GUIDELINES FOR

ORAL AND MAXILLOFACIAL SURGERY

Version 1

Issue Date: 10/06/2021

Effective Date: 10/08/2021

Health Policies and Standards Department

Health Regulation Sector (2021)

INTRODUCTION

Dubai Health Authority (DHA) is the responsible entity for regulating, licensing and monitoring health facilities and healthcare professionals in the Emirate of Dubai. The Health Regulation Sector (HRS) is an integral part of DHA and was founded to fulfil the following overarching strategic objectives and program:

Objective #1: Position Dubai as a global medical destination by introducing a value-based, comprehensive, integrated and high quality service delivery system.

Objective #2: Direct resources to ensure healthy and safe environment for Dubai population.

Strategic Program #5: Oral & Dental Care- This program focuses on improving the oral health outcomes and ensure that all individuals have access to high quality treatments and effective prevention programs for dental care.

ACKNOWLEDGMENT

This document was developed by Dental Services Department, Primary Healthcare Services Sector (PHCSS). It has further been reviewed by the Health Policy and Standards Department (HPSD).

HRS would like to acknowledge and thank all parties that participated and worked toward developing these guidelines to ensure improving the quality and safety of healthcare services.

The Health Regulation Sector

Dubai Health Authority

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EXECUTIVE SUMMARY

Clinical guidelines to enhance the standard of care in health facilities are increasingly becoming part of current practice and will become more common over the next decade. These Clinical Guidelines aim to improve the quality and the level of healthcare provided to the clients. Healthcare providers can use these guidelines to answer specific questions in day-to-day practice and as an information source for continuing professional education.

This document presents a framework for Oral and Maxillofacial Surgeons to:

- Provide guidance for the proper management for the extraction of wisdom teeth and impacted canines.
- Manage patients on anticoagulants/antiplatelet undergoing dental/oral surgical procedure, in order to achieve effective results.
- Provide an overview on the topic of antibiotic prophylaxis to make informed decisions on prophylactic antibiotic use in the prevention of local & systemic infections.
- Provide an overview on the management of pregnant patients undergoing dental/oral & maxillofacial treatment.
- Diagnose and manage oral soft tissue lesions.
- Introduce decision-making criteria regarding diagnosis, management and treatment plan of Odontogenic/Cervicofacial infections and to reduce inappropriate variation in practice.
- Provide an overview on the topic of oral & dental management of patients at risk of or having Medication-Related Osteonecrosis of the Jaw (MRONJ).

- Elaborate on the in diagnosis and primary care of patient with Tempro-Mandibular Joint (TMJ) Disorders and also specify a referral pathway to aid in the referring process of such patients.
- Standardize management of skeletal malocclusions and maximize patient outcome both functionally and aesthetically.
- Manage oral and maxillofacial fractures to reach optimal outcomes.

DEFINITIONS

Temporomandibular disorders (TMD): are disorders that involve the temporomandibular joint, which can involve the joint itself, surrounding muscles and supporting structures.

Temporomandibular Joint (TMJ): is also known as the jaw joint. It is the joint that connects the lower jawbone to the skull. Two joints are present at both sides of the face in front of the ears. Muscles and ligaments are connected to the joint and the joint is surrounded by a protective capsule. A cartilaginous disc is located between the bones and slides forward and backward with jaw movement.

ABBREVIATIONS

AAPD	:	American Academy of Pediatric Dentistry
ADA	:	American Dental Association
AHA	:	American Heart Association
ARD	:	Acute Respiratory Distress
ASA	:	American Society of Anesthesiologists
BMI	:	Body Mass Index
CAD	:	Coronary Artery Disease
CBCT	:	Cone Beam Computed Tomography
CHD	:	Congenital Heart Disease
CT	:	Computerized Tomography
CVA	:	Cerebrovascular Accident
DHA	:	Dubai Health Authority
DHIC	:	Dubai Health Insurance Corporation
DIC	:	Disseminated Intravascular Coagulation
DM	:	Diabetes Mellitus
EBP	:	Essential Benefit Plan
ESRD	:	End-Stage Renal Disease
FDA	:	Food and Drug Administration
HIV	:	Human Immunodeficiency Virus
HPSD	:	Health Policies and Standards Department

HRS	:	Health Regulation Sector
HTN	:	Hypertension
IE	:	Infective Endocarditis
IM	:	Intramuscular
IV	:	Intra vascular
MI	:	Myocardial Infarction
MRI	:	Magnetic Resonance Imaging
OPG	:	Dental Orthopantomogram
PCA	:	Post Conceptual Age
PET	:	Positron Emission Tomography
PHCSS	:	Primary Healthcare Services Sector
PJI	:	Prosthetic Joint Infections
SPECT	:	Single Photon Emission Computed Tomography
TIA	:	Transient Ischemic Attack
TMD	:	Temporomandibular disorders
TMJ	:	Temporomandibular Joint
UAE	:	United Arab Emirates

A. GUIDELINES FOR THE MANAGEMENT OF WISDOM TEETH AND IMPACTED CANINES

1. BACKGROUND

Third molars (wisdom teeth) are the most posterior and the last teeth to erupt in the oral cavity. They are four in number, two in each arch. They erupt between the ages of 18-24 years. Either a wisdom tooth fails to erupt into the dental arch or it erupts fully and functions within the arch. Most common impacted teeth are maxillary and mandibular third molar, maxillary canine, mandibular second premolar and supernumerary teeth.

