited to the following: panoramic radiography, cephalometric radiography, conventional tomography, arthrography, CT, cone beam computed tomography, and/or MRI.
  o Appropriate diagnostic records to determine progression of the disease (eg, serial bite registration and models, imaging studies, laboratory studies)

The following procedures for the management of rheumatoid arthritis are not listed in order of preference:

Nonsurgical management
• Patient education (eg, stress reduction, dietary recommendations, jaw rest)
• Medication (eg, NSAIDs, analgesics, muscle relaxants, antiarthritis, steroids)
• Physical medicine (eg, physical therapy, massage, heat, cold, ultrasonography, trigger point injections)
• Intracapsular diagnostic and therapeutic injections
• Behavioral modification (eg, stress reduction, work modification, counseling, biofeedback, psychotherapy)
• Orthopedic appliances (eg, splints)
• Management of dental abnormalities
• Appropriate diagnostic records to determine progression of the disease (eg, serial bite registration and models, imaging studies in selected cases)

Surgical management
• The activity of the systemic disease must be considered prior to surgical management of the TMJ.
• Active (progressive) TMJ disease
• Arthrocentesis
• Stable (nonprogressive) TMJ disease
• Arthrocentesis

Post-treatment management
• Wound care
• Pain management
• Diet and oral hygiene management
• Physical therapy
• Ongoing rheumatologic management
• Occlusal management
• Patient reassessment
• Instructions for posttreatment care and follow-up

V. Outcome Assessment Indices for Rheumatoid Arthritis
• Favorable therapeutic outcomes
  o General favorable therapeutic outcomes
  o Acceptable clinical appearance (eg, absence of motor deficits, absence of hypertrophic scar formation, absence of facial asymmetry or deformity)
  o Improved mandibular function (eg, maximum incisal opening, lateral and protrusive excursions)

• Known risks and complications associated with therapy
  o Presence of a general known risk and/or complication, as listed in the section entitled General Criteria, Parameters, and Considerations for Temporomandibular Joint Surgery
  o Removal of autograft or alloplast
  o Ankylosis

INFECTIONOUS ARTHRITIS
The management of infectious arthritis depends on whether the condition is acute or chronic and primary or secondary.
Treatment objectives are directed toward the elimination of causes.
Surgical intervention for infectious arthritis is indicated only when nonsurgical therapy has been ineffective and pain and/or dysfunction are moderate to severe. Pretreatment therapeutic goals are determined individually for each patient.

I. Indications for Therapy for Infectious Arthritis
• Evidence of localized or systemic infection

• Moderate-to-severe pain
  o Temporomandibular pain
  o Preauricular pain
  o Referred pain (eg, earaches)
  o Masticatory muscle pain

• Dysfunction that is disabling and characterized by any of the following:
  o Restricted range of jaw motion (eg, hypomobility: acute, chronic, intermittent, persistent)
  o Joint noises (eg, crepitation)
  o Abnormal masticatory function (eg, painful chewing, malocclusion)
  o Swelling, erythema, suppuration, and/or joint effusion
• Imaging evidence of infectious process, failed prosthesis, or foreign body
• Maxillofacial deformity

II. Specific Therapeutic Goals for Infectious Arthritis
• Presence of a general therapeutic goal
• Elimination of infection
• Removal of any foreign body
• Alleviation or reduction of pain in the joint
• Elimination or reduction of noise in the joint
• Limited progression of disease
• Corrected malocclusion
• Corrected or improved associated maxillofacial deformity

III. Specific Factors Affecting Risk for Infectious Arthritis
• Presence of a general factor affecting risk
• Compromised host defenses
• Presence of alloplast or autograft
• Extent of infection

IV. Indicated Therapeutic Parameters for Infectious Arthritis

The source of the infection (eg, extension of an otologic infection), systemic manifestations of the infection (eg, septicemia), presence of systemic disease (eg, diabetes mellitus), and host response (eg, human immunodeficiency virus infection, immunosuppression) all must be considered before surgical management of the infected TMJ.

• The pretreatment assessment includes, at a minimum:
  o General history and physical examination
  o Focused history and physical examination of the TMJ region to determine the presence of indications for care for infectious arthritis and to identify factors affecting risks
  o Appropriate laboratory studies to confirm the diagnosis of infectious arthritis (eg, white blood cell count by serum or aspiration, Gram stain, bacterial culture, and sensitivity)
  o An imaging examination, if indicated, based on the history and physical findings. The examination may include but is not limited to the following: panoramic radiography, cephalometric radiography, conventional tomography, arthrography, CT, cone beam computed tomography, and/or MRI.

The following procedures for the management of infectious arthritis are not listed in order of preference:

Nonsurgical management
• Patient education (eg, dietary recommendations, jaw rest)
• Antibiotic therapy
• Pain management
• Physical therapy
• Supportive therapy (eg, hydration, antipyretics)

Surgical management
• Acute infection
• Aspiration and/or arthrocentesis
• Incision and drainage with culture and sensitivity studies
• Identification and elimination of etiology
• Arthroscopic surgery
• Removal of implant or foreign body

• Chronic infection
• Aspiration and/or arthrocentesis
• Incision and drainage with culture and sensitivity studies
• Identification and elimination of etiology
• Arthroscopic surgery
Posttreatment management

- Ongoing medical management of infection
- Wound care
- Pain management
- Diet and oral hygiene management
- Physical therapy
- Reassessment of infectious process
- Instructions for posttreatment care and follow-up
- Management of residual deformity after elimination of infectious process (eg, orthognathic surgery, joint reconstruction)

V. Outcome Assessment Indices for Infectious Arthritis

- Favorable therapeutic outcomes
  - General favorable therapeutic outcomes
  - Elimination of infection
  - Limited period of disability
  - Acceptable clinical appearance (eg, absence of motor deficits, absence of hypertrophic scar formation, absence of facial asymmetry or deformity)
  - Improved mandibular function (eg, maximum incisal opening, lateral and protrusive excursions)

- Known risks and complications associated with surgery
  - Presence of a general known risk and/or complications
  - Ankylosis
  - Progression of infection (eg, osteomyelitis, sepsis, deep space infection)
  - Adherent unacceptable scar formation

MANDIBULAR DISLOCATION: RECURRENT OR PERSISTENT

Mandibular dislocation can be acute, recurrent, or persistent. All of these refer to the dislocation of the intact non-fractured condyle. Acute dislocation describes blockage of the condyle by the eminence that prevents its return to the glenoid fossa, thus causing inability to close the mouth. Recurrent dislocation describes multiple episodes of dislocation during a specific period. Persistent dislocation describes a long-term blockage of the condyle by the eminence and may be associated with irreversible intracapsular pathology. This section addresses the therapy for recurrent or persistent dislocation. Acute dislocation is addressed in the Trauma Surgery chapter.

I. Indications for Therapy of Mandibular Dislocation: Recurrent or Persistent

May include one or more of the following:

- Moderate-to-severe pain
  - Temporomandibular pain
  - Preauricular pain
  - Masticatory muscle pain (see Masticatory Muscle Disorders section)

- Dysfunction that is disabling and characterized by any of the following:
  - Restricted range of jaw motion
  - Excessive range of jaw motion in patients who relocate after the dislocation
  - Joint noises (eg, clicking, popping, crepitation)
  - Abnormal masticatory function (eg, painful chewing, malocclusion)
  - Displaced autograft or alloplastic implant
• Imaging evidence of dislocation and/or displaced autograft or alloplastic implant

II. Specific Therapeutic Goals for Mandibular Dislocation: Recurrent or Persistent
• Presence of a general therapeutic goal, as listed in the section entitled General Criteria, Parameters, and Considerations for Temporomandibular Joint Surgery
• Correction and prevention of dislocation
• Limited pain in the joint
• Elimination or reduction of noise in the joint

III. Specific Factors Affecting Risk for Mandibular Dislocation: Recurrent or Persistent
• Presence of a general factor affecting risk
• Status and/or degree of abnormal condylar and/or articular eminence growth and development
• Presence of autograft and/or alloplastic implant
• Therapeutic use of medications causing extrapyramidal reactions

IV. Indicated Therapeutic Parameters for Mandibular Dislocation: Recurrent or Persistent
• The pretreatment assessment includes, at a minimum:
  o General history and physical examination
  o Focused history and physical examination of the TMJ region to determine the presence of indications for care of mandibular dislocation and to identify factors affecting risks
  o An imaging examination, based on the history and physical findings, may include but is not limited to the following: panoramic radiography, cephalometric radiography, conventional tomography, arthrography, CT, cone beam computed tomography, radionuclide scanning, and/or MRI.

The following procedures for the management of mandibular dislocation are not listed in order of preference:

Nonsurgical management
• Patient education (eg, dietary recommendations, jaw rest, decreased range of motion)
• Discontinuation of use of medications causing extrapyramidal reactions
• Medication (eg, drugs used to manage tremors, NSAIDs, analgesics, muscle relaxants, steroids)
• Physical medicine (eg, physical therapy, massage, heat, cold, ultrasonography)
• Intracapsular diagnostic and therapeutic injections
• Behavioral modification (eg, counseling, biofeedback, psychotherapy)

Surgical management
• Manipulation and relocation of the condyle
• Application of maxillomandibular fixation
• Arthroscopic surgery
• Arthrotoomy or arthroplasty
  o Disk repair procedures
  o Diskectomy without replacement
  o Diskectomy with replacement
  o Articular surface recontouring (condyle/eminence)
  o Removal of displaced autograft or alloplastic implant
• Autogenous graft to limit condylar movement
• Temporalis muscle scarification
• Inferomedial fracture of zygomatic arch
• Orthognathic surgery (eg, modified condylotomy)
• Autogenous or alloplastic joint replacement
• Neuromuscular blocking agents
Post-treatment management
• Wound care
• Pain management
• Diet and oral hygiene management
• Physical therapy
• Occlusal management
• Patient reassessment
• Instructions for posttreatment care and follow-up

IV. Outcome Assessment Indices for Mandibular Dislocation: Recurrent or Persistent
• Favorable therapeutic outcomes
  o General favorable therapeutic outcomes
  o Absence of recurrent or persistent mandibular dislocation
• Known risks and complications associated with therapy
  o Presence of a general known risk and/or complication
• Parameters, and Considerations for Temporomandibular Joint Surgery
  o Need to remove an autograft or alloplast
  o Continued dislocation

ANKYLOSIS AND RESTRICTED JAW MOTION
Intra-articular and extra-articular processes may restrict jaw motion severely. Ankylosis of the TMJ is an intra-articular process characterized by fibrous, fibro-osseous, or osseous obliteration of the joint space. Extracapsular causes of restricted jaw motion (pseudoankylosis) include but are not limited to coronoid-zygomatic fusion, coronoid hypertrophy, and muscular fibrosis.

Surgical intervention for ankylosis is indicated only when nonsurgical therapy has been ineffective and pain and/or dysfunction are moderate to severe. Pretreatment therapeutic goals are determined individually for each patient.

I. Indications for Therapy for Ankylosis and Restricted Jaw Motion
• Severely restricted jaw motion accompanied by one or more of the following:
  o Inadequate masticatory function
  o Abnormal speech (eg, constrained)
  o Inability to undergo dental and/or medical care (eg, dental preventive and/or restorative, oral or pharyngeal surgery, endoscopy)
  o Compromised anesthetic management (eg, intubation)
  o Inhibited facial growth
  o Imaging evidence of osseous or soft tissue abnormality
  o Clinical and/or imaging evidence of restriction or obstruction unrelated to the TMJ (eg, coronoid-zygomatic fusion, coronoid hypertrophy)

II. Specific Therapeutic Goals for Ankylosis and Restricted Jaw Motion
• Presence of a general therapeutic goal
• Release of ankylosis
• Access for dental and/or medical care
• Improved speech
• Improved masticatory function
• Relief or reduction of pain

III. Specific Factors Affecting Risk for Ankylosis and Restricted Jaw Motion
• Presence of a general factor affecting risk, as listed in the section entitled General Criteria, Parameters, and
• Considerations for Temporomandibular Joint Surgery
• Type of ankylosis (eg, fibrous or bony)
• Etiology of the ankylosis (eg, traumatic or inflammatory)
• Extent and duration of ankylosis
• Degree of pre-existing muscular atrophy
• Ankylosis in a growing child
• Previous placement of alloplastic joint

IV. Indicated Therapeutic Parameters for Ankylosis and Restricted Jaw Motion

• The pretreatment assessment includes, at a minimum:
  o General history and physical examination
  o Focused history and physical examination of the TMJ region to determine the
    presence of indications for care of ankylosis and restricted jaw motion and to
    identify factors affecting risks
  o An imaging examination, based on the history and physical findings. The
    examination may include but is not limited to the following: panoramic
    radiography, cephalometric radiography, conventional tomography, CT, 3-
    dimensional CT, cone beam computed tomography, and/or MRI.

The following procedures for the management of ankylosis and restricted jaw motion are not
listed in order of preference:

Nonsurgical management (usually not helpful in bony ankylosis)
• Medication (eg, NSAIDs, analgesics, muscle relaxants, anti-arthritis, steroids)
• Physical therapy
• Management of dental abnormalities

Surgical management
• Brisement (forceful manipulation of jaw under general anesthesia)
• Arthroplasty
• Condylectomy, partial or total and with or without replacement
• Gap arthroplasty with autogenous or alloplastic replacement (eg with autogenous fat
  grafting)
• Coronoidectomy or coronoidotomy
• Osteotomy of zygoma or zygomatic arch
• Myotomy
• Scar revision (eg, intraoral and/or extraoral)
• Orthognathic surgery for residual maxillofacial deformity
• Excision of heterotopic bone or gap arthroplasty with reconstruction of the ramus-
  condyle unit by
  • distraction osteogenesis

Post-treatment management
• Wound care
• Physical therapy
• Pain management
• Diet and oral hygiene management
• Occlusal management
• Appropriate diagnostic records to determine progression of the disease (eg, serial bite
  registration and models, imaging studies in select cases)
• Patient reassessment
• Instructions for post-treatment care and follow-up

V. Outcome Assessment Indices for Ankylosis and Restricted Jaw Motion

• Favorable therapeutic outcomes
  o General favorable therapeutic outcomes, as listed in the section entitled General
    Criteria, Parameters, and Considerations for Temporomandibular Joint Surgery
In a growing child, continued symmetric growth of the mandible in proper relationship to the midface

Acceptable clinical appearance (eg, absence of motor deficits, absence of hypertrophic scar formation, absence of facial asymmetry or deformity)

Improved mandibular function (eg, maximum incisal opening, lateral and protrusive excursions)

- Known risks and complications associated with therapy
  - Presence of a general known risk and/or complication, as listed in the section entitled General Criteria, Parameters, and Considerations for Temporomandibular Joint Surgery
  - Need to remove an autograft or alloplast
  - Recurrence of ankylosis

**CONDYLAR HYPERPLASIA OR HYPOPLASIA**

Abnormal condylar size or configuration characterizes condylar hyperplasia or hypoplasia, which may be associated with abnormal mandibular and/or maxillary growth or changing skeletal relationships.

Surgical intervention for condylar hyperplasia or hypoplasia is indicated when nonsurgical therapy has been ineffective and/or considered inappropriate and pain, dysfunction, or deformity is moderate to severe. Pretreatment therapeutic goals are determined individually for each patient.

The clinical and imaging characteristics of the condylar abnormality may mimic those of a neoplasm or other pathologic process, necessitating further evaluation.

**I. Indications for Therapy for Condylar Hyperplasia or Hypoplasia**

- Moderate-to-severe pain
  - Temporomandibular pain
  - Preauricular pain
  - Referred pain (eg, earache)
  - Masticatory muscle pain (see Masticatory Muscle Disorders section)

- Dysfunction that is disabling and characterized by any of the following:
  - Restricted range of jaw motion (eg, hypomobility: acute, chronic, intermittent, persistent)
  - Excessive range of jaw motion (eg, hypermobility: acute, chronic, intermittent, persistent)
  - Joint noises (eg, clicking, popping, crepitation)
  - Abnormal masticatory function (eg, painful chewing, malocclusion)

- Imaging evidence of condylar hyperplasia or hypoplasia
- Maxillofacial deformity
- Continued abnormal growth

**II. Specific Therapeutic Goals for Condylar Hyperplasia or Hypoplasia**

- Presence of a general therapeutic goal, as listed in the section entitled General Criteria, Parameters, and Considerations for Temporomandibular Joint Surgery
- Limited pain in the joint
- Elimination or reduction of noise in the joint
- Limited progression of the disease
- Corrected malocclusion
- Corrected or improved associated maxillofacial deformity

**III. Specific Factors Affecting Risk for Condylar Hyperplasia or Hypoplasia**

- Presence of a general factor affecting risk, as listed in the section entitled General Criteria, Parameters, and Considerations for Temporomandibular Joint Surgery
• Status and/or degree of abnormal condylar growth

IV. Indicated Therapeutic Parameters for Condylar Hyperplasia or Hypoplasia

• The pretreatment assessment includes, at a minimum:
  o General history and physical examination
  o Regional history and physical examination to determine the presence of indications for care for condylar hyperplasia or hypoplasia and to identify factors affecting risks
  o An imaging examination, if indicated, based on the history and physical findings. The examination may include but is not limited to the following: panoramic radiography, cephalometric radiography, conventional tomography, arthrography, CT, cone beam computed tomography, radionuclide scanning, and/or MRI.
  o Appropriate diagnostic records to determine progression of the disease (eg, serial bite registration and models, imaging studies in selected cases)

The following procedures for the management of condylar hyperplasia or hypoplasia are not listed in order of preference:

Surgical management
• Incisional or excisional biopsy
• Partial or total condylectomy
• Arthroplasty
• Partial or total joint reconstruction (eg, autogenous graft, allogeneic graft, alloplastic implant)
• Osseous reduction or augmentation
• Soft tissue reduction or augmentation
• Orthognathic surgery
• Posttreatment management
  • Wound care
  • Pain management
  • Diet and oral hygiene management
  • Physical therapy
  • Occlusal management
  • Patient reassessment
  • Instructions for posttreatment care and follow-up

V. Outcome Assessment Indices for Condylar Hyperplasia or Hypoplasia

• Favorable therapeutic outcomes
  o General favorable therapeutic outcomes
  o Acceptable clinical appearance
• Known risks and complications associated with therapy
  o Presence of a general known risk and/or complication
• Parameters, and Considerations for Temporomandibular Joint Surgery
  o Removal of autograft or alloplast
  o Infection
  o Continued growth
  o Continued asymmetry

GOUTY ARTHRITIS
Gouty arthritis (arthritis, hyperuricemia) is a metabolic disease that may affect the TMJ. The disease may be primary or secondary to another disease and/or medication that causes an increase in serum uric acid. In acute gouty arthritis, urate crystals can be precipitated in the synovial fluid of the TMJ, causing a severely painful inflammation. This condition should be treated with the close cooperation of the physician managing the overall systemic disease.
Gout occurs in less than 0.5% of the population and is more common in males than in females. The disease, when present, usually occurs in people older than 40 years. Although the large toe is the joint most commonly involved, the TMJ can also be affected. A synovial fluid analysis demonstrating urate crystals is necessary to confirm the diagnosis. Symptoms include severe TMJ pain, swelling, erythema, joint noise, and restricted mandibular mobility. Surgical intervention for arthritic conditions is indicated only when nonsurgical therapy has been ineffective and pain and/or dysfunction are moderate to severe. Surgery is not indicated for asymptomatic or minimally symptomatic patients. Surgery also is not indicated for preventive reasons in patients without pain and with satisfactory function.

Pretreatment therapeutic goals are determined individually for each patient.

I. Indications for Therapy for Gouty Arthritis

- Moderate-to-severe pain
  - Temporomandibular joint pain
  - Preauricular pain
  - Referred pain (eg, earaches)
  - Masticatory muscle pain (see Masticatory Muscle Disorders section)
- Dysfunction that is disabling and characterized by any of the following:
  - Restricted range of jaw motion (eg, locking of the joint: acute, chronic, intermittent, persistent)
  - Joint noises (eg, clicking, popping, crepitation)
  - Abnormal masticatory function (eg, painful chewing, malocclusion)
  - Joint swelling and/or effusion
  - Erythema of skin over the TMJ region
- Imaging evidence of arthritic process
- Maxillofacial deformity

II. Specific Therapeutic Goals for Gouty Arthritis

- Presence of a general therapeutic goal, as listed in the section entitled General Criteria, Parameters, and Considerations for Temporomandibular Joint Surgery
- Limited pain in the joint gouty arthritis
- Decreased systemic uric acid level
- Improved function
- Elimination or reduction in noise in the joint
- Limited progression of the disease
- Corrected or improved associated maxillofacial deformity

III. Specific Factors Affecting Risk for Gouty Arthritis

- Presence of a general factor affecting risk, as listed in the section entitled General Criteria, Parameters, and Considerations for Temporomandibular Joint Surgery
- Active process of condylar cortical erosions, bone spurs, and exostoses
- Presence of alloplast or autograft
- Gouty arthritis affecting other joints

III. Indicated Therapeutic Parameters for Gouty Arthritis

- The pretreatment assessment includes, at a minimum:
  - General history and physical examination
  - Focused history and physical examination of the TMJ region to determine the presence of indications for care for gouty arthritis and to identify factors affecting risks
  - Appropriate laboratory studies to confirm the diagnosis of gouty arthritis (eg, identification of uric acid crystals in the synovial fluid, serum uric acid level, and, in acute cases, leukocytosis and an elevated sedimentation rate)
An imaging examination, if indicated, based on the history and physical findings. The examination may include but is not limited to the following: panoramic radiography, cephalometric radiography, conventional tomography, arthrography, CT, cone beam computed tomography, and/or MRI.

Appropriate diagnostic records to determine progression of the disease (eg, laboratory studies, synovial aspirate analysis, imagining studies in selected cases)

The following procedures for the management of gouty arthritis are not listed in order of preference:

Nonsurgical management
- Medication (eg, colchicine, indomethacin, NSAIDs, analgesics)
- Physical medicine (eg, physical therapy, cold)
- Intracapsular diagnostic synovial fluid aspiration
- Medical management (eg, steroid injections, evaluation of medications that can increase uric acid)
- Orthopedic appliances (eg, splints)

Surgical management
- Synovial fluid aspiration
- Arthrocentesis
- Arthroscopic surgery
- Biopsy
- Arthroplasty
- Partial or total joint reconstruction (eg, autogenous graft, allogeneic graft, alloplastic implant)

Post-treatment management
- Wound care
- Pain management
- Diet and oral hygiene management
- Physical therapy
- Laboratory studies
- Occlusal management
- Patient reassessment
- Instructions for posttreatment care and follow-up

IV. Outcome Assessment Indices for Gouty Arthritis

A. Favorable therapeutic outcomes
- General favorable therapeutic outcomes, as listed in the section entitled General Criteria, Parameters, and Considerations for Temporomandibular Joint Surgery
- Acceptable clinical appearance (eg, absence of motor deficits, absence of hypertrophic scar formation, absence of facial asymmetry or deformity)
- Improved mandibular function (eg, maximum incisal opening, lateral and protrusive excursions)

B. Known risks and complications associated with therapy
- Presence of a general known risk and/or complication, as listed in the section entitled General Criteria, Parameters, and Considerations for Temporomandibular Joint Surgery
- Removal of autograft or alloplast
- Ankylosis
SELECTED REFERENCES – TEMPOROMANDIBULAR JOINT SURGERY

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. e224 AAOMS ParCare 2012

Temporomandibular Joint Surgery

SPECIAL CONSIDERATIONS FOR PEDIATRIC TEMPOROMANDIBULAR JOINT SURGERY


Tallents RH, Catania J, Sommers E: Temporomandibular joint findings in pediatric populations and young adults: a critical review. Angle Orthod
AAOMS ParCare 2012 e227
Temporomandibular Joint Surgery
e228 AAOMS ParCare 2012
Temporomandibular Joint Surgery


DEGENERATIVE JOINT DISEASE


RHEUMATOID ARTHRITIS


AAOMS ParCare 2012 e229

Temporomandibular Joint Surgery

INFECTIONOUS ARTHRITIS


MANDIBULAR DISLOCATION: RECURRENT OR PERSISTENT


ANKYLOSIS AND RESTRICTED JAW MOTION

Israel HA, Syrop SB: The important role of motion in the rehabilitation of patients with mandibular hypomobility: a review of the literature. Cranio 15:74, 1997

INFECTIOUS ARTHRITIS

CONDYLAN HYPERPLASIA OR HYPOPLASIA
Harris SA, Quayle AA, Testa HJ: Radionuclide bone scanning in the diagnosis and management of condylar hyperplasia. Nucl Med Commun 5:373, 1984

GOUTY ARTHRITIS
Harris SA, Quayle AA, Testa HJ: Radionuclide bone scanning in the diagnosis and management of condylar hyperplasia. Nucl Med Commun 5:373, 1984

GOUTY ARTHRITIS
ORAL MEDICINE AND ORAL MUCOSAL DISEASE MANAGEMENT
INTRODUCTION
Oral medicine and oral mucosal disease management include management of oro-facial manifestations of systemic diseases. The parameters of care for mucosal disease management and oro-facial manifestations of systemic disease have their foundation in knowledge that is continuing to expand. Increased understanding of the nature of these diseases, their biologic behavior, and their response to therapy form the basis for practice parameters. Evidence-based medicine demonstrates that treatment decisions and their outcomes should be based on a definitive pathologic diagnosis obtained either by preoperative biopsy or posttreatment submission of surgical specimens. When reasonable, submission of specimens to oral and maxillofacial pathologists is encouraged because this increases the likelihood of diagnostic accuracy and, therefore, appropriate management. This document does not replace existing biomedical knowledge; it merely provides the basis for defining indications for therapy, parameters of therapy, goals of therapy, and the range of outcomes. This section will refer only to diagnostic and therapeutic surgical procedures for the management of the lesions mentioned. Other areas of pathology, including temporomandibular disorders and congenital defects, are covered in other sections.

GENERAL CRITERIA, PARAMETERS, AND CONSIDERATIONS FOR DIAGNOSIS AND MANAGEMENT OF PATHOLOGICAL CONDITIONS

INFORMED CONSENT: All surgery must be preceded by the patient’s or legal guardian’s consent, unless an emergent situation dictates otherwise. These circumstances should be documented in the patient’s record. Informed consent is obtained after the patient or the legal guardian has been informed of the indications for the procedure(s), the goals of treatment, the known benefits, and risks of the procedure(s), the factors that may affect the risk, the treatment options, and the favorable outcomes.

PERI-OPERATIVE ANTIBIOTIC THERAPY: In certain circumstances, the use of antimicrobial rinses and systemic antibiotics may be indicated to prevent infections related to surgery. The decision to employ prophylactic perioperative antibiotics is at the discretion of the treating surgeon and should be based on the patient’s clinical condition as well as other comorbidities which may be present.

USE OF IMAGING MODALITIES: Imaging modalities may include panoramic radiograph, periapical and/or occlusal radiographs, maxillary and/or mandibular radiographs, computed tomography, cone beam computed tomography, positron emission tomography, positron emission tomography/computed tomography, and magnetic resonance imaging. In determining studies to be performed for imaging purposes, principles of ALARA (as low as reasonably achievable) should be followed.

DOCUMENTATION: Documentation of objective findings, diagnoses, and patient management interventions. The ultimate judgment regarding the appropriateness of any specific procedure must be made by the individual surgeon in light of the circumstances presented by each patient. Understandably, there may be good clinical reasons to deviate from these parameters. When a surgeon chooses to deviate from an applicable parameter based on the circumstances of a particular patient, he/she is well advised to note in the patient’s record the reason for the procedure followed. Moreover, it should be understood that adherence to the parameters does not guarantee a favorable outcome.

GENERAL THERAPEUTIC GOALS FOR DIAGNOSIS AND MANAGEMENT OF PATHOLOGICAL CONDITIONS:
• Provision of medical and/or surgical palliation or cure of the disease process
• Restoration of function
• Restoration of form
• Preservation of vital structures
• Prevention of recurrence
• Limited period of disability
• Appropriate understanding by patient (family) of treatment options and acceptance of treatment plan
• Appropriate understanding and acceptance by patient (family) of favorable outcomes and known risks and complications
• Palliation of patient’s disease in the event of disseminated disease

GENERAL FACTORS AFFECTING RISK DURING DIAGNOSIS AND MANAGEMENT OF PATHOLOGICAL CONDITIONS:
• Degree of patient’s and/or family’s understanding of the origin and natural course of the condition or disorder and therapeutic goals and acceptance of proposed treatment
• Presence of coexisting major systemic disease (eg, disease that increases a patient’s ASA classification to II, III, or IV
• Age of patient
• Presence of acute and/or preexisting infection
• Accuracy and quality of pathologic diagnosis
• Presence of local or systemic conditions that may interfere with the normal healing process and subsequent tissue homeostasis (eg, previously irradiated tissue, diabetes mellitus, chronic renal disease, liver disease, blood disorder, steroid therapy, contraceptive medication, immunosuppression, malnutrition)
• Presence of behavioral, psychological, neurologic, and/or psychiatric disorders, including habits (eg, substance abuse, including tobacco and alcohol), seizure disorders, self-mutilation, or dementia, which may affect surgery, healing, and/or response to therapy
• Degree of patient’s and/or family’s cooperation and/or compliance
• Regulatory and/or third-party decisions concerning access to care, indicate therapy, drugs, devices, and/or materials
• Potential for risk to adjacent vital structures
• Existing drug or alcohol intoxication

GENERAL FAVORABLE THERAPEUTIC OUTCOMES FOR DIAGNOSIS AND MANAGEMENT OF PATHOLOGICAL CONDITIONS:
• Cure or palliation of disease
• Restored form
• Restored function
• Presence of intact adjacent structures (eg, no unanticipated loss or damage)
• Limited period of disability
• Patient (family) acceptance of procedure and understanding of outcomes

GENERAL KNOWN RISKS AND COMPLICATIONS OF DIAGNOSIS AND MANAGEMENT OF PATHOLOGICAL CONDITIONS:
• Unplanned admission to intensive care unit after elective surgery
  *Comment and Exception: Planned admission should be documented in the patient’s record before surgery.
• Unplanned intubation for longer than 24 hours after surgery
  *Comment and Exception: Planned intubation longer than 24 hours should be documented in the patient’s record before surgery.
• Reintubation or tracheostomy after surgery
• Use of parenteral drugs and/or fluids for longer than 72 hours after elective surgery
  *Comments and Exceptions: Procedures in which long-term parenteral drugs and/or fluids are indicated as part of the original treatment plan should be documented in the patient’s record before surgery.
• Failure to ambulate within an acceptable period after surgery
• Facial and/or trigeminal nerve dysfunction after surgery
  *Comment and Exception: When postoperative nerve dysfunction is common, anticipated deficits should be noted in the patient’s record before surgery (eg, anesthesia of inferior alveolar nerve distribution after segmental resection of the mandible for benign or malignant disease).
• Facial fracture during or after surgery (eg, pathologic fracture of mandible after marginal resection)
  *Comment and Exception: A fractured bone that may be a sequela to surgery should be documented in the patient’s record before surgery.
• Unplanned Caldwell-Luc, bronchoscopy, or other exploratory procedures associated with surgery
• Dental injury during surgery
  *Comment and Exception: Any potential dental injury should be noted in the patient’s record before surgery.
• Ocular injury during surgery
• Repeat Oral and/or Maxillofacial Surgery
  *Comment and Exception: Staged procedures that are part of the original treatment plan should be documented before the initial procedure.
• Postsurgical radiograph indicating presence of foreign body
  *Comment and Exception: Foreign bodies (eg, plates, screws, wires) that are anticipated as a normal course of the surgical procedures (eg, orthognathic, trauma) should be noted in the patient’s record.
• Readmission of cancer patient for repeat ablative surgery within 12 months of primary surgery
• Unplanned transfusion(s) of blood or blood components during or after surgery
• Readmission for complications or incomplete management of problems on previous hospitalization
  *Comments and Exceptions:
• Complication or incomplete management occurring at another hospital or involving a physician who is not on the medical staff
• Readmission for chronic disease (eg, intractable asthma, recurrent congestive heart failure, cancer); service-specific criteria required for this exception
• Planned admissions for secondary procedures needed to complete treatment
• Respiratory and/or cardiac arrest
• Unanticipated residual functional deformity
• Unanticipated residual structural deformity
• Loss of or damage to adjacent vital structures (eg, neurosensory, dentition)
• Local sequelae, with damage to or loss of vital structures
• Loss of function
• Loss of form
• Death from tumor extension or as a result of tumor therapy
• Death
  * Comment and Exception: Admissions for terminal care must be documented.
OSTEORADIONECROSIS

I. Indications for Therapy for Osteoradionecrosis

A. Clinical indications
   • History of radiotherapy
   • Pain
   • Exposed bone
   • Sequestrum
   • Orocutaneous fistula
   • Tissue hypoxia (e.g., thin skin, beard loss, oximetry evidence)
   • Soft tissue retraction
   • Evidence of pathologic fracture
   • Tooth mobility
   • Altered sensation
   • Swelling
   • Induration
   • Secondary infection
   • Fetor oris

B. Imaging indications (based on clinical and plain radiograph assessment)
   1. Destruction of bone (radiolucency or other evidence of osteolytic process)
   2. Sequestrum formation
   3. Sclerosis of bone
   4. Evidence of pathologic fracture
   5. Altered uptake on bone scan

C. Results of differential diagnosis

D. Results of additional studies, as indicated
   1. Surgical evidence
      a. Biopsy to rule out presence of tumor and confirm nonvital bone, as indicated

E. Additional presurgical studies may include:
   1. Imaging
      a. Office-based scans (panoramic and/or cone beam computed tomography)
      b. CT
      c. Nuclear scans
   2. Transcutaneous oxygen concentration measurements

II. Specific Therapeutic Goals for Osteoradionecrosis

• Presence of a general therapeutic goal, as previously described.
• Limited pain
• Provision of full mucosal coverage of remaining, viable bone
• Preparation of the patient for bony reconstruction, as necessary
• Reconstruction of quantitatively deficient soft tissue bed

III. Specific Factors Affecting of Risk in Treatment of Osteoradionecrosis

• Presence of a general factor affecting risk, as previously described.
• Associated teeth
• Associated nonvital teeth
• Periodontal disease
• Potential for risk to adjacent structures
• Extent of osteoradionecrosis clinically present (staging)
• Dose, portals, fractionation, and tissue response of radiotherapy
• Airway status