Impacted and fully erupted teeth may cause problems for some people like swelling and pain, or they might cause no symptoms at all. Extraction of symptomatic and asymptomatic teeth is a common surgical procedure that needs proper investigation and management.

1.1. Etiology of teeth impaction:

1.1.1. Local factors:

a. Arch length discrepancy

b. Premature loss of primary teeth

c. Presence of a supernumerary tooth

d. Ectopic position of a tooth germ

e. Local pathology e.g. odontome

f. Thickened overlying osseous or mucosal tissue

g. Obstacles to eruption e.g. ankylosed primary molar

h. Cleft palate

i. Biomechanical impediments secondary to childhood maxillofacial surgery or dento-alveolar trauma.

1.1.2. Systemic factors:

a. Cleidocranial dysostosis

b. Other hereditary or syndromic conditions.

2. SCOPE

2.1. Provide guidance to Oral Maxillofacial Surgeons regarding the proper management for the extraction of wisdom teeth and impacted teeth.

3. PURPOSE

3.1. To guide for proper decision-making for diagnosing & managing extraction of wisdom teeth and common impacted teeth.

3.2. To reduce the risk of post extraction complications.

3.3. To improve patient care.

4. APPLICABILITY

4.1. DHA licensed Oral and Maxillofacial Surgeons.

5. **RECOMMENDATION ONE:** CLASSIFICATION OF WISDOM TEETH

5.1. Wisdom teeth can be classifies as follows:

5.1.1. Totally erupted Third Molars

5.1.2. Partially erupted Third Molars (Soft tissue or bony impacted)

5.1.3. Impacted Third Molars

5.2. Impacted third molars are classified as per Winter's classification as follows:

5.2.1. Mesioangular

5.2.2. Distoangular

5.2.3. Horizontal

5.2.4. Vertical

5.2.5. Buccal/Lingual Obliquity

5.2.6. Transverse

5.3. Impacted third molars are classified as per Pell and Gregory radiographic classification as follows:

5.3.1. Classification with respect to mandibular ramus:

a. Class I: the crown is located anterior to the anterior border of the ramus.

b. Class II: ½ of the crown covered by the anterior border of the ramus.

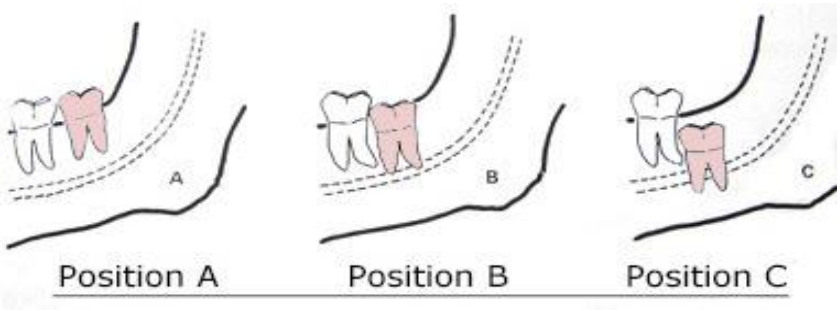
c. Class III: the crown is fully covered by the anterior border of the ramus.

5.3.2. Classification for the occlusal plane:

a. Class A: at the same level as, or a little below than that of the second molar.

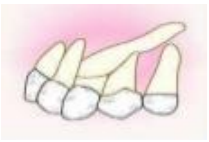
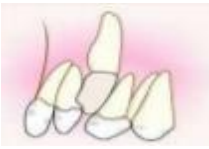
b. Class B: at the middle of the crown of the second molar or at the same level as the cervical line.

c. Class C: apical to the cervical line of the second molar.



6. RECOMMENDATION TWO: CLASSIFICATION OF IMPACTED CANINES

6.1. Classification of impacted maxillary canine:

Classification of impacted maxillary canines		
CLASS 1	Impacted cuspids located in palate.	
CLASS 2	Impacted cuspids located in labial or buccal surface of maxilla.	
CLASS 3	Impacted cuspids located in palatine and maxillary bone, the crown is on the palate and root passes through the root of the adjacent teeth and ends in the labial or buccal surface.	
CLASS 4	Impacted cuspids located in alveolar process, usually vertically between incisor and first bicuspids.	
CLASS 5	Impacted cuspids located in edentulous maxilla.	

7. **RECOMMENDATION THREE:** CLINICAL MANAGEMENT OF WISDOM/IMPACTED CANINE TEETH

7.1. Clinical assessment

7.1.1. The general agreement indicates that a wisdom tooth should be removed if pathology or symptoms are present or the chance for their future appearance exists.

7.1.2. Decision of extraction will be undertaken according to the following indications:

a. Indications for wisdom teeth extraction:

I. Non-restorable caries

II. Non-treatable pulpal and/or periapical pathology

III. Cellulitis

IV. Abscess and osteomyelitis

V. Internal/external resorption of the tooth or adjacent teeth

VI. Fracture of tooth

VII. Disease of follicle including cyst/tumour

VIII. Tooth/teeth impeding surgery or reconstructive jaw surgery and when a tooth is involved in or within the field of tumour resection.

b. Indications for impacted teeth extraction:

I. Arch space- tooth size discrepancy

II. Dental caries of the impacted or adjacent teeth

III. Widening of periodontal ligament space of the adjacent tooth

IV. Root resorption of the adjacent tooth

V. Disease of follicle including cyst/tumour.

7.2. Radiographic assessment

7.2.1. It is essential that proper radiographs be taken for the tooth to be removed. In general, Periapical Radiographs (PA) provide the most accurate & detailed information concerning the tooth, its roots and the surrounding tissue.

7.2.2. Panoramic radiographs (OPG) are used frequently, but their greatest usefulness is for impacted teeth as opposed to erupted teeth & its relationship of associated vital structures.

7.2.3. The various Imaging modalities are as follows:

a. Intra oral periapical radiograph with parallelism & using SLOB rule (SLOB: Same Lingual Opposite Buccal)

b. Orthopantomogram (OPG)

c. Cone beam computed tomography (CBCT) in case of deeply impacted teeth, presence of pathology, or to check proximity to the inferior alveolar nerve (IAN).

7.3. Laboratory testing (in case required).

7.4. Treatment options for impacted teeth.

7.4.1. According to the clinical & radiological findings, treatment option could be as follows:

a. Observation and follow up

b. Simple or Surgical extraction

c. Intervention by orthodontic means or extraction of a neighbouring permanent

d. Surgical exposure and orthodontic alignment

e. Coronectomy or Partial Odontectomy.

8. **RECOMMENDATION FOUR:** CLINICAL STEPS FOR WISDOM/IMPACTED CANINE TEETH EXTRACTION

8.1. Fundamental requirements for a successful extraction:

8.1.1. Adequate access & visualization of the field of surgery.

8.1.2. An unimpeded pathway for the removal of the tooth.

8.1.3. The use of controlled force to luxate & remove the tooth.

8.2. Clinical steps for wisdom teeth extraction:

8.2.1. There are two techniques for wisdom tooth extraction: Simple (closed) or Surgical (open).

8.2.2. Simple tooth extraction (closed/uncomplicated) is the most frequently used technique. The different steps involved in a Simple tooth extraction are as follows:

a. Anesthesia

b. Tooth removal

c. Socket debridement (only if necessary)

d. Control haemorrhage

e. Wound closure

f. Post-operative instructions.

8.2.3. Surgical tooth extraction (open/complicated) is used whenever excessive force is necessary to remove the tooth, a substantial amount of the crown is missing, or when the tooth is impacted and the access is difficult. The different steps involved in a Surgical tooth extraction are as follows:

a. Anesthesia

b. Incision and mucoperiosteal flap

c. Removal of bone

d. Tooth removal

e. Socket debridement (only if necessary) and bone smoothening

f. Control haemorrhage

g. Wound closure

h. Post-operative instructions.

8.3. Clinical steps for surgical exposure of impacted canines:

8.3.1. Factors to be considered before the surgical management of impacted canines are as follows:

a. Labial-palatal position of impacted canine.

b. Impaction position relative to the Mucogingiva Junction (MGJ) in an apical-coronal dimension.

c. Evaluation of the amount of keratinized gingiva (KG) mainly with facial impactions.

d. The mesial-distal position of the canine relative to the lateral incisor.

8.3.2. There are two techniques for surgical exposure of impacted canines: Open Surgical technique and Closed Surgical Technique.

8.3.3. The different steps involved in an Open Surgical technique are as follows:

a. Surgical uncovering of the canine with a mucoperiosteal flap.

b. Dissection of the bone (bone covering the canine is being removed).

c. An attachment with a chain is bonded to the tooth.

d. The palatal flap is repositioned and sutured back with the chain above the mucosa.

e. Shortly after the surgery, orthodontic force is applied via the chain.

f. The canine is orthodontically moved beneath the palatal mucosa by forced eruption.

8.3.4. The different steps involved in an Closed Surgical technique are as follows:

a. Surgical uncovering of the canine, removing a window of tissue around it and placing pack to cover the exposed area.

b. The treatment approaches vary depending on whether the attachment with a chain is bonded to the exposed tooth at surgery or if spontaneous eruption of the palatally impacted canine is expected post surgically.

c. Orthodontic force is applied via the chain and the canine is orthodontically moved above the mucosa.

9. **RECOMMENDATION FIVE:** SUMMARY OF THE MANAGEMENT OF EXTRACTION OF IMPACTED TEETH

9.1. Pre-Operative

9.1.1. Medical History.

9.1.2. Medication history.

9.1.3. Radiographic examination of the tooth to be removed.

9.1.4. Assessment of extensiveness of the procedure.

9.1.5. Informed consent (all risks & possible complications have to be clearly explained to the patient).

9.2. Operative

9.2.1. Monitor premonitory signs (sweating, dyschromia, finger dysesthesia).

9.2.2. Proper Anesthesia selection.

9.2.3. Proper flap design (if needed).

9.2.4. Bone removal (if needed).

9.2.5. Tooth removal.

9.2.6. Socket debridement/curettage only if necessary. In case of periapical lesion is visible on the preoperative radiograph & there was no granuloma attached to the tooth after removal. Or if ant debris is obvious (tooth fragment, calculus, or filling material).