IV. Indicated Therapeutic Parameters for Osteoradionecrosis

A. Supportive, nonsurgical treatment
   • Ruling out of recurrent tumor
B. Surgical treatment (with adjunctive hyperbaric oxygen therapy when appropriate)
   1. Removal of affected bone
      a. Sequestrectomy
      b. Saucerization to bleeding bone
      c. Marginal resection of mandible
      d. Segmental resection of mandible
      e. Removal of all affected radiated bone
   2. Vascularized soft tissue flap with bone resection
      All specimens must be submitted for pathologic assessment.
C. Primary or secondary bony reconstruction to restore form and/or function
D. Post-treatment follow-up
   1. Baseline imaging in the initial postoperative period
   2. Bone scan, when indicated, to assess progress
   3. Repeat biopsy, when indicated by clinical or radiographic changes
   4. Instructions to return if signs or symptoms recur before regularly scheduled follow-up appointment
E. Instructions for post-treatment care and follow-up

V. Outcome Assessment Indices for Osteoradionecrosis
A. Favorable therapeutic outcomes
   1. General favorable therapeutic outcomes, as previously described.
   2. Elimination of clinically active osteoradionecrosis and associated signs and symptoms
B. Known risks and complications associated with therapy
   1. Presence of a general known risk and/or complication, as previously described.
   2. Clinically persistent osteoradionecrosis (eg, pain, fistula, exposed bone, pathologic fracture)
   3. Systemic sequelae (eg, septicemia, endocarditis)
   4. Masticatory or airway impairment
   5. Facial deformity

BISPHOSPHONATE-RELATED OSTEONECROSIS OF THE JAWS
I. Indications for Therapy for Bisphosphonate-Related Osteonecrosis of the Jaws
A. Clinical indications
   • History of bisphosphonate therapy
   • Pain
   • Exposed bone
   • Sequestrum
   • Orocutaneous fistula
   • Soft tissue retraction
   • Evidence of pathologic fracture
   • Tooth mobility
   • Altered sensation
   • Swelling
   • Induration
   • Secondary infection
   • Fetor oris
B. Imaging indications (based on clinical and plain radiograph assessment)
   1. Destruction of bone (radiolucency or other evidence of osteolytic process)
2. Sequestrum formation
3. Sclerosis of bone
4. Evidence of pathologic fracture
5. Altered uptake on bone scan
C. Results of differential diagnosis
D. Results of additional studies, as indicated
   1. Surgical evidence
      a. Biopsy to rule out presence of tumor and confirm nonvital bone, as indicated
   2. Microbiologic assessment
E. Additional presurgical studies may include:
   1. Imaging
      a. Office-based scans (panoramic and/or cone beam computed tomography)
      b. CT
      c. Bone scans
II. Specific Therapeutic Goals for Bisphosphonate-Related Osteonecrosis of the Jaws
A. Presence of a general therapeutic goal
B. Limited pain
C. Provision of full mucosal coverage of remaining, viable bone
III. Specific Factors Affecting Risk in the Treatment of Bisphosphonate-Related Osteonecrosis of the Jaws
A. Presence of a general factor affecting risk
B. Associated teeth
C. Associated nonvital teeth
D. Periodontal disease
E. Potential for risk to adjacent structures
F. Extent of osteonecrosis clinically present (staging)
G. Airway status
H. Overall health of patient (active malignancy, metastatic disease, immunosuppression)
IV. Indicated Therapeutic Parameters for Bisphosphonate-Related Osteonecrosis of the Jaws
A. Supportive, nonsurgical treatment
   1. Local wound care
   2. Nutritional support
   3. Optimal therapy of concomitant systemic disease
   4. Antibiotic therapy for secondary infections
B. Surgical treatment
   1. Removal of affected bone
      a. Sequestrectomy
      b. Saucerization to bleeding bone
      c. Marginal resection of mandible
      d. Segmental resection of mandible
      e. Partial or complete maxillectomy
All specimens must be submitted for pathologic assessment.
C. Primary or secondary bony reconstruction to restore form and/or function
   1. Alloplast reconstruction (bone plates)
D. Post-treatment follow-up
   1. Baseline imaging in the initial postoperative period
   2. Repeat biopsy, when indicated by clinical or radiographic changes
   3. Instructions to return if signs or symptoms recur before regularly scheduled follow-up appointment
E. Instructions for posttreatment care and follow-up
V. Outcome Assessment Indices for Bisphosphonate-Related Osteonecrosis of the Jaws
   A. Favorable therapeutic outcomes
      1. General favorable therapeutic outcomes
      2. Elimination of clinically active osteonecrosis of the jaws and associated signs and symptoms
   B. Known risks and complications associated with therapy
      1. Presence of a general known risk and/or complication
      2. Clinically persistent osteonecrosis of the jaws (eg, pain, fistula, exposed bone, pathologic fracture)
      3. Systemic sequelae (eg, septicemia, endocarditis)
      4. Masticatory or airway impairment
      5. Facial deformity

VASCULAR LESIONS
   I. Indications for Therapy for Vascular Lesions
      A. Clinical indications
         • Pain
         • Deformity (eg, swelling, expansion)
         • Altered sensation
         • Altered function
         • Induration
         • Thrill
         • Bruit
         • Hemorrhage
         • Elevated temperature
         • Red, white, discolored, or pigmented lesions
         • Secondary infection
      B. Imaging indications
         1. Infiltration of adjacent soft tissue and/or bony structures
      C. Results of differential diagnosis
      D. Results of additional studies, as indicated
         1. Biopsy (incisional or excisional, depending on lesion size, site, extent, character, and differential diagnosis)
            2. Fine-needle aspiration
            3. Microbiologic assessment for secondarily infected lesions
      E. Additional presurgical studies may include:
         1. Imaging
            a. Conventional angiography with possible therapeutic intervention and/or ultrasonographic examination for presumptive vascular malformation
            b. Magnetic resonance imaging or magnetic resonance angiography for presumptive vascular malformations
            c. CT angiography
         2. Laboratory assessment
            a. Culture and sensitivity for secondarily infected lesion

   II. Specific Therapeutic Goals for Vascular Lesions
      • Presence of a general therapeutic goal, as previously described.
      • Eradication of tumor or malformation

   III. Specific Factors Affecting Risk in the Treatment of Vascular Lesions
      • Presence of a general factor affecting risk, as previously described.
      • Presence of acute and/or preexisting infection
      • Proximity to/invasion of adjacent structures
      • Extent of tumor or malformation (eg, limited to primary site, beyond primary site)
• Degree of mobility of normally mobile organ/structure (eg, tongue, mandible)
• Excessive bleeding
• Pregnancy

IV. Indicated Therapeutic Parameters for Vascular Lesions
The following procedures for the management of vascular lesions are not listed in order of preference:
A. Diagnosis by physical examination, aspiration, or biopsy
B. Primary treatment
   1. Embolization and/or vessel ligation for vascular lesions
   2. Excision or resection (possibly postembolization)
All specimens must be submitted for pathologic assessment.
C. Adjunctive treatment
   1. Primary or secondary reconstruction
      a. Bone grafts
      b. Skin grafting
      c. Soft tissue flaps (eg, local, pedicled, free)
      d. Alloplasts (bone plates)
   2. Access osteotomies
D. Post-treatment follow-up
   1. Clinical examination for vascular lesions until form and/or function are restored
   2. Instructions to return if signs or symptoms recur before the regularly scheduled follow-up appointment
   3. Repeat imaging study
      a. Conventional angiogram
      b. CT angiogram
      c. Magnetic resonance imaging angiogram
E. Instructions for post-treatment care and follow-up

V. Outcome Assessment Indices for Vascular Lesions
A. Favorable therapeutic outcomes
   1. General favorable therapeutic outcomes, as previously described.
   2. Disease eliminated
B. Known risks and complications associated with therapy
   1. Presence of a general known risk and/or complication, as previously described.
   2. Local recurrence of tumor
   3. Death from hemorrhage

MUCOSAL DISEASES

I. Indications for Therapy for Mucosal Diseases
A. Clinical indications
   • Pain
   • Altered function
   • Altered appearance (eg, change in color or character)
   • Altered mucosal integrity (eg, ability to elevate or wipe off lesion by rubbing surface)
B. Results of differential diagnosis
C. Additional studies, as indicated, may include:
   1. Exfoliative cytology (eg, herpes or candidiasis)
   2. Microbiologic assessment
   3. Biopsy for direct immunofluorescence
   4. Blood for indirect immunofluorescence
   5. Brush biopsy
II. Specific Therapeutic Goals for Mucosal Diseases
   A. Presence of a general therapeutic goal, as previously described.
   B. Elimination or control of disease
   C. Elimination of symptoms

III. Specific Factors Affecting Risk in the Treatment of Mucosal Diseases
   A. Presence of a general factor affecting risk, as previously described.
   B. Presence of acute and/or preexisting infection

IV. Indicated Therapeutic Parameters for Mucosal Diseases
   A. Diagnosis by physical examination and/or biopsy
   B. Primary treatment
      1. Observation and periodic follow-up (eg, lichen planus)
      2. Elimination of etiologic factor (eg, change medication in cases of lichenoid drug reaction)
      3. Medication (eg, antifungal, topical and/or systemic corticosteroid therapy, antineoplastic, other immune modulation therapy)
      4. Surgical removal
   All specimens must be submitted for pathologic assessment.
   C. Adjunctive treatment
      1. Ensuring oral hygiene
      2. Evaluation of medications
      3. Nutritional support
   D. Post-treatment follow-up (dependent on nature of disease)
      1. Consider repeat biopsy if change occurs in the clinical appearance of the lesion
   E. Instructions to return if signs or symptoms recur before the regularly scheduled follow-up appointment
   F. Instructions for post-treatment care and follow-up

V. Outcome Assessment Indices for Mucosal Diseases
   A. Favorable therapeutic outcomes
      1. General favorable therapeutic outcomes, as previously described.
      2. Elimination or amelioration of symptoms (pain)
      3. Elimination or control of disease
   B. Known risks and complications associated with therapy
      1. Presence of a general known risk and/or complication, as previously described.
      2. Recurrence of symptoms
      3. Recurrence of disease
      4. Functional disability
      5. Chronic pain
SELECTED REFERENCES

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.

BISPONPHONATE-RELATED OSTEONECROSIS OF THE JAWS


Metabolic and Dystrophic Diseases of Bone


Mucosal Diseases

Ahmed AR, Colon JE: Comparison between intravenous immunoglobulin and conventional immunosuppressive therapy regimens in patients with severe HPV: effects on disease progression in patients nonresponsive to dapsone therapy. Arch Dermatol 137:1181, 2001


MANAGEMENT OF MAXILLOFACIAL TRAUMA (SOFT AND HARD TISSUES)
GENERAL CRITERIA, PARAMETERS, AND CONSIDERATIONS FOR
TRAUMA SURGERY

1. INFORMED CONSENT: All surgery must be preceded by the patient’s or legal
guardian’s consent, unless an emergent situation dictates otherwise. These
circumstances should be documented in the patient's record. Informed consent is
obtained after the patient or the legal guardian has been informed of the indications for
the procedure(s), the goals of treatment, the known benefits and risks of the
procedure(s), the factors that may affect the risk, the treatment options, and the
favorable outcomes.

2. PERIOPERATIVE ANTIBIOTIC THERAPY: In certain circumstances, the use of
antimicrobial rinses and systemic antibiotics may be indicated to prevent infections
related to surgery. The decision to employ prophylactic perioperative antibiotics is at the
discretion of the treating surgeon and should be based on the patient's clinical condition
as well as other comorbidities which may be present.

3. USE OF IMAGING MODALITIES: Imaging modalities may include panoramic
radiograph, periapical and/or occlusal radiographs, maxillary and/or mandibular
radiographs, computed tomography, cone beam computed tomography, and magnetic
resonance imaging. In determining studies to be performed for imaging purposes,
principles of ALARA (as low as reasonably achievable) should be followed.

4. DOCUMENTATION:
Documentation of objective findings, diagnoses, and patient management interventions.
The individual surgeon in light of the circumstances presented by each patient must
make the ultimate judgment regarding the appropriateness of any specific procedure.
Understandably, there may be good clinical reasons to deviate from these parameters.
When a surgeon chooses to deviate from an applicable parameter based on the
circumstances of a particular patient, he/she is well advised to note in the patient's
record the reason for the procedure followed. Moreover, it should be understood that
adherence to the parameters does not guarantee a favorable outcome.

GENERAL THERAPEUTIC GOALS OF TRAUMA SURGERY:

- Restoration of premorbid form and function
- Preservation of tissue
- Control of hemorrhage
- Limited period of disability
- Limited psychological morbidity
- Limited pain
- Uncomplicated healing
- Avoidance of infection
- Appropriate understanding by patient (family) of treatment options and acceptance of
treatment plan
- Appropriate understanding and acceptance by patient (family) of favorable outcomes
and known risks and complications
- Avoidance of secondary deformities
Optimized esthetic result

GENERAL FACTORS AFFECTING RISK DURING TRAUMA SURGERY:

- Presence of airway impairment
- Presence of hemorrhage
- Degree of patient and/or family understanding of the origin and natural course of the condition or disorder and therapeutic goals and acceptance of proposed treatment
- Presence of coexisting major systemic disease (eg, disease that increases a patient’s American Society of Anesthesiologists classification to II, III, or IV)
- Inability to complete the preoperative evaluation due to the urgency of the patient’s clinical condition
- Age of the patient
- Crush, thermal, chemical, and/or electrical injury
- Presence of underlying fracture
- Presence of tissue loss (eg, avulsive injuries)
- Adequacy of blood supply to affected tissues
- Presence of infection and/or pathology associated with injury
- Availability of instruments or equipment
- Presence of concomitant medical or surgical problems that may delay management (eg, severe intracranial injury, cervical spine injury, pulmonary injury, cardiac injury)
- Presence of local or systemic conditions that may interfere with the normal healing process and subsequent tissue homeostasis (eg, previously irradiated tissue, diabetes mellitus, chronic renal disease, liver disease, blood disorder, steroid therapy, contraceptive medication, immunosuppression, malnutrition)
- Presence of behavioral, psychological, neurologic, and/or psychiatric disorders, including habits (eg, substance abuse, including tobacco and alcohol), seizure disorders, and self-mutilation, that may affect surgery, healing, and/or response to therapy
- Degree of patient’s and/or family’s cooperation and/or compliance
- Regulatory and/or third-party decisions concerning access to care, indicated therapy, drugs, devices, and/or materials
- Time elapsed since injury
- History or presence of keloid or hypertrophic scar formation
- Patient’s stage of skeletal and/or dental development (eg, growing child; deciduous, mixed, or permanent dentition)
- Presence of coexisting or previous maxillofacial injury
- Presence of coexisting or previous neurologic abnormalities (eg, sensory or motor disturbance)
- Presence of a preexisting dentofacial abnormality
- Cause of injury and degree of contamination

GENERAL FAVORABLE THERAPEUTIC OUTCOMES FOR TRAUMA SURGERY:

- Healed soft and hard tissues
  - Osseous union
  - Primary soft tissue healing of incisions or lacerations
  - Retention of premorbid tissue
- Restored facial form (maybe influenced by premorbid condition)
- Restored physiologic function
- Limited period of disability
- Limited pain
• Absence of infection
• Absence of neurologic dysfunction (sensory or motor)
• Absence of skeletal deformity
• Absence of soft tissue deformity
• Absence of growth disturbance in children
• Patient (family) acceptance of procedure and understanding of outcomes

GENERAL KNOWN RISKS AND COMPLICATIONS OF TRAUMA SURGERY:

• Infection
• Scarring (eg, from incisions and/or injury)
• Chronic pain
• Prolonged or chronic disability
• Psychological impairment
• Wound breakdown
• Unplanned admission to intensive care unit after surgery
  o Comment and Exception: Planned admission should be documented in the patient’s record before surgery.
• Unplanned intubation for longer than 12 hours after surgery
  o Comment and Exception: Planned intubation longer than 12 hours should be documented in the patient’s record before surgery.
• Unplanned tracheostomy
• Reintubation or tracheostomy after surgery
• Use of parenteral drugs and/or fluids for longer than 72 hours after surgery
  o Comment and Exception: Procedures in which long-term parenteral drugs and/or fluids are indicated as part of the original treatment plan should be documented in the patient’s record.
• Failure to ambulate within 48 hours of elective surgery
  o Comment and Exception: Patients who are restricted by injury.
• Facial fracture during or following surgery
• Unplanned Caldwell-Luc, or other exploratory procedures associated with surgery
• Dental injury during surgery
• Ocular injury during surgery
• Repeat Oral and/or Maxillofacial Surgery
  o Comment and Exception: Staged procedures that are part of the original treatment plan should be documented before the initial procedure.
• Core temperature of greater than 101°F 72 hours after surgery
• Postsurgical radiograph indicating presence of foreign body
  o Comment and Exception: Foreign bodies (eg, plates, screws, wires) that are anticipated as a normal course of the surgical procedures should be noted in the patient’s record (eg, operative record).
• Unplanned transfusion(s) of blood or blood components during or after surgery
• Readmission for complications or incomplete management of problems on previous hospitalization
  o Comment and Exception: Complication or incomplete management occurring at another hospital or involving a physician who is not on the medical staff.
• Respiratory and/or cardiac arrest
• Chronic neurologic abnormality (eg, motor and/or sensory dysfunction)
  o Comment and Exception: When postoperative nerve dysfunction is anticipated, preexisting deficits should be noted in the patient’s record before surgery.
Malunion and/or Nonunion
Cerebrospinal fluid leak
Death
  - Comment and Exception: Do not resuscitate orders must be documented.

SPECIAL CONSIDERATIONS FOR PEDIATRIC TRAUMA SURGERY

Treatment principles for children sustaining maxillofacial injury are similar to those for adults. However, special considerations are based on the child's anatomy, size, and stages of dental and psychological development. Complications unique to children include growth abnormalities, and psychosocial problems related to posttraumatic facial deformity.

Treatment goals in the pediatric population are the same as those described for adults, with the addition of limiting growth abnormalities and ensuring that both the patient and parents obtain adequate counseling to deal with any functional or anatomical deficits resulting from the injury.

Psychosocial factors must be considered in the pediatric patient group. Parents often feel guilty about the circumstances surrounding the injury, and counseling may be required to help them understand and deal with potential problems. Age-appropriate counseling may also be required to help the child deal with functional disability or anatomical deformity. The specter of child abuse must be entertained, and where suspicion is aroused, it must be investigated appropriately according to ethical and local legal requirements.

The major additional risks to the patient are related to the stage of growth. For example, between the ages of 4 and 7 years and 11 and 13 years, condylar fractures present the risk of abnormal growth of the mandible, with resultant malocclusion and asymmetric or symmetric dentofacial deformity. Midface injuries in those younger than 10 years present the risk of decreased growth, resulting in midface hypoplasia and class III malocclusion. Finally, injuries during the deciduous and mixed dentition stages present the risk of direct or treatment-related iatrogenic damage to the permanent teeth, with subsequent late eruption, failure of eruption, or abnormal tooth structure.

Specific treatment of fractures in children is similar to that in adults, with some exceptions due to age-related anatomic and physiologic variables. When planning open reduction and internal fixation of fractures in children, care must be taken to be aware of and avoid unerupted teeth that may be in the path of plates and screws. Furthermore, in children who have deciduous and mixed dentition, the bone may be soft, and it may be difficult to find adequate bone stock to hold screws. In the mixed stages of dental development, the process of active tooth eruption may compensate for minor misalignments of alveolar fracture reductions.

Treatment of condylar fractures warrants special mention. The goals should be to achieve preinjury occlusion and normal motion. Special care should be taken to avoid maxillomandibular fixation for more than 7 to 10 days in children with condylar fractures because this significantly increases the incidence of hypomobility and ankylosis. Significantly displaced condylar fractures in children younger than 5 years are often associated with condylar remodeling or regenesis.

Midface injuries in children are treated similarly to adults. Alternatively, bioresorbable materials may be used in both maxillary and mandibular fractures in this age group. Nasal fractures should be reduced, and treatment is rarely associated with growth disturbance. On the other hand, severely comminuted nasal fractures, with loss of nasal septal cartilage, are often associated with midfacial growth disturbance. The diagnosis of nasal fractures in children may be improved with the use of ultrasound imaging techniques.

Soft tissue injuries are managed similarly to that described for adults. In the case of avulsive injuries, tissue (including permanent teeth) should almost always be replanted, even if the prognosis is apparently poor. Children heal well but often experience excessive scarring.
For this reason, most sutures should be placed subdermally and long-term skin dressing support implemented. Tissue glues are easily applied for the approximation of tension-free lacerations.

FRACTURED TEETH

I. Indications for Therapy for Fractured Teeth

- Physical evidence of a crown fracture and/or root fracture
- Imaging evidence of a crown fracture and/or root fracture
- Physical evidence of a malocclusion
- Physical evidence of tooth mobility
- Tooth sensitivity to percussion, manipulation, or mastication
- Sensitivity to thermal stimuli
- Physical evidence of injury to the adjacent gingiva, alveolar process, or basal bone
- Imaging evidence of associated alveolar process or basal bone fracture
- Pain in the absence of noxious stimuli

II. Specific Therapeutic Goals for Fractured Teeth

- Presence of a general therapeutic goal
- Preservation of tooth structures
- Preservation of alveolar architecture
- Restoration of occlusion, function, and aesthetics

III. Specific Factors Affecting Risk for Fractured Teeth

- Presence of a general factor affecting risk
- Amount of protrusion of the upper incisors
- Malocclusion
- Labial competence
- Vector of impact
- Preexisting periodontal disease
- Preexisting caries
- Preexisting endodontic therapy
- Preexisting dental restorations
- Extent of root development
- Size of pulp chamber and root canal
- Location of fracture

IV. Indicated Therapeutic Parameters for Fractured Teeth

- Debridement of small tooth fragments
- Stabilization of loose teeth
- Endodontic therapy for pulp exposures (eg, pulp cap, pulpotomy)
- Elimination of sharp edges
- Pulp protection until restoration
- Antimicrobials as indicated
- Extraction in cases of nonrestorable teeth
V. Outcome Assessment Indices for Fractured Teeth

A. Favorable therapeutic outcomes
   • General favorable therapeutic outcomes
   • Preserved teeth and tooth structures
   • Restored occlusion, function, and aesthetics

B. Known risks and complications
   • Presence of a general known risk and/or complication
     • Ankylosis
     • Root resorption (internal/external)
     • Discoloration
     • Malocclusion
     • Loss of tooth or teeth
     • Periodontal defects
     • Pulpal disease
     • Alveolar ridge resorption

LUXATED AND/OR AVULSED TEETH

I. Indications for Therapy for Luxated and/or Avulsed Teeth
   • Physical evidence of a missing tooth or teeth
   • Physical evidence of a mobile tooth or teeth
   • Physical evidence of an intruded tooth or teeth
   • Physical evidence of an extruded tooth or teeth
   • Physical evidence of a laterally positioned tooth or teeth
   • Bleeding from the gingival sulcus
   • Malocclusion
   • Physical evidence of an alveolar process injury
   • Physical evidence of a mandibular or maxillary fracture
   • Imaging evidence of an alveolar process fracture
   • Imaging evidence of widened periodontal ligament
   • Imaging evidence of a displaced or missing tooth

II. Specific Therapeutic Goals for Luxated and/or Avulsed Teeth
   • Presence of a general therapeutic goal
   • Preservation of teeth and tooth structures
   • Preservation of alveolar architecture
   • Restoration of occlusion, function, and aesthetics

III. Specific Factors Affecting Risk for Luxated and/or Avulsed Teeth
   • Presence of a general factor affecting risk
   • Amount of protrusion of the upper incisor
   • Malocclusion
   • Labial competence
   • Vector of impact
   • Preexisting periodontal disease
   • Preexisting caries
• Preexisting endodontic therapy
• Preexisting dental restorations (eg, crown and bridge)
• Extent of root development
• Size of pulp chamber and root canal
• Associated tooth fracture
• Post-injury transportation media
• Time elapsed since injury and/or reimplantation
• Alveolar ridge resorption

**IV. Indicated Therapeutic Parameters for Luxated and/or Avulsed Teeth**

• Reimplantation of adult avulsed teeth
• Irrigation of tooth socket
• Repositioning of luxated or extruded teeth
• Stabilization of mobile teeth or avulsed adult teeth
• Observation for the eruption of intruded teeth
• Consideration for endodontic therapy
• Management of associated alveolar process, mandible, or maxillary fractures
• Extraction (or no reimplantation) in cases of non-salvageable teeth
• Antimicrobials as indicated
• Control of pain
• Instructions for post-treatment care and follow-up

**V. Outcome Assessment Indices for Luxated and/or Avulsed Teeth**

**A. Favorable therapeutic outcomes**
- General favorable therapeutic outcomes
- Preserved teeth and tooth structures
- Restored occlusion, aesthetics, phonation

**B. Known risks and complications**
- Presence of a general known risk and/or complication
- Ankylosis
- Root resorption (internal/external)
- Discoloration
- Malocclusion
- Loss of tooth or teeth
- Periodontal defects
- Pulpal disease

**ALVEOLAR PROCESS INJURIES**

I. Indications for Therapy for Alveolar Process Injuries may include one or more of the following:

• Physical evidence of fracture
• Imaging evidence of fracture
• Malocclusion
• Masticatory dysfunction
• Injuries to associated soft tissue
• Sensory nerve deficits
• Fractures or mobility of the dentition
II. Specific Therapeutic Goals for Alveolar Process Injuries

- Presence of a general therapeutic goal
- Preservation of teeth and alveolar bone
- Restoration of premorbid sensory nerve function
- Restoration of occlusion, function, and aesthetics

III. Specific Factors Affecting Risk for Alveolar Process Injuries

- Presence of a general factor affecting risk
- Presence of abnormal dental occlusion or lack of occlusion (eg, partial edentulism)
- Presence of fractured teeth
- Presence of teeth in line of fracture
- Presence of periodontal disease, infection, or pathology associated with teeth fracture
- Degree of displacement of fracture
- Presence of multiple fractured segments or fracture comminution
- Presence of compound fracture
- Inadequacy of blood supply to fracture segment(s) and/or overlying soft tissue

IV. Indicated Therapeutic Parameters for Alveolar Process Injuries

- Observation and appropriate diet based on limited severity of fracture, displacement, and mobility
- Closed reduction in cases of:
  1. Compound fractures
  2. Complex fractures
  3. Medical and/or anesthetic contraindication to open reduction
- Open reduction alveolus - stabilization of teeth open reduction splinting
  1. Unstable fractures
  2. Patient or surgeon preference for early or immediate function
  3. Inability to perform closed reduction
  4. Injuries associated with soft or other bony tissue
  5. Inadequate dentition (inability to apply dental splinting)
- Removal of teeth
- Antimicrobials as indicated
- Control of pain
- Drains for management of dead spaces or contaminated wounds when judgment dictates
- Instructions for post-treatment care and follow-up

V. Outcome Assessment Indices for Alveolar Process Injuries

A. Favorable therapeutic outcomes

- General favorable therapeutic outcomes
- Osseous union
- Restored pre-trauma arch form and occlusion
- Restored occlusion, function, and aesthetics
- Normal speech, deglutition, respiration, cosmesis
B. Known risks and complications

- Presence of a general known risk and/or complication, as listed in the section entitled General Criteria, Parameters, and Considerations for Trauma Surgery
- Loss of teeth and/or supporting structures
- Periodontal defects
- Devitalized teeth
- Non-union
- Post-treatment facial deformity
  - Skeletal deformity or malunion
  - Facial soft tissue deformity (eg, scarring)
- Abnormal oral and maxillofacial function
  - Malocclusion and/or masticatory dysfunction
  - Dysphonia
- Alveolar ridge resorption

MANDIBULAR INJURIES (ANGLE, BODY, RAMUS, AND SYMPHYSIS)

I. Indications for Therapy for Mandibular Injuries (Angle, Body, Ramus, and Symphysis)

- Physical evidence of fractured mandible
- Imaging evidence of fractured mandible
- Malocclusion
- Mandibular dysfunction
- Abnormal relationship of jaws
- Deficits of sensory and/or motor nerves
- Fractured or mobile dentition
- Continuity defects
- Presence of foreign bodies
- Injuries to associated soft or other bony tissue
- Airway compromise

II. Specific Therapeutic Goals for Mandibular Injuries (Angle, Body, Ramus, and Symphysis)

- Presence of a general therapeutic goal
- Restoration of pretrauma occlusion
- Preservation of teeth and bone structure
- Restoration of motor and/or sensory nerve function
- Adequate jaw function, including opening of greater than 40 mm

III. Specific Factors Affecting Risk for Mandibular Injuries (Angle, Body, Ramus, and Symphysis)

- Presence of a general factor affecting risk, as listed in the section entitled General Criteria, Parameters, and Considerations for Trauma Surgery
- Degree of displacement and/or mobility of fracture
- Presence of multiple fractured segments (fracture comminution)
- Presence of compound fracture
- Presence of abnormal dental occlusion or lack of occlusion (eg, edentulism)
- Presence of fractured teeth
- Presence of teeth in line of fracture
• Presence of infection or pathology associated with a fracture or associated teeth
• History or presence of temporomandibular joint disorder, pathology, or infection
• Presence of coexisting alveolar process or maxillary injury

IV. Indicated Therapeutic Parameters for Mandibular Injuries (Angle, Body, Ramus and Symphysis)
• Observation and appropriate diet based on limited severity of fracture, displacement, and mobility
• Closed reduction in cases of:
  o Stable fracture
  o Reduction and stabilization of fracture achievable with closed method and maxillomandibular fixation and/or external fixation
  o Medical and/or anesthetic contraindication to open reduction
• Open reduction in cases of:
  o Unstable fractures
  o Continuity defects
  o Patient or surgeon preference for early or immediate mobilization or function
  o Injuries to associated soft or other bony tissue
  o Need for vascular or neurologic exploration or repair
  o Associated midface fractures (LeFort level fractures)
• Antimicrobials as indicated
• Control of pain
• Drains for management of dead spaces or contaminated wounds when judgment dictates
• Instructions for posttreatment care and follow-up

V. Outcome Assessment Indices for Mandibular Injuries (Angle, Body, Ramus, and Symphysis)
• Favorable therapeutic outcomes
  o General favorable therapeutic outcomes
  o Primary healing of soft tissue incisions
  o Osseous union
  o Normal speech, deglutition, and respiration
  o Occlusion at premorbid status
  o Adequate jaw mobility including opening
• Known risks and complications
  o Presence of a general known risk and/or complication
• Parameters, and Considerations for Trauma Surgery
  o Nonunion
  o Postmanagement facial deformity
    ▪ Skeletal deformity and/or malunion

MANDIBULAR INJURIES (ANGLE, BODY, RAMUS, AND SYMPHYSIS)
• Deformity of facial soft tissue
• Abnormal oral and mandibular function (may be influenced by premorbid condition)
  o Malocclusion and/or masticatory dysfunction
• Dysphonia and/or dysphagia
• Partial or complete respiratory obstruction
  o Loss of tooth or teeth vitality
  o Loss of tooth or teeth
  o Loss of bony structures
MANDIBULAR CONDYLE INJURIES

I. Indications for Therapy for Mandibular Condyle Injuries
   • Physical evidence of fracture
   • Imaging evidence of fracture
   • Malocclusion
   • Mandibular dysfunction
   • Abnormal relationship of jaw
   • Presence of foreign bodies
   • Lacerations and/or hemorrhage in external auditory canal
   • Hemotympanum
   • Cerebrospinal fluid otorrhea
   • Inability to tolerate maxillomandibular fixation
   • Midface fractures
   • Severe displacement of condyle
   • Dislocation of the condylar head out of the fossa
   • Effusion
   • Hemarthrosis

II. Specific Therapeutic Goals for Mandibular Condyle Injuries
   • Presence of a general therapeutic goal
   • Considerations for Trauma Surgery
   • Limited pain in the joint
   • Minimal mandibular growth disturbances in children
   • Minimal acute or chronic temporomandibular joint disorders (eg, internal derangement, osteoarthritis)
   • Adequate jaw mobility including opening

III. Specific Factors Affecting Risk for Mandibular Condyle Injuries
   • Presence of a general factor affecting risk
   • Type and location of fracture (eg, greenstick, compound, comminuted, intracapsular or extracapsular)
   • Absence of teeth
   • Type and location of fracture
   • Extent of injury (eg, unilateral or bilateral)
   • Degree of displacement (eg, nondisplaced, fracture dislocation)
   • Presence of foreign body
   • History or presence of temporomandibular joint disorder, pathology, or infection
   • Presence of coexisting mandibular or maxillary injury
   • Age

IV. Indicated Therapeutic Parameters for Mandibular Condyle Injuries
   • Observation and appropriate diet based on limited severity of fracture, displacement, and mobility
   • Closed reduction in cases of:
     - Nondisplaced or displaced fracture of a mandibular condyle where form
and/or function can be restored and there are no medical contraindications to maxillomandibular fixations
  
- Fracture dislocations or comminuted fractures in the growing child where form and/or function can be restored
- Medical and/or anesthetic contraindications to open reduction

- **Open reduction (including endoscopically assisted)** in cases of:
  
  - Fracture dislocation of a mandibular condyle
  - Mechanical interference with mandibular function by the condyle or a foreign body
  - Condylar fractures with loss of anterior-posterior and vertical dimension that cannot be managed by closed reduction (eg, edentulous patient, multiple facial fractures)
  - Compound fracture
  - Displacement of a mandibular condyle into middle cranial fossa
  - Patient or surgeon preference for early or immediate mobilization or function
  - Antimicrobials as indicated
  - Control of pain
  - Drains for management of dead spaces or contaminated wounds when judgment dictates

G. Instructions for posttreatment care and follow-up

V. **Outcome Assessment Indices for Mandibular Condyle Injuries**

  - **Favorable therapeutic outcomes**
    
    - General favorable therapeutic outcomes
    - Osseous union
    - Restored joint anatomy and physiology
    - Primary healing of incisions
    - Normal speech, deglutition, and respiration
    - Occlusion at premorbid status
    - Limited period of disability
    - Adequate mobilization including opening

  - **Known risks and complications**
    
    - Presence of a general known risk and/or complication
    - Ankylosis
    - Nonunion
    - Post-treatment facial deformity
      
      - Skeletal deformity or malunion
      - Deformity of the facial soft tissue (eg, scarring)
      - Abnormal mandibular growth in children
    - Abnormal oral and maxillofacial function (may be influenced by premorbid condition)
      
      - Malocclusion and/or masticatory dysfunction
      - Dysphagia and/or dysphonia
      - Partial or complete respiratory obstruction

MANDIBULAR CONDYLE DISLOCATION

I. **Indications for Therapy for Mandibular Condyle Dislocation**

  - Physical evidence of condylar dislocation
  - Imaging evidence of condylar dislocation
• Dental malocclusion
• Mandibular dysfunction
• Abnormal jaw relationship
• Pain and anxiety

II. Specific Therapeutic Goals for Mandibular Condyle Dislocation
• Presence of a general therapeutic goal
• Reduction of dislocation
• Restoration of mandibular function
• Limited anxiety

III. Specific Factors Affecting Risk for Mandibular Condyle Dislocation
• Presence of a general factor affecting risk
• Presence of neuromuscular disorders
• History of previous temporomandibular joint dislocation
• Duration of temporomandibular joint dislocation
• Presence of anatomical deformity of temporomandibular joint
• History or presence of temporomandibular joint disorder, pathology, or infection

IV. Indicated Therapeutic Parameters for Mandibular Condyle Dislocation
• Observation and appropriate diet based on limited severity of fracture, displacement, and mobility
• Closed reduction with or without sedation or general anesthesia
  o Reduction with maxillomandibular immobilization
  o Reduction without maxillomandibular immobilization
• Open reduction (including endoscopically assisted)
• Prophylactic antibiotic coverage for open reduction
• Antimicrobials as indicated
• Management/control of pain and anxiety
• Instructions for posttreatment care and follow-up (including physical therapy)

V. Outcome Assessment Indices for Mandibular Condyle Dislocation
  • Favorable therapeutic outcomes
    ▪ General favorable therapeutic outcomes
    ▪ Absence of skeletal malrelation
    ▪ Absence of preauricular depression
    ▪ Normal speech and deglutition
    ▪ Occlusion at premorbid status
  • Known risks and complications
    ▪ Presence of a general known risk and/or complication
    ▪ Posttreatment facial deformity
      * Unfavorable skeletal relation
      * Deformity of facial soft tissue (eg, surgical scar)
    ▪ Abnormal oral and maxillofacial function (may be influenced by premorbid condition)
      * Malocclusion and/or masticatory dysfunction
      * Dysphagia and/or dysphonia
    ▪ Chronic dislocation
MAXILLARY INJURIES

I. Indications for Therapy for Maxillary Injuries may include one or more of the following:

- Physical evidence of a fractured maxilla
- Imaging evidence of a fractured maxilla
- Malocclusion
- Masticatory dysfunction
- Deficits of sensory or motor nerves
- Continuity defects
- Presence of foreign bodies
- Injuries to associated soft tissue
- Cerebrospinal fluid rhinorrhea
- Periorbital ecchymosis
- Subcutaneous emphysema
- Subconjunctival hemorrhage
- Ocular dysfunction and/or abnormalities
- Nasolacrimal and/or nasofrontal apparatus dysfunction
- Bleeding from nose (epistaxis) or mouth
- Intercanthal widening
- Orbital entrapment
- Significant orbital floor fracture as identified clinically or radiographically

II. Specific Therapeutic Goals for Maxillary Injuries

- Presence of a general therapeutic goal, as listed in the section entitled General Criteria, Parameters, and Considerations for Trauma Surgery
- Restoration of occlusion, phonation, and cosmetics
- Restoration of premorbid form and/or function of orbit and nose
- Restoration of premorbid function of paranasal sinuses
- Preservation of teeth and bone structure

Specific Factors Affecting Risk for Maxillary Injuries

- Presence of a general factor affecting risk
- Degree and displacement of fracture
- Presence of multiple fractured segments or fracture comminution
- Presence of compound fracture
- History or presence of temporomandibular joint disorder, pathology, or infection
- Presence of abnormal dental occlusion or lack of occlusion
- Presence of fractured teeth
- Presence of teeth in line of fracture
- Presence of infection or pathology associated with fracture
- Presence of paranasal sinus or nasolacrimal apparatus infection or disease
- Presence of congenital maxillofacial deformity (e.g., cleft palate)
- Presence of coexisting maxillofacial fractures

IV. Indicated Therapeutic Parameters for Maxillary Injuries

The presurgical assessment includes, at a minimum, a history and both a clinical and an imaging evaluation. See also the Patient Assessment chapter.