9.2.7. Finger compression of the expanded buccolingual plates of bone.

9.2.8. Smoothening of sharp edges (if needed).

9.2.9. Hemostasis through applying pressure by gauze, suturing or local/systemic hemostatic agent.

9.3. Post-Operative Instructions

9.3.1. Take painkiller/antibiotic (if prescribed).

9.3.2. Bite firmly on gauze for 30–45 min.

9.3.3. In case bleeding continues, place another gauze for an extra hour.

9.3.4. Stay on cold soft diet for twenty-four (24) hours.

9.3.5. Avoid mouth rinsing for the first twenty-four (24) hours. After twenty-four (24) hours, rinse with warm salt water, three (3) times a day for 3–4 days.

9.3.6. Avoid brushing and flossing in the first twenty-four (24) hours in the area of surgery.

9.3.7. Follow-up in case nonresorbable sutures placed for wound closure.

10. **RECOMMENDATION SIX:** COMPLICATIONS OF TEETH EXTRACTION

10.1. Common complications during the surgery:

10.1.1. Mesioangular and horizontal positions of third molars are responsible for development of distal cervical caries on the second molar.

10.1.2. Impacted tooth/root displacement: close proximity of the root apex to the anatomical structures such as the maxillary sinus, and the mandibular canal.

a. Complications associated with impacted or adjacent tooth

b. Soft tissue complications

c. Nerve injuries (inferior alveolar nerve or lingual nerve)

d. Bone complications.

10.2. Possible Complications after the extraction:

10.2.1. Pain/discomfort

10.2.2. Swelling

10.2.3. Bruising

10.2.4. Hemorrhage/bleeding

10.2.5. Bad breath

10.2.6. Dry socket

10.2.7. Infection/inflammation

10.2.8. Trismus/limited mouth opening

10.2.9. Alter in sensation, paresthesia, or numbness of lip and tongue

10.2.10. Damage to adjacent teeth/restoration

10.2.11. TMJ pain can last for a few weeks to months

10.2.12. Oroantral communication (Sometimes, Upper wisdom teeth are located close to maxillary sinus, if sinus membrane is perforated, closure of the oroantral communication is required to correct the defect).

11. **RECOMMENDATION SEVEN:** SPECIAL ENDORSEMENTS

11.1. Informed consent and time out must be done before starting the extraction procedure.

11.2. Explain all risks & possible complications, including temporary or permanent damage to the inferior alveolar nerve as; paraesthesia or numbness & to lingual nerve leading to numbness of the tongue.

11.3. Unnecessary or vigorous curettage of the socket wall merely produces additional injury & may delay healing.

11.4. In case tooth was removed due to periodontal disease, special attention should be given to removing the granulation tissue by curetting the socket to avoid excessive bleeding.

11.5. Surgical removal of impacted teeth should be limited to patients with evidence of pathology.

11.6. Prophylactic removal of pathology free wisdom teeth should be avoided as:

11.6.1. There is no reliable research to suggest that this practice benefits patients.

11.6.2. Patients who do have healthy wisdom teeth removed are being exposed to the risks of surgery.

11.7. Symptoms free wisdom teeth to be monitored on a regular check-up.

11.8. Symptomatic impacted teeth have to be removed regardless of the difficulties of the surgical management.

11.9. First episode of Pericoronitis, unless particularly severe, should not be considered as an indication for surgery. Second or subsequent episodes should be considered the appropriate indication for extraction.

11.10. Younger healthy patient might have less postoperative complications when compared with older patient.

11.11. Palpation of impacted canine at age of 9 years old, because canine impaction can be associated with functional or aesthetic impairment.

11.12. Surgery for removal of impacted teeth may be associated with several postoperative complications; the surgeon should be prepared to manage them when they occur.

B. GUIDELINES FOR THE MANAGEMENT OF PATIENTS ON ANTICOAGULANTS/ ANTIPLATELETS UNDERGOING DENTAL/ORAL SURGICAL PROCEDURES

1. BACKGROUND

Anticoagulants and other known blood thinners have been used to combat thromboembolisms and blood clots. These medications are considered crucial to high-risk individuals, especially those who have had previous thromboembolic events. In the dental oral surgery field, there is an exposure to a range of individuals with varying severities of medical conditions. This requires the dental practitioner to master the art of medical history taking, which aids in identifying the patients who are on anticoagulant medications and therefore are at a great risk of haemorrhage and other complications after dental surgery.

2. SCOPE

2.1. To provide guidance that aids in the effective dental management of anticoagulant/antiplatelet consuming patients which will positively reduce the demands of secondary referrals from primary healthcare.

3. PURPOSE

3.1. To identify patients who are on anticoagulant/antiplatelet therapy.

3.2. To identify patients on anticoagulant/antiplatelet therapy who require dental management in a hospital setting.

3.3. To implement proper management modalities thereby reducing the incidence of excessive bleeding.

4. APPLICABILITY

4.1. DHA licensed Oral and Maxillofacial Surgeons.

5. **RECOMMENDATION ONE:** PATIENT DIAGNOSIS

5.1. Along with a thorough medical history review, the following factors greatly impact a patient's bleeding risk following an oral surgical procedure:

5.1.1. Main medical conditions associated with increased risk of bleeding **Appendix 1.**

5.1.2. Main drug groups associated with high risk of bleeding **Appendix 2.**

5.1.3. Major drug interactions between Anticoagulants/Antiplatelets and most commonly prescribed medications in the dental field **Appendix 3.**

5.1.4. Dental procedures that are likely to cause bleeding **Appendix 4.**

6. **RECOMMENDATION TWO:** CLINICAL MANAGEMENT PATIENTS WHO ARE AT RISK OF BLEEDING FROM AN ORAL SURGICAL PROCEDURE

6.1. Low bleeding risk procedures:

6.1.1. Maintain standard protocol in achieving hemostasis (By applying pressure to the bleeding point using gauze for 30 minutes).

6.2. High bleeding risk procedures:

6.2.1. Consult with the patient's general or specialist medical practitioner if needed.

6.2.2. Depending on the urgency of therapy, delay the elective procedure.

6.2.3. Obtain effective hemostatic measure.

6.2.4. Perform atraumatic surgical procedures.

6.2.5. Discharge with a concise, effective post-operative instructions with a verbalized understanding by the patient.

Note: For a flowchart Refer to **Appendix 5.**

7. **RECOMMENDATION THREE:** SPECIAL ENDORSEMENT

7.1. Patients on long-term oral anticoagulants with significant medical problems such as; liver disease, renal disease, thrombocytopenia or who are taking anti-platelet drugs pose an increased risk of bleeding. Those patients should be managed in a hospital setting under the care of the oral and maxillofacial department and the individuals' respective medical physicians or specialists.

C. GUIDELINES FOR ANTIBIOTIC PROPHYLAXIS FOR PATIENTS UNDERGOING DENTAL/ORAL MAXILLOFACIAL PROCEDURES

1. BACKGROUND

Antibiotic prophylaxis still represents a common but often misused procedure in dental practice, thus aggravating the risk for antimicrobial resistance and adverse effects occurrence.

2. SCOPE

2.1. To assist General Dental Practitioners and Oral & Maxillofacial Surgeons make informed decisions on prophylactic antibiotic use in the prevention of local & systemic infections.

3. PURPOSE

3.1. To identify the procedures in oral surgery that would benefit from surgical antibiotic prophylaxis.

3.2. To assist in deciding which antibiotics to prescribe and what regimen to follow if prophylactic antibiotics are indicated.

4. APPLICABILITY

4.1. DHA licensed Oral and Maxillofacial Surgeons.

4.2. DHA licensed General Dental Practitioners

5. RECOMMENDATION ONE: CLASSIFICATION OF INDICATIONS FOR ANTIBIOTIC PROPHYLAXIS

5.1. Indications for antibiotic prophylaxis are classified as follows:

1.	Type of surgical procedure	Severity & extensiveness

2.	Wound class	According to the risk of contamination/infection
3.	Patients underlying medical problems according to ASA	ASA: American Society of Anesthesiologists physical status classifications
4.	Patients underlying medical problems according to AHA	AHA: American Heart Association
5.	Patients underlying medical problems According to ADA	ADA: American Dental Association
6.	Patients underlying medical problems according to AAPD	AAPD: American Academy of Pediatric Dentistry

5.2. Type of surgical procedure:

5.2.1. Antibiotic prophylaxis is not indicated for:

a. Clean dental surgery in healthy patients

b. Lower third molar surgery

5.2.2. Antibiotic prophylaxis is not recommended for:

a. Routine periodontal surgery

5.2.3. But indicated for:

a. Minor surgery with a high degree of difficulty in which the duration of the surgery is predicted to be long

b. Surgery to place dental implants

c. Minor oral surgical procedures in which a bone graft is inserted

d. Major clean contaminated maxillofacial surgery, such as orthognathic surgery and surgery for large benign cysts and tumors

e. All forms of head and neck cancer surgery

f. Open reduction and internal fixation of facial bone fractures

5.3. Wound classification:

5.3.1. Antibiotic prophylaxis should not be used if the infection rate of a specific procedure is ≤5%,

	Wound Classification	Estimated Infection Rate
1.	Clean: No disruption of the mucosa such as the oral cavity.	<1–5%.
2.	Clean contaminated: Disruption of the mucosa such as the oral cavity or surgery in an inflamed area.	3–11%.
3.	Contaminated: Oncological surgery in which both oral cavity and neck contact.	10-17%.
4.	Dirty and infected wound	>27%.

5.4. Patients underlying medical problems according to ASA:

5.4.1. Patients with ASA scores of 1 and 2 have lower infection rates than patients with ASA scores of 3 or more.

5.4.2. Antibiotic prophylaxis is indicated for all surgical procedures carried out on medically compromised patients. Patients could be oncological patients, patients with congenital or immunological immune-depression, patients with immune-depression due to medication, patients with infectious immune-depression (AIDS), patients with metabolic disorders (diabetes) and patients with renal and hepatic insufficiency while for those with ASA less than three (3) depends on the physician's discretion.