The following procedures for the management of maxillary injuries are not listed in order of
preference:

• Observation and appropriate diet based on limited severity of fracture, displacement, and mobility
• Closed reduction in cases of:
  o Uncomplicated fractures, displaced or nondisplaced
  o Reduction and stabilization of fracture achievable with closed method and maxillomandibular fixation
  o Comminuted fractures
  o Medical and/or anesthetic contraindication to open reduction
• Open reduction in cases of:
  o Inability to reduce fracture using closed methods
  o Displaced fracture
  o Unstable fracture
  o Compound fracture
  o Avulsion of bony or dento-osseous segments
  o Patient or surgeon preference for early or immediate mobilization or function
  o Need for bone graft reconstruction
  o Injuries to associated soft tissue
  o Need for vascular or neurologic exploration or repair
  o Multiple facial fractures including mandibular fractures
• Antimicrobials as indicated
• Control of pain
• Drains for management of dead spaces or contaminated wounds when judgment dictated
• Instructions for posttreatment care and follow-up

V. Outcome Assessment Indices for Maxillary Injuries

• Favorable therapeutic outcomes
  o General favorable therapeutic outcomes, as listed in the section entitled General Criteria, Parameters, and Considerations for Trauma Surgery
  o Primary healing of soft tissue incisions
  o Mucosal healing over and/or around bony and dento-osseous segments
  o Osseous union
  o Normal speech, deglutition, and respiration
  o Restored premorbid occlusion
  o Restored sinus function
  o Restored ocular function
  o Restored nasal function
• Known risks and complications
  ▪ Presence of a general known risk and/or complication
  ▪ Nonunion
  ▪ Post-management facial deformity
    o Skeletal deformity or malunion
    o Deformity of facial hard and/or soft tissue (eg, nasal and/or orbital deformity)
    o Loss of bone and/or dento-osseous segment
  ▪ Abnormal oral and maxillofacial function (may be influenced by premorbid condition)
    o Malocclusion and/or masticatory dysfunction
o Dysphonia
o Chronic oroantral or oronasal communication
o Altered ocular function including restriction of gaze
o Chronic sinus pathology
o Anosmia
o Partial or complete respiratory obstruction
o Blindness
o Enophthalmos
o Entropion
o Ectropion

- Loss of tooth and/or teeth vitality
- Loss of tooth and/or teeth or bony structure

ZYGOMATIC INJURIES

I. Indications for Therapy for Zygomatic Injuries
   • Physical evidence of fracture
   • Imaging evidence of fracture
   • Sensory or motor nerve deficit
   • Mandibular dysfunction
   • Ocular dysfunction and/or abnormalities
   • Facial deformity
   • Subcutaneous emphysema
   • Multiple facial fractures (panfacial fractures)
   • Severely displaced fractures
   • Severe comminution of zygomatic arch fractures

II. Specific Therapeutic Goals for Zygomatic Injuries
   • Presence of a general therapeutic goal
   • Restoration of premorbid ocular function
   • Correction or prevention of enophthalmos/exophthalmus
   • Restoration of premorbid antral function
   • Restoration of mandibular range of motion

III. Specific Factors Affecting Risk for Zygomatic Injuries
   • Presence of a general factor affecting risk
   • Presence of compound or comminuted fracture
   • Degree of displacement
   • Presence of congenital maxillofacial deformity
   • Presence of paranasal sinus infection or disease
   • Presence of coexisting maxillofacial fractures

IV. Indicated Therapeutic Parameters for Zygomatic Injuries
   • Observation based on limited severity of fracture, displacement, and mobility
   • Open reduction in cases of:
     o Fractured zygoma
     o Fractured zygomatic arch
     o Panfacial fractures
   • Antimicrobials as indicated
   • Control of pain
• Drains for management of dead spaces or contaminated wounds when judgment dictates
• Instructions for post-treatment care and follow-up

V. Outcome Assessment Indices for Zygomatic Injuries

Indices are used by the specialty to assess aggregate outcomes of care. Outcomes are assessed through clinical evaluation and may include an imaging evaluation.

• Favorable therapeutic outcomes
  o General favorable therapeutic outcomes
  o Osseous union
  o Mandibular opening of at least 40 mm (less opening acceptable in children, commensurate with age and development)
  o Mandibular excursions of at least 4 to 6 mm
  o Normal speech, deglutition, and respiration
  o Premorbid occlusion status

• Known risks and complications
  ■ Presence of a general known risk and/or complication
  ■ Non-union
  ■ Post-treatment facial deformity
    o Skeletal deformity or malunion
    o Deformity of facial soft tissue (eg, scarring, nasal asymmetry)
  ■ Abnormal oral and maxillofacial function (may be influenced by premorbid condition)
    o Mandibular opening of less than 35 mm (less opening acceptable in children, commensurate with age and development)
    o Mandibular excursions of less than 4 to 6 mm
    o Malocclusion and/or masticatory dysfunction
    o Dysphagia and/or dysphonia
    o Partial or complete respiratory obstruction
  ■ Abnormal orbital form and eye function
  ■ Chronic oroantral or oronasal communication

ORBITAL INJURIES

I. indications for therapy for Orbital injuries
• Physical evidence of orbital injury
• Imaging evidence of orbital injury
• Ocular dysfunction and/or abnormalities
• Nasolacrimal dysfunction
• Presence of foreign bodies
• Subcutaneous emphysema
• Motor and sensory nerve deficits
• Presence of soft tissue injuries
• Entrapment of ocular muscles
• Retrobulbar hematoma
• Large defects
• Exophthalmos
II. Specific Therapeutic Goals for Orbital Injuries
• Presence of a general therapeutic goal
• Preservation of vision
• Correction or prevention of enophthalmos/exophthalmus
• Preservation of antral function
• Correction or prevention of nasolacrimal duct dysfunction

III. Specific Factors Affecting Risk for Orbital Injuries
• Presence of a general factor affecting risk
• Presence of globe injury
• Presence of compound or comminuted fracture
• Presence and degree of fracture displacement
• Presence of congenital maxillofacial deformity (e.g., Crouzon syndrome)
• Presence of infection and/or pathology associated with fracture
• Presence of paranasal sinus infection and/or disease
• Presence of nasolacrimal apparatus infection and/or disease
• Presence of coexisting middle and/or upper facial third fractures

IV. Indicated Therapeutic Parameters for Orbital Injuries
The presurgical assessment includes, at a minimum, a history and both a clinical and an imaging evaluation, including consideration for ophthalmologic evaluation. See also the Patient Assessment chapter.

The following procedures for the management of orbital injuries are not listed in order of preference:
• Observation based on limited severity of fracture, displacement, and mobility
• Open treatment (including endoscopically assisted and computed tomography (CT) guided navigation)
• Antimicrobials as indicated
• Control of pain
• Drains for management of dead spaces or contaminated wounds when judgment dictates
• Instructions for posttreatment care and follow-up

Outcome Assessment Indices for Orbital Injuries
• Favorable therapeutic outcomes
  o General favorable therapeutic outcomes
  o Restored nasolacrimal function
  o Restored ocular function (e.g., vision, extraocular movements)
• Known risks and complications
  o Presence of a general known risk and/or complication
  o Postmanagement facial deformity
  o Skeletal deformity or malunion
  o Deformity of facial soft tissue (e.g., scarring, nasal asymmetry)
  o Abnormal orbital form
  o Abnormal ocular function
  o Failure and/or extrusion of alloplastic implant
  o Asymmetric growth disturbances in children
  o Abnormal position of lower eyelid (entropion, ectropion, sclera show)

NASAL BONE INJURIES
I. Indications for Therapy for Nasal Bone Injuries
• Physical evidence of fractured nasal bones or septum
• Imaging evidence of fractured nasal bones or septum
• Septal hematoma
• Nasal airway obstruction
• Anosmia
• Deficits of sensory and/or motor nerves
• Presence of foreign bodies
• Injuries to associated soft tissue
• Periorbital ecchymosis
• Subcutaneous emphysema
• Nasolacrimal and/or nasofrontal apparatus dysfunction
• Epistaxis

II. Specific Therapeutic Goals for Nasal Bone Injuries
• Presence of a general therapeutic goal
• Restoration of premorbid function of paranasal sinuses

III. Specific Factors Affecting Risk for Nasal Bone Injuries
• Presence of a general factor affecting risk
• Epistaxis
• Septal hematoma
• Degree and displacement of fracture
• Presence of multiple fractured segments or fracture comminution
• Presence of a compound fracture
• Preexisting paranasal infection or pathology
• Damage to nasofrontal and/or nasolacrimal duct
• Presence of cerebrospinal fluid leak
• Presence of coexisting middle or upper-third facial bone fractures

IV. Indicated Therapeutic Parameters for Nasal Bone Injuries
• Observation based on limited severity of fracture, displacement, and mobility
• Closed reduction
  ○ Displaced fractures
  ○ Comminuted fractures
  ○ Medical and/or anesthetic contraindication to open reduction
• Open reduction
  ○ Fractures that cannot be reduced by a closed method (eg, septal displacement, mechanical impaction of fragments)
  ■ Avulsion of bony segment and/or overlying soft tissue laceration
  ■ Fractures requiring immediate bone grafting reconstruction
  ■ Exposure to the nasal bones provided by surgical access to associated fractures
  ■ Saddle nose deformity
  ■ Airway obstruction
  ■ Antimicrobials as indicated
  ■ Control of pain
  ■ Drains for management of dead spaces or contaminated wounds when judgment dictates
  ■ Instructions for posttreatment care and follow-up
V. Outcome Assessment Indices for Nasal Bone Injuries

• Favorable therapeutic outcomes
  o General favorable therapeutic outcomes, as listed in the section entitled General Criteria, Parameters, and Considerations for Trauma Surgery
    ▪ Restored premorbid function of nose and paranasal sinuses

• Known risks and complications
  ▪ Presence of a general known risk and/or complicationNonunion
  ▪ Postmanagement facial deformity
    o Skeletal deformity and/or malunion
    o Deformity of facial soft and/or hard tissue (eg, nasal deformity, scarring, synechiae)
  ▪ Obstruction of nasal airway
  ▪ Paranasal sinus dysfunction

NASO-ORBITAL-ETHMOID COMPLEX INJURIES

I. Indications for Therapy for Naso-Orbital-Ethmoid Complex Injuries

• Physical evidence of nasal, ethmoid, lacrimal, maxilla, and frontal sinus floor fractures
• Imaging evidence of nasal, ethmoid, lacrimal, maxilla, and frontal sinus floor fractures
• Epistaxis
• Peri orbital ecchymosis
• Telecanthus
• Septal hematoma
• Nasal airway obstruction
• Anosmia
• Deficits of sensory and/or motor nerves
• Presence of foreign bodies
• Injuries to associated soft tissue
• Subcutaneous emphysema
• Saddle nose deformity

II. Specific Therapeutic Goals for Naso-Orbital-Ethmoid Complex Injuries

• Presence of a general therapeutic goal
• Specific Factors Affecting Risk for Naso-Orbital-Ethmoid Complex Injuries

Severity factors that increase risk and the potential for known complications:

• Presence of a general factor affecting risk
• Epistaxis
• Ocular injury
• Nasolacrimal duct injury
• Nasofrontal duct injury
• Airway obstruction
• Septal hematoma
• Degree and displacement of fracture
• Presence of multiple fractured segments or fracture comminution
• Presence of a compound fracture
• Preexisting paranasal infection or pathology
• Presence of coexisting middle and upper-third facial fractures
IV. Indicated Therapeutic Parameters for Naso-Orbital-Ethmoid Complex Injuries

- Observation based on limited severity of fracture, displacement, and mobility
- Closed reduction in cases of:
  - Displaced fractures
  - Comminuted fractures
  - Medical and/or anesthetic contraindication to open reduction
- Open reduction in cases of:
  - Fractures that cannot be reduced by a closed method (e.g., septal displacement, mechanical impaction of fragments)
  - Avulsion of bony segment and/or overlying soft tissue laceration
  - Fractures requiring immediate bone grafting reconstruction
  - Exposure to the nasal, orbital, or ethmoid bones provided by surgical access to associated fractures
  - Extraocular muscle entrapment
- Antimicrobials as indicated
- Control of pain
- Drains for management of dead spaces or contaminated wounds when judgment dictates
- Instructions for posttreatment care and follow-up

V. Outcome Assessment Indices for Naso-Orbital-Ethmoid Complex Injuries

- Favorable therapeutic outcomes
  - General favorable therapeutic outcomes
- Known risks and complications
  - Presence of a general known risk and/or complication
  - Nonunion
  - Post-management facial deformity
    - Skeletal deformity and/or malunion
    - Deformity of facial soft and/or hard tissue (e.g., nasal deformity, scarring, synechiae, persistent telecanthus, dystopia, enophthalmos, exophthalmus)
  - Obstruction of nasal airway
  - Paranasal sinus dysfunction and/or pathology
  - Visual disturbances (e.g., diplopia)
  - Nasolacrimal dysfunction (e.g., epiphora)
  - Nasofrontal duct dysfunction
  - Anosmia
  - Epiphora

FRONTAL BONE AND FRONTAL SINUS INJURIES

I. Indications for Therapy for Frontal Bone and Frontal Sinus Injuries

- Physical evidence of a supraorbital rim fracture
- Physical evidence of a frontal sinus wall fracture
- Physical evidence of a frontal bone fracture
- Imaging evidence of a supraorbital rim fracture
- Imaging evidence of a frontal sinus wall fracture
- Imaging evidence of a frontal bone fracture
- Deficits in sensation of the supraorbital nerve
- Injuries to the overlying soft tissue
• Presence of foreign bodies
• Contour irregularities
• Continuity defects
• Periorbital ecchymosis
• Clinical or imaging evidence of associated fractures (eg, nasal, orbital, ethmoid)

II. Specific Therapeutic Goals for Frontal Bone and Frontal Sinus Injuries
• Presence of a general therapeutic goal
• Restoration of premorbid sinus physiologic function and/or prevention of frontal sinus pathology

III. Specific Factors Affecting Risk for Frontal Bone and Frontal Sinus Injuries
Severity factors that increase risk and the potential for known complications:
• Presence of a general factor affecting risk, as listed in the section entitled General Criteria, Parameters, and Considerations for Trauma Surgery
• Degree and displacement of fracture
• Presence of multiple fractured segments or fracture comminution
• Presence of a compound fracture
• Preexisting infection or pathology (eg, frontal sinusitis, mucocele)
• Presence of coexisting or previous maxillofacial injury
• Damage to nasofrontal duct
• Presence of cerebrospinal fluid leak
• Presence of coexisting neurologic or ophthalmologic injury

IV. Indicated Therapeutic Parameters for Frontal Bone and Frontal Sinus Injuries
o Neurosurgical consultation in cases of:
  ▪ Displaced frontal bone fractures
  ▪ Evidence of neurologic injury
  ▪ Displaced posterior table frontal sinus fractures
o Observation in cases of:
  ▪ Minimally or nondisplaced linear frontal bone fractures
  ▪ Minimally or nondisplaced supraorbital rim fractures
o Observation, antibiotic therapy, and nasal decongestant in cases of minimally or nondisplaced anterior table frontal sinus fractures
o Open reduction in cases of:
  ▪ Displaced anterior table frontal sinus fractures
  ▪ Displaced anterior and posterior table frontal sinus fractures
  ▪ Fractures of the floor of the frontal sinus
  ▪ Displaced supraorbital rim fractures
o Open reduction with creation of a new nasofrontal duct in cases of:
  ▪ Grossly comminuted sinus floor injury
  ▪ Grossly comminuted nasofrontal-ethmoidal injury
o Sinus obliteration in cases of:
  ▪ Minimally displaced posterior sinus wall injury with questionable nasofrontal duct function
  ▪ Displaced or avulsed posterior sinus wall injury
  ▪ Increased risk for sinusitis
  ▪ Gross neurologic injury
o Antimicrobials as indicated
o Control of pain
o Drains for management of dead spaces or contaminated wounds when judgment dictates
ORAL/PERIORAL SOFT TISSUE INJURIES

I. Indications for Therapy for Oral/Perioral Soft Tissue Injuries
   - Physical evidence of abrasions, hematoma, lacerations, and/or avulsions
   - Penetrating wounds
   - Clinical and/or imaging evidence of foreign bodies
   - Vascular injuries
   - Compromised airway
   - Deficits of sensory and/or motor nerves
   - Injury to salivary glands
   - Burns (eg, thermal, chemical, and/or electrical)

II. Specific Therapeutic Goals for Oral/Perioral Soft Tissue Injuries
   - Presence of a general therapeutic goal
   - Restoration of premorbid continuity of soft tissues
   - Minimal formation of scar tissue
   - Preservation and/or restoration of premorbid form and/or function of sensory and motor nerves
   - Preservation and/or restoration of premorbid form and/or function of salivary glands and ducts
   - Prevention of sialocele formation

III. Specific Factors Affecting Risk for Oral/Perioral Soft Tissue Injuries
   - Presence of a general factor affecting risk
   - Location, length, configuration, and direction of laceration
   - Presence of lacerations involving the salivary glands or ducts, cranial nerves and/or blood vessels, oral commissure, or vermilion border

IV. Indicated Therapeutic Parameters for Oral/Perioral Soft Tissue Injuries
   - Management of airway obstruction
   - Control of hemorrhage
   - Debridement of soft tissue
   - Removal of foreign bodies
Management of vascular injuries
- Repair of salivary gland and/or duct. Utilization of stints where indicated
- Reconstruction of avulsive wounds
- Antimicrobials as indicated
- Control of pain
- Drains for management of dead spaces or contaminated wounds when judgment dictates
- Instructions for posttreatment care and follow-up
- Local, regional, and distant flaps when indicated

V. Outcome Assessment Indices Oral/Perioral Soft Tissue Injuries
Indices are used by the specialty to assess aggregate outcomes of care. Outcomes are assessed through clinical evaluation and may include an imaging evaluation.
- Favorable therapeutic outcomes
  - General favorable therapeutic outcomes, as listed in the section entitled General Criteria, Parameters, and Considerations for Trauma Surgery
  - Restored soft tissue pigmentation, texture, hair growth, speech, deglutition
  - Normal salivary gland
- Known risks and complications
  - Presence of a general known risk and/or complication, as listed in the section entitled General Criteria, Parameters, and Considerations for Trauma Surgery
  - Wound breakdown
  - Post-treatment deformity of facial soft tissue
  - Poor soft tissue quality (e.g., pigmentation, texture, alopecia)
  - Salivary gland dysfunction
  - Hypertrophic scar or keloid formation

PERIORBITAL SOFT TISSUE INJURIES
I. Indications for Therapy of Periorbital Soft Tissue Injuries
- Physical evidence of abrasions, lacerations, and/or avulsions
- Motor and/or sensory nerve deficits
- Penetrating wounds (e.g., interruption of tarsal plate)
- Burns (e.g., thermal, chemical, and/or electrical)
- Vascular injury
- Clinical and/or imaging evidence of foreign bodies
- Hematoma
- Emphysema

II. Specific Therapeutic Goals for Periorbital Soft Tissue Injuries
- Presence of a general therapeutic goal
- Restoration of continuity
- Restoration of premorbid soft tissue quality (e.g., pigmentation, texture, hair growth)
- Minimal formation of scar tissue
- Preservation and/or restoration of premorbid form and/or function of sensory and motor nerves
III. Specific Factors Affecting Risk for Periorbital Soft Tissue Injuries

Severity factors that increase risk and the potential for known complications:
• Presence of a general factor affecting risk
• Location, length, configuration, and direction of laceration
• Presence of lacerations involving cranial nerves, blood vessels, and/or muscles

IV. Indicated Therapeutic Parameters for Periorbital Soft Tissue Injuries

• Wound cleansing, debridement, and control of hemorrhage in cases of abrasion
• Wound cleansing, exploration, debridement, and repair in cases of simple lacerations
• Postseptal hematoma evacuation and control of active hemorrhage
• Split- or full-thickness skin grafts in cases of skin avulsion
• Wedge resection and primary closure in cases of minor partial avulsion of lid
• Antimicrobials as indicated
• Control of pain

• Drains for management of dead spaces or contaminated wounds when judgment dictates
• Instructions for posttreatment care and follow-up
• Tarsorrhaphy or Frost Suture to prevent scar retraction when indicated

V. Outcome Assessment Indices for Periorbital Soft Tissue Injuries

• Favorable therapeutic outcomes
  o General favorable therapeutic outcomes
  o Restored soft tissue pigmentation, texture, hair growth
  o Normal lacrimal gland and nasolacrimal duct function
  o Adequate function of eyelids
• Known risks and complications
  o Presence of a general known risk and/complication
  o Wound breakdown
  o Post-treatment deformity of facial soft tissue (eg, ptosis, ectropion, entropion, eyebrow malalignment, coloboma)
  o Poor soft tissue quality (eg, pigmentation, texture, alopecia)
  o Ptosis
  o Lacrimal gland dysfunction
  o Nasolacrimal dysfunction (eg, epiphora)
  o Chronic pain
  o Hypertrophic scar or keloid formation

PERINASAL SOFT TISSUE INJURIES

I. Indications for Therapy for Perinasal Soft Tissue Injuries

• Physical evidence of laceration
• Physical evidence of hematoma
• Physical evidence of partial or total avulsion
• Physical evidence of abrasion
• Deficits in sensory nerves
• Presence of foreign bodies
- Injuries to underlying nasal and other facial bones, nasal septum, and associated cartilaginous structures
- Burns (eg, thermal, chemical, and/or electrical)

II. Specific Therapeutic Goals for Perinasal Soft Tissue Injuries
- Presence of a general therapeutic goal
- Restoration of premorbid airway
- Preservation of cartilage and skin
- Limited hypertrophic scars
- Limited scar contracture

III. Specific Factors Affecting Risk for Perinasal Soft Tissue Injuries
- Presence of a general factor affecting risk
- Underlying nasal, septal, and facial bone fractures
- Location, length, configuration, and direction of laceration

IV. Indicated Therapeutic Parameters for Perinasal Soft Tissue Injuries
- Wound cleansing, debridement, and control of hemorrhage in cases of abrasion
- Wound cleansing, exploration, debridement, and repair in cases of simple lacerations
- Evacuation and application of a pressure dressing in cases of hematoma
- Antimicrobials as indicated
- Control of pain
- Drains for management of dead spaces or contaminated wounds when judgment dictates
- Instructions for post-treatment care and follow-up

V. Outcome Assessment Indices for Perinasal Soft Tissue Injuries
- Favorable therapeutic outcomes
  - General favorable therapeutic outcomes
  - Preserved cartilage and cutaneous tissue
  - Restored tissue form and/or function (eg, pigmentation, texture, contour, and patent nasal airway)
- Known risks and complications
  - Presence of a general known risk and/or complication
  - Necrosis of cartilage and skin (eg, nasal septal perforation)
  - Chondritis
  - Hypertrophic scars (eg, children)
  - Saddle nose deformities
  - Scar contracture
  - Subcutaneous atrophy
  - Asymmetry

FACIAL SOFT TISSUE INJURIES
I. Indications for Therapy for Facial Soft Tissue Injuries
- Physical evidence of abrasions, lacerations, and/or avulsions
- Motor and/or sensory nerve deficits
- Penetrating wounds
- Burns (eg, thermal, chemical, and/or electrical)
- Compromised airway
- Vascular injury
II. Specific Therapeutic Goals for Facial Soft Tissue Injuries

- Presence of a general therapeutic goal
- Minimal formation of scar tissue
- Preservation and/or restoration of premorbid form and/or function of salivary glands and ducts
- Prevention of sialocele formation

III. Specific Factors Affecting Risk for Facial Soft Tissue Injuries

- Presence of a general factor affecting risk
- Location, length, configuration, and direction of laceration
- Presence of coexisting or previous maxillofacial injuries
- Presence of lacerations involving the salivary glands or ducts, cranial nerves, and/or blood vessels

IV. Indicated Therapeutic Parameters for Facial Soft Tissue Injuries

- Control of hemorrhage
- Debridement of soft tissue wounds
- Removal of foreign bodies
- Management of vascular injuries
- Nerve repair when appropriate
- Surgical repair of soft tissue
- Reconstruction of avulsive wounds, including use of local or regional flaps and/or free tissue transfer of tissue
- Antimicrobials as indicated
- Control of pain
- Drains for management of dead spaces or contaminated wounds when judgment dictates
- Instructions for posttreatment care and follow-up

V. Outcome Assessment Indices Facial Soft Tissue Injuries

- Favorable therapeutic outcomes
  - General favorable therapeutic outcomes
  - Restored soft tissue pigmentation, texture, hair growth
  - Normal salivary gland and nasolacrimal duct function
- Known risks and complications
  - Presence of a general known risk and/or complication, as listed in the section entitled General Criteria, Parameters, and Considerations for Trauma Surgery
  - Wound breakdown
  - Posttreatment deformity of facial soft tissue
  - Poor soft tissue quality (eg, pigmentation, texture, alopecia)
  - Salivary gland dysfunction
  - Nasolacrimal dysfunction
  - Chronic pain
  - History of hypertrophic scars or keloid formation
SELECTED REFERENCES – TRAUMA SURGERY

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.

SPECIAL CONSIDERATIONS FOR PEDIATRIC TRAUMA SURGERY


FRACATED TEETH


SPECIAL CONSIDERATIONS FOR PEDIATRIC TRAUMA SURGERY
MANDIBULAR CONDYLE DISLOCATION


Boutros SG: Closed reduction and fluoroscopically assisted percutaneous stabilization of displaced subcondylar mandible fractures. Plast Reconstr Surg 116:971, 2005


**NASAL BONE INJURIES**

Frodel JL: Primary and secondary nasal bone grafting after major facial trauma. Facial Plast Surg 8:194, 1992

**NASO-ORBITAL-ETHMOID COMPLEX INJURIES**


**FRONTAL BONE AND FRONTAL SINUS INJURIES**

Donald PJ: Frontobasal approach for trauma and tumor. Minim Invasive Neurosurg 37:37, 1994

**ORAL/PERIORAL SOFT TISSUE INJURIES**

Donald PJ: Frontobasal approach for trauma and tumor. Minim Invasive Neurosurg 37:37, 1994

**NASAL BONE INJURIES**

PERINASAL SOFT TISSUE INJURIES
Leach J: Proper handling of soft tissue in the acute phase. Facial Plast Surg 17:227, 2001

FACIAL SOFT TISSUE INJURIES
Leach J: Proper handling of soft tissue in the acute phase. Facial Plast Surg 17:227, 2001
MANAGEMENT
OF OROFACIAL PAIN
INTRODUCTION
The term TMD (Temporomandibular Disorders) and orofacial pain are sometimes used mistakenly. The term orofacial pain is used appropriately, with the understanding that it is a broad term that encompasses the types of oral and facial pain with the inclusion of TMD as etiologic cause. Currently there is an emphasis on the fact that dentists treat musculoskeletal, neurovascular, and neuropathic pain in the entire head and neck rather than in the oral and facial regions exclusively. The name orofacial pain implies anatomic limitations that are not consistent with the scope of clinical practice. A name that is consistent with contemporary practice is head and neck pain management. But it should not be confused with the clinical scope of practice of other medical practitioner such as Anesthesiologists, Neurologists, Neurological surgeons. Such confusion should be eliminated that in cases of diagnosed disorders that are not encompassed in the field of practice, such cases are referred to the appropriate specialist.

This clinical practice guidelines show the types of disorders that can be diagnosed or detected by an oral and maxillofacial surgery specialist. It should not be confused with the management of such diagnosed disorders. Such disorders detected by the clinician should be referred to appropriate specialist in that field of practice suggesting that these kinds of disorders are better managed as a team or with the help of the appropriate specialty.

GENERAL CRITERIA, PARAMETERS, AND CONSIDERATIONS FOR OROFACIAL PAIN MANAGEMENT

INFORMED CONSENT: All procedures must be preceded by the patient’s or legal guardian’s consent. Informed consent is obtained after the patient or the legal guardian has been informed of the indications for the procedure(s), the goals of treatment, the known benefits and risks of the procedure(s), the factors that may affect the risk, the treatment options, and the favorable outcomes.

PAIN SCALE QUESTIONNAIRE AND PROGRESS RECORDS: Pain is a subjective complaint of the patient which is the main reason for the management of such disorder. A record of the pain scale and location of pain is intended for the therapeutic progress records of the patient. This also includes the modalities used and the regimen done by the patient applying the Physical Self Regulation and Home medications from the clinician and other specialists.

USE OF IMAGING MODALITIES: Imaging modalities may include panoramic radiograph, periapical and/or occlusal radiographs, maxillary and/or mandibular radiographs, computed tomography, cone beam computed tomography, positron emission tomography, positron emission tomography/computed tomography, and magnetic resonance imaging, kinematic TMJ magnetic imaging resonance. In determining studies to be performed for imaging purposes, principles of ALARA (as low as reasonably achievable) should be followed.

DOCUMENTATION: Documentation of objective findings, diagnoses, and patient management interventions. The ultimate judgment regarding the appropriateness of any specific procedure must be made by the individual clinician in light of the circumstances presented by each patient. Understandably, there may be good clinical reasons to deviate from these parameters. When a clinician chooses to deviate from an applicable parameter based on the circumstances of a particular patient, he/she is well advised to note in the patient’s record the reason for the procedure followed. Moreover, it should be understood that adherence to the parameters does not guarantee a favorable outcome.

GENERAL THERAPEUTIC GOALS FOR OROFACIAL PAIN MANAGEMENT:
A. Reduction or Elimination of Pain from its source
B. Improve function and form
C. Limited period of disability
D. Improved range of jaw motion and/or function
E. Appropriate understanding by patient (family) of treatment options and acceptance of treatment plan
F. Appropriate understanding and acceptance by patient (family) of favorable outcomes and known risks and complications

CLASSIFICATION OF OROFACIAL PAIN
I. AXIS I

A. SOMATIC PAIN

1. SUPERFICIAL PAIN
   a. MUCOGINGIVAL PAIN
   b. CUTANEOUS PAIN

2. DEEP PAIN
   a. VISCERAL PAIN
      i. NEUROVASCULAR
         a) MIGRAINE
         b) TENSION TYPE HEADACHE
         c) TRIGEMINAL AUTONOMIC CEPHALGIA (TAC)
         d) OTHER PRIMARY HEADACHE
         e) NEUROVASCULAR VARIANTS
      ii. VASCULAR
         a) ARTERITIS
         b) CAROTIDENIA
      iii. PULPAL
      iv. VISCERAL MUCOSAL PAIN
      v. GLANDULAR ENT PAIN

b. MUSCULOSKELETAL PAIN
   i. PERIODONTAL
   ii. CONNECTIVE TISSUE
   iii. OSSEOUS
iv. TMJ PAIN
   a) LIGAMENTOUS
   b) RETRODiscal
   c) CAPSULAR
   d) ARTHRITIC

v. MUSCLE
   a) PROTECTIVE CO-CONTRACTION
   b) MYOFASCIAL
   c) LOCAL MUSCLE SORENESS
   d) CENTRALLY MEDIATED MYALGIA
   e) MYOSPASM

B. NEUROPATHIC PAIN

1. EPISODIC PAIN
   a. NEUROVASCULAR PAIN (SEE AXIS I – NEUROVASCULAR PAIN)
   b. PAROXYSMAL NEURALGIA
      i. TRIGEMINAL NEURALGIA
      ii. OTHER NEURALGIAS

2. CONTINUOUS PAIN
   a. CENTRALLY MEDIATED PAIN
      i. CRPS
   b. PERIPHERALLY MEDIATED PAIN
      i. BURNING MOUTH DISORDER
      ii. OCCLUSAL DYSESTHESIA
      iii. DENTOALVEOLAR PAIN
      iv. NEURITIC PAIN
         a) HERPES ZOSTER
         b) PERIPHERAL NEURITIS
c) TRAUMATIC NEUROMA
  v. DEAFFERENTATION PAIN
  vi. ENTRAPMENT NEUROPATHY
  c. METABOLIC POLYNEUROPATHIES

II. AXIS II
   A. MOOD DISORDERS
   B. ANXIETY DISORDERS
   C. SOMATOFORM DISORDERS
   D. OTHER CONDITIONS

CAUSE-RELATED THERAPY
The parameters of pain do not intend to discuss the whole diagnostics and management of all Orofacial Pains. Such topic will encompass or may overlap with other parameters of care on the Oral and Maxillofacial Surgery practice.