ASA PS	Definition	Examples, including, but not limited to:

Classification		
ASA I	A normal healthy patient	Healthy, non-smoking, no or minimal alcohol use
ASA II	A patient with mild systemic disease	Mild diseases only without substantive functional limitations Examples include (but not limited to): Current smoker, social alcohol drinker, pregnancy, obesity (30 < BM < 40), well controlled DM/HTN, mild lung disease
ASA III	A patient with severe systemic disease	Substantive functional limitations; One or more moderate to severe diseases Examples include (but not limited to): Poorly controlled DM or HTN, COPD, morbid obesity (BMI ≥40), active hepatitis, alcohol dependence or abuse, implanted pacemaker, moderate reduction of ejection fraction, ESRD undergoing regularly scheduled dialysis, premature infant PCA < 60 weeks, history (>3 months) of MI, CVA, TIA, or CAD/stents.
ASA IV	A patient with severe systemic disease that is a constant threat to life	Examples include (but not limited to): recent (< 3 months) MI, CVA, TIA, or CAD/stents, ongoing cardiac ischemia or severe valve dysfunction, severe reduction of ejection fraction, sepsis, DIC, ARD or ESRD not undergoing regularly scheduled dialysis
ASA V	A moribund patient who is not expected to survive without the operation	Examples include (but not limited to): Ruptured abdominal/thoracic aneurysm, massive trauma, intracranial bleed with mass effect, ischemic bowel in the face of significant cardiac pathology or multiple organ/ system dysfunction

5.5. Patients with underlying medical condition according to AHA:

5.5.1. The AHA recommends antibiotic prophylaxis only for those whose underlying cardiac conditions are associated with the highest risk of adverse outcome. Such conditions include:

a. Prosthetic cardiac valve or prosthetic material used for cardiac valve repair

b. A previous history of IE

c. Congenital heart disease (CHD):

I. Unrepaired cyanotic CHD including palliative shunts and conduits.

II. Completely repaired congenital heart defect with prosthetic material or device, whether placed by surgery or by catheter intervention during the first six months after the procedure

III. Repaired CHD with residual defects at the site or adjacent to the site of a prosthetic patch or prosthetic device (which inhibits endothelialisation)

d. Cardiac transplantation recipients who develop cardiac valvopathy.

5.5.2. Antibiotics are recommended for all dental procedures that involve:

a. Manipulation of gingival tissue/periapical region of teeth

b. Perforation of the oral mucosa for cardiac patients with the highest risk of adverse outcome.

5.6. Patients with underlying medical condition according to ADA:

5.6.1. According to ADA, antibiotic prophylaxis is given to patients with medical conditions and cardiac conditions and no need for the ones with prosthetic joints.

5.6.2. The updated evidence-based clinical guidelines published by ADA in 2015 concluded that there were no statistically significant association between dental procedures and Prosthetic joint infection (PJI).

5.6.3. Key recommendations of the guideline:

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

b. The practitioner and patient should consider possible clinical circumstances that may suggest the presence of a significant medical risk in providing dental care without antibiotic prophylaxis as well as the risks of widespread antibiotic use. This should be integrated with the practitioner's professional judgment and the patient's needs and preferences.

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

5.7. Patients with underlying medical problems according to AADP:

5.7.1. Consultation with the patient's physician is recommended for management of patients with compromised immunity

5.7.2. Antibiotic prophylaxis is required in the following conditions:

a. Risk for distant site infection from a dental procedure

b. Immunosuppression secondary to:

I. Human Immunodeficiency Virus (HIV)

II. Severe combined immunodeficiency

III. Neutropenia

IV. Cancer chemotherapy; and

V. Hematopoietic stem cell or solid organ transplantation

c. Head and neck radiotherapy

d. Autoimmune disease

e. Sickle cell anaemia, chronic steroid usage, diabetes

f. Bisphosphonate therapy or other antiresorptive therapy; according to the decision of the attending surgeon during patient's assessment & treatment planning.

6. **RECOMMENDATION TWO:** CLINICAL MANAGEMENT

6.1. The patients need to undergo the following investigations:

6.1.1. Dental X-rays:

a. Periapical

b. Dental Orthopantomogram (OPG)

6.1.2. Cone beam computed tomography CBCT

6.1.3. CT with contrast

6.1.4. Lab tests according to the patient's health and medical condition

6.1.5. Medical reports.

6.2. For the antibiotic prophylaxis regimen for oral/dental procedures **Appendix 6.**

7. **RECOMMENDATION THREE:** SPECIAL ENDORSEMENTS

7.1. According to ADA, dental procedures are not associated with PJI and antibiotics provided before care do not prevent PJI.

7.2. Potential harms of antibiotics include risk for anaphylaxis, antibiotic resistance, and opportunistic infections.

7.3. Benefits of use may not exceed the harms for most patients.

7.4. Individual preferences and circumstances should be considered when deciding to use antibiotic prophylaxis prior to dental procedures.

7.5. For prevention of orthopaedic implant infection refer to **Appendix 7**.

D. GUIDELINES FOR THE MANAGEMENT OF PREGNANT PATIENTS UNDERGOING DENTAL/ORAL SURGICAL PROCEDURES

1. BACKGROUND

Pregnancy is a normal and healthy condition. Pregnant patients are not medically compromised and hence they should not be denied dental treatment. Pregnancy is accompanied by a variety of physiologic, anatomic and hormonal changes that can affect the plan of treatment.