THERAPEUTIC MODALITIES
A. Pharmacologic therapy
   1. Analgesic medications
      a. Single non-narcotic analgesic medications
      b. Combination non-narcotic analgesic medications
      c. Narcotic analgesic medications
      d. Adjuvant analgesic medications
   2. Anti-inflammatory medications
   3. Muscle relaxants
   4. Anxiolytic medications
   5. Antidepressants
   6. Anticonvulsive medications
   7. Vasoactive medications
      a. Preventive medications
      b. Abortive medications
   8. Norepinephrine blockers
   9. Antimicrobial medications
   10. Antiviral medications
   11. Antihistamine medications
   12. Neurolytic medications
   13. Uricosuric medications
   14. Dietary considerations
   15. Anesthetic medications
      a. Topical anesthetics
      b. Injectable local anesthetics
B. Physical therapy
   1. Modalities
      a. Counterstimulation
      b. Thermal therapy
      c. Coolant therapy
      d. Ultrasound
      e. Phonophoresis
      f. Iontophoresis
      g. Electrogalvanic stimulation
      h. Transcutaneous electrical nerve stimulation
      i. Cold laser/ Low Level Light Therapy
   2. Manual techniques
      a. Massage
      b. Spray and stretch techniques
      c. Joint mobilization
      d. Muscle conditioning

C. Acupuncture

D. Psychologic therapy
   1. Counseling
   2. Behavioral modification training
      a. Emotional stress reduction training
      b. Relaxation training
      c. Physical self-regulation

INJECTIONS, SPECIAL CONSIDERATIONS

Dentists, oral and maxillofacial surgeons, TMD specialists, Orofacial Pain specialists; are experienced in performing various diagnostic and therapeutic injections for the purpose of localizing and classifying pain. These injections include, but are not limited to:

- Trigger-point injections into masticatory and cervical muscles for evaluation and/or treatment of pain referred from musculoskeletal structures;
- Intramuscular or subcutaneous injection of serotonin agonists for evaluation and/or treatment of neurovascular pain;
- And anesthetic blocks of trigeminal and upper cervical nerves, and autonomic ganglia, for evaluation and/or treatment of neuropathic pain.

As a result of the comprehensive nature of dental education and the experience of clinical practice, only the dentist is able to assess whether intraoral pain, jaw pain, and facial pain originate from local causes or as a result of referred pain from cervical musculoskeletal structures, neurovascular pain, or neuropathic pain. Since the pathophysiology and treatment of pain is the same, regardless of whether it is expressed as a toothache of nondental origin, as facial pain, or in associated structures in the head and neck, it is within the province of dental practice to employ accepted medical and dental techniques to treat head and neck pain.

PURPOSE OF INJECTIONS IN OROFACIAL PAIN MANAGEMENT

A. Analgesia
B. Diagnostic Purposes in identifying the source and site of pain
C. Trigger Point Injection

LOW LEVEL LASER THERAPY

The use of Low Level Laser Therapy, also known as Cold Laser Therapy, may be applicable as an adjunct to the physical therapy regimen set by a Physical Therapy Specialist for muscle relief and pain reduction.
REFERRAL TO OTHER SPECIALISTS
Management of Orofacial Pain sometimes is done by a team approach. Proper referral to the Physical Therapist, Anesthesiologist, Pain Specialists, Neurologist, Neuro Surgeon, and other related specialties is greatly suggested.

References:
"Clinician's Guide to the Diagnosis & Treatment of Chronic Orofacial Pain" Decker Publishing
Amanat D et al. The adjunct therapeutic effect of lasers with medication in the management of orofacial pain: double blind randomized controlled trial. Photomed Laser Surg - October 1, 2013; 31 (10); 474-9
Ganzberg S. - Pain management part II: pharmacologic management of chronic orofacial pain. Anesth Prog - January 1, 2010; 57 (3); 114-8; quiz 119
Howard A. Israel The Essential Role of The Oral and Maxillofacial Surgeon in the Diagnosis, Management, Causation and Prevention of Chronic Orofacial Pain: Clinical Perspectives, Oral and Maxillofacial Surgery, CHAPTER 8, 112-135
PREPROSTHETIC AND IMPLANT SURGERY
DENTAL AND IMPLANT SURGERY

INTRODUCTION
Reconstructive dental and implant surgery encompasses the use of implants to rehabilitate and restore form and function to the edentulous or partially edentulous jaws and the craniomaxillofacial skeleton of patients using fixed and removable prostheses. Implants also assist in the stabilization of prostheses that replace missing maxillofacial parts, such as the nose, eyes, and ears. Implant reconstruction enables patients to regain normal mastication, speech, and deglutition; resolves pain, gagging, and dysfunction from conventional removable prostheses; and improves the symmetry and appearance of the face. Thus, it promotes self-esteem and restores both masticatory function and a sense of well-being in patients with congenital, developmental, and acquired orofacial deficits and deformities. The conditions are described generically and listed without any judgment regarding priority.

Advances in implant science, biomaterials, and biotechnology, together with a better understanding of the biology of osseointegration, the bone-implant interface, and biomechanics, have resulted in improved outcomes and expanded applications for implants. Improved methods of imaging for diagnosis, a diverse availability of implants with varied geometry and surfaces, and refinement of augmentation and reconstructive techniques have enabled previously rejected or inadequately rehabilitated patients to be treated. Nanotechnology manipulates biomaterials on an atomic and molecular scale. The reconstruction techniques include guided bone regeneration, autogenous grafting from the maxillofacial region and other sites, and use of bone substitutes, composite grafts, and bone. The techniques involve materials using the concepts of osteogenesis, osteoinduction, osteoconduction, and osteopromotion. Soft tissue procedures, in combination with implant surgery, have improved the health and aesthetics of the peri-implant tissues. Increased understanding of biologic, biomechanical, and patient- and clinician-related risk factors, as well as a growing consensus of biologically acceptable patient treatment protocols, has improved the safety and efficacy of dental and craniomaxillofacial implant surgery.

The use of implants (temporary, provisional) may provide function and aesthetics during the reconstructive phase of treatment.

The team approach, involving a restorative dentist, in the management of dental implant patients emphasizes that the restoration is the primary factor that drives the implant placement and the requirements for adjunctive grafting procedures. It is essential that there is proper patient selection and presurgical consultation with a restorative dentist involved in the treatment planning using appropriate available assessment tools. Implant dentistry is a recognized method for tooth replacement.
GENERAL CRITERIA, PARAMETERS, AND CONSIDERATIONS FOR DENTAL AND IMPLANT SURGERY

INFORMED CONSENT:
All surgery must be preceded by the patient’s or legal guardian’s consent, unless an emergent situation dictates otherwise. These circumstances should be documented in the patient’s record. Informed consent is obtained after the patient or the legal guardian has been informed of the indications for the procedure(s), the goals of treatment, the known benefits and risks of the procedure(s), the factors that may affect the risk, the treatment options, and the potential favorable and unfavorable outcomes.

PERI-OPERATIVE ANTIBIOTIC THERAPY:
In certain circumstances, the use of antimicrobial rinses and systemic antibiotics may be indicated to prevent failure of and infections related to surgery. The decision to employ prophylactic perioperative antibiotics is at the discretion of the treating surgeon and should be based on the patient’s clinical condition as well as other comorbidities which may be present.

USE OF IMAGING MODALITIES:
Imaging modalities may include panoramic radiograph, periapical and/or occlusal radiographs, maxillary and/or mandibular radiographs, computed tomography, cone beam computed tomography, positron emission tomography, positron emission tomography/computed tomography, and magnetic resonance imaging. In determining studies to be performed for imaging purposes, principles of ALARA (as low as reasonably achievable) should be followed.

DOCUMENTATION:
The AAOMS ParCare 2012 includes documentation of objective findings, diagnoses, and patient management interventions. The ultimate judgment regarding the appropriateness of any specific procedure must be made by the individual surgeon in light of the circumstances presented by each patient. Understandably, there may be good clinical reasons to deviate from these parameters. When a surgeon chooses to deviate from an applicable parameter based on the circumstances of a particular patient, he/she is well advised to note in the patient’s record the reason for the procedure followed. Moreover, it should be understood that adherence to the parameters does not guarantee a favorable outcome.

GENERAL THERAPEUTIC GOALS FOR DENTAL AND IMPLANT SURGERY:
• Restored function
• Improved appearance
• Improved social and psychological well-being
• Limited pain
• Limited period of disability
• Provision of stable anchorage
• Achievement of uncomplicated healing
• Achievement of patient satisfaction
• Appropriate understanding by patient (family and/or significant other) of treatment options and acceptance of
• Treatment plan
• Appropriate understanding and acceptance by patient (family) of favorable outcomes and known risks and
• Complications
• Preservation and protection of existing bone from continual resorption

**GENERAL FACTORS AFFECTING RISK DURING DENTAL AND IMPLANT SURGERY:**
• Magnitude of deformity/anomaly
• Inadequate quality or quantity of alveolar bone and soft tissues
• Presence of bone and/or soft tissue infection
• Presence of bone and/or soft tissue pathology
• Factors that are known to influence osseointegration adversely
  o Implant material
  o Implant geometry (macrostructure)
  o Implant surface (microstructure)
  o Status of recipient bone (inadequate bone quality and volume)
  o Trauma to host bone (eg, fracture, thermal injury, dehiscence)
  o Bone healing potential
• Inadequate prosthetic or surgical treatment planning
• Unfavorable prosthetic design and loading conditions
• Presence of behavioral, psychological, neurologic, and/or psychiatric disorders, including habits (eg, substance abuse, including tobacco and alcohol), seizure disorders, self-mutilation that may affect surgery, healing, and/or response to therapy
• Degree of patient and/or family understanding of the origin and natural course of the condition or disorder, therapeutic goals, and acceptance of proposed treatment
• Parafunctional habits
• Pre-existing neurologic dysfunction
• Presence of local or systemic conditions that may interfere with the normal healing process and subsequent tissue homeostasis (eg, previously irradiated tissue, diabetes mellitus, chronic renal disease, liver disease, blood disorder, steroid therapy, contraceptive medication, immunosuppression, malnutrition), history of local trauma, acute or chronic infection(s) including active or refractory periodontal disease, failed endodontic therapy, osteoporosis, multiple surgical interventions at the site in question that could interfere with healing, history of intravenous bisphosphonate drug administration, and/or history of oral bisphosphonate drug administration.
• Degree of patient’s and/or family’s cooperation and/or compliance
• Inadequate hygiene
• Age of patient (eg, developmental status of alveolar growth)
• Proximity of implant placement site to adjacent structures (eg, teeth, other dental implants, nerve, brain, sinus)
• Presence of coexisting major systemic disease (eg, disease that increases a patient's American Society of Anesthesiologists classification to II, III, or IV) as detailed in the Patient Assessment chapter
• Regulatory and/or third-party decisions concerning access to care, indicated therapy, drugs, devices, and/or materials
• Non-compliance of the patient
GENERAL FAVORABLE THERAPEUTIC OUTCOMES FOR DENTAL AND IMPLANT SURGERY:

- Retained, stable, functional implant(s) capable of supporting a prosthesis for a minimum of 5 years
- Bone height loss of less than 0.2 mm annually after the first year of service
- No evidence of peri-implant radiolucency
- Peri-implant soft tissue health (absence of inflammation, exudate, and bleeding on probing of peri-implant soft tissues)
- Patient satisfaction with function, aesthetics, and ease of maintenance
- Improved social and psychological well-being
- Limited period of pain and disability
- Patient (family) acceptance of procedure and understanding of outcomes

GENERAL KNOWN RISKS AND COMPLICATIONS FOR DENTAL AND IMPLANT SURGERY:

- Unstable implant
- Loss of implant
- Anesthesia, paresthesia, hyperesthesia, hypoesthesia
- Excessive vertical and horizontal bone loss greater than 2.0 mm
- Presence of signs and symptoms, such as pain, infection, neuropathies, or paresthesia
- Infection (acute and/or chronic)
- Unanticipated bony deficiency, dehiscence, or fenestration
- Implant malposition
- Dental injury during surgery
- Mandible fracture
- Injury to adjacent teeth
- Mobility of adjacent teeth
- Unfavorable axial inclination of adjacent teeth
- Loss of bone graft or augmentation material, resulting in implant failure
- Nasal or sinus fistulae
- Implant not restorable
- Implant or component failure (eg, fracture, screw loosening)
- Improper implant positioning, causing prosthetic compromise
- Hemorrhage
- Hyperplastic soft tissue response
- Aberrant frenum or mobile mucosal tissues
- Intubation, tracheostomy, or other respiratory problems after surgery
- Prolonged period of disability
- Facial and/or trigeminal nerve dysfunction after surgery
  - Comment and Exception: When postoperative nerve dysfunction is common, anticipated deficits should be noted in the patient’s record before surgery (eg, inferior alveolar nerve dysfunction after nerve lateralization).
- Unplanned Caldwell-Luc, bronchoscopy, or other exploratory procedures associated with surgery
- Ocular injury during surgery
• Unanticipated repeat Oral and/or Maxillofacial Surgery
  o Comment and Exception: Staged procedures that are part of the original treatment plan should be documented before the initial procedure.
• Core temperature of greater than 101°F 72 hours after elective surgery
• Postsurgical radiograph indicating presence of foreign body
  o Comment and Exception: Foreign bodies (eg, implants) that are anticipated as a normal course of the surgical procedure (eg, implant surgery) should be noted in the patient’s medical record.
• Unplanned transfusion(s) of blood or blood components during or after surgery
• Readmission for complications or incomplete management from previous surgery
  o Comments and Exceptions: Complication or incomplete management occurred or planned admissions for secondary procedures are needed to complete treatment.
• Respiratory and/or cardiac arrest
• Death

SPECIAL CONSIDERATIONS FOR PEDIATRIC DENTAL AND IMPLANT SURGERY

Craniomaxillofacial implants have three primary applications in the pediatric population: restoration of missing dentition, as an anchoring device for orthopedic manipulation, and for prosthetic reconstruction of the missing ear.

Osseointegrated dental implants can provide optimal restoration for children with hypodontia syndrome or with segments of lost dentition. Congenitally missing teeth are referred to as hypodontia (one to five missing teeth), oligodontia (six or more missing teeth), and anodontia (missing all permanent teeth in one or both jaws). Agenesis generally refers to missing individual teeth. Missing teeth in a growing individual can be a disabling condition, which must be addressed with consideration for both physical and psychological development. Achievement and maintenance of osseointegrated implants in healthy children have been shown to be possible. There is no fixed chronologic age at which implants may be placed in children. Children younger than 2 years may have unsuitably soft or thin cortical bone for implant placement. In general, growth and skeletal development should be completed or nearly completed before implants are placed. Skeletal maturity can be assessed in a number of ways, including superimposition of serial cephalometric films obtained at 6-month to 1-year intervals. In cases of anodontia and oligodontia, dental implants may be placed before the pubertal growth period. It must be understood, however, that dental implants will not erupt together with adjacent teeth during dentoalveolar development, and they will not be displaced in space as natural teeth are during growth and development.

Osseous dental implants may serve as anchoring devices for orthodontic and orthopedic mechanisms. In combination with elastic or active spring devices, dental segments may be moved into more ideal positions. This procedure should be undertaken in conjunction with an orthodontist familiar with these mechanisms.

Prosthetic reconstruction may be indicated for the missing ear or severe grade II type microtia. Currently, it is still difficult to achieve an aesthetic-appearing ear using autogenous materials and local flaps. A maxillofacial prosthodontist should see the child before surgery to determine the child’s suitability as a candidate for an extraoral prosthesis and possible implant placement to retain the prosthesis. Calvarial bone will achieve the necessary thickness for implant placement by approximately 5 or 6 years of age.
SPECIAL CONSIDERATIONS REQUIRING IMPLANTS

• Neurologic Dysfunction
  Certain motor disorders affecting the orofacial musculature and sensory disorders affecting the overlying soft tissues adversely affect masticatory function and the patient’s ability to function with a conventional removable prosthesis.
    ○ Pain
      ▪ Nerve compression
      ▪ Soft tissue irritation
    ○ Neuromuscular disorders
      ▪ Parkinsonism
      ▪ Cerebrovascular accident
      ▪ Multiple sclerosis
      ▪ Epilepsy
      ▪ Orofacial dyskinesia
      ▪ Oral mandibular dystonia
      ▪ Tardive dyskinesia
      ▪ Hyperactive gag reflex
    ○ Parafuncional habits (eg, bruxism, clenching, tongue thrusting, finger sucking)

• Tissue Intolerance
  Possible reactions to methyl methacrylate or base metal alloys; lack of fixed, keratinized soft tissue; and a propensity to chronic inflammatory or autoimmune conditions (eg, Sjögren’s syndrome) may contribute to masticatory dysfunction with a conventional prosthesis.

• Inadequate Orthodontic or Orthopedic Anchorage
  Use of implants can enable the orthodontist to manage a variety of clinical problems related to anchorage control and missing teeth. By virtue of its rigid orthopedic anchorage in bone, the osseointegrated implant or the biointegrated implant can be used both to move teeth orthodontically and as root form implants to support single or multiple tooth restorations.
  Orthodontic implants may also be used as osseous handles to guide orthopedic development and as bone anchors for distraction osteogenesis.
  Implants may be used as absolute anchorage where the anchoring unit remains stationary under orthodontic forces. Certain skeletal deformities may be corrected using titanium screw anchorage.
  • Patients with congenitally missing teeth or developmental anomalies, including those with ectodermal dysplasia.

OTHER ADJUNCTIVE DIAGNOSTIC/IMAGING AND SURGICAL PROCEDURES

• Cone Beam Computed Tomography for Implant Treatment Planning
• Guided Surgery
• Use of Software for Treatment Planning
• Mini-implants
• Flapless Surgery
• Orthodontic Tooth Extrusion
• Immediate Loading Protocols
• Vascularized Pedicle Flaps
PARTIAL EDENTULISM

**Indications for Therapy for Partial Edentulism**

May include one or more of the following:
- Preservation of natural tooth by avoiding tooth preparation for a fixed and/or removable prosthesis
- Inadequate natural teeth to support a fixed and/or removable prosthesis
- Prevention of occlusal overloading of remaining natural dentition
- Prevention of alveolar bone resorption and loss of osseous support
- Clinical or imaging evidence of hard or soft tissue defect(s) in the maxillofacial region, including defects resulting from tooth loss, oncologic therapy, and trauma (e.g., mandibular, maxillary, nasal, orbital, ear)
- Masticatory dysfunction (e.g., maxillary and/or mandibular partial edentulism and/or alveolar atrophy)
- Aesthetic deficiency and/or compromise
- Speech impairment
- Behavioral and/or psychological impairment
- Neurologic dysfunction
  - Nerve compression
  - Soft tissue irritation
- Intolerance to and/or inability to accommodate to tooth/soft tissue–borne prostheses
- Reaction to materials used in tooth/soft tissue–borne prosthetic reconstruction
- Unstable obturator

**Specific Therapeutic Goals for Partial Edentulism**

The goal of therapy is to restore form and/or function. However, risk factors and potential complications may preclude complete restoration of form and/or function.

The primary goal of implant reconstruction is to provide long-term, stable anchorage for a prosthesis. The implant, in combination with the prosthesis, may then provide one or more of the following:
- Presence of a general therapeutic goal, as previously described
- Preservation of remaining natural dentition
- Prevention of alveolar atrophy and loss of supportive bone
- Prevention of occlusal overloading of remaining natural dentition
- Improved mastication
- Improved speech
• Improved deglutition
• Prevention of gagging
• Enabling of successful orthodontic treatment
• Improved stability of obturators
• Enhanced aesthetics

• Specific Factors Affecting Risk for Partial Edentulism
  Severity factors that increase risk and the potential for known complications:
  o Presence of a general factor affecting risk, as previously described Implant Surgery
  o Position of the roots of the adjacent dentition within the alveolar bone
  o Tooth/ridge relationship of opposing arch (eg, overbite, overjet, cross-bite, supraeruption)
  o Unfavorable ridge morphology
  o Unfavorable access (eg, trismus, macroglossia, position of opposing dentition)
  o Prior radiation
  o Hypermineralization or hypomineralization of alveolar bone

• Indicated Therapeutic Parameters for Partial Edentulism
  The presurgical assessment includes, at a minimum, a clinical and imaging evaluation, as well as a prosthetic treatment plan. Also see the Patient Assessment chapter.
  Proper patient selection; flap design; prevention of thermal injury; selection of site, angle, position, and trajectory; and primary implant stability are critical factors in achieving favorable outcomes. Magnitude and time of implant loading must be taken into consideration.
  The following procedures for the management of partial edentulism are not listed in order of preference:
  o Placement of osseointegrated type implant(s), including, when appropriate, immediate placement and immediate provisionalization with and without occlusal loading
  o Augmentation with autogenous, allogeneic, xenogeneic, or alloplastic graft(s) or growth factors, bone morphogenetic protein, and autologous and allogeneic stem cells to facilitate implant reconstruction, including sinus/nasal floor grafts
  o Harvesting of autogenous grafts from intraoral or extraoral sites, including but not limited to mandibular ramus, ramus body, symphysis, alveolar ridge and retromolar region, maxillary tuberosity, zygomatic buttress ilium, cranium, tibia
  o Supplemental procedures:
    ▪ Guided tissue regeneration (resorbable guided tissue regeneration, nonresorbable)
    ▪ Soft tissue augmentation (eg, grafts and local flaps)
    ▪ Maxillary or mandibular osteotomy with or without bone graft and rigid fixation or osseous distraction
    ▪ Ridge preservation at time of extraction and hard or soft tissue site development
  o Instructions for posttreatment care and follow-up

• Outcome Assessment Indices for Partial Edentulism
Indices are used by the specialty to assess aggregate outcomes of care. Outcomes are assessed through clinical evaluation and may include an imaging evaluation.

• Favorable therapeutic outcomes
  o General favorable therapeutic outcomes, as previously described
  o Preservation of natural dentition
  o Improved speech
  o Achievement of favorable aesthetics
  o Improved deglutition
  o Improved mastication
  o Preservation of alveolar supportive bone
  o Prevention of occlusal overloading of remaining natural dentition
  o Prevention of gagging
  o Successful orthodontic treatment
  o Improved stability of obturators

• Known risks and complications associated with therapy
  o Presence of a general known risk and/or complication, as previously described
  o Loss of or damage to adjacent dentition

ISOLATED PARTIAL EDENTULISM IN AN AESTHETIC ZONE

• Indications for Therapy for Isolated Partial Edentulism in an Aesthetic Zone
  May include one or more of the following:
  o Restoration of improvement of aesthetics
  o Preservation of natural tooth by avoiding tooth preparation for fixed and/or removable prosthesis
  o Inadequate natural teeth to support a fixed and/or removable prosthesis
  o Prevention of occlusal overloading of remaining natural dentition
  o Prevention of alveolar bone resorption and loss of supportive bone
  o Clinical or imaging evidence of hard or soft tissue defect(s) in the maxillofacial region, including defects resulting from tooth loss, oncologic therapy, and trauma
  o Masticatory dysfunction (eg, maxillary and/or mandibular partial edentulism and/or alveolar atrophy)
  o Speech impairment
  o Behavioral and/or psychological impairment
  o Soft tissue irritation
  o Intolerance to and/or inability to accommodate to tooth/soft tissue-borne prostheses
  o Reaction to materials used in tooth/soft tissue–borne prosthetic reconstruction

II. Specific Therapeutic Goals for Isolated Partial Edentulism in an Aesthetic Zone

  The goal of therapy is to restore form and/or function. However, risk factors and potential complications may preclude complete restoration of form and/or function.

  The primary goal of implant reconstruction is to provide long-term, stable anchorage for a prosthesis. The implant, in combination with a prosthesis, may then provide one or more of the following:
Presence of a general therapeutic goal, as listed in the section entitled General Criteria, Parameters, and Considerations for Dental and Craniomaxillofacial Implant Surgery
- Maintenance or improvement of aesthetics
- Preservation of remaining natural dentition
- Prevention of alveolar atrophy and loss of supportive bone
- Prevention of occlusal overloading of remaining natural dentition
- Improved mastication
- Improved speech
- Improved deglutition
- Prevention of gagging
- Improved patient social confidence and self esteem

Specific Factors Affecting Risk for Isolated Partial Edentulism in an Aesthetic Zone
- Severity factors that increase risk and the potential for known complications:
  - Presence of a general factor affecting risk, as previously described
  - The presence of anatomical variations (e.g., “high smile line,” crown length, maxillary hyperplasia)
  - Position of the roots of the adjacent dentition within the alveolar bone
  - Insufficient or excessive interdental space
  - Tooth/ridge relationship of opposing arch (e.g., overbite, overjet, cross-bite, supraeruption)
  - Unfavorable ridge morphologic features
  - Vertical maxillary deficiency with reduced reconstructive soft tissue envelope
  - Compromised bone volume on adjacent natural dentition
  - Unfavorable axial inclination of adjacent teeth
  - Inadequate orthodontic retention
  - Unrealistic patient expectations
  - Gingival biotype (inadequate orofacial soft tissue thickness less than 2.0 mm required to mask underlying implant components or for lateral biologic width requirements)
  - Shape of tooth crowns (triangular indicates high risk; ovoid, medium risk; and square, low risk)
  - Restorative status of adjacent teeth (virgin indicates low risk; subgingival restoration with ideal biologic acceptance, medium risk; and subgingival restoration with inflammatory response, high risk)
  - Immediate implant placement at aesthetic extraction sites with facial bone less than 2.0 mm
  - Immediate implant placement at aesthetic extraction sites with facial bone defects that compromise the bone crests on the adjacent dentition
  - Two or more adjacent implants in the aesthetic zone

Indicated Therapeutic Parameters for Isolated Partial Edentulism in an Aesthetic Zone
- The presurgical assessment includes, at a minimum, a clinical and imaging evaluation, as well as a prosthetic treatment plan. Also see the Patient Assessment chapter.
Proper patient selection; flap design; prevention of thermal injury; selection of site, angle, position, and trajectory; implant diameter; and primary implant stability are critical factors in achieving favorable outcomes.

Magnitude and time of implant loading must be taken into consideration.

The following procedures for the management of isolated partial edentulism in an aesthetic zone are not listed in order of preference:

- Placement of osseointegrated type implant(s), including, when appropriate, early and/or immediate placement and immediate provisionalization without occlusal loading
- Augmentation with autogenous, allogeneic, xenogeneic, or alloplastic graft(s) or growth factors to facilitate implant reconstruction, including sinus/nasal floor grafts
- Harvesting of autogenous grafts from intraoral or extraoral sites, including but not limited to mandibular ramus, ramus body, symphysis, alveolar ridge and retromolar region, maxillary tuberosity, ilium, tibia
- Supplemental procedures:
  - Passive or active guided tissue regeneration
  - Use of platelet-rich plasma
  - Soft tissue augmentation
  - Maxillary or mandibular osteotomy or osseous distraction
  - Ridge preservation at time of extraction and site development at time of extraction or delayed
- Instructions for posttreatment care and follow-up

Outcome Assessment Indices for Isolated Partial Edentulism in an Aesthetic Zone

Indices are used by the specialty to assess aggregate outcomes of care. Outcomes are assessed through clinical evaluation and may include an imaging evaluation.

- Favorable therapeutic outcomes
  - General favorable therapeutic outcomes, as previously described
  - Achievement of favorable or harmonious aesthetics
  - Preservation of natural dentition
  - Improved speech
  - Improved deglutition
  - Improved mastication
  - Preservation of alveolar supportive bone
  - Prevention of occlusal overloading of remaining natural dentition
  - Prevention of gagging
  - Improved patient social confidence and self-esteem

- Known risks and complications associated with therapy
  - Presence of a general known risk and/or complication, as listed in the section entitled General Criteria, Parameters, and Considerations for Dental and Craniomaxillofacial Implant Surgery
  - Loss of or damage to adjacent dentition
  - Fibrotic wound healing, resulting in an unaesthetic result
  - Loss of alveolar bone and soft tissues, resulting in aesthetic, phonetic, and functional compromise
EDENTULOUS MANDIBLE

• Indications for Therapy for Edentulous Mandible
  May include one or more of the following:
  o Absence of natural teeth to support a fixed and/or removable prosthesis
  o Prevention of alveolar bone resorption and loss of supportive bone
  o Clinical or imaging evidence of hard or soft tissue defect(s) in the mandible, including those resulting from tooth loss, oncologic therapy, and trauma
  o Masticatory dysfunction
  o Aesthetic deficiency and/or compromise
  o Speech impairment
  o Behavioral and/or psychological impairment
  o Neurologic dysfunction
    ■ Nerve compression
    ■ Soft tissue irritation
  o Intolerance to and/or inability to accommodate to a complete denture
  o Reaction to materials used in denture construction

• Specific Therapeutic Goals for Edentulous Mandible
  The goal of therapy is to restore form and/or function. However, risk factors and potential complications may preclude complete restoration of form and/or function. The primary goal of implant reconstruction is to provide long-term, stable anchorage for a prosthesis. The implant, in combination with a prosthesis, may then provide one or more of the following:
  o Presence of a general therapeutic goal, as previously described Improved mastication
  o Prevention of alveolar atrophy and loss of supportive bone
  o Improved deglutition
  o Improved nutrition
  o Improved speech
  o Prevention of gagging
  o Enhancement of aesthetics

• Specific Factors Affecting Risk for Edentulous Mandible
  Severity factors that increase risk and the potential for known complications:
  o Presence of a general factor affecting risk, as previously described
  o Ridge relationship of opposing arch (eg, retrognathia, laterognathia, prognathia)
  o Unfavorable ridge morphologic features
  o Unfavorable access (eg, trismus, macroglossia)
  o Presence of severe atrophy
  o Relative position of soft tissue, muscle attachments, and the inferior alveolar and mental nerve foramen
  o Location of adjacent vascular structures
  o Relative position of genial tubercle
  o Relative position of the floor of mouth and salivary glands and ducts
  o Prior radiation

• Indicated Therapeutic Parameters for Edentulous Mandible
The presurgical assessment includes, at a minimum, a clinical and imaging evaluation, as well as a prosthetic treatment plan. Also see the Patient Assessment chapter.

Proper patient selection; flap design; prevention of thermal injury; selection of site, angle, position, and trajectory; and primary implant stability are critical factors in achieving favorable outcomes. Magnitude and time of implant loading must be taken into consideration.

The following procedures for the management of edentulous mandible are not listed in order of preference:

- Placement of osseointegrated type implant(s), including, when appropriate, immediate placement and immediate or early loading
- Placement of transosseous implant
- Placement of subperiosteal implant
- Harvesting of autogenous grafts from intraoral or extraoral sites, including but not limited to mandibular ramus, symphysis, alveolar ridge and retromolar region, maxillary tuberosity, ilium, tibia
- Supplemental procedures:
  - Passive or active guided tissue regeneration
  - Soft tissue augmentation
  - Maxillary or mandibular osteotomy or osseous distraction

- Instructions for posttreatment care and follow-up

**Outcome Assessment Indices for Edentulous Mandible**

Indices are used by the specialty to assess aggregate outcomes of care. Outcomes are assessed through clinical evaluation and may include an imaging evaluation.