2. SCOPE

2.1. To increase awareness of General Dental Practitioners and Oral & Maxillofacial Surgeons in the management of the pregnant patients undergoing oral & maxillofacial treatment.

3. PURPOSE

3.1. To designate treatment to maximize the benefit to the mother while minimizing the risk to the fetus.

3.2. To update General Dental Practitioners and Oral & Maxillofacial Surgeons in the management of the pregnant patient.

3.3. To understand the physiological changes to ensure provision of better quality care for pregnant women.

4. APPLICABILITY

4.1. DHA licensed Oral and Maxillofacial Surgeons.

4.2. DHA licensed General Dental Practitioners.

5. **RECOMMENDATION ONE:** CLINICAL MANAGEMENT OF PREGNANT PATIENTS

5.1. Pregnant patients may have some physiological changes (**Appendix 8**) and/or may be taking some drugs, which may influence the clinical management of these patients.

5.2. Drugs in Pregnancy

5.2.1. Drugs used or prescribed in pregnant patient should aim to avoid any adverse drug reactions. Certain drugs are known to cause miscarriage, teratogenicity and low birth rate because most drugs cross the placenta by simple diffusion.

5.2.2. Medications prescribed to pregnant patients often require modification in dosage, duration of the prescription and the frequency in which they are taken. Drugs that can be prescribed during pregnancy are elaborated in **Appendix 9**.

5.2.3. Teratogenic drugs should be avoided in pregnant patients. These drugs could cause either structural or functional birth defects. Effects of Teratogenic drugs are elaborated in **Appendix 10**.

5.2.4. Certain drugs are responsible for developing acquired methemoglobinemia in patients, which include oxidative drugs, glucose-6-phosphate dehydrogenase and local anesthetics. Food and Drug Administration (FDA) has categorised these drugs **Appendix 11**.

5.3. Ideal Patient position

5.3.1. The ideal position of the pregnant patient is positioning her left lateral lying position with the right buttock and hip elevated by 15°.

5.4. Radiographs during pregnancy

5.4.1. While taking radiographs of pregnant patients, the dental staff must practice ALARA principle (As Low As Reasonably Achievable).

5.4.2. The accepted cumulative dose of ionizing radiation during pregnancy is 5 cGy

5.4.3. Computed Tomography (CT) scanning delivers up to 4.0 cGy of radiation.

5.4.4. Panoramic and bitewing radiography generates about one third the radiation exposure associated with a full-mouth series.

5.4.5. If protective measures like rectangular collimated beams, high-speed (E-speed) films, thyroid collar and lead apron, are used, Dental radiography is safe for pregnant patients.

5.4.6. Magnetic Resonance Imaging (MRI) does not use ionizing radiation; therefore, it is safer than CT in pregnant patients.

6. **RECOMMENDATION TWO:** SPECIAL CONSIDERATION

6.1. All elective surgical procedures should be postponed until postpartum.

6.2. Regular dental visits should be planned as part of prenatal care.

6.3. Dental treatments should be planned during 2nd trimester safe period.

6.4. Pregnant patients should be educated on safe use of antibiotics to avoid progression of localized abscess to fascial cellulitis.

6.5. Dental caries to be detected early before it leads to periapical abscess and invade surrounding bone.

6.6. For the removal of wisdom teeth is to follow the guideline of wisdom teeth extraction.

6.7. Cooperation between the patient's Gynaecologist and Oral and Maxillofacial surgeon is important in successful treatment plan in case of major facial trauma & cervicofacial infections, which may require special management of the pregnant patient.

E. GUIDELINES FOR THE DIAGNOSIS AND MANAGEMENT OF ORAL SOFT TISSUE LESIONS

1. BACKGROUND

Oral mucosal conditions and diseases may be caused by local causes (bacterial or viral), systematic diseases (metabolic or immunologic), drug related reactions or lifestyle factors such as consumption of tobacco, betel quid or alcohol. Oral lesions can cause discomfort or pain that interferes with mastication, swallowing and speech and they can produce symptoms such as halitosis, xerostomia or oral dysesthesia, which interfere with daily social activities. Different oral diseases, may be in the form of swelling (benign or malignant) or a mucosal or ulcerative lesion (pre-malignant or malignant), so the knowledge of all the pathological conditions of the oral cavity is mandatory for their successful treatment and management.

Clinicians may encounter doubtful radiographic or mucosal changes that are considered abnormal while providing comprehensive dental treatment, but lack the typical features of malignancy and may require observation over time. This can create a dilemma for a dentist deciding how to proceed with such patients.