- Favorable therapeutic outcomes
  - General favorable therapeutic outcomes, as previously described
  - Improved mastication
  - Preservation of alveolar and supportive bone
  - Improved speech
  - Achievement of favorable aesthetics
  - Improved deglutition
  - Prevention of gagging

- Known risks and complications associated with therapy
  - Presence of a general known risk and/or complication, as previously described
  - Neurosensory disturbances
  - Mandibular fracture
  - Salivary duct/gland injuries
  - Soft tissue hyperplasia
  - Life threatening hemorrhage
EDENTULOUS MAXILLA

• Indications for Therapy for Edentulous Maxilla
  May include one or more of the following:
  o Absence of natural teeth to support a fixed and/or removable prosthesis
  o Prevention of alveolar bone resorption and loss of supportive bone
  o Clinical or imaging evidence of hard or soft tissue defect(s) in the maxilla, including those resulting from tooth loss, oncologic therapy, and trauma
  o Masticatory dysfunction
  o Aesthetic deficiency and/or compromise
  o Speech impairment
  o Behavioral and/or psychological impairment
  o Neurologic dysfunction
    ▪ Nerve compression
    ▪ Soft tissue irritation
  o Intolerance to and/or inability to accommodate to a complete denture
  o Reaction to materials used in denture construction
  o Combination syndrome (anterior maxillary resorption, maxillary hyperplasia, bulbous tuberosities)
  o Maxillary and/or mandibular vertical, transverse, and anterior-posterior skeletal discrepancies

• Specific Therapeutic Goals for Edentulous Maxilla
  The goal of therapy is to restore form and/or function. However, risk factors and potential complications may preclude complete restoration of form and/or function.
  The primary goal of implant reconstruction is to provide long-term, stable anchorage for a prosthesis. The implant, in combination with prosthesis, may then provide one or more of the following:
  o Presence of a general therapeutic goal, as previously described
  o Improved mastication
  o Prevention of alveolar atrophy and loss of supportive bone
  o Improved deglutition
  o Improved nutrition
  o Improved speech
  o Prevention of gagging
  o Enhancement of aesthetics

• Specific Factors Affecting Risk for Edentulous Maxilla
  Severity factors that increase risk and the potential for known complications:
  o Presence of a general factor affecting risk, as previously described
  o Ridge relationship of opposing arch (eg, retrognathia, laterognathia, prognathia)
  o Unfavorable ridge morphologic features
  o Unfavorable access (eg, trismus, macroglossia)
  o Presence of severe atrophy
  o Relative position of soft tissue and muscle attachments
  o Location of adjacent vascular structures
  o Pneumatized maxillary sinuses
  o Maxillary sinus disease (eg, obstructed ostium)
  o Enlarged incisive canal
• Prior radiation
  • Hypermineralization or hypomineralization of the alveolar process

• Indicated Therapeutic Parameters for Edentulous Maxilla
  The presurgical assessment includes, at a minimum, a clinical and imaging evaluation, as well as a prosthetic treatment plan. Also see the Patient Assessment chapter.
  Proper patient selection; flap design; prevention of thermal injury; selection of site, angle, position, and trajectory; and primary implant stability are critical factors in achieving favorable outcomes. Magnitude and time of implant loading must be taken into consideration.
  The following procedures for the management of edentulous maxilla are not listed in order of preference:
  • Placement of osseointegrated type implant(s), including, when appropriate, early or immediate placement and immediate or early loading
  • Augmentation with autogenous, allogeneic, xenogeneic, or alloplastic graft(s) or growth factors to facilitate implant reconstruction, including sinus/nasal floor grafts
  • Harvesting of autogenous grafts from intraoral or extraoral sites, including but not limited to mandibular ramus, symphysis, alveolar ridge and retromolar region, maxillary tuberosity, ilium, tibia
  • Supplemental procedures:
    ▪ Passive or active guided tissue regeneration
    ▪ Soft tissue augmentation
    ▪ Maxillary or mandibular osteotomy or osseous distraction
    ▪ Placement of zygomatic implants
    ▪ Alveoloplasty, alveolectomy, vestibuloplasty
  • Instructions for posttreatment care and follow-up

• Outcome Assessment Indices for Edentulous Maxilla
  Indices are used by the specialty to assess aggregate outcomes of care. Outcomes are assessed through clinical evaluation and may include an imaging evaluation.
  • Favorable therapeutic outcomes
    ▪ General favorable therapeutic outcomes as previously described
    ▪ Improved mastication
    ▪ Preservation of alveolar supportive bone
    ▪ Improved speech
    ▪ Achievement of favorable aesthetics
    ▪ Improved deglutition
    ▪ Prevention of gagging
    ▪ Improved stability of obturators
  • Known risks and complications associated with therapy
    ▪ Presence of a general known risk and/or complication, as previously described Oral nasal and oral antral fistulae
    ▪ Maxillary sinus infection and/or disease
THE RECONSTRUCTED MANDIBLE (PARTIALLY AND EDENTULOUS)

• Indications for Therapy of the Reconstructed Mandible (Partially and Edentulous)
  May include one or more of the following:
  o Preservation of natural tooth by avoiding tooth preparation for fixed and/or removable prosthesis
  o Inadequate natural teeth to support a fixed and/or removable prosthesis
  o Prevention of occlusal overloading of remaining natural dentition
  o Prevention of alveolar bone resorption and loss of support of bone
  o Clinical or imaging evidence of hard or soft tissue defect(s) in the maxillofacial region, including those resulting from tooth loss, oncologic therapy, and trauma
  o Masticatory dysfunction (eg, mandibular partial edentulism and/or alveolar atrophy)
  o Aesthetic deficiency and/or compromise
  o Speech impairment
  o Behavioral and/or psychological impairment
  o Neurologic dysfunction
    ▪ Nerve compression
    ▪ Soft tissue irritation
  o Intolerance to and/or inability to accommodate to tooth/soft tissue–borne prostheses
  o Reaction to materials used in tooth/soft tissue–borne prosthetic reconstruction
  o Relative position of genial tubercle
  o Relative position of the floor of mouth and salivary glands and ducts

• Specific Therapeutic Goals for the Reconstructed Mandible (Partially and Edentulous)
  The goal of therapy is to restore form and/or function. However, risk factors and potential complications may preclude complete restoration of form and/or function.
  The primary goal of implant reconstruction is to provide long-term, stable anchorage for a prosthesis. The implant, in combination with a prosthesis, may then provide one or more of the following:
  o Presence of a general therapeutic goal, as previously described Prevention of loss of reconstructed alveolar and supporting bone
  o Preservation of overlying soft tissue
  o Improved mastication
  o Improved deglutition
  o Improved nutrition
  o Improved speech
  o Prevention of gagging
  o Enhancement of aesthetics
  o Prevention of occlusal overloading of remaining natural dentition

• Specific Factors Affecting Risk for the Reconstructed Mandible (Partially and Edentulous)
  Severity factors that increase risk and the potential for known complications:
  o Presence of a general factor affecting risk, as previously described
  o Ridge relationship of opposing arch (eg, retrognathia, laterognathia, prognathia)
  o Unfavorable ridge morphologic features
  o Unfavorable access (eg, trismus, macroglossia)
• Presence of severe atrophy
• Relative position of soft tissue and muscle attachments
• Location of adjacent vascular structures
• Potential vascular compromise of grafted area
• Position of the roots of the adjacent dentition
• Potential for grafted bone to be inadequately fixated, consolidated, and/or incorporated

Indicated Therapeutic Parameters for the Reconstructed Mandible (Partially and Edentulous)

The presurgical assessment includes, at a minimum, a clinical and imaging evaluation, as well as a prosthetic treatment plan. Also see the Patient Assessment chapter.

Proper patient selection; flap design; prevention of thermal injury; selection of site, angle, position, and trajectory; and primary implant stability are critical factors in achieving favorable outcomes. Magnitude and time of implant loading must be taken into consideration.

The following procedures for the management of the reconstructed mandible are not listed in order of preference:

• Placement of osseointegrated type implant(s), including, when appropriate, immediate placement and immediate or early loading
• Placement of transosseous implant
• Augmentation with autogenous, allogeneic, xenogeneic, or alloplastic graft(s) or growth factors to facilitate implant reconstruction
• Harvesting of autogenous grafts from intraoral or extraoral sites, including but not limited to mandibular ramus, symphysis, alveolar ridge and retromolar region, maxillary tuberosity, ilium, tibia
• Ridge preservation at time of extraction and site development at time of extraction or delayed
• Supplemental procedures:
  - Guided tissue regeneration
  - Soft tissue augmentation (eg, grafts and local flaps)
  - Mandibular osteotomy or osseous distraction
  - Soft tissue sculpting
  - Alveoloplasty, alveolectomy, vestibuloplasty
  - Ridge preservation at time of extraction and site development at time of extraction or delayed
• Instructions for posttreatment care and follow-up

Outcome Assessment Indices for the Reconstructed Mandible (Partially and Edentulous)

Indices are used by the specialty to assess aggregate outcomes of care. Outcomes are assessed through clinical evaluation and may include an imaging evaluation.

• Favorable therapeutic outcomes
  - General favorable therapeutic outcomes, as previously described
  - Prevention of loss of reconstructed alveolar and supporting bone
  - Preservation of overlying soft tissue
  - Improved mastication
• Improved deglutition
• Improved speech
• Prevention of gagging
• Achievement of favorable aesthetics
• Prevention of occlusal overloading of remaining natural dentition

○ Known risks and complications associated with therapy
  ▪ Presence of a general known risk and/or complication, as listed in the section entitled General Criteria, Parameters, and Considerations for Dental and Craniomaxillofacial Implant Surgery
  ▪ Neurosensory disturbances
  ▪ Mandibular fracture
  ▪ Salivary duct/gland injuries
  ▪ Soft tissue hyperplasia
  ▪ Loss of graft
  ▪ Bone resorption
  ▪ Loss of implant

THE RECONSTRUCTED MAXILLA (PARTIALLY AND EDENTULOUS)

• Indications for Therapy for the Reconstructed Maxilla (Partially and Edentulous)
  May include one or more of the following:
  ○ Preservation of natural tooth by avoiding tooth preparation for fixed and/or removable prosthesis
  ○ Inadequate natural teeth to support a fixed and/or removable prosthesis
  ○ Prevention of occlusal overloading of remaining natural dentition
  ○ Prevention of alveolar bone resorption and loss of supportive of bone
  ○ Clinical or imaging evidence of hard or soft tissue defect(s) in the maxillofacial region, including those resulting from tooth loss, oncologic therapy, and trauma
  ○ Masticatory dysfunction
  ○ Aesthetic deficiency and/or compromise
  ○ Speech impairment
  ○ Behavioral and/or psychological impairment
  ○ Neurologic dysfunction
    ▪ Nerve compression
    ▪ Soft tissue irritation
  ○ Intolerance to and/or inability to accommodate to tooth/soft tissue–borne prostheses
  ○ Reaction to materials used in tooth/soft tissue–borne prosthetic reconstruction
  ○ Combination syndrome (anterior maxillary resorption, papillary hyperplasia, bulbous tuberosities)

• Specific Therapeutic Goals for the Reconstructed Maxilla (Partially and Edentulous)
  The goal of therapy is to restore form and/or function. However, risk factors and potential complications may preclude complete restoration of form and/or function.
  The primary goal of implant reconstruction is to provide long-term, stable anchorage for a prosthesis. The implant, in combination with a prosthesis, may then provide one or more of the following:
  ○ Presence of a general therapeutic goal, as previously described
Prevention of loss of reconstructed alveolar and supporting bone
Preservation of overlying soft tissue
Improved mastication
Improved deglutition
Improved nutrition
Improved speech
Prevention of gagging
Enhanced aesthetics
Prevention of occlusal overloading of remaining natural dentition

- Specific Factors Affecting Risk for the Reconstructed Maxilla (Partially and Edentulous)
  - Severity factors that increase risk and the potential for known complications:
    - Presence of a general factor affecting risk, as previously described
    - Ridge relationship of opposing arch (e.g., retrognathia, laterognathia, prognathia)
    - Unfavorable ridge morphologic features
    - Unfavorable access (e.g., trismus, macroglossia)
    - Presence of severe atrophy
    - Relative position of soft tissue and muscle attachments
    - Location of adjacent vascular structures
    - Potential vascular compromise of grafted area
    - Position of the roots of the adjacent dentition
    - Anatomical relationship of maxillary sinus and nasal fossa
    - Size and location of incisive canal

- Indicated Therapeutic Parameters for the Reconstructed Maxilla (Partially and Edentulous)
  - The presurgical assessment includes, at a minimum, a clinical and imaging evaluation, as well as a prosthetic treatment plan. Also see the Patient Assessment chapter.
  - Proper patient selection; flap design; prevention of thermal injury; selection of site, angle, position, and trajectory; and primary implant stability are critical factors in achieving favorable outcomes. Magnitude and time of implant loading must be taken into consideration.
  - The following procedures for the management of the reconstructed maxilla are not listed in order of preference:
    - Placement of implant(s), including, when appropriate, immediate placement and immediate or early loading
    - Augmentation with autogenous, allogeneic, xenogeneic, or alloplastic graft(s) or growth factors to facilitate implant reconstruction, including sinus/nasal floor grafts
    - Harvesting of autogenous grafts from intraoral or extraoral sites, including but not limited to mandibular ramus, symphysis, alveolar ridge and retromolar region, maxillary tuberosity, ilium, tibia
    - Supplemental procedures:
      - Guided tissue regeneration
      - Soft tissue augmentation (e.g., grafts and local flaps)
      - Maxillary osteotomy or osseous distraction
      - Soft tissue sculpting
• Alveoloplasty, alveolectomy, vestibuloplasty
• Ridge preservation at time of extraction and site development at time of extraction or delayed
  o Instructions for posttreatment care and follow-up
• Outcome Assessment Indices for the Reconstructed Maxilla (Partially and Edentulous)
  Indices are used by the specialty to assess aggregate outcomes of care. Outcomes are assessed through clinical evaluation and may include an imaging evaluation.
  o Favorable therapeutic outcomes
    • General favorable therapeutic outcomes, as previously described
    • Prevention of loss of reconstructed alveolar and supporting bone
    • Preservation of overlying soft tissue
    • Improved mastication
    • Improved deglutition
    • Improved speech
    • Prevention of gagging
    • Achievement of favorable aesthetics
    • Prevention of occlusal overloading of remaining natural dentition
    • Improved stability of obturators
  o Known risks and complications associated with therapy
    • Presence of a general known risk and/or complication, as previously described
    • Neurosensory disturbances
    • Soft tissue hyperplasia
    • Loss of graft vascularity
    • Oral nasal and oral antral fistulae
    • Maxillary sinus infection and/or disease
    • Bone resorption
    • Loss of implant

IRRADIATED BONE
• Indications for Therapy of Irradiated Bone
  May include one or more of the following:
  o Preservation of natural tooth by avoiding tooth preparation for fixed and/or removable prosthesis
  o Inadequate or absence of natural teeth to support a fixed and/or removable prosthesis
  o Prevention of occlusal overloading of remaining natural dentition
  o Prevention of alveolar bone resorption and loss of supportive bone
  o Clinical or imaging evidence of hard or soft tissue defect(s) in the maxillofacial region, including those resulting from tooth loss, oncologic therapy, and trauma (eg, mandibular, maxillary, nasal, orbital, ear)
  o Masticatory dysfunction (eg, maxillary and/or mandibular partial or total edentulism and/or alveolar atrophy)
  o Aesthetic deficiency and/or compromise
  o Speech impairment
o Behavioral and/or psychological impairment
o Neurologic dysfunction
  ▪ Nerve compression
  ▪ Soft tissue irritation
o Intolerance to and/or inability to accommodate to tooth/soft tissue–borne prosthesis
o Reaction to materials used in tooth/soft tissue–borne prosthetic reconstruction
o Unstable obturator
o Provision of a stable prosthesis in the irradiated jaw with low tolerance to soft and hard tissue irritation or trauma
o Provision of retention and anchorage for maxillofacial, nasal, orbital, and ear prosthesis in irradiated tissue
o Provision of retention and support of a prosthesis in a xerostomic patient

• Specific Therapeutic Goals for Irradiated Bone
  The goal of therapy is to restore form and/or function. However, risk factors and potential complications may preclude complete restoration of form and/or function. The primary goal of implant reconstruction is to provide long-term, stable anchorage for a prosthesis. The implant, in combination with prosthesis, may then provide one or more of the following:
  o Presence of a general therapeutic goal, as previously described
  o Prevention of loss of soft tissue integrity to minimize contribution to osteoradionecrosis
  o Improved mastication
  o Improved deglutition
  o Improved nutrition
  o Improved speech
  o Prevention of gagging
  o Enhanced aesthetics
  o Preservation of remaining natural dentition
  o Improved stability of obturators
  o Provision of anchorage of maxillofacial, nasal, orbital, and ear prosthesis
  o Diminished risk of osteoradionecrosis secondary to trauma from conventional removable prosthesis

• Specific Factors Affecting Risk for Irradiated Bone
  Severity factors that increase risk and the potential for known complications:
  o Presence of a general factor affecting risk, as previously described
  o Unfavorable ridge morphologic features
  o Tissue hypoxia
  o Tissue hypocellularity
  o Potential for tumor recurrence
  o Xerostomia
  o Diminished reparative capability of tissue
  o Potential for radiation-induced cervical caries
  o Low tolerance of overlying mucosa and skin to trauma
  o Radiation dose
- Absorbed radiation dose to the implant region
- Diminished potential for osseointegration
- Correlation between implant lengths and implant losses
- Higher frequency of implant loss in craniofacial bones (frontal bone, followed by zygoma, maxilla, and mastoid process of the temporal bone)
- Interval between irradiation and implant placement
- Smoking habits of patient
- Radiation-associated trismus and with difficult surgical access
- Radiation source (eg, internal source of radiation, such as iridium implants, increase risk for radiation damage)
- Radiation fractionation
- Potential for reparative fibrosis, demineralization of bone, and increased susceptibility to infection and avascular necrosis

• Indicated Therapeutic Parameters for Irradiated Bone
  - The presurgical assessment includes, at a minimum, a clinical and imaging evaluation, as well as a prosthetic treatment plan. Also see the Patient Assessment chapter.
  - Proper patient selection; flap design; prevention of thermal injury; selection of site, angle, position, and trajectory; and primary implant stability are critical factors in achieving favorable outcomes. Magnitude and time of implant loading must be taken into consideration.
  - The following procedures for the management of acquired deformities are not listed in order of preference:
    - Placement of implant(s)
    - Augmentation with autogenous, allogeneic, xenogeneic, or alloplastic graft(s) or growth factors to facilitate implant reconstruction, including sinus/nasal floor grafts
    - Harvesting of autogenous grafts from nonirradiated sites
    - Use of microsurgically revascularized bone grafts
    - Supplemental procedures:
      - Guided tissue regeneration
      - Soft tissue augmentation (eg, grafts and local flaps)
      - Maxillary osteotomy or osseous distraction
    - Use of hyperbaric oxygen
    - Instructions for posttreatment care and follow-up (implant maintenance procedure)

• Outcome Assessment Indices for Irradiated Bone
  - Indices are used by the specialty to assess aggregate outcomes of care. Outcomes are assessed through clinical evaluation and may include an imaging evaluation.
    - Favorable therapeutic outcomes
      - General favorable therapeutic outcomes, as previously described
      - Improved mastication
      - Prevention of alveolar atrophy and loss of supportive bone
      - Improved deglutition
      - Improved nutrition
      - Improved speech
- Prevention of gagging
- Enhanced aesthetics
- Preservation of remaining dentition
- Improved stability of obturators
- Provision of anchorage of maxillofacial, nasal, orbital, and ear prosthesis
- Diminished risk of osteoradionecrosis secondary to trauma from conventional removable prosthesis
  - Known risks and complications associated with therapy
    - Presence of a general known risk and/or complication, as previously described
    - Diminished potential for osseointegration
    - Osteoradionecrosis
    - Delayed healing of overlying mucosa skin
    - Risk of tumor recurrence mimicking inflammation/infection
    - Longer healing periods

THE RECONSTRUCTED ALVEOLAR CLEFT

- See also the Cleft and Craniofacial Surgery chapter.
- Indications for Implant Therapy for the Reconstructed Alveolar Cleft
  - May include one or more of the following:
    - Inadequate ridge for prosthetic reconstruction (eg, implant placement)
    - Preservation of the natural tooth by avoiding preparation for fixed and/or removable prosthesis
    - Inadequate natural teeth to support a fixed and/or removable prosthesis
    - Prevention of occlusal overloading of remaining natural dentition
    - Prevention of alveolar bone resorption and loss of support of bone
    - Masticatory dysfunction
    - Speech impairment
    - Behavioral and/or psychological impairment
    - Soft tissue irritation
    - Intolerance to and/or inability to accommodate to tooth/soft tissue-borne prostheses
    - Aesthetic deficiency and/or compromise
    - Reaction to materials used in tooth/soft tissue-borne prosthetic reconstruction
    - Prevention of alveolar bone resorption and loss of supportive bone

- Specific Therapeutic Goals for Implants in the Reconstructed Alveolar Cleft
  - The goal of therapy is to restore form and/or function. However, risk factors and potential complications may preclude complete restoration of form and/or function.
  - The primary goal of implant reconstruction is to provide long-term, stable anchorage for a prosthesis. The implant, in combination with a prosthesis, may then provide one or more of the following:
    - Prevention of loss of reconstructed alveolar bone
    - Preservation of overlying soft tissue
    - Improved mastication
    - Improved speech
    - Enhanced aesthetics
o Prevention of occlusal overloading of remaining natural dentition

• Specific Factors Affecting Risk for Implants in the Reconstructed Alveolar Cleft
  Severity factors that increase risk and the potential for known complications:
  o Ridge relationship of opposing arch
  o Unfavorable ridge morphologic features
  o Presence of severe atrophy
  o Position of the roots of the adjacent dentition
  o Size and location of incisive canal

• Indicated Therapeutic Parameters for Implants in the Reconstructed Alveolar Cleft
  The presurgical assessment includes, at a minimum, a clinical and imaging evaluation, as well as a prosthetic treatment plan. Also see the Patient Assessment chapter.
  Proper patient selection; flap design; prevention of thermal injury; selection of site, angle, position, and trajectory; and primary implant stability are critical factors in achieving favorable outcomes. Magnitude and time of implant loading must be taken into consideration.
  The following procedures for the management of acquired deformities are not listed in order of preference:
  o Placement of osseointegrated type implant(s), including, when appropriate, immediate placement and immediate or early loading
  o Augmentation with autogenous, allogeneic, xenogeneic, or alloplastic graft(s) or growth factors to facilitate implant reconstruction, including sinus/nasal floor grafts
  o Harvesting of autogenous grafts from intraoral or extraoral sites, including but not limited to mandibular ramus, symphysis, alveolar ridge and retromolar region, maxillary tuberosity, ilium, cranium, tibia
  o Placement of zygomatic implants
  o Instructions for posttreatment care and follow-up

• Outcome Assessment Indices for Implants in the Reconstructed Alveolar Cleft
  Indices are used by the specialty to assess aggregate outcomes of care. Outcomes are assessed through clinical evaluation and may include an imaging evaluation.
  o Favorable therapeutic outcomes
    ▪ General favorable therapeutic outcomes, as previously described
    ▪ Prevention of loss of reconstructed alveolar and supporting bone
    ▪ Preservation of overlying soft tissue
    ▪ Improved mastication
    ▪ Improved speech
    ▪ Favorable aesthetics
    ▪ Prevention of occlusal overloading of remaining natural dentition
  o Known risks and complications associated with implant therapy
    ▪ Presence of a general known risk and/or complication, as previously described
    ▪ Neurosensory disturbances
    ▪ Soft tissue hyperplasia
    ▪ Failed implant
    ▪ Periimplantitis
Indications for Therapy for Developmental or Acquired Craniofacial Deformities
May include one or more of the following:

- Improvement on conventional retention of maxillofacial prosthesis
- Prevention of alveolar bone resorption and loss of supportive bone
- Clinical or imaging evidence of hard or soft tissue defect (e.g., congenital, traumatic, or oncologic loss of eye, ear, nose, hair, or other hard or soft tissue structure)
- Aesthetic deficiency and/or compromise
- Speech impairment
- Behavioral and/or psychological impairment
- Intolerance to and/or inability to accommodate a conventional prosthesis
- Adverse reaction to materials used in prosthesis construction

Specific Therapeutic Goals for Developmental or Acquired Craniofacial Deformities
The goal of therapy is to restore form and/or function. However, risk factors and potential complications may preclude complete restoration of form and/or function. The primary goal of implant reconstruction is to provide long-term, stable anchorage for a prosthesis. The implant, in combination with prosthesis, may then provide one or more of the following:

- Presence of a general therapeutic goal, as previously described
- Prevention of atrophy and loss of supportive bone
- Improved speech
- Prevention of gagging
- Enhanced aesthetics/appearance
- Improved psychosocial well-being

Specific Factors Affecting Risk for Developmental or Acquired Craniofacial Deformities
Severity factors that increase risk and the potential for known complications:

- Presence of a general factor affecting risk, as previously described
- Quantity and quality of remaining hard and soft tissues
- Unfavorable access
- Relative position of vital structures (e.g., nerves, cranial contents, vasculature)
- Relative position of craniofacial sinus

Indicated Therapeutic Parameters for Developmental or Acquired Craniofacial Deformities
The presurgical assessment includes, at a minimum, a clinical and imaging evaluation, as well as a prosthetic treatment plan. Also see the Patient Assessment chapter.

Proper patient selection; flap design; prevention of thermal injury; selection of site, angle, position, and trajectory; and primary implant stability are critical factors in achieving favorable outcomes. Magnitude and time of implant loading must be taken into consideration.

The following procedures for the management of acquired deformities are not listed in order of preference:

- Placement of osseointegrated type implant(s), including, when appropriate, immediate placement and immediate or early loading
o Augmentation with autogenous, allogeneic, xenogeneic, or alloplastic graft(s) or growth factors to facilitate implant reconstruction, including sinus/nasal floor grafts
o Harvesting of autogenous grafts from intraoral or extraoral sites, including but not limited to mandibular ramus, symphysis, alveolar ridge and retromolar region, maxillary tuberosity, ilium, cranium, tibia
o Instructions for post-treatment care and follow-up
o Use of absolute anchorage implants for correction of some skeletal deformities
o Ridge preservation at time of extraction and site development at time of extraction or delayed

• Outcome Assessment Indices for Developmental or Acquired Craniofacial Deformities

Indices are used by the specialty to assess aggregate outcomes of care. Outcomes are assessed through clinical evaluation and may include an imaging evaluation.

○ Favorable therapeutic outcomes
  ▪ General favorable therapeutic outcomes, as previously described
  ▪ Preservation of natural dentition
  ▪ Improved aesthetics
  ▪ Improved speech
  ▪ Preservation of remaining hard and soft tissues
  ▪ Improved stability of obturators
  ▪ Improved retention of maxillofacial prosthesis

○ Known risks and complications associated with therapy
  ▪ Presence of a general known risk and/or complication, as listed in the section entitled General Criteria, Parameters, and Considerations for Dental and Craniomaxillofacial Implant Surgery
  ▪ Loss of remaining soft or hard tissue
  ▪ Need for replacement of implant and/or prosthesis
  ▪ Damage to adjacent structures (eg, intracranial contents, neurovascular structures, craniofacial sinus)
SELECTED REFERENCES – DENTAL AND CRANIOMAXILLOFACIAL IMPLANT SURGERY

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.

SPECIAL CONSIDERATIONS FOR PEDIATRIC DENTAL AND CRANIOMAXILLOFACIAL IMPLANT SURGERY


Bergendal B: When should we extract deciduous teeth and place implants in young individuals with tooth agenesis? J Oral Rehabil 35(Suppl): 55, 2008


SPECIAL CONSIDERATIONS REQUIRING IMPLANTS


Consensus Conferences on Oral Implants in Young Patients, The Institute for Postgraduate Dental Education. Göteborg, Sweden: Graphic Systems AB, 1996


Orthodontics as a restorative option: implant anchorage to close posterior extraction sites. Orthodontic Dialogue. 7, 1994

Roberts WE, Marshel KJ, Mozsay PG: Rigid endosseous implant utilized as anchorage to protract molars and close an atrophic site. Angle Orthod 60:135, 1990


Salama H, Salama M: The role of orthodontic extrusive remodeling in the enhancement of soft and hard tissue profiles prior to a systemic approach to the management of extraction site defects. Int J Periodontics Restorative Dent 13:313, 1993


Degidi M, Piattelli A: Comparative analysis study of 702 dental implants subjected to immediate functional loading and immediate nonfunctional loading to traditional healing periods with a follow-up of up to 24 months. Int J Oral Maxillofac Implants 20:99, 2004


Misch CE: Early crestal bone loss etiology and its effect on treatment planning for implants. Postgrad Dent 2:3, 1995


Ryser MR, Block MS, Mercante DE: Correlation of papilla to crestal bone levels around single tooth implants in immediate or delayed crown protocols. J Oral Maxillofac Surg 63:1184, 2005


ISOLATED PARTIAL EDENTULISM IN AN AESTHETIC ZONE
Buser D, Belser UC, Lang NP: The original one-stage dental implant system and its clinical applications. J Periodontol 17:106, 1996
Degidi M, Piattelli A: Comparative analysis study of 702 dental implants subjected to immediate functional loading and immediate nonfunctional loading to traditional healing periods with a follow-up of up to 24 months. Int J Oral Maxillofac Implants 20:99, 2005


THE RECONSTRUCTED MANDIBLE (PARTIALLEY AND EDENTULOUS)


THE RECONSTRUCTED MAXILLA (PARTIALLY AND EDENTULOUS)


IRRADIATED BONE

THE RECONSTRUCTED ALVEOLAR CLEFT

DEVELOPMENTAL OR ACQUIRED CRANIOFACIAL DEFORMITIES
Anderson JD, Healey IR: Craniofacial applications for osseointegrated implants. Ont Dent 72:16, 1995
MANAGEMENT OF HEAD AND NECK INFECTIONS
INTRODUCTION
Management of head and neck infections includes odontogenic infections, non-odontogenic soft tissue infections of the head and neck and osteomyelitis.

GENERAL CRITERIA, PARAMETERS, AND CONSIDERATIONS FOR DIAGNOSIS AND MANAGEMENT OF PATHOLOGICAL CONDITIONS

INFORMED CONSENT: All surgery must be preceded by the patient’s or legal guardian’s consent, unless an emergent situation dictates otherwise. These circumstances should be documented in the patient’s record. Informed consent is obtained after the patient or the legal guardian has been informed of the indications for the procedure(s), the goals of treatment, the known benefits, and risks of the procedure(s), the factors that may affect the risk, the treatment options, and the favorable outcomes.

PERIOPERATIVE ANTIBIOTIC THERAPY: In certain circumstances, the use of antimicrobial rinses and systemic antibiotics may be indicated to prevent infections related to surgery. The decision to employ prophylactic perioperative antibiotics is at the discretion of the treating surgeon and should be based on the patient's clinical condition as well as other comorbidities which may be present.

USE OF IMAGING MODALITIES: Imaging modalities may include panoramic radiograph, periapical and/or occlusal radiographs, maxillary and/or mandibular radiographs, computed tomography, cone beam computed tomography, and magnetic resonance imaging. In determining studies to be performed for imaging purposes, principles of ALARA (as low as reasonably achievable) should be followed.

DOCUMENTATION: Documentation of objective findings, diagnoses, and patient management interventions is included. The ultimate judgment regarding the appropriateness of any specific procedure must be made by the individual surgeon in light of the circumstances presented by each patient. Understandably, there may be good clinical reasons to deviate from these parameters. When a surgeon chooses to deviate from an applicable parameter based on the circumstances of a particular patient, he/she is well advised to note in the patient’s record the reason for the procedure followed. Moreover, it should be understood that adherence to the parameters does not guarantee a favorable outcome.

GENERAL THERAPEUTIC GOALS FOR DIAGNOSIS AND MANAGEMENT OF PATHOLOGICAL CONDITIONS:
• Provision of medical and/or surgical palliation or cure of the disease process
• Restoration of function
• Restoration of form
• Preservation of vital structures
• Prevention of recurrence
• Limited period of disability
• Appropriate understanding by patient (family) of treatment options and acceptance of treatment plan
• Appropriate understanding and acceptance by patient (family) of favorable outcomes and known risks and complications
• Palliation of patient’s disease in the event of disseminated disease
GENERAL FACTORS AFFECTING RISK DURING DIAGNOSIS AND MANAGEMENT OF PATHOLOGICAL CONDITIONS:

• Degree of patient’s and/or family’s understanding of the origin and natural course of the condition or disorder and therapeutic goals and acceptance of proposed treatment
• Presence of coexisting major systemic disease (eg, disease that increases a patient’s American Society of Anesthesiologists classification to II, III, or IV)
• Age of patient
• Presence of acute and/or preexisting infection
• Accuracy and quality of pathologic diagnosis
• Presence of local or systemic conditions that may interfere with the normal healing process and subsequent tissue homeostasis (eg, previously irradiated tissue, diabetes mellitus, chronic renal disease, liver disease, blood disorder, steroid therapy, contraceptive medication, immunosuppression, malnutrition)
• Presence of behavioral, psychological, neurologic, and/or psychiatric disorders, including habits (eg, substance abuse, including tobacco and alcohol), seizure disorders, self-mutilation, or dementia, which may affect surgery, healing, and/or response to therapy
• Degree of patient’s and/or family’s cooperation and/or compliance
• Regulatory and/or third-party decisions concerning access to care, indicate therapy, drugs, devices, and/or materials
• Potential for risk to adjacent vital structures
• Existing drug or alcohol intoxication

GENERAL FAVORABLE THERAPEUTIC OUTCOMES FOR DIAGNOSIS AND MANAGEMENT OF PATHOLOGICAL CONDITIONS:

• Cure or palliation of disease
• Restored form
• Restored function
• Presence of intact adjacent structures (eg, no unanticipated loss or damage)
• Limited period of disability
• Patient (family) acceptance of procedure and understanding of outcomes

GENERAL KNOWN RISKS AND COMPLICATIONS OF DIAGNOSIS AND MANAGEMENT OF PATHOLOGICAL CONDITIONS:

• Unplanned admission to intensive care unit after elective surgery
  ● Comment and Exception: Planned admission should be documented in the patient’s record before surgery.
• Unplanned intubation for longer than 24 hours after surgery
  ● Comment and Exception: Planned intubation longer than 24 hours should be documented in the patient’s record before surgery.
• Reintubation or tracheostomy after surgery
• Use of parenteral drugs and/or fluids for longer than 72 hours after elective surgery
  ● Comments and Exceptions: Procedures in which long-term parenteral drugs and/or fluids are indicated as part of the original treatment plan should be documented in the patient’s record before surgery.
• Failure to ambulate within an acceptable period after surgery
• Facial and/or trigeminal nerve dysfunction after surgery
  ● Comment and Exception: When postoperative nerve dysfunction is common, anticipated deficits should be noted in the patient’s record before surgery (eg, anesthesia of inferior alveolar nerve distribution after segmental resection of the mandible for benign or malignant disease).
• Facial fracture during or after surgery (eg, pathologic fracture of mandible after marginal
resection)
- Comment and Exception: A fractured bone that may be a sequela to surgery should be documented in the patient’s record before surgery.
- Unplanned Caldwell-Luc, bronchoscopy, or other exploratory procedures associated with surgery
- Dental injury during surgery
  - Comment and Exception: Any potential dental injury should be noted in the patient’s record before surgery.
- Ocular injury during surgery
- Repeat Oral and/or Maxillofacial Surgery
  - Comment and Exception: Staged procedures that are part of the original treatment plan should be documented before the initial procedure.
- Postsurgical radiograph indicating presence of foreign body
  - Comment and Exception: Foreign bodies (eg, plates, screws, wires) that are anticipated as a normal course of the surgical procedures (eg, orthognathic, trauma) should be noted in the patient’s record.
- Readmission of cancer patient for repeat ablative surgery within 12 months of primary surgery
- Unplanned transfusion(s) of blood or blood components during or after surgery
- Readmission for complications or incomplete management of problems on previous hospitalization
  - Comments and Exceptions:
    - Complication or incomplete management occurring at another hospital or involving a physician who is not on the medical staff
    - Readmission for chronic disease (eg, intractable asthma, recurrent congestive heart failure, cancer); service-specific criteria required for this exception
    - Planned admissions for secondary procedures needed to complete treatment
- Respiratory and/or cardiac arrest
- Unanticipated residual functional deformity
- Unanticipated residual structural deformity
- Loss of or damage to adjacent vital structures (eg, neurosensory, dentition)
- Local sequelae, with damage to or loss of vital structures
- Loss of function
- Loss of form
- Death from tumor extension or as a result of tumor therapy
- Death
  - Comment and Exception: Admissions for terminal care must be documented.

**ODONTOGENIC INFECTIONS**
- Establishment of airway
- Elimination of source (removal of tooth, endodontic treatment, periodontal therapy, etc)
- Incision and drainage (intraorally and/or extraorally of the maxillofacial region)
- Aspiration
- Pain control
- Irrigation and debridement
- Identification of organism (eg, Gram stain, aerobic and anaerobic organism culture and sensitivity testing, culture acid-fast bacilli and fungi) when indicated
- Assessment and support of host defenses (eg, local measures, antipyretics, nutritional support, and hydration, hyperbaric oxygen treatment)
- Antimicrobial therapeutic management, if indicated (systemic or local therapy)
- Assessment and management of systemic involvement (eg, sepsis)
• Assessment and management of coexisting systemic disease (eg, diabetes mellitus)
• Instructions for post-treatment care and follow-up

V. Outcome Assessment Indices for Odontogenic Infections
Indices are used by the specialty to assess aggregate outcomes of care. Outcomes are assessed through clinical evaluation and may include an imaging evaluation.

A. Favorable therapeutic outcomes
• General favorable therapeutic outcomes
• Absence of local or systemic signs and/or symptoms of infection
• Absence of unanticipated tissue loss
• Restored form and function
• Improved host defenses
• Limited period of disability

B. Known risks and complications associated with therapy
• Presence of a general known risk and/or complication
• Persistence or extension of infection (intracranial extension, eg, sinusitis, cavernous sinus thrombosis, osteomyelitis, mediastinitis)
• Airway impairment
• Tissue loss or damage to adjacent vital structures
• Adverse systemic sequelae (eg, septicemia, endocarditis), which could lead to organ failure and death
• Adverse drugs reactions or interaction with existing therapeutic drug regimens
• Facial, neck scarring, or keloid formation with need for secondary revision surgery
• Nerve injury secondary to the infection or the surgical intervention
• Fracture of the maxilla or mandible
• Onset or exacerbation of symptom(s) related to the temporomandibular joint (TMJ) and surrounding structures

OSTEOMYELITIS
I. Indications for Therapy for Osteomyelitis
A. Clinical indications
• Pain
• Swelling
• Altered sensation
• Altered function
• Diaphoresis
• Fever
• Trismus
• Chills
• General malaise
• Swelling
• Erythema
• Purulence
• Exposed bone
• Fetor oris
• Soft tissue induration
• Fluctuance
• Sinus tract (fistula)
• Malocclusion
• Tooth mobility
• Lymphadenitis
• Sequestration
• Evidence of fracture
• Mottling
• Granulation tissue

B. Imaging indications (based on clinical and plain radiograph assessment)
• Destruction of bone (radiolucency or other evidence of osteolytic process)
• Evidence of sequestrum formation
• Reactive hyperplasia (sclerosis) of bone
• Abnormal bone scan
• Abnormal location and extent of radiopacity
• Antral or nasal wall destruction or thickening
• Evidence of pathologic fracture

C. Results of differential diagnosis
D. Results of additional studies, as indicated
   1. Surgical procedures
      a. Biopsy
      b. Incision and drainage with productive result
      c. Removal of bone sequestrum
      d. Lateral decortication
      e. Resection
   2. Laboratory evidence
      a. Gram stain
      b. Histopathology (special stains identifying organisms)
      c. Culture and sensitivities
      d. Complete blood cell count, differential count, and sedimentation rate

E. Additional presurgical studies may include:
   1. Imaging
      a. Office-based scans (panoramic and/or cone beam computed tomography)
      b. CT

II. Specific Therapeutic Goals for Osteomyelitis

A. Presence of a general therapeutic goal
B. Elimination of infection
C. Prevention or treatment of pathologic fractures

III. Specific Factors Affecting Risk in the Treatment of Osteomyelitis
• Presence of a general factor affecting risk
• Associated nonvital teeth
• Periodontal disease
• Presence of impending airway obstruction
• Extent of infection (eg, localized, diffuse)
• Identification of organism (eg, known, classified)
• Virulence of organism and/or responsiveness to antibiotics
• Degree of vascularity in region (eg, prior injury or surgery)
• Presence of associated fracture

IV. Indicated Therapeutic Parameters for Osteomyelitis
A. Diagnosis by imaging, biopsy, and culture (if indicated)
B. Nonsurgical treatment
   • Antibiotic therapy
   • Nutritional support
   • Hydration
• Irrigation
• Control of systemic disease
• Hyperbaric oxygen therapy

C. Surgical treatment
   1. Incision and drainage
   2. Debridement and sequestrectomy
   3. Stabilization of fracture
   4. Removal of involved teeth
   5. Saucerization
   6. Lateral decortication of mandible
   7. Marginal resection of mandible
   8. Segmental resection of mandible
   9. Partial or complete maxillectomy

All specimens must be submitted for pathologic and microbiologic assessments.

D. Post-treatment follow-up
   1. Baseline imaging in the initial postoperative period
   2. Antibiotic therapy
   3. Posttreatment assessment (bone scan)
   4. Determination of restoration of form and/or function
   5. Instructions to return if signs or symptoms recur before regularly scheduled follow-up appointment

E. Instructions for posttreatment care and follow-up

V. Outcome Assessment Indices for Osteomyelitis
A. Favorable therapeutic outcomes
   1. General favorable therapeutic outcomes, as previously described
   2. Complete absence of infection

B. Known risks and complications associated with therapy
   1. Presence of a general known risk and/or complication, as previously described
   2. Persistent infection
   3. Pathologic fracture
   4. Airway impairment

NON-ODONTOGENIC SOFT TISSUE INFECTIONS OF THE HEAD AND NECK
I. Indications for Therapy for Non-Odontogenic Soft Tissue Infections of the Head and Neck
A. Clinical or physical findings
   • Pain
   • Swelling
   • Soft tissue induration
   • Erythema
   • Lymphadenitis
   • Trismus
   • Purulence
   • Fistula
   • Malaise
   • Fever
   • Chills
   • Diaphoresis
   • Dyspnea
   • Dysphagia
   • Altered function
• Altered sensation
• Soft tissue necrosis (eg, necrotizing fasciitis)
• Systemic sepsis
• Disseminated infection (eg, prosthetic cardiac valve)

B. Diagnostic imaging findings
   1. Gas spaces in soft tissue
   2. Soft tissue mass, fluid loculation, and/or abscess cavity

C. Laboratory findings
   1. Abnormal complete blood cell count, differential count, sedimentation rate, serum electrolytes, glucose, arterial blood gas
   2. Positive microbiologic culture (eg, blood, purulence)
   3. Positive Gram stain
   4. Elevated temperature

II. Specific Therapeutic Goals for Non-Odontogenic Soft Tissue Infections of the Head and Neck
A. Presence of a general therapeutic goal, as previously described.
B. Prevention of recurrence

III. Specific Factors Affecting Outcomes from Non-Odontogenic Soft Tissue Infections of the Head and Neck
• Presence of a general factor affecting risk, as previously described.
• Extent of infection (eg, localized, diffuse)
• Direction and/or rate of extension of infection
• Presence of impending airway obstruction
• Susceptibility of organism to antibiotics
• Virulence of organism
• Proximity to contiguous structures
• Presence of foreign bodies or implanted materials

IV. Indicated Therapeutic Parameters for Non-Odontogenic Soft Tissue Infections of the Head and Neck
A. Establishment of airway (intubation, emergency tracheostomy, cricothyroidotomy), if compromised
B. Elimination of source
C. Incision and drainage
D. Aspiration
E. Pain control
F. Irrigation and debridement
G. Identification of organism (eg, Gram stain, aerobic and anaerobic organism culture and sensitivity testing, culture acid-fast bacilli, methicillin-resistant Staphylococcus aureus [MRSA] and fungi) when indicated
H. Assessment and support of host defenses (eg, local measures, antipyretics, nutritional support, and hydration, hyperbaric oxygen treatment)
I. Antimicrobial therapeutic management, if indicated (systemic or local therapy)
J. Assessment and management of systemic involvement (eg, sepsis)
K. Assessment and management of coexisting systemic disease (eg, diabetes mellitus)
L. Instructions for post-treatment care and follow-up
V. Outcome Assessment Indices for Non-Odontogenic Soft Tissue Infections of the Head and Neck

A. Favorable therapeutic outcomes
   1. General favorable therapeutic outcomes, as previously described.
   2. Absence of local or systemic signs and/or symptoms of infection
   3. Absence of unanticipated tissue loss
   4. Restored form and function
   5. Improved host defenses
   6. Limited period of disability

B. Known risks and complications associated with therapy
   1. Presence of a general known risk and/or complication, as previously described.
   2. Persistence or extension of infection (intracranial extension, eg, sinusitis, cavernous sinus thrombosis, osteomyelitis, mediastinitis)
   3. Airway impairment
   4. Tissue loss or damage to adjacent vital structures
   5. Adverse systemic sequelae (eg, septicemia, endocarditis), which could lead to organ failure and death
   6. Adverse drugs reactions or interaction with existing therapeutic drug regimens
   7. Facial, neck scarring, or keloid formation with need for secondary revision surgery
   8. Nerve injury secondary to the infection or the surgical intervention

SELECTED REFERENCES

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.

ODONTOGENIC INFECTIONS


OSTEOMYELITIS

NON-ODONTOGENIC SOFT TISSUE INFECTIONS OF THE HEAD AND NECK

NON-ODONTOGENIC SOFT TISSUE INFECTIONS OF THE HEAD AND NECK
RECONSTRUCTIVE MAXILLOFACIAL SURGERY, INCLUDING HARVESTING OF GRAFTS
INTRODUCTION
➢ Reconstructive Oral and Maxillofacial Surgery is defined as the surgical correction of soft and/or hard tissue defects of the jaws, face, and contiguous structures, including reduction, revision, augmentation, grafting, and implantation for the correction or replacement of defective structures to assist in restoring function to the compromised patient.
➢ The general principles of reconstruction in the region of the face and jaws are similar to those for reconstruction of other anatomic sites. The concentration of essential functional and aesthetic anatomy in the oral and maxillofacial region, however, mandates particular care and knowledge of the facial form, masticatory apparatus, and dentition.
➢ The Oral and Maxillofacial Surgeon, therefore, must understand and observe diagnostic and technical principles specific to the restitution of normal function and appearance in this critical area. Because of rapid developments associated with both alloplastic and allogeneic materials and autogenous tissue transfers, variability in treatment approaches within the definitions of acceptable practice can be expected. Evolution of computer assisted surgical planning and navigational surgery also introduces variability in treatment approaches within the definitions of acceptable practice. However, diagnostic or therapeutic measures employed in reconstructive surgery should be based on objective scientific data and where appropriate, clinical observation representative of a structured analysis of treatment. Treatment analysis should be based on an adequate sample, take into account inclusion and exclusion criteria, and involve a sufficient period of follow-up.

GENERAL CRITERIA, PARAMETERS, AND CONSIDERATIONS FOR RECONSTRUCTIVE SURGERY
➢ INFORMED CONSENT: All surgery must be preceded by the patient’s or legal guardian’s consent, unless an emergent situation dictates otherwise. These circumstances should be documented in the patient's record. Informed consent is obtained after the patient or the legal guardian has been informed of the indications for the procedure(s), the goals of treatment, the known benefits and risks of the procedure(s), the factors that may affect the risk, the treatment options, and the favorable outcomes.
➢ PERIOPERATIVE ANTIBIOTIC THERAPY: In certain circumstances, the use of antimicrobial rinses and systemic antibiotics may be indicated to prevent infections related to surgery. The decision to employ prophylactic perioperative antibiotics is at the discretion of the treating surgeon and should be based on the patient's clinical condition as well as other co morbidities which may be present.
➢ IMAGING MODALITIES: Imaging modalities may include panoramic radiograph, periapical and/or occlusal radiographs, maxillary and/or mandibular radiographs, computed tomography, cone beam computed tomography, positron emission tomography, positron emission tomography/computed tomography, and magnetic resonance imaging. In determining studies to be performed for imaging purposes, principles of ALARA (as low as reasonably achievable) should be followed.
➢ DOCUMENTATION: This includes documentation of objective findings, diagnoses, and patient management interventions. The ultimate judgment regarding the appropriateness of any specific procedure must be made by the individual surgeon in light of the circumstances presented by each patient. Understandably, there maybe
good clinical reasons to deviate from these parameters. When a surgeon chooses to
deviate from an applicable parameter based on the circumstances of a particular
patient, he/she is well advised to note in the patient’s record the reason for the
procedure followed. Moreover, it should be understood that adherence to the
parameters does not guarantee a favorable outcome.

GENERAL THERAPEUTIC GOALS FOR RECONSTRUCTIVE SURGERY:

• Restored absent or abnormal tissue and function
• Restored or improved facial symmetry and appearance
• Enhanced social and psychological well-being
• Limited severity and period of disability
• Replacement of missing or qualitatively deficient soft tissue and improved physiologic
function
• Maintenance of form and function over time (eg, maintenance of volume of grafted
bone, acceptable growth of a costochondral graft in a child)
• Appropriate understanding by patient (family) of treatment options and acceptance of
treatment plan
• Appropriate understanding and acceptance by patient (family) of favorable outcomes
and known risks and complications

GENERAL FACTORS AFFECTING RISK DURING RECONSTRUCTIVE SURGERY:

• Degree of patient’s and/or family’s understanding of the origin and natural course of the
condition or disorder and therapeutic goals and acceptance of proposed treatment
• Presence of coexisting major systemic disease (eg, disease that increases a patient’s
American Society of Anesthesiologists classification to II, III, or IV), as detailed in the
Patient Assessment chapter
• Age of patient
• Abnormal or inadequate osseous and/or soft tissue anatomy
• Presence of disease in bone and/or soft tissue
• Presence of infection
• Unfavorable local or systemic response (eg, hypersensitivity, foreign body reaction,
fibrosis) to materials used in reconstructive surgery
• Use of unsuspected contaminated or diseased materials
• Severity of the deformity
• Inadequate vascularity of the area (eg, effect of previous surgery, radiation, trauma,
chemical or burn injuries, cleft palate deformity, hypertrophic scar, keloid)
• Inadequate healing secondary to previous trauma or surgery (eg, failure, nonunion)
• Inadequate support systems
• Presence of local or systemic conditions that may interfere with the normal healing
process and subsequent tissue homeostasis (eg, previously irradiated tissue, diabetes
mellitus, chronic renal disease, liver disease, anticoagulative blood disorders, steroid
therapy, contraceptive medication, immunosuppression, malnutrition)
• Presence of behavioral, psychological, neurologic, and/or psychiatric disorders,
including habits (eg, substance abuse, including tobacco and alcohol), seizure
disorders, self-mutilation that may affect surgery, healing, and/or response to therapy
• Degree of patient’s and/or family’s cooperation and/or compliance
• Regulatory and/or third-party decisions concerning access to care, indicated therapy,
drugs, devices, and/or materials
• Abnormalities in the health or position of the remaining bone
• Previous surgical history
GENERAL FAVORABLE THERAPEUTIC OUTCOMES FOR RECONSTRUCTIVE SURGERY:
• Improved physiologic function
• Improved support for hard and soft tissue structures
• Enhanced social and psychological well-being
• Limited severity and/or period of disability
• Improved appearance
• Improved facial symmetry
• Maintenance of form and function over time
• Improved function
• Improved physiologic function
• Patient (family) acceptance of procedure and understanding of outcomes

GENERAL KNOWN RISKS AND COMPLICATIONS FOR RECONSTRUCTIVE SURGERY:
➢ Unexpected systemic postsurgical complications may occur in the oral and maxillofacial surgical patient, as with any other surgical patient (eg, deep venous thromboses, pulmonary emboli, myocardial infarctions, cerebrovascular accidents)
• Unplanned admission to intensive care unit after elective surgery
  o Comment and Exception: Planned admission should be documented in the patient’s record before surgery.
• Unplanned intubation for longer than 12 hours after surgery
  o Comment and Exception: Planned intubation longer than 12 hours should be documented in the patient’s record before surgery.
• Reintubation or tracheostomy after surgery
• Use of parenteral drugs, intravenous fluids, catheters, feeding tubes, and other intensive support for an extended period after elective surgery
  o Comment and Exception: Long-term intensive support that is anticipated as part of the original treatment plan should be documented in the patient’s record before surgery.
• Unexpected failure to ambulate within a reasonable period after elective surgery
• Facial and/or trigeminal nerve dysfunction after surgery
  o Comment and Exception: When postoperative nerve dysfunction is common, anticipated deficits should be noted in the patient’s record before surgery (eg, inferior alveolar anesthesia after mandibular resection, dysfunction of the temporal branch of facial nerve after temporomandibular joint procedures).
• Facial fracture during or after surgery
  o Comment and Exception: A fractured bone that may be a sequela to surgery should be documented in the patient’s record before surgery.
• Unplanned Caldwell-Luc, or other exploratory procedures associated with surgery
• Dental injury during surgery
• Repeat Oral and/or Maxillofacial Surgery
  o Comment and Exception: Staged procedures that are part of the original treatment plan should be documented before the initial procedure.
• Core temperature of greater than 101°F 72 hours after elective surgery
• Postsurgical radiograph indicating presence of foreign body
  o Comment and Exception: Foreign bodies (eg, plates, screws, wires) that are anticipated as a normal course of the surgical procedures (eg, orthognathic, trauma) should be noted in the patient’s record.
• Readmission of cancer patient for repeat ablative surgery
• Unplanned transfusion(s) of blood or blood components during or after surgery
• Readmission for complications or incomplete management of problems on previous hospitalization
  o Comments and Exceptions:
    ▪ Complication or incomplete management occurring at another hospital or involving a physician who is not on the medical staff.
    ▪ Readmission for chronic disease (eg, intractable asthma, recurrent congestive heart failure, cancer); service-specific criteria required for this exception.
    ▪ Planned admissions for secondary procedures needed to complete treatment.
• Respiratory and/or cardiac arrest in the perioperative period
• Recipient site(s) morbidity
• Donor site(s) morbidity
• Development of new systemic disease or condition (eg, human immunodeficiency virus infection, hepatitis, pulmonary embolism)
• Exacerbation of existing systemic disease (eg, cerebrovascular, cardiac, pulmonary)
• Worsened social and psychological well-being
• Increased severity and/or extension of period of disability
• Pain
• Death

SPECIAL CONSIDERATIONS FOR PEDIATRIC RECONSTRUCTIVE SURGERY
  ➢ A primary concern for the Oral and Maxillofacial Surgeon performing pediatric maxillofacial reconstruction is to provide a stable, functional skeletal framework that will respond to future unrestricted growth and development. Of particular concern are the nasal, orbital, and mandibular regions.
  ➢ Nasal development is progressive, with significant projection and nasal cavity enlargement. Costochondral grafts usually respond favorably to functional forces and intrinsic stimuli for growth.
  ➢ The jaws, particularly the mandible, are key regions of development in pediatric patients. Because mandibular growth is both active (programmed) and passive (responsive), reconstruction during childhood must be staged chronologically. Optimal ramal/condylar growth necessitates both osseous and cartilaginous elements, which are provided by costochondral grafts. Mandibular body reconstruction in later childhood may be accomplished through osseous grafts from rib or iliac crest. Distraction osteogenesis and/or early orthognathic procedures may further facilitate facial development after condylar elements are in place and monitored for responsive or adaptive mechanisms.

DEFECTS OF THE MANDIBLE AND ASSOCIATED SOFT TISSUES
• Indications for Therapy for Defects of the Mandible and Associated Soft Tissues
  o Impaired masticatory function, speech, and/or swallowing
  o Malocclusion
  o Inadequate digestion and nutritional deficiencies
  o Inadequate bone support for soft tissue oral and maxillofacial structures
  o Inadequate quantity and quality of bone and soft tissue for implant reconstruction
  o Obstructed airway
  o Facial asymmetries
  o Temporomandibular joint dysfunction
  o Impaired functional mobility (eg, scar contracture)
  o Provision of soft tissue coverage of vital structures (eg, mandible)
  o Salivary incontinence
- Mucocutaneous pathology
- Presence of foreign bodies
- Quantitative or qualitative soft tissue deficiencies
- Periodontal disease
- Orocutaneous fistula

**Specifics Therapeutic Goals for Defects of the Mandible and Associated Soft Tissues**
- Presence of a general therapeutic goal, as listed in the section entitled General Criteria, Parameters, and Considerations for Reconstructive Surgery
- Improved functional mobility
- Improved nutrition
- Improved facial symmetry and appearance
- Adequate coverage of vital structure
- Closure of orocutaneous fistulae
- Reduced salivary incontinence
- Controlled mucocutaneous pathology
- Improved masticatory and/or prosthetic function
- Improved range of jaw motion
- Improved speech
- Improved swallowing
- Improved airway
- Improved environment for maintenance of periodontal health
- Diagnosis and control of mucocutaneous diseases and systemic pathology
- Corrected or limited effects of abnormal growth

**Specific Factors Affecting Risk for Defects of the Mandible and Associated Soft Tissues**
- Presence of a general factor affecting risk, as listed in the section entitled General Criteria, Parameters, and Considerations for Reconstructive Surgery
- Abnormalities in the health and positioning of remaining teeth or bone
- Functional deficiencies in mastication and/or swallowing
- Presence and functional status of temporomandibular joint
- Presence of muscular disorders
- Airway compromise (eg, presence of obstructive sleep apnea syndrome (OSAS), tumors)

**Indicated Therapeutic Parameters for Defects of the Mandible and Associated Soft Tissues**

➢ The presurgical assessment includes, at a minimum, a history and both a clinical and an imaging evaluation.

➢ The following is a list of procedures for reconstruction of defects of the mandible and associated soft tissue. Defect characteristics, including volume, tissue condition, and anatomical site, should guide the selection of an appropriate reconstructive technique. The following procedures for the management of defects of the mandible and associated soft tissues are not listed in order of preference:

- Timing of reconstruction should be considered during preoperative planning
  - Immediate reconstruction
    - When potential for successful hard tissue reconstruction is favorable (eg, adequate soft tissue and vascular supply)
For tumor ablative surgery, when there is a high degree of confidence that the tumor has been completely removed

- When there is concern regarding deterioration of the psychological and/or psychiatric status of the patient and/or family
- Palliative reconstruction in cases of terminal disease when there is facial disfigurement
- In the presence of extensive soft tissue defect, to prevent infection, contracture, salivary incontinence, etc

○ Delayed reconstruction
  - When the potential for successful immediate hard tissue reconstruction is unfavorable (eg, oral contamination, compromised vascular supply, infection)
  - For tumor ablative surgery, when it is not certain that the tumor has been completely removed
  - Palliative reconstruction in cases of terminal disease when there is facial disfigurement

○ Access for reconstruction
  - Preauricular incisions
  - Oral incisions
  - Lip incisions

○ Modalities for reconstruction
  - Hard tissue
    - Autogenous bone (eg, particulate and/or block grafts)
      - Free grafts
        - Ilium (eg, anterior and/or posterior)
        - Tibial, maxillofacial (eg, mandible) for alveolar reconstruction before prosthetic and/or implant rehabilitation
        - Rib
        - Osteomyocutaneous pedicle flaps
      - Microvascular flaps
        - Fibula
        - Radius
    - Alloplastic materials
      - Metal plates, screws, and trays
      - Synthetic bone substitutes
      - Guided tissue regeneration materials
      - Polymeric materials (eg, resorbable and nonresorbable)
    - Allogeneic bone (crushed cortical and/or cancellous, with or without autogenous bone)
      - Ilium
      - Mandible
    - Xenogeneic bone (eg, bovine bone)
    - Bone morphogenetic protein
    - Implant placement and/or prosthetic rehabilitation
    - Adjunctive therapy
      - Hyperbaric oxygen
      - Growth factors (eg, fibrin adhesive, autologous platelet-rich plasma)
    - Fixation and/or stabilization of skeletal devices
      - Rigid internal plates
• Intraosseous wires
• Maxillomandibular fixation
• Intraoral splints
  ▪ Transport Distraction osteogenesis for segmental defect reconstruction (includes initial application of device and subsequent removal)
  ▪ Implant placement
  □ Soft tissue
    ▪ Local flaps
    ▪ Microvascular flaps (e.g., radial forearm flap)
    ▪ Full- or split-thickness skin and mucosal grafts
    ▪ Adjunctive therapy (e.g., hyperbaric oxygen, wound debridement)
  □ Instructions for post treatment care and follow-up

• Outcome Assessment Indices for Defects of the Mandible and Associated Soft Tissues
  □ Favorable therapeutic outcomes
    • General favorable therapeutic outcomes, as listed in the section entitled General Criteria, Parameters, and Considerations for Reconstructive Surgery
    • Replaced missing hard tissue
    • Improved mandibular function (e.g., mastication, speech, swallowing, nutritional status, and/or airway)
    • Improved functional mobility of mandible and soft tissues
    • Adequate coverage of vital structure
    • Closure of orocutaneous fistulae
    • Reduced salivary incontinence
    • Controlled mucocutaneous pathology
    • Improved environment for maintenance of periodontal health
    • Correction or limitation of abnormal growth and development
  □ Known risks and complications associated with therapy
    • Presence of a general known risk and/or complication, as listed in the section entitled General Criteria, Parameters, and Considerations for Reconstructive Surgery
    • Recipient site
      ▪ Malunion, nonunion, fibrous union
      ▪ Inadequate volume
      ▪ Infection
    • Specific known risks and complications associated with selected more commonly used donor sites:
      ▪ Ilium
        ▪ Persistent gait disturbance
        ▪ Hernia
        ▪ Ileus
        ▪ Peritonitis
        ▪ Retroperitoneal hematoma
      ▪ Rib
        ▪ Pneumothorax and/or hemothorax
        ▪ Chondritis
    • Specific known risks and complications associated with recipient site
      ▪ Inability to wear prosthesis
- Inadequate quantity and quality of bone and soft tissue for placement for dental implants
- Neurologic deficit (e.g., anesthesia, paresthesia, paralysis, dysgeusia)

**DEFECTS OF THE MAXILLA AND ASSOCIATED SOFT TISSUES**

- **Indications for Therapy for Defects of the Maxilla and Associated Soft Tissues**
  - Impaired masticatory function, speech, and/or swallowing
  - Malocclusion
  - Nutritional deficiencies
  - Inadequate bone support for soft tissue, oral and maxillofacial structures, teeth, and prosthetic appliances
  - Obstructed airway
  - Oronasal, oroantral, and/or oral-orbital communication
  - Quantitative or qualitative soft tissue deficiencies (e.g., cheeks, lips)
  - Impaired functional mobility (e.g., scar contracture)
  - Facial asymmetry and disfigurement
  - Drooling
  - Orocutaneous fistula
  - Nutritional deficiencies
  - Provision of soft tissue coverage of vital structures (e.g., eyes, paranasal sinuses)
  - Facial asymmetry and disfigurement
  - Soft tissue dehiscence with exposure of bone plate or bone graft
  - Periodontal disease
  - Mucocutaneous and systemic pathology
  - Presence of foreign bodies

- **Specific Therapeutic Goals for Defects of the Maxilla and Associated Soft Tissues**
  - Presence of a general therapeutic goal, as listed in the section entitled General Criteria, Parameters, and Considerations for Reconstructive Surgery
  - Improved functional mobility
  - Improved swallowing and prevention of aspiration and/or regurgitation
  - Improved facial symmetry
  - Adequate coverage of vital structures
  - Closure of orocutaneous fistulae
  - Improved appearance
  - Identification of occult or previously unrecognized disease during therapy
  - Improved masticatory and/or prosthetic function
  - Improved speech
  - Improved nutrition
  - Improved airway
  - Closure of oronasal, oroantral, and/or cutaneous fistulae
  - Improved environment for maintenance of periodontal health
  - Diagnosis and control of mucocutaneous diseases and systemic disease
  - Corrected or limited effects of abnormal growth

- **Specific Factors Affecting Risk for Defects of the Maxilla and Associated Soft Tissues**
  - Presence of a general factor affecting risk, as listed in the section entitled General Criteria, Parameters, and Considerations for Reconstructive Surgery
  - Compromises in the health and positioning of remaining teeth or bone
  - Functional deficiencies in mastication and/or swallowing
- Presence of muscular disorders
- Airway compromise (eg, presence of obstructive sleep apnea syndrome, tumors)
- Abnormal speech (eg, presence or absence of hypernasal or hyponasal speech, velopharyngeal incompetence, articulatory speech dysfunction, tongue volume and immobility)
- Compromised osseous and/or soft tissue anatomy

- **Indicated Therapeutic Parameters for Defects of the Maxilla and Associated Soft Tissues**

  - Timing of reconstruction should be considered during preoperative planning
    - **Immediate reconstruction**
      - When potential for successful hard tissue reconstruction is favorable (eg, adequate soft tissue, vascular supply)
      - For tumor ablative surgery, when there is a high degree of confidence that the tumor has been completely removed
      - When there is concern regarding deterioration of the psychological and/or psychiatric status of the patient and/or family
      - Palliative reconstruction in cases of terminal disease when there is facial disfigurement
      - In the presence of extensive soft tissue defect, to prevent infection, contracture, salivary incontinence, etc
    - **Delayed reconstruction**
      - When the potential for successful immediate hard tissue reconstruction is unfavorable (eg, oral contamination, compromised vascular supply, infection)
      - For tumor ablative surgery, when it is not certain that the tumor has been completely removed
      - Palliative reconstruction in cases of terminal disease when there is facial disfigurement

  - **Access for reconstruction**
    - Transoral
    - Transcutaneous (eg, Weber-Ferguson incision)
    - Facial degloving incision

  - **Modalities for reconstruction**
    - **Hard tissue**
      - Autogenous bone
        - Free grafts
          - Ilium (eg, anterior and posterior)
          - Tibial, maxilofacial (eg, mandible) for alveolar or maxillary sinus reconstruction before prosthetic and/or implant rehabilitation
      - Rib
      - Osteomyocutaneous pedicle flaps
        - Microvascular flaps
          - Fibula
          - Osteomyocutaneous
      - Alloplastic materials
        - Metallic plates, screws, and trays
        - Synthetic bone substitutes
        - Guided tissue regeneration materials
Polymeric materials
- Xenogeneic bone (eg, bovine bone)
- Bone morphogenetic protein
- Implant placement and/or prosthetic reconstruction
- Adjunctive therapy
  - Fixation and/or stabilization of skeletal segments
  - Hyperbaric oxygen
  - Growth factors (eg, fibrin adhesive, autologous platelet-rich plasma)
- Fixation and/or stabilization devices
  - Rigid internal plates
  - Wire osteosynthesis
  - Maxillomandibular fixation
  - Intraoral splints
- Soft tissue reconstruction of maxillary bone defects
  - Buccal fat pad flaps
  - Adjacent local soft tissue flaps
- Implant placement
- Soft tissue
  - Local flaps
    - Regional flaps
  - Microvascular flaps (eg, radial forearm flap)
  - Full- or split-thickness skin and mucosal grafts
  - Adjunctive therapy (eg, hyperbaric oxygen, wound debridement)
  - Tissue expanders
- Instructions for post treatment care and follow-up

*Outcome Assessment Indices for Defects of the Maxilla and Associated Soft Tissues*
- Favorable therapeutic outcomes
  - General favorable therapeutic outcomes, as listed in the section entitled General Criteria, Parameters, and Considerations for Reconstructive Surgery
  - Replaced missing hard tissue
  - Improved maxillary function, mastication, speech, swallowing, nutritional status, and/or airway
  - Replaced missing or qualitatively deficient soft tissue
  - Improved functional mobility
  - Improved swallowing and prevention of aspiration and/or regurgitation
  - Adequate coverage of vital structures
  - Closure of orocutaneous fistulae
  - Control secretions
  - Identification of occult or previously unrecognized disease during therapy
  - Improved environment for maintenance of periodontal health
  - Diagnosis and control of mucocutaneous diseases and systemic disease
  - Corrected or limited effects of abnormal growth and development
- Known risks and complications associated with therapy
  - Presence of a general known risk and/or complication, as listed in the section entitled General Criteria, Parameters, and Considerations for Reconstructive Surgery
  - Recipient site
    - Oroantral and/or nasal communication
Inability to wear a prosthetic appliance

Specific known risks and complications for selected commonly used donor sites:

- Ilium
  - Persistent gait disturbance
  - Hernia
  - Ileus
  - Peritonitis
  - Retroperitoneal hematoma

- Rib
  - Pneumothorax and/or hemothorax
  - Chondritis

- Fibula free flap
  - Persistent gait disturbance
  - Knee and/or angle instability
  - Excessive scarring and/or donor site cosmetic defects
  - Neurologic disturbance
  - Compartment syndrome
  - Extremity ischemia

- Radial forearm free flap
  - Excessive scarring and/or donor site cosmetic defects
  - Fine motor disturbances
  - Neurologic disturbance
  - Compartment syndrome
  - Extremity ischemia
  - Excessive scarring and/or donor site cosmetic defects
  - Upper extremity range of motion disturbance
SELECTED REFERENCES – RECONSTRUCTIVE SURGERY

SPECIAL CONSIDERATIONS FOR PEDIATRIC RECONSTRUCTIVE SURGERY


DEFECTS OF THE MANDIBLE AND ASSOCIATED SOFT TISSUES


Alvi A, Myers EN: Skin graft reconstruction of the composite resection defect. Head Neck 18:538, 1998


ORTHOGNATHIC SURGERY
INTRODUCTION

The surgical correction of maxillofacial skeletal deformities includes the reconstructive procedures that correct deformities of the maxilla, mandible, facial skeleton, and associated soft tissue structures. The etiology of maxillofacial skeletal deformities may be either congenital or acquired. Deformities may be evident at birth or may manifest during subsequent growth and development, creating functional, degenerative, cosmetic, and/or psychological problems. The timing of corrective surgery can be critical and may occur during or after completion of growth.

Orthodontic consultation and treatment in conjunction with surgical correction are frequently necessary and highly favorable in most cases. Radiographic evaluation prior to or following treatment is critical, but should be used judiciously as clinically indicated. Treatment planning can involve single or multiple separate, staged surgical and nonsurgical treatments. Other nonsurgical specialties (eg, speech therapy, sleep medicine, psychology, orthodontics, prosthodontics) may also be helpful or necessary for completion of treatment in more complicated cases. The principal goal for surgical correction of the maxillofacial skeletal deformity is to create or restore normal function and health, while minimizing potential negative short-term and long-term sequelae.

Procedures used for the correction of maxillofacial skeletal deformities may also be necessary to correct obstructive sleep apnea syndrome (OSAS). It is recognized that obstructive sleep apnea due to upper airway obstruction can effectively be corrected with maxillomandibular advancement, whether or not traditional cephalometric landmarks and analysis diagnose a specific maxillofacial skeletal abnormality. Cosmetic alterations may result after the treatment of maxillofacial surgical deformities. Treatment planning for the correction of maxillofacial skeletal deformities normally entails basic cosmetic tenets and guidelines to maximize patient outcomes both functionally and esthetically.

Congenital, developmental, and acquired abnormalities of the temporomandibular joint can result in functional alterations, distortion, and/or disfigurement of the mandible, maxilla, and related structures. Distortion and disfigurement of the maxillofacial skeleton can also cause temporomandibular joint problems. Surgical correction of the maxillofacial skeletal structures may include surgical and nonsurgical treatment of the temporomandibular joint.

Cleft lip and palate and/or craniofacial deformities often occur in conjunction with other maxillofacial skeletal deformities and are not independent of each other. Recognition and treatment of these associated cleft and craniofacial deformities may influence or change treatment guidelines for maxillofacial skeleton deformities.

These parameters were prepared with the recognition that there is more than one approach to treating specific deformities of the maxillofacial skeleton. Each patient may require an individualized treatment based on a number of contributing factors. Consequently, flexibility has been incorporated into this document to allow the practitioner to select the most appropriate treatment option in each case. Newer diagnostic and surgical adjuvants, including computed tomography (CT), CT-guided planning, CT-generated surgical guides, and 3-dimensional modeling and navigational surgery may be indicated in some cases to reduce surgical risk and improve outcomes. This is particularly true in more severe deformities and/or abnormal development with abnormal anatomy requiring complicated surgical maneuvers. In addition, navigational and endoscopic surgical techniques are rapidly evolving and may offer an advantage over traditional surgical techniques in selected instances. The future application of robotic surgery may even develop into a useful surgical tool for the treatment of maxillofacial skeletal deformities and adjunctive procedures. Future changes in the treatment of maxillofacial skeletal deformities, resulting from new research findings and evolving technologic developments, will undoubtedly extend the capabilities for treatment and enable an even higher quality of patient care.
The surgical correction of maxillofacial skeletal deformities requires clear understanding, by both surgeon and patient, of stated treatment objectives and expectations regarding the proposed treatment and outcome, recognizing that different treatments for the same deformity may not only be acceptable but may also present different risks, benefits, and outcomes.

GENERAL CRITERIA, PARAMETERS, AND CONSIDERATIONS FOR SURGICAL CORRECTION OF MAXILLOFACIAL SKELETAL DEFORMITIES

INFORMED CONSENT: All surgery must be preceded by the patient’s or legal guardian’s consent, unless an emergent situation dictates otherwise. Emergent circumstances should be documented in the patient’s record. Informed consent is obtained after the patient or the legal guardian has been informed of the indications for the procedure(s), the goals of treatment, the known benefits and risks of the procedure(s), the factors that may affect the risk, the treatment options, and the favorable outcomes.

PERIOPERATIVE ANTIBIOTIC THERAPY: The use of antimicrobial rinses and systemic antibiotics may be indicated to prevent infections related to surgery. Prophylactic perioperative antibiotics is at the discretion of the treating surgeon and should be based on the patient’s clinical condition as well as other comorbidities which may be present.

USE OF IMAGING MODALITIES: Panoramic radiograph, periapical and/or occlusal radiographs, maxillary and/or mandibular radiographs, computed tomography, cone beam computed tomography, positron emission tomography, positron emission tomography/computed tomography, and magnetic resonance imaging. In determining studies to be performed for imaging purposes, principles of ALARA (as low as reasonably achievable) should be followed.

DOCUMENTATION: Documentation of objective findings, diagnoses, and patient management interventions.

COMPREHENSIVE CARE: Comprehensive care in the surgical correction of maxillofacial skeletal deformities usually includes orthodontic therapy. In cases where orthodontics is not included, adequate documentation is recommended. Other comprehensive care may include any necessary evaluations or interventions for medical, dental, psychological, speech, or airway concerns before surgery.

GENERAL INDICATIONS FOR THERAPY FOR SURGICAL CORRECTION OF MAXILLOFACIAL SKELETAL DEFORMITIES:

- Physical evidence of musculoskeletal, dento-osseous, and/or soft tissue deformity
- Imaging evidence of musculoskeletal, dento-osseous, and/or soft tissue deformity
  - Deviation from cephalometric norms
  - Other imaging disclosure of abnormality
- Malocclusion that cannot be reasonably corrected by a nonsurgical means (eg, unstable or traumatic occlusion, compromised aesthetics, protracted treatment time)
- Masticatory and swallowing abnormalities
- Incomplete correction or unstable result of previous treatment
- Dental and/or periodontal pathology
- Associated temporomandibular joint disorders
• Associated muscular disorder (surgical correction may be useful when reversible occlusal alteration demonstrates relief of symptoms)
• Sleep disordered breathing

GENERAL THERAPEUTIC GOALS FOR SURGICAL CORRECTION OF MAXILLOFACIAL SKELETAL DEFORMITIES:

• Improved musculoskeletal, dento-osseous, and/or soft tissue relationships
• Improved masticatory and swallowing
• Improved occlusion
• Improved quality of speech
• Enhanced stability of orthodontic result
• Improved dental and periodontal health
• Improved social and psychological well-being
• Improved associated temporomandibular joint and/or muscular disorders
• Limited period of disability
• Improved airway, including improvement of signs and symptoms of sleep disordered breathing

GENERAL FACTORS AFFECTING RISK DURING SURGICAL CORRECTION OF MAXILLOFACIAL SKELETAL DEFORMITIES:

• Degree of patient and/or family understanding of the origin and natural course of the condition or disorder and therapeutic goals and acceptance of proposed treatment
• Presence of coexisting major systemic disease (eg, disease that increases a patient’s American Society of Anesthesiologist classification to II, III, or IV)
• Age of patient
• Active and/or disproportionate maxillofacial growth
• Presence and severity of temporomandibular joint and/or muscular disorders
• Severity of maxillofacial skeletal deformity (eg severe hemifacial microsomia syndromes, distorted or unusual anatomy, malocclusions with large occlusal discrepancies (generally \( \geq 1 \) cm)
• Presence and severity of acquired maxillary and/or mandibular skeletal, dento-osseous, or soft tissue deformities (eg, secondary to facial trauma, compromised dentoalveolar health, previous surgical treatment)
• Presence of parafunctional habits (eg, bruxism, clenching, tongue thrusting, finger sucking)
• Presence of local or systemic conditions that may interfere with the normal healing process and subsequent tissue homeostasis (eg, previously irradiated tissue, diabetes mellitus, chronic renal disease, liver disease, blood disorder, steroid therapy, contraceptive medication, immunosuppression, malnutrition)
• Degree of patient’s and/or family’s cooperation and/or compliance
• Regulatory and/or third-party decisions concerning access to care, indicated therapy, drugs, devices, and/or materials
• Subsequent operative surgery to correct suboptimal results from prior maxillofacial skeletal surgery
• Subsequent operative surgery due to prior planned/staged maxillofacial skeletal surgery
• Maxillofacial skeletal surgery after prior adjunctive hard and soft tissue surgery (eg, pharyngeal flap, cleft repair, distraction osteogenesis)
• Correction of traumatic deformities
• Preoperative deformity, condition, and/or temporomandibular joint disease complicating the establishment of a secure airway for surgery (eg, significant retrognathia, temporomandibular joint hypomobility/ankylosis, macroglossia, scleroderma)

GENERAL FAVORABLE THERAPEUTIC OUTCOMES FOR SURGICAL CORRECTION OF MAXILLOFACIAL SKELETAL DEFORMITIES:

• Long-term improvement in the musculoskeletal, dento-osseous, and/or soft tissue relationships
• Improved masticatory and swallowing function
• Improved speech
• Stable functional occlusion
• Satisfactory temporomandibular function
• Satisfactory range of motion
• Stable orthodontic result
• Improved dental and periodontal health
• Improved social and psychological well-being
• Uncompromised facial aesthetics
• Stable surgical result
• Satisfactory surgical wound healing
• Limited period of disability
• Patient (family) acceptance of procedure and understanding of options and outcomes
• Improvement or elimination of OSAS

GENERAL KNOWN RISKS AND COMPLICATIONS FOR SURGICAL CORRECTION OF MAXILLOFACIAL SKELETAL DEFORMITIES:

- Unplanned admission to intensive care unit after elective surgery
- Unplanned intubation for longer than 12 hours after surgery
- Reintubation or tracheostomy after surgery
- Use of parenteral drugs and/or fluids for longer than 72 hours after elective surgery
  ● Comment and Exception: Procedures in which long-term parenteral drugs and/or fluids are anticipated as part of the original treatment plan should be documented in the patient’s record before surgery.
- Failure to ambulate within 48 hours of elective surgery
- Failure to begin or maintain adequate nutritional intake following surgery
- Facial fracture during or after surgery
  ● Comment and Exception: A fractured bone that may be a sequela to surgery should be documented in the patient’s record before surgery.
- Unplanned Caldwell-Luc, bronchoscopy, or other exploratory procedures associated with surgery.
- Dental injury during surgery
  ● Comment and Exception: When the likelihood of dental injury is possible, it should be noted in the patient’s record before surgery.
- Repeat oral and/or maxillofacial surgery
  ● Comment and Exception: Staged procedures that are part of the original treatment plan should be documented before the initial procedure.
- Core temperature of greater than 101 °F 72 hours after elective surgery
- Postsurgical radiograph indicating presence of foreign body
● Comment and Exception: Foreign bodies (eg, plates, screws, wires) that are anticipated as a normal course of the surgical procedures (eg, orthognathic, trauma) should be noted in the patient’s record.

• Surgical anesthesia risks and complications
• Unplanned transfusion(s) of blood or blood components during or after surgery
• Readmission for complications or incomplete management of problems during previous hospitalization

● Comments and Exceptions: Complication or incomplete management occurring at another hospital or involving a surgeon who is not on the medical staff. Readmission for chronic disease (eg, intractable asthma, recurrent congestive heart failure, cancer); service-specific criteria required for this exception. Planned admissions for secondary procedures needed to complete treatment.

• Respiratory and/or cardiac arrest
• Impaired dental occlusion
• Impaired airway or worsening of sleep disordered breathing
• Deterioration of facial appearance
• Onset or exacerbation of temporomandibular disorders
• Failure of bone to heal (eg, delayed or nonunion)
• Damage or loss of teeth, bone, and/or soft tissue

• Dental pathology requiring treatment
• Infection (eg, acute or chronic)
• Unplanned need for removal of fixation devices
• Hemorrhage (may include unplanned blood transfusion)
• Pain
• Restricted mandibular range of motion
• Skeletal relapse and/or unstable surgical result
• Prolonged period of disability
• Delayed wound healing
• Scar
• Excess or deficiency of anticipate growth after surgery
• Growth disturbance
• Death

MANDIBULAR PROGNATHISM/HYPERPLASIA

I. Indications for Therapy of Mandibular Prognathism/Hyperplasia
May include one or more of the following:
• Bilateral condylar hyperplasia
• Physical evidence of musculoskeletal, dento-osseous, and/or soft tissue deformity
• Imaging evidence of musculoskeletal, dento-osseous, and/or soft tissue deformity
  1. Deviation from cephalometric norms
  2. Other imaging disclosure of abnormality
• Malocclusion that cannot be reasonably corrected by a nonsurgical means (eg, unstable or traumatic occlusion, compromised aesthetics, protracted treatment time)
• Masticatory and swallowing abnormalities
• Incomplete correction or unstable result of previous treatment
• Dental and/or periodontal pathology
• Associated temporomandibular joint disorders
• Associated muscular disorder (surgical correction may be useful when reversible occlusal alteration demonstrates relief of symptoms)
• Sleep disordered breathing

II. Specific Therapeutic Goals for Mandibular Prognathism/Hyperplasia

The goal of therapy is to restore form and/or function. However, risk factors and potential complications may preclude complete restoration of form and/or function.

- Improved musculoskeletal, dento-osseous, and/or soft tissue relationships
- Improved masticatory and swallowing
- Improved occlusion
- Improved quality of speech
- Enhanced stability of orthodontic result
- Improved dental and periodontal health
- Improved social and psychological well-being
- Improved associated temporomandibular joint and/or muscular disorders
- Limited period of disability
- Improved airway, including improvement of signs and symptoms of sleep disordered breathing

III. Specific Factors Affecting Risk for Mandibular Prognathism/Hyperplasia

Factors that increase risk and the potential for known complications:

A. Existing or recently removed impacted mandibular third molars
B. Presence of sleep disordered breathing preoperatively
C. Active pathologic growth process

IV. Indicated Therapeutic Parameters for Mandibular Prognathism/Hyperplasia

The following procedures for the management of mandibular prognathism are not listed in order of preference:

- Sagittal split ramus osteotomy
- Vertical oblique ramus osteotomy (eg, intraoral, extraoral, endoscopic)
- Supplemental procedures
  - Le Fort I maxillary osteotomy
  - Mandibular symphysis vertical osteotomy
  - Subapical or body osteotomy/ostectomy
  - Grafting procedures (eg, autogenous, allogeneic bone, alloplasts, bone morphogenetic protein, others)
  - Coronoidectomy and/or coronoidectomy
  - High condylectomy (in severe cases demonstrating continuous abnormal growth)
  - Alveolar bone grafting in preparation for orthodontic movement
  - Surgically assisted orthodontic movement (includes skeletal anchorage devices, corticotomies)
  - Partial glossectomy
  - Dental extractions (includes third molar removal)
D. Instructions for post-treatment care and follow-up

V. Outcome Assessment Indices for Mandibular Prognathism/Hyperplasia

Indices are used by the specialty to assess aggregate outcomes of care. Outcomes are assessed through clinical evaluation and may include an imaging evaluation.

A. Favorable therapeutic outcomes
   • Long-term improvement in the musculoskeletal, dento-osseous, and/or soft tissue relationships
   • Improved masticatory and swallowing function
   • Improved speech
   • Stable functional occlusion
   • Satisfactory temporomandibular function
   • Satisfactory range of motion
   • Stable orthodontic result
   • Improved dental and periodontal health
   • Improved social and psychological well-being
   • Uncompromised facial aesthetics
   • Stable surgical result
   • Satisfactory surgical wound healing
   • Limited period of disability
   • Patient (family) acceptance of procedure and understanding of options and outcomes
   • Improvement or elimination of OSAS

A. Known risks and complications associated with therapy
   o Unplanned admission to intensive care unit after elective surgery
   o Unplanned intubation for longer than 12 hours after surgery
   o Reintubation or tracheostomy after surgery
   o Use of parenteral drugs and/or fluids for longer than 72 hours after elective surgery
     ▪ Comment and Exception: Procedures in which long-term parenteral drugs and/or fluids are anticipated as part of the original treatment plan should be documented in the patient’s record before surgery.
   o Failure to ambulate within 48 hours of elective surgery
   o Failure to begin or maintain adequate nutritional intake following surgery
   o Facial fracture during or after surgery
     ▪ Comment and Exception: A fractured bone that may be a sequela to surgery should be documented in the patient’s record before surgery.
   o Unplanned Caldwell-Luc, bronchoscopy, or other exploratory procedures associated with surgery.
   o Dental injury during surgery
     ▪ Comment and Exception: When the likelihood of dental injury is possible, it should be noted in the patient’s record before surgery.
   o Repeat oral and/or maxillofacial surgery
     ▪ Comment and Exception: Staged procedures that are part of the original treatment plan should be documented before the initial procedure.
   o Core temperature of greater than 101 °F 72 hours after elective surgery
   o Postsurgical radiograph indicating presence of foreign body
Comment and Exception: Foreign bodies (eg, plates, screws, wires) that are anticipated as a normal course of the surgical procedures (eg, orthognathic, trauma) should be noted in the patient’s record.

• Surgical anesthesia risks and complications
• Unplanned transfusion(s) of blood or blood components during or after surgery
• Readmission for complications or incomplete management of problems during previous hospitalization

• Comments and Exceptions: Complication or incomplete management occurring at another hospital or involving a surgeon who is not on the medical staff. Readmission for chronic disease (eg, intractable asthma, recurrent congestive heart failure, cancer); service-specific criteria required for this exception. Planned admissions for secondary procedures needed to complete treatment.

• Respiratory and/or cardiac arrest
• Impaired dental occlusion
• Impaired airway or worsening of sleep disordered breathing
• Deterioration of facial appearance
• Onset or exacerbation of temporomandibular disorders
• Failure of bone to heal (eg, delayed or nonunion)
• Damage or loss of teeth, bone, and/or soft tissue

• Dental pathology requiring treatment
• Infection (eg, acute or chronic)
• Unplanned need for removal of fixation devices
• Hemorrhage (may include unplanned blood transfusion)
• Pain
• Restricted mandibular range of motion
• Skeletal relapse and/or unstable surgical result
  o Prolonged period of disability
  o Delayed wound healing
  o Scar
  o Excess or deficiency of anticipate growth after surgery
  o Growth disturbance
  o Death

MANDIBULAR RETROGNATHISM/HYPOPLASIA

I. Indications for Therapy of Mandibular Retrognathism/Hypoplasia

May include one or more of the following:

  o Presence of one or more indications for therapy, as listed in the section entitled General Criteria, Parameters, and Considerations for Surgical Correction of Maxillofacial Skeletal Deformities

  o Associated developmental, pathologic, or acquired condylar disorders (eg, ankylosis, idiopathic condylar resorption)

  o Associated airway obstruction (eg, obstructive sleep apnea syndrome or upper airway resistance syndrome, when confirmed by appropriate sleep studies as part of a multidisciplinary approach to treatment)
II. Specific Therapeutic Goals for Mandibular Retrognathism/Hypoplasia

- Presence of one or more general therapeutic goals, as listed in the section entitled General Criteria, Parameters, and Considerations for Surgical Correction of Maxillofacial Skeletal Deformities

- Correction of airway obstruction and signs and symptoms of obstructive sleep apnea syndrome.

III. Specific Factors Affecting Risk for Mandibular Retrognathism/Hypoplasia

- Presence of one or more general factors affecting risk, as listed in the section entitled General Criteria, Parameters, and Considerations for Surgical Correction of Maxillofacial Skeletal Deformities

- Presence of or recent removal of impacted mandibular third molar

IV. Indicated Therapeutic Parameters for Mandibular Retrognathism/Hypoplasia

- Sagittal split ramus osteotomy with rigid fixation
- Inverted “L” osteotomy with bone grafting and rigid fixation
- Supplemental procedures
  - Le Fort I maxillary osteotomy
  - Mandibular symphysis vertical osteotomy
  - Grafting procedures (eg, autogenous, allogeneic bone, alloplasts)
  - Subapical or alveolar osteotomies
  - Contour augmentation and/or reduction (augmentation with prosthesis, bone graft, or osteoplasty)
  - Myotomy
  - Reconstruction (condyle/mandible)
  - Alveolar bone grafting in preparation for orthodontic movement
  - Surgically assisted orthodontic movement (includes skeletal anchorage devices and corticotomies)
  - Dental extractions (includes third molar removal)
- Distraction osteogenesis both for mandibular widening and lengthening
- Instructions for posttreatment care and follow-up

V. Outcome Assessment Indices for Mandibular Retrognathism/Hypoplasia

- Favorable therapeutic outcomes
  - Presence of general favorable therapeutic outcomes, as listed in the section entitled General Criteria, Parameters, and Considerations for Surgical Correction of Maxillofacial Skeletal Deformities
  - Improved airway (OSAS patients)

- Known risks and complications associated with therapy
  - Presence of general known risks and/or complications, as listed in the section entitled General Criteria, Parameters, and Considerations for Surgical Correction of Maxillofacial Skeletal Deformities
  - Altered growth
  - Degenerative condylar disease (idiopathic condylar resorption)
MANDIBULAR ASYMMETRY

Mandibular asymmetry may result from congenital, developmental, or acquired condylar anomalies. It may be manifested as hyperplasia with overgrowth or hypoplasia with deficiency and may also be present without apparent condylar involvement.

The condition may be isolated to the transverse plane or demonstrate transverse, sagittal, and vertical skeletal deformity.

I. Indications for Therapy for Mandibular Asymmetry
May include one or more of the following

- Presence of one or more indications for therapy, as listed in the section entitled General Criteria, Parameters, and Considerations for Surgical Correction of Maxillofacial Skeletal Deformities
- Associated developmental, pathologic, or acquired condylar disorders affecting mandibular symmetry
- Vertical and/or horizontal asymmetry of the ramus and/or body of the mandible

II. Specific Therapeutic Goals for Mandibular Asymmetry
- Presence of one or more general therapeutic goals, as listed in the section entitled General Criteria, Parameters, and Considerations for Surgical Correction of Maxillofacial Skeletal Deformities

III. Specific Factors Affecting Risk for Mandibular Asymmetry
Severity factors that increase risk and the potential for known complications:

- Presence of one or more of the general factors affecting risk, as listed in the section entitled General Criteria, Parameters, and Considerations for Surgical Correction of Maxillofacial Skeletal Deformities
- Severity of mandibular condylar deformity
- Etiology of condylar deformity (eg, tumor, idiopathic condylar resorption, ankylosis)
- Associated soft tissue asymmetry
- Severity of mandibular asymmetry
- Lack of functional condylar articulation

IV. Indicated Therapeutic Parameters for Mandibular Asymmetry
- Sagittal split ramus osteotomy, vertical ramus osteotomy, inverted “L” osteotomy
- Le Fort I osteotomy with or without segmentalization
- Partial or complete condylectomy
- Supplemental procedures
  - Mandibular symphysis vertical osteotomy
  - Grafting procedures (eg, autogenous, allogeneic bone, alloplasts)
  - Temporomandibular joint surgery
  - Genial tubercle advancement
  - Alveolar bone grafting in preparation for orthodontic movement
  - Surgically assisted orthodontic movement (includes skeletal anchorage devices and corticotomies)
  - Dental extractions (includes third molar removal)
- Distraction osteogenesis
V. Outcome Assessment Indices for Mandibular Asymmetry

A. Favorable therapeutic outcomes
   ▪ General favorable therapeutic outcomes, as listed in the section entitled General Criteria, Parameters, and Considerations for Surgical Correction of Maxillofacial Skeletal Deformities

B. Known risks and complications associated with therapy
   ▪ Presence of a general known risk and/or complication, as listed in the section entitled General Criteria, Parameters, and Considerations for Surgical Correction of Maxillofacial Skeletal Deformities
   ▪ Soft tissue response to hard/soft tissue augmentation or reduction
   ▪ Continued facial asymmetry

MAXILLARY HYPERPLASIA
Maxillary hyperplasia consists of three component subsets: vertical, horizontal, and transverse. Items listed under this condition are applicable to all subsets of this condition unless otherwise designated.

I. Indications for Therapy for Maxillary Hyperplasia
May include one or more of the following:
   ▪ Presence of one or more indications for therapy, as listed in the section entitled General Criteria, Parameters, and Considerations for Surgical Correction of Maxillofacial Skeletal Deformities
   ▪ Airway obstruction (eg., sleep disordered breathing, nasal airway obstruction)
   ▪ Associated soft tissue deformities (eg, lip incompetence)

II. Specific Therapeutic Goals for Maxillary Hyperplasia

A. Presence of a general therapeutic goal, as listed in the section entitled General Criteria, Parameters, and Considerations for Surgical Correction of Maxillofacial Skeletal Deformities

III. Specific Factors Affecting Risk for Maxillary Hyperplasia

A. Presence of a general factor affecting risk as listed in the section entitled General Criteria, Parameters, and Considerations for Surgical Correction of Maxillofacial Skeletal Deformities
B. Presence of or recent removal of impacted maxillary third molars

IV. Indicated Therapeutic Parameters for Maxillary Hyperplasia
The following procedures for the management of maxillary hyperplasia are not listed in order of preference:
   ▪ Segmental maxillary alveolar osteotomies
   ▪ Le Fort I osteotomy with or without segmentalization
   ▪ Supplemental procedures
      ▪ Grafting procedures (eg, autogenous, allogeneic bone, alloplasts)
- Mandibular osteotomy
- Dental extractions (includes third molar removal)
- Soft tissue procedures (eg, V-Y closure, nasal cinch, buccal fat removal)
- Palatal or alveolar cleft repair with/without bone grafting
- Surgically assisted orthodontic movement (includes skeletal anchorage devices and corticotomies
  - Instructions for posttreatment care and follow-up

V. Outcome Assessment Indices for Maxillary Hyperplasia
Indices are used by the specialty to assess aggregate outcomes of care. Outcomes are assessed through clinical evaluation and may include an imaging evaluation.

A. Favorable therapeutic outcomes
- General favorable therapeutic outcomes, as listed in the section entitled General Criteria, Parameters, and Considerations for Surgical Correction of Maxillofacial Skeletal Deformities
- Improved airway

B. Known risks and complications associated with therapy
- Presence of a general known risk and/or complication, as listed in the section entitled General Criteria, Parameters, and Considerations for Surgical Correction of Maxillofacial Skeletal Deformities

MAXILLARY HYPOPLASIA
Maxillary hypoplasia consists of three component subsets: vertical, horizontal, and transverse.

I. Indications for Therapy for Maxillary Hypoplasia
May include one or more of the following:
  - Presence of one or more indications for therapy, as listed in the section entitled General Criteria, Parameters, and Considerations for Surgical Correction of Maxillofacial Skeletal Deformities
  - Transverse maxillary discrepancies not amenable to orthodontic correction
  - Posttraumatic

II. Specific Therapeutic Goals for Maxillary Hypoplasia
  - Presence of a general therapeutic goal, as listed in the section entitled General Criteria, Parameters, and Considerations for Surgical Correction of Maxillofacial Skeletal Deformities
  - Improved airway

III. Specific Factors Affecting Risk for Maxillary Hypoplasia
Severity factors that increase risk and the potential for known complications:
  - Presence of a general factor affecting risk, as listed in the section entitled General Criteria, Parameters, and Considerations for Surgical Correction of Maxillofacial Skeletal Deformities
  - Severity of maxillary deformity
  - Presence of or recent removal of impacted maxillary third molars
IV. Indicated Therapeutic Parameters for Maxillary Hypoplasia

The following procedures for the management of maxillary hypoplasia are not listed in order of preference:

- Segmental maxillary alveolar osteotomies
- Le Fort I, II, or III osteotomy with or without segmentalization (quadrangular and Kufner modifications)
- Distraction osteogenesis
- Supplemental procedures
  - Grafting procedures (eg, autogenous, allogeneic bone, alloplasts)
  - Contour augmentation and/or reduction
  - Mandibular osteotomy
  - Dental extractions (includes third molar removal)
  - Soft tissue procedures (eg, V-Y closure, nasal cinch, buccal fat removal)
  - Palatal or alveolar cleft repair with/without bone grafting
  - Surgically assisted orthodontic movement (includes skeletal anchorage devices and corticotomies)
  - Instructions for posttreatment care and follow-up

V. Outcome Assessment Indices for Maxillary Hypoplasia

A. Favorable therapeutic outcomes
   - General favorable therapeutic outcomes, as listed in the section entitled General Criteria, Parameters, and Considerations for Surgical Correction of Maxillofacial Skeletal Deformities
   - Improved airway

B. Known risks and complications associated with therapy

   - Presence of a general known risk and/or complication, as listed in the section entitled General Criteria, Parameters, and Considerations for Surgical Correction of Maxillofacial Skeletal Deformities.

SKELETAL OPEN BITE (APERTOGNATHIA)

Skeletal open bite can be developmental or acquired, as well as secondary to local factors influencing tooth eruption and dentoalveolar growth. The condition may be isolated to the vertical dimension in one or both jaws, may be seen in conjunction with sagittal and transverse problems, and may occur anteriorly or posteriorly, both unilaterally or bilaterally.

I. Indications for Therapy for Skeletal Open Bite (Apertognathia)

May include one or more of the following:

- Presence of one or more indications for therapy, as listed in the section entitled General Criteria, Parameters, and Considerations for Surgical Correction of Maxillofacial Skeletal Deformities
- Associated developmental, pathologic, or acquired condylar disorders resulting in open bite (eg, ankylosis, idiopathic condylar resorption, osteochondroma)
- Associated soft tissue deformities (eg, lip incompetence)
- Dry mouth
- Mouth breathing gingivitis
II. Specific Therapeutic Goals for Skeletal Open Bite (Apertognathia)

- Presence of a general therapeutic goal, as listed in the section entitled General Criteria, Parameters, and Considerations for Surgical Correction of Maxillofacial Skeletal Deformities
- Improvement in lip incompetence

III. Specific Factors Affecting Risk for Skeletal Open Bite (Apertognathia)
Severity factors that increase risk and the potential for known complications:

- Presence of a general factor affecting risk, as listed in the section entitled General Criteria, Parameters, and Considerations for Surgical Correction of Maxillofacial Skeletal Deformities
- Severity of open bite
- Presence and severity of localized conditions (e.g., tongue posture, tongue size, mode of respiration as it influences jaw posture)
- Active condylar disease (e.g., rheumatoid arthritis)

IV. Indicated Therapeutic Parameters for Skeletal Open Bite (Apertognathia)

The following procedures for the management of skeletal open bite are not listed in order of preference:

- Le Fort I osteotomy with or without segmentalization
- Segmental maxillary alveolar osteotomies
- Sagittal split ramus osteotomy with rigid fixation
- Inverted “L” osteotomy with bone grafting and rigid fixation
- Vertical ramus osteotomies in conjunction with mandibular setback procedures
- Supplemental procedures
  - Grafting procedures (e.g., autogenous, allogeneic bone, alloplasts)
  - Partial glossectomy
  - Distraction osteogenesis
  - Reconstruction (condyle/mandible), including autogenous or alloplastic total joint reconstruction
  - Dental extractions (includes third molar removal)
  - Soft tissue procedures (e.g., V-Y closure, nasal cinch, buccal fat removal)
  - Palatal or alveolar cleft repair with/without bone grafting
  - Surgically assisted orthodontic movement (includes skeletal anchorage devices and corticotomies)

V. Outcome Assessment Indices for Skeletal Open Bite (Apertognathia)

A. Favorable therapeutic outcomes

- General favorable therapeutic outcomes, as listed in the section entitled General Criteria, Parameters, and Considerations for Surgical Correction of Maxillofacial Skeletal Deformities
- Improved airway
B. Known risks and complications associated with therapy
   - Presence of a general known risk and/or complication, as listed in the section entitled General Criteria, Parameters, and Considerations for Surgical Correction of Maxillofacial Skeletal Deformities.

SPECIAL CONSIDERATIONS FOR SLEEP DISORDERED BREATHING

Surgical correction of maxillofacial skeletal deformities are often indicated for the treatment of sleep disordered breathing, which includes most commonly obstructive sleep apnea syndrome (OSAS) and upper airway resistance syndrome. Untreated, the disorder can increase the risk of cardiovascular disease, cerebrovascular disease, diabetes, and other metabolic and endocrine dysfunctions. It may also increase the risk for work-related injuries and motor vehicle collisions and may exacerbate psychiatric conditions. In the pediatric population, sleep disordered breathing can have a profound impact on a child's achievement of developmental milestones and quality of life. Neuropsychological manifestations predominate with behavioral and attention deficit issues, and learning disabilities being frequent complaints. In severe cases, sleep apnea may result in failure to thrive. Polysomnographic, radiographic, and clinical evaluation and a thorough history are essential for diagnosing obstructive sleep apnea syndrome and subtler forms of sleep disordered breathing so that an appropriate treatment plan be developed.

Maxillomandibular advancement procedures demonstrate well-documented success in the treatment of obstructive sleep apnea syndrome. Ancillary/adjunctive procedures, such as hyoid suspension, genioglossus advancement, tonsillectomy and/or adenoidectomy, uvulopalatopharyngoplasty, radiofrequency tongue base reduction, tracheostomy, and turbinectomy, can also provide relief and may be indicated for the treatment of obstructive sleep apnea syndrome in both children and adult patients. As with the surgical correction of maxillofacial skeletal deformities, proper patient assessment and informed consent is critical to maximizing results. It is important to note that for some patients with a history of OSAS undergoing surgery for maxillofacial skeletal deformities, inpatient overnight observation with consideration given to intensive care monitoring may be indicated.

OBSTRUCTIVE SLEEP APNEA SYNDROME (OSAS)

I. Indications for Therapy for Obstructive Sleep Apnea Syndrome

May include one or more of the following:
- One or more indications for therapy, as listed in the section entitled General Criteria, Parameters, and Considerations for Surgical Correction of Maxillofacial Skeletal Deformities
- An elevated Respiratory Disturbance Index (RDI) or Apnea Hypopnea Index (AHI), as measured objectively by polysomnography (PSG)
- Nocturnal hypoxia
- Upper airway obstruction or collapse as documented by imaging of the upper airway
- Maxillary or mandibular retrognathism, ie hypoplasia
- Cleft and craniofacial syndromes
II. Specific Therapeutic Goals for Obstructive Sleep Apnea Syndrome

- One or more therapeutic goals as listed in the section entitled General Criteria, Parameters, and Considerations for Surgical Correction of Maxillofacial Skeletal Deformities
  - Reduce RDI and/or AHI
  - Reduce nocturnal hypoxia
  - Reduce daytime sleepiness
  - Improve quality of life
  - Improve cardiovascular health
  - Reduce upper airway obstruction or collapse
  - Improve form and function of the upper airway by increasing upper airway space
  - Reduce snoring
  - Reduce or eliminate need for continuous positive pressure airway (CPAP) and/or tracheostomy
  - Improve cognitive and behavioral function and development

III. Specific Factors Affecting Risk for Obstructive Sleep Apnea Syndrome

Factors that increase risk and the potential for known complications:

- Presence of one or more general factors affecting risk, as listed in the section entitled General Criteria, Parameters, and Considerations for Surgical Correction of Maxillofacial Skeletal Deformities
- Associated comorbid conditions including: obesity, cardio-pulmonary disease, hypertension, history of stroke, history of myocardial infarction, diabetes, neuromuscular disorders, metabolic disease.
- Drug and alcohol dependence
- Presence and severity of localized conditions, eg, tongue posture, tongue size, periodontal disease, impacted teeth, etc
- Temporomandibular joint (TMJ) and jaw deformities, ie ankylosis, Pierre Robin sequence, hemifacial, microsomia, etc
- TMJ pain and dysfunction
- Cleft and Craniofacial Disorders
- Family history of OSAS

IV. Indicated Therapeutic Parameters for Obstructive Sleep Apnea Syndrome

The following procedures for the management of obstructive sleep apnea syndrome are not listed in order of preference:

- Maxillomandibular advancement (MMA) to improve form and function of the upper airway
- Consideration of specific adjunctive surgical techniques to maximize stability of MMA, minimize neurosensory deficits and promote normal wound healing including:
  - Mandibular advancement
  - Maxillary and/or mandibular expansion
  - Partial glossectomy (or variant)
  - Tongue suspension
  - Orthodontics
  - Prosthetics
  - Oral appliances
Consideration of specific post-operative management strategies to minimize wound healing problems, establish normal TMJ function, functional occlusion and promote recovery of mandibular mobility

Instructions for post-treatment care and follow-up

V. Outcome Assessment Indices for Obstructive Sleep Apnea Syndrome

- Favorable therapeutic outcomes
  - General favorable therapeutic outcomes, as listed in the section entitled General Criteria, Parameters, and Considerations for Surgical Correction of Maxillofacial Skeletal Deformities
  - Reduction in OSAS with reduction in AHI, RDI, as measured objectively by PSG
  - Routine post-operative course including uneventful wound healing
  - Imaging documentation of positive upper airway change, adequate bone healing and stability of MMA or adjunctive procedures
  - Establish and maintain functional occlusion and normal TMJ function
  - Minimal neurosensory dysfunction

- Known risks and complications associated with therapy
  - Presence of a general known risk and/or complication, as listed in the section entitled General Criteria, Parameters, and Considerations for Surgical Correction of Maxillofacial Skeletal Deformities
  - Perioperative hypertension, cardiovascular events, respiratory and venous thromboembolic events
  - Revision surgery
SURGICAL CORRECTION OF MAXILLOFACIAL SKELETAL DEFORMITIES - SELECTED REFERENCES


MANDIBULAR PROGNATHISM/HYPERPLASIA


MANDIBULAR RETROGNATHISM/HYPOLASIA


Hochban W, Peter JH, Brandenburg U: Surgical treatment of obstructive sleep apnea by maxillomandibular advancement. Sleep 17:624, 1994


SKELETAL OPEN BITE (APERROGNATHIA)


**OBSTRUCTIVE SLEEP APNEA SYNDROME**

Woodson BT: Non-pressure therapies for obstructive sleep apnea: surgery and oral appliances. Respir Care 55:1314, 2010
MANAGEMENT OF MALIGNANT TUMORS OF THE MAXILLOFACIAL REGION
INTRODUCTION
Management of malignant tumors of the maxillofacial region. The parameters of care for pathological conditions have their foundation in knowledge that is continuing to expand. Increased understanding of the nature of these diseases, their biologic behavior, and their response to therapy form the basis for practice parameters. Evidence-based medicine demonstrates that treatment decisions and their outcomes should be based on a definitive pathologic diagnosis obtained either by preoperative biopsy or posttreatment submission of surgical specimens. Submission of specimens to oral and maxillofacial pathologists is encouraged because this increases the likelihood of diagnostic accuracy and, therefore, appropriate management. This document does not replace existing biomedical knowledge; it merely provides the basis for defining indications for therapy, parameters of therapy, goals of therapy, and the range of outcomes. This section will refer only to diagnostic and therapeutic surgical procedures for the management of the lesions mentioned. Other areas of pathology, including temporomandibular disorders and congenital defects, are covered in other sections.

GENERAL CRITERIA, PARAMETERS, AND CONSIDERATIONS FOR DIAGNOSIS AND MANAGEMENT OF PATHOLOGICAL CONDITIONS

INFORMED CONSENT: All surgery must be preceded by the patient’s or legal guardian’s consent, unless an emergent situation dictates otherwise. These circumstances should be documented in the patient’s record. Informed consent is obtained after the patient or the legal guardian has been informed of the indications for the procedure(s), the goals of treatment, the known benefits, and risks of the procedure(s), the factors that may affect the risk, the treatment options, and the favorable outcomes.

PERIOPERATIVE ANTIBIOTIC THERAPY: In certain circumstances, the use of antimicrobial rinses and systemic antibiotics may be indicated to prevent infections related to surgery. The decision to employ prophylactic perioperative antibiotics is at the discretion of the treating surgeon and should be based on the patient’s clinical condition as well as other comorbidities which may be present.

USE OF IMAGING MODALITIES: Imaging modalities may include panoramic radiograph, periapical and/or occlusal radiographs, maxillary and/or mandibular radiographs, computed tomography, cone beam computed tomography, positron emission tomography, positron emission tomography/computed tomography, and magnetic resonance imaging. In determining studies to be performed for imaging purposes, principles of ALARA (as low as reasonably achievable) should be followed.

DOCUMENTATION: This includes documentation of objective findings, diagnoses, and patient management interventions. The ultimate judgment regarding the appropriateness of any specific procedure must be made by the individual surgeon in light of the circumstances presented by each patient. Understandably, there may be good clinical reasons to deviate from these parameters. When a surgeon chooses to deviate from an applicable parameter based on the circumstances of a particular patient, he/she is well advised to note in the patient’s record the reason for the procedure followed. Moreover, it should be understood that adherence to the parameters does not guarantee a favorable outcome.
GENERAL THERAPEUTIC GOALS FOR DIAGNOSIS AND MANAGEMENT OF PATHOLOGICAL CONDITIONS:

- Provision of medical and/or surgical palliation or cure of the disease process
- Restoration of function
- Restoration of form
- Preservation of vital structures
- Prevention of recurrence
- Limited period of disability
- Appropriate understanding by patient (family) of treatment options and acceptance of treatment plan
- Appropriate understanding and acceptance by patient (family) of favorable outcomes and known risks and complications
- Palliation of patient’s disease in the event of disseminated disease

GENERAL FACTORS AFFECTING RISK DURING DIAGNOSIS AND MANAGEMENT OF PATHOLOGICAL CONDITIONS:

- Degree of patient’s and/or family’s understanding of the origin and natural course of the condition or disorder and therapeutic goals and acceptance of proposed treatment
- Presence of coexisting major systemic disease (eg, disease that increases a patient’s American Society of Anesthesiologists classification to II, III, or IV
- Age of patient
- Presence of acute and/or preexisting infection
- Accuracy and quality of pathologic diagnosis
- Presence of local or systemic conditions that may interfere with the normal healing process and subsequent tissue homeostasis (eg, previously irradiated tissue, diabetes mellitus, chronic renal disease, liver disease, blood disorder, steroid therapy, contraceptive medication, immunosuppression, malnutrition)
- Presence of behavioral, psychological, neurologic, and/or psychiatric disorders, including habits (eg, substance abuse, including tobacco and alcohol), seizure disorders, self-mutilation, or dementia, which may affect surgery, healing, and/or response to therapy
- Degree of patient’s and/or family’s cooperation and/or compliance
- Regulatory and/or third-party decisions concerning access to care, indicate therapy, drugs, devices, and/or materials
- Potential for risk to adjacent vital structures
- Existing drug or alcohol intoxication

GENERAL FAVORABLE THERAPEUTIC OUTCOMES FOR DIAGNOSIS AND MANAGEMENT OF PATHOLOGICAL CONDITIONS:

- Cure or palliation of disease
- Restored form
- Restored function
- Presence of intact adjacent structures (eg, no unanticipated loss or damage)
- Limited period of disability
- Patient (family) acceptance of procedure and understanding of outcomes

GENERAL KNOWN RISKS AND COMPLICATIONS OF DIAGNOSIS AND MANAGEMENT OF PATHOLOGICAL CONDITIONS:

- Unplanned admission to intensive care unit after elective surgery
  - Comment and Exception: Planned admission should be documented in the patient’s record before surgery.
- Unplanned intubation for longer than 24 hours after surgery
  - Comment and Exception: Planned intubation longer than 24 hours should be documented in the patient’s record before surgery.
- Reintubation or tracheostomy after surgery
- Use of parenteral drugs and/or fluids for longer than 72 hours after elective surgery
  - Comments and Exceptions: Procedures in which long-term parenteral drugs and/or fluids are indicated as part of the original treatment plan should be documented in the patient’s record before surgery.
- Failure to ambulate within an acceptable period after surgery
- Facial and/or trigeminal nerve dysfunction after surgery
  - Comment and Exception: When postoperative nerve dysfunction is common, anticipated deficits should be noted in the patient’s record before surgery (eg, anesthesia of inferior alveolar nerve distribution after segmental resection of the mandible for benign or malignant disease).
- Facial fracture during or after surgery (eg, pathologic fracture of mandible after marginal resection)
  - Comment and Exception: A fractured bone that may be a sequela to surgery should be documented in the patient’s record before surgery.
- Unplanned Caldwell-Luc, bronchoscopy, or other exploratory procedures associated with surgery
- Dental injury during surgery
  - Comment and Exception: Any potential dental injury should be noted in the patient’s record before surgery.
- Ocular injury during surgery
- Repeat Oral and/or Maxillofacial Surgery
  - Comment and Exception: Staged procedures that are part of the original treatment plan should be documented before the initial procedure.
- Postsurgical radiograph indicating presence of foreign body
  - Comment and Exception: Foreign bodies (eg, plates, screws, wires) that are anticipated as a normal course of the surgical procedures (eg, orthognathic, trauma) should be noted in the patient’s record.
- Readmission of cancer patient for repeat ablative surgery within 12 months of primary surgery
- Unplanned transfusion(s) of blood or blood components during or after surgery
- Readmission for complications or incomplete management of problems on previous hospitalization
  - Comments and Exceptions:
    - Complication or incomplete management occurring at another hospital or involving a physician who is not on the medical staff
    - Readmission for chronic disease (eg, intractable asthma, recurrent congestive heart failure, cancer); service-specific criteria required for this exception
    - Planned admissions for secondary procedures needed to complete treatment
- Respiratory and/or cardiac arrest
- Unanticipated residual functional deformity
- Unanticipated residual structural deformity
- Loss of or damage to adjacent vital structures (eg, neurosensory, dentition)
- Local sequelae, with damage to or loss of vital structures
- Loss of function
- Loss of form
- Death from tumor extension or as a result of tumor therapy
- Death
Comment and Exception: Admissions for terminal care must be documented.

MALIGNANT TUMORS OF BONE
This section includes primary and metastatic lesions.

I. Indications for Therapy for Malignant Tumors of Bone

A. Clinical indications
   • Pain
   • Deformity (eg, swelling, expansion)
   • Altered sensation
   • Altered function
   • Drainage
   • Structures damaged or displaced from their normal position (eg, nerves, teeth, sinuses)
   • Altered hue
   • Crepitus
   • Clinical evidence of fracture
   • Secondary infection
   • Pulsation, bruit, or thrill
   • Ulceration
   • Hemorrhage
   • Evidence of local tumor extension, regional lymphadenopathy, or metastasis

B. Imaging indications (based on clinical and plain radiograph assessment)
   • Change in bone architecture and/or density
   • Displacement of adjacent anatomical structures
   • Assessment of proximity to/invasion of adjacent structures
   • Evidence of pathologic fracture
   • Abnormal bone scan
   • Altered vascularity
   • Positron emission tomography (PET) or positron emission tomography/computed tomography (PET/CT) scan demonstrating intense hypermetabolic focus or foci

C. Results of differential diagnosis
D. Results of additional studies, as indicated
   1. Aspiration to rule out vascular lesions
   2. Incisional biopsy
   3. Fine-needle aspiration biopsy
   4. Microbiologic assessment (eg, culture and sensitivity for secondarily infected lesions)
E. Additional presurgical studies may include:
   1. Imaging
      a. Office-based scans (panoramic and/or cone beam computed tomography)
      b. Conventional or computed tomography (depending on size and character)
      c. Magnetic resonance imaging
      d. Nuclear medicine scan (bone scan, PET or PET/CT scan)
      e. Plain radiographs, including chest radiograph and skeletal survey, as necessary
      f. Angiography
   2. Laboratory studies (eg, complete blood cell count, liver function tests, serum electrophoresis)

II. Specific Therapeutic Goals for Malignant Tumors of Bone

A. Presence of a general therapeutic goal
B. Eradication of tumor
III. Specific Factors Affecting Risk in the Treatment of Malignant Tumors of Bone

Severity factors that increase risk and the potential for known complications:

• Presence of a general factor affecting risk
• Associated teeth
• Proximity to/invasion of adjacent structures
• Extent of primary tumor
• Presence and extent of regional and/or distant metastasis
• Fracture or weakening of mandible due to presence of tumor
• Compromised airway

IV. Indicated Therapeutic Parameters for Malignant Tumors of Bone

A. Diagnosis by aspiration or biopsy
B. Primary treatment
1. Observation (eg, unresectable tumors, indolent lesions in compromised patients, patients unwilling to give informed consent)
2. Marginal resection when a margin of normal bone can be removed without creating a segmental defect
3. Segmental resection of bone with adjacent structures
4. Composite resection of bone, including surrounding soft tissues and regional lymph nodes for squamous cell carcinoma
5. Radiation therapy and/or neoadjuvant chemotherapy
   All specimens must be submitted for pathologic assessment.

C. Adjuvant therapy and reconstruction
1. Radiation therapy and/or chemotherapy
2. Reconstruction bone plates to bridge segmental defects or prevent pathologic fractures in extensive marginal resections
3. Primary reconstruction to restore form and/or function for defects likely to persist, for weakened underlying structures with low potential for infection, or for recurrence in the absence of systemic or local contraindications
   a. Bone grafts
   b. Skin grafts and soft tissue flaps (eg, local, pedicled, free)
   c. Composite grafts
   d. Alloplasts (bone plates)
   e. Implant reconstruction
4. Secondary reconstruction to restore form and/or function for cases with high potential for infection or recurrence or with systemic or local contraindications to primary reconstruction
   a. Bone grafts
   b. Skin grafts and soft tissue flaps (eg, local, pedicled, free)
   c. Composite grafts
   d. Alloplasts (bone plates)
   e. Implant reconstruction
D. Post-treatment follow-up
1. Baseline plain radiography in the initial postoperative period
2. Plain radiographs of the chest at regularly scheduled intervals
3. Special imaging studies (CT, magnetic resonance imaging, bone scans, PET or PET/CT, according to tumor type and location and the clinician’s level of suspicion for recurrent and metastatic disease)
4. Clinical and imaging examination for malignant tumors for the patient’s lifetime, depending on tumor type, likely site of metastasis, and likely length of time to recurrence
5. Instructions to return if signs or symptoms recur before regularly scheduled follow-up
E. Instructions for post-treatment care and follow-up

V. Outcome Assessment Indices for Malignant Tumors of Bone
A. Favorable therapeutic outcomes
1. General favorable therapeutic outcomes
2. Patient remains free of disease
B. Known risks and complications associated with therapy
1. Presence of a general known risk and/or complication
2. Local recurrence of tumor or regional and/or distant metastasis
3. Death from regional extension of tumor, metastasis, or as a result of therapy
4. Excess morbidity from radiation and/or chemotherapy (eg, tissue necrosis, radiation caries)

MALIGNANT TUMORS OF SOFT TISSUE
Malignant tumors are managed only in part by surgery. Management is frequently comprehensive and involves an interdisciplinary team that includes specialties of Oral and Maxillofacial Surgery, radiation therapy, medical oncology, dentistry, and various support services.

I. Indications for Therapy for Malignant Tumors of Soft Tissue
A. Clinical indications
   • Pain
   • Deformity (eg, swelling, expansion)
   • Altered sensation
   • Altered function
   • Induration
   • Hemorrhage
   • Elevated temperature
   • Red, white, discolored, or pigmented lesions
   • Ulceration
   • Evidence of local tumor extension, regional lymphadenopathy, or metastasis
   • Secondary infection
B. Imaging indications
   1. Proximity to/invasion of adjacent bony or soft tissue structures
C. Results of differential diagnosis
D. Results of additional studies, as indicated
   1. Biopsy (incisional or excisional, depending on lesion size, site, extent, character, and differential diagnosis)
   2. Fine-needle aspiration
   3. Microbiologic assessment for secondarily infected lesions
E. Additional presurgical studies may include:
   1. Imaging
      a. CT, magnetic resonance imaging, or ultrasonography of primary site for extent of infiltration of lesion, of neck for lymphadenopathy in case of malignant disease, and of metastatic sites in case of malignant tumor, if appropriate
      b. Nuclear medicine scan for evaluation of possible distant metastatic sites (bone scan, PET scan, PET/CT scan)
      c. Conventional films, including chest radiograph to complete TNM (Tumor, Node, Metastasis) staging and skeletal survey for presumptive metastatic lesion
2. Laboratory assessment
   a. Culture and sensitivity for secondarily infected lesion
   b. Blood tests for presumptive malignant lesions, including complete blood cell count and liver function tests for tumors that may metastasize to the liver
3. Surgical
   a. Evaluation for presence of synchronous tumors that may include panendoscopy, if indicated
4. Clinical staging

II. Specific Therapeutic Goals for Malignant Tumors of Soft Tissue
A. Presence of a general therapeutic goal, as previously described.
B. Eradication of tumor

III. Specific Factors Affecting Risk in the Treatment of Malignant Tumors of Soft Tissue
   • Presence of a general factor affecting risk, as previously described.
   • Presence of acute and/or preexisting infection
   • Proximity to/invasion of adjacent structures
   • Extent of tumor (eg, limited to primary site, beyond primary site)
   • Presence and extent of regional and/or distant metastasis
   • Degree of mobility of normally mobile organ/structure (eg, tongue, mandible)

IV. Indicated Therapeutic Parameters for Malignant Tumors of Soft Tissue
A. Diagnosis by aspiration or biopsy
B. Primary treatment
   1. Local surgical or chemical excision for malignant tumors deemed to be local
   2. Excision of associated structures for invasive tumors
   3. Excision of associated structures in region, including neck dissection when palpable cervical lymph nodes are present (N_) or when high risk of occult neck disease exists in patients with malignant disease
   4. Management of malignant tumors with radiation therapy and/or chemotherapy if indicated
   All specimens must be submitted for pathologic assessment.
C. Adjunctive treatment (Also see the Reconstructive Surgery chapter)
   1. Adjunctive radiation therapy and/or chemotherapy
   2. Primary or secondary reconstruction
      a. Bone grafts
      b. Skin grafting
      c. Soft tissue flaps (eg, local, pedicled, free)
      d. Alloplasts (bone plates)
   3. Access osteotomies
D. Post-treatment follow-up
   1. Baseline plain radiographic imaging in the initial postoperative period
   2. Plain radiographs of the chest at regularly scheduled intervals
   3. Special imaging studies (CT, magnetic resonance imaging, bone scans, PET or PET/CT, according to tumor type and location and the clinician's level of suspicion for recurrent and metastatic disease)
   4. Clinical and imaging examination for malignant tumors for the patient’s lifetime, depending on tumor type, likely site of metastasis, and likely length of time to recurrence
   5. Instructions to return if signs or symptoms recur before regularly scheduled follow-up appointment.
E. Instructions for posttreatment care and follow-up

V. Outcome Assessment Indices for Malignant Tumors of Soft Tissue

A. Favorable therapeutic outcomes
   1. General favorable therapeutic outcomes, as previously described.
   2. Disease eliminated

B. Known risks and complications associated with therapy
   1. Presence of a general known risk and/or complication, as previously described.
   2. Local recurrence of tumor or metastasis
   3. Residual functional deformity
   4. Residual structural deformity
   5. Damage to or loss of adjacent structures
   6. Excess morbidity from radiation therapy or chemotherapy
   7. Death from tumor metastasis, tumor extension, or as a result of tumor therapy

SELECTED REFERENCES

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.

MALIGNANT TUMORS OF BONE


MALIGNANT TUMORS OF SOFT TISSUE

SALIVARY GLAND SURGERY
GENERAL CRITERIA, PARAMETERS, AND CONSIDERATIONS FOR DIAGNOSIS AND MANAGEMENT OF PATHOLOGICAL CONDITIONS

INFORMED CONSENT: All surgery must be preceded by the patient’s or legal guardian’s consent, unless an emergent situation dictates otherwise. These circumstances should be documented in the patient’s record. Informed consent is obtained after the patient or the legal guardian has been informed of the indications for the procedure(s), the goals of treatment, the known benefits, and risks of the procedure(s), the factors that may affect the risk, the treatment options, and the favorable outcomes.

PERIOPERATIVE ANTIBIOTIC THERAPY: In certain circumstances, the use of antimicrobial rinses and systemic antibiotics may be indicated to prevent infections related to surgery. The decision to employ prophylactic perioperative antibiotics is at the discretion of the treating surgeon and should be based on the patient’s clinical condition as well as other comorbidities which may be present.

USE OF IMAGING MODALITIES: Imaging modalities may include panoramic radiograph, periapical and/or occlusal radiographs, maxillary and/or mandibular radiographs, computed tomography, cone beam computed tomography, and magnetic resonance imaging. In determining studies to be performed for imaging purposes, principles of ALARA (as low as reasonably achievable) should be followed.

DOCUMENTATION: Documentation includes objective findings, diagnoses, and patient management interventions. The ultimate judgment regarding the appropriateness of any specific procedure must be made by the individual surgeon in light of the circumstances presented by each patient. Understandably, there may be good clinical reasons to deviate from these parameters. When a surgeon chooses to deviate from an applicable parameter based on the circumstances of a particular patient, he/she is well advised to note in the patient’s record the reason for the procedure followed. Moreover, it should be understood that adherence to the parameters does not guarantees a favorable outcome.

GENERAL THERAPEUTIC GOALS FOR DIAGNOSIS AND MANAGEMENT OF PATHOLOGICAL CONDITIONS:

• Provision of medical and/or surgical palliation or cure of the disease process
• Restoration of function
• Restoration of form
• Preservation of vital structures
• Prevention of recurrence
• Limited period of disability
• Appropriate understanding by patient (family) of treatment options and acceptance of treatment plan
• Appropriate understanding and acceptance by patient (family) of favorable outcomes and known risks and complications
• Palliation of patient’s disease in the event of disseminated disease

GENERAL FACTORS AFFECTING RISK DURING DIAGNOSIS AND MANAGEMENT OF PATHOLOGICAL CONDITIONS:

• Degree of patient’s and/or family’s understanding of the origin and natural course of the condition or disorder and therapeutic goals and acceptance of proposed treatment
• Presence of coexisting major systemic disease (eg, disease that increases a patient’s
American Society of Anesthesiologists classification to II, III, or IV
• Age of patient
• Presence of acute and/or preexisting infection
• Accuracy and quality of pathologic diagnosis
• Presence of local or systemic conditions that may interfere with the normal healing process and subsequent tissue homeostasis (eg, previously irradiated tissue, diabetes mellitus, chronic renal disease, liver disease, blood disorder, steroid therapy, contraceptice medication, immunosuppression, malnutrition)
• Presence of behavioral, psychological, neurologic, and/or psychiatric disorders, including habits (eg, substance abuse, including tobacco and alcohol), seizure disorders, self-mutilation, or dementia, which may affect surgery, healing, and/or response to therapy
• Degree of patient’s and/or family’s cooperation and/or compliance
• Regulatory and/or third-party decisions concerning access to care, indicate therapy, drugs, devices, and/or materials
• Potential for risk to adjacent vital structures
• Existing drug or alcohol intoxication

GENERAL FAVORABLE THERAPEUTIC OUTCOMES FOR DIAGNOSIS AND MANAGEMENT OF PATHOLOGICAL CONDITIONS:
• Cure or palliation of disease
• Restored form
• Restored function
• Presence of intact adjacent structures (eg, no unanticipated loss or damage)
• Limited period of disability
• Patient (family) acceptance of procedure and understanding of outcomes

GENERAL KNOWN RISKS AND COMPLICATIONS OF DIAGNOSIS AND MANAGEMENT OF PATHOLOGICAL CONDITIONS:
• Unplanned admission to intensive care unit after elective surgery
  ● Comment and Exception: Planned admission should be documented in the patient’s record before surgery.
• Unplanned intubation for longer than 24 hours after surgery
  ● Comment and Exception: Planned intubation longer than 24 hours should be documented in the patient’s record before surgery.
• Reintubation or tracheostomy after surgery
• Use of parenteral drugs and/or fluids for longer than 72 hours after elective surgery
  ● Comments and Exceptions: Procedures in which long-term parenteral drugs and/or fluids are indicated as part of the original treatment plan should be documented in the patient’s record before surgery.
• Failure to ambulate within an acceptable period after surgery
• Facial and/or trigeminal nerve dysfunction after surgery
  ● Comment and Exception: When postoperative nerve dysfunction is common, anticipated deficits should be noted in the patient’s record before surgery (eg, anesthesia of inferior alveolar nerve distribution after segmental resection of the mandible for benign or malignant disease).
• Facial fracture during or after surgery (eg, pathologic fracture of mandible after marginal resection)
  ● Comment and Exception: A fractured bone that may be a sequela to surgery should be documented in the patient’s record before surgery.
• Unplanned Caldwell-Luc, bronchoscopy, or other exploratory procedures associated
with surgery

• Dental injury during surgery
  ● Comment and Exception: Any potential dental injury should be noted in the patient’s record before surgery.

• Ocular injury during surgery

• Repeat Oral and/or Maxillofacial Surgery
  ● Comment and Exception: Staged procedures that are part of the original treatment plan should be documented before the initial procedure.

• Postsurgical radiograph indicating presence of foreign body
  ● Comment and Exception: Foreign bodies (eg, plates, screws, wires) that are anticipated as a normal course of the surgical procedures (eg, orthognathic, trauma) should be noted in the patient’s record.

• Readmission of cancer patient for repeat ablative surgery within 12 months of primary surgery

• Unplanned transfusion(s) of blood or blood components during or after surgery

• Readmission for complications or incomplete management of problems on previous hospitalization
  ● Comments and Exceptions:
    ● Complication or incomplete management occurring at another hospital or involving a physician who is not on the medical staff
    ● Readmission for chronic disease (eg, intractable asthma, recurrent congestive heart failure, cancer); service-specific criteria required for this exception
    ● Planned admissions for secondary procedures needed to complete treatment

• Respiratory and/or cardiac arrest

• Unanticipated residual functional deformity

• Unanticipated residual structural deformity

• Loss of or damage to adjacent vital structures (eg, neurosensory, dentition)

• Local sequelae, with damage to or loss of vital structures

• Loss of function

• Loss of form

• Death from tumor extension or as a result of tumor therapy

• Death
  ● Comment and Exception: Admissions for terminal care must be documented.

SALIVARY GLAND DISEASES: BENIGN AND MALIGNANT TUMORS AND MISCELLANEOUS LESIONS

I. Indications for Therapy for Salivary Gland Diseases: Benign and Malignant Tumors and Miscellaneous Lesions

A. Clinical indications

• Pain

• Mass effect (eg, swelling, expansion)

• Ulceration

• Altered neurologic function

• Reduced or absent salivary flow

• Alteration in color of overlying tissue

• Fluctuance

• Secondary infection

• Altered speech or masticatory function

• Evidence of regional or distant metastasis

• Auditory changes
B. Imaging indications
   1. Displacement of adjacent anatomical structures
   2. Proximity to/invasion of adjacent structures (eg, deep lobe of parotid gland, palatal bone)
C. Results of differential diagnosis
D. Results of additional studies, as indicated
   1. Fine-needle aspiration
   2. Incisional or excisional biopsy, depending on lesion location, extent, and character
E. Additional presurgical studies may include:
   1. Magnetic resonance imaging, CT or PET, PET/CT scanning, as indicated, for evaluation of primary site, neural involvement, and metastases
   2. Plain radiographs, including panoramic radiograph, for intraosseous salivary gland tumors or other tumors with suspected bone involvement
   3. Chest radiographs in cases of malignant lesions
   4. Laboratory tests, including complete blood cell count and liver function tests in cases of malignant disease

II. Specific Therapeutic Goals for Salivary Gland Diseases: Benign and Malignant Tumors and Miscellaneous Lesions
   A. Presence of a general therapeutic goal, as previously described.
   B. Eradication of cyst or tumor

III. Specific Factors Affecting Risk in the Treatment of Salivary Gland Diseases: Benign and Malignant Tumors and Miscellaneous Lesions
   • Presence of a general factor affecting risk, as previously described.
   • Presence of acute and/or preexisting infection
   • Proximity to/invasion of adjacent structures
   • Extent of cyst or primary tumor
   • Presence and extent of regional and/or distant metastases

IV. Indicated Therapeutic Parameters for Salivary Gland Diseases: Benign and Malignant Tumors and Miscellaneous Lesions
   A. Diagnosis by aspiration or biopsy
   B. Primary treatment
      1. Marsupialization (eg, ranula)
      2. Local excision of lesion (eg, canalicular adenoma)
      3. Local excision of lesion with adjacent tissue (eg, mucous retention phenomenon, pleomorphic adenoma)
      4. Sialadenectomy (eg, sublingual gland for ranula, pleomorphic adenoma of major gland)
      5. Sialadenectomy with excision of associated adjacent tissues (eg, malignant tumor of major gland)
      6. Simultaneous or delayed prophylactic or therapeutic lymph node dissection (eg, malignant tumor)
      7. Radiation therapy and/or chemotherapy for malignant tumors
   All specimens must be submitted for pathologic assessment.
   C. Adjunctive treatment
      1. Radiation therapy and/or chemotherapy for malignant tumors, when indicated
      2. Reconstructive procedures (Also see the Reconstructive Surgery chapter)
         i. Bone, nerve, and soft tissue grafts, including local pedicled and microvascular free grafts
3. Nutritional support
D. Post-treatment follow-up
   1. Clinical follow-up of cyst or benign tumors until form and/or function are restored
   2. Annual clinical follow-up of recurrence-prone tumor (eg, pleomorphic adenoma), with special reference to primary site
   3. Continual clinical examination for malignant tumors for the patient’s lifetime, with type of examination and imaging depending on tumor type, likely site of metastasis, and likely length of time to appearance of recurrence or metastasis
   4. Instructions to return if signs or symptoms recur before the regularly scheduled follow-up appointment
E. Instructions for posttreatment care and follow-up

V. Outcome Assessment Indices for Salivary Gland Diseases: Benign and Malignant Tumors and Miscellaneous Lesions
A. Favorable therapeutic outcomes
   1. General favorable therapeutic outcomes, as previously described.
   2. Patient free of cyst or tumor at primary or distant site
B. Known risks and complications associated with therapy
   1. Presence of a general known risk and/or complication, as previously described.
   2. Local recurrence of cyst or tumor
   3. Metastasis
   4. Death from tumor metastasis, extension, or therapy

SALIVARY GLAND INFECTIONS
I. Indications for Therapy for Salivary Gland Infections
A. Clinical indications
   • Pain
   • Swelling
   • Erythema
   • Altered neurologic function
   • Drainage of pus or mucus
   • Reduced salivary flow
   • Sinus tracts (fistula)
   • Fluctuance
   • Induration
   • Fever
   • Dehydration
   • Leukocytosis
   • Elevation of sedimentation rate
   • Evidence from culture
B. Results of differential diagnosis
C. Results of additional studies, as indicated
   1. Culture and sensitivity
   2. Gram stain
   3. Aspiration
D. Additional studies, as indicated, may include:
   1. Radiographs for sialolith
   2. Office-based scans (panoramic and/or cone beam computed tomography)
   3. CT
   4. Magnetic resonance imaging
   5. Sialography
6. Complete blood cell count with differential count
7. Sedimentation rate
8. Evaluation for underlying disease process (eg, alcohol, starvation, diabetes, immunosuppression, collagen vascular disease, etc)
9. Microbiologic assessment

II. Specific Therapeutic Goals for Salivary Gland Infections
A. Presence of a general therapeutic goal, as previously described.
B. Eradication of infection

III. Specific Factors Affecting Risk in the Treatment of Salivary Gland Infections
• Presence of a general factor affecting risk, as previously described.
• Presence of acute infection
• Extent of infection (eg, localized, diffuse)
• Identification of organism (eg, known, classified)
• Virulence of organism and/or responsiveness to antibiotics
• Potential for injury to adjacent structures
• Degree of vascularity in region (eg, after radiation therapy, multiple operations)
• Postsurgical state with intensive care unit admission

IV. Indicated Therapeutic Parameters for Salivary Gland Infections
• Appropriate antibiotic therapy
• Incision and drainage
• Control of pain
• Management of underlying medical condition when present
• Maintenance of hydration and nutrition
• Sialolithotomy
• Sialodochotomy
• Sialodochoplasty
• Sialadenectomy
• Instructions for posttreatment care and follow-up

All specimens must be submitted for microbiologic assessment.

V. Outcome Assessment Indices for Salivary Gland Infections
A. Favorable therapeutic outcomes
   1. General favorable therapeutic outcomes, as previously described.
   2. Absence of infection
B. Known risks and complications associated with therapy
   1. Presence of a general known risk and/or complication, as previously described.
   2. Persistent infection
   3. Systemic sequelae of the infection

SALIVARY GLAND DISEASES: OTHER LOCAL OR SYSTEMIC
This section includes but is not limited to Sjögren syndrome, sarcoidosis, and necrotizing sialometaplasia.

I. Indications for Therapy for Salivary Gland Diseases: Other Local or Systemic
A. Clinical indications
   1. Xerostomia
   2. Salivary gland enlargement
   3. Ulceration
B. Results of differential diagnosis
C. Results of additional studies, as indicated
   1. Clinical
      a. Keratoconjunctivitis sicca
      b. Rheumatoid arthritis
      c. Lacrimal gland enlargement
      d. Signs and symptoms of sarcoidosis (eg, hilar lymphadenopathy, Heerfordt syndrome, hypercalcemia, Löfgren syndrome)
   2. Imaging
      a. Sialography
      b. Nuclear medicine scan (bone scan)
      c. CT
      d. Magnetic resonance imaging
      e. Chest radiograph for sarcoidosis
   3. Laboratory
      a. Evidence of Sjögren syndrome (eg, SSA, SSB, antinuclear antibody, latex fixation test)
      b. Elevated sedimentation rate
      c. Serum angiotensin-converting enzyme (eg, sarcoidosis)
   4. Surgical
      a. Fine-needle aspiration
      b. Biopsy (lip vs parotid)
D. Additional presurgical studies may include:
   1. Magnetic resonance imaging or CT

II. Specific Therapeutic Goals for Salivary Gland Diseases: Other Local or Systemic
   A. Presence of a general therapeutic goal, as previously described.
   B. Elimination or control of disease

III. Specific Factors Affecting Risk in the Treatment of Salivary Gland Diseases: Other Local or Systemic
   A. Presence of a general factor affecting risk, as previously described.
   B. Presence of acute and/or preexisting infection
   C. Potential for injury to adjacent structures

IV. Indicated Therapeutic Parameters for Salivary Gland Diseases: Other Local or Systemic
   • Diagnosis by aspiration or biopsy
   • Medical treatment of underlying disorders
   • Palliative treatment of pain, dehydration, malnutrition
   • Sialadenectomy in chronic and persistent disease
   • Instructions for posttreatment care and follow-up

V. Outcome Assessment Indices for Salivary Gland Diseases: Other Local or Systemic
   A. Favorable therapeutic outcomes
      • General favorable therapeutic outcomes, as previously described.
      • Patient free of disease
      • Reduction in number and severity of symptoms
      • Reversal of damage to structures
      • Controlled progression of disease
      • Improved clinical status
B. Known risks and complications associated with therapy
1. Presence of a general known risk and/or complication, as previously described.
2. Deterioration of clinical status or progression of disease
3. Malignant transformation
4. Injury (temporary or permanent) to sensory or motor nerves

SELECTED REFERENCES

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.

SALIVARY GLAND DISEASES: BENIGN AND MALIGNANT TUMORS, MISCELLANEOUS LESIONS

SALIVARY GLAND INFECTIONS


SALIVARY GLAND DISEASES: OTHER LOCAL OR SYSTEMIC