2. SCOPE

2.1. To offer some generalized recommendations for General Dental Practitioners and Oral & Maxillofacial Surgeons to consider regarding the diagnosis & management of oral soft tissue lesions

3. PURPOSE

3.1. To restore the function and form of the oral cavity.

3.2. To preserve the vital structures and reduce chances of reoccurrence.

3.3. To improve the quality of care received by patients.

3.4. To reduce morbidity and mortality and improve quality of life, where possible.

4. APPLICABILITY

4.1. DHA licensed Oral and Maxillofacial Surgeons.

4.2. DHA licensed General Dental Practitioners.

5. RECOMMENDATION ONE: DIAGNOSIS AND INVESTIGATION

5.1. Clinical examination

5.1.1. Any undiagnosed lesions usually should be followed up for 7 to 14 days, with or without local treatment.

5.1.2. Lymph nodes examination should be in consideration.

5.2. Biopsy

5.2.1. If the lesion has not disappeared, but has not changed in appearance or surface characteristics during the 7 to 14 days period, then the clinician must decide whether a biopsy should be performed or the lesion merely should be re-evaluated periodically.

5.2.2. Types of biopsy includes:

a. Oral cytology

b. Aspiration biopsy

c. Incisional biopsy

d. Excisional biopsy

5.3. Imaging

5.3.1. OPG and CBCT

5.3.2. CT (depending on size and character)

5.3.3. MRI

5.3.4. Nuclear medicine scan (bone scan, SPECT, PET or PET/CT scan)

5.3.5. Base line complete blood cell count

6. **RECOMMENDATION TWO:** CLASSIFICATION OF ORAL SOFT TISSUE LESIONS

6.1. The oral mucosal lesions can be broadly classified into the following:

6.1.1. Surface Lesions

6.1.2. Soft Tissue Enlargements

Note: For a detailed classification Refer to **Appendix 12.**

7. **RECOMMENDATION THREE:** CLINICAL MANAGEMENT OF ORAL SOFT TISSUE LESIONS

7.1. The clinical management of oral soft tissue lesions are elaborated in the **Appendices 13,14,15,16,17** under the following categories:

7.1.1. Mucosal diseases

7.1.2. Cysts

7.1.3. Vascular lesions

7.1.4. Malignant tumors of soft tissue

7.1.5. Salivary gland benign and malignant tumors.

8. **RECOMMENDATION FOUR:** SPECIAL CONSIDERATIONS

8.1. A step-by-step approach will lead to successful management of patients with oral mucosal lesions. This can be accomplished by gathering information and applying it in a systematic manner excluding lesions from the differential diagnosis until the definitive diagnosis is reached. If in doubt, patients should be referred to an oral medicine specialist or oral and maxillofacial surgeon for further investigation and management.

8.2. Informed Consent

8.2.1. Patient's or legal guardian's consent must be taken prior to any surgery. It should be obtained after the patient or the legal guardian has been informed of the indications for the procedures, the goals of treatment, the known benefits, and risks, the treatment options, and the favorable outcomes.

8.3. Perioperative Antibiotic Therapy

8.3.1. The use of systemic antibiotics may be indicated in certain circumstances, to prevent infections related to surgery. The decision to employ prophylactic perioperative antibiotics is at the discretion of the treating surgeon and based on the patient's clinical condition.

8.4. Use of Imaging Modalities

8.4.1. Includes panoramic radiograph, periapical and/or occlusal radiographs, maxillary and/or mandibular radiographs, computed tomography, cone beam computed tomography. In determining studies to be performed for imaging purposes, principles of ALARA (as low as reasonably achievable) should be followed.

8.5. Documentation

8.5.1. Clinicians must document the cases thoroughly and accurately. Findings must be documented and include a medical health history signed by the patient and a thorough initial evaluation note that includes detailed descriptions of the clinical appearance and location of the lesion or lesions. Follow-up notes should be equally thorough and all notes should be signed or initialed by the dentist.

8.6. Recording details of the lesions

8.6.1. A precise measurement (in millimeters or centimeters) of the dimensions of the lesion is needed. The clinician or staff member can sketch the general shape and appearance of the lesion or lesions at each visit for comparison purposes. These important details are unlikely to be remembered one month or six months in the future.

F. GUIDELINES FOR THE MANAGEMENT OF ODONTOGENIC/CERVICOFACIAL INFECTIONS

1. BACKGROUND

An odontogenic infection is an infection of the alveolus, jaws, or face that originates from a tooth or from its supporting structures and is one of the most frequently encountered infections.

The most common causes of the odontogenic infections are dental caries, deep filling or failed root canal treatments, Pericoronitis & periodontal disease. The infection starts locally around the tooth & may remain localized to the region where it started, or may spread into adjacent areas.

The course of infection depends on:

1.1. Virulence of the bacteria

1.2. Host resistance factors

1.2. The regional anatomy.

2. SCOPE

2.1. To introduce decision-making criteria regarding diagnosis, management and treatment plan of odontogenic/Cervicofacial infections and to reduce inappropriate variation in practice.

3. PURPOSE

3.1. To restore the function and form of the oral cavity.

3.2. To preserve the vital structures and reduce chances of reoccurrence.

3.3. To improve the quality of care received by patients.

4. APPLICABILITY

4.1. DHA licensed Oral and Maxillofacial Surgeons.

4.2. DHA licensed General Dental Practitioners.

5. **RECOMMENDATION ONE:** DIAGNOSIS AND DIFFERENTIAL DIAGNOSIS

5.1. Investigations

5.1.1. Radiographic

a. Panoramic radiograph (OPG)

b. Periapical radiographs

c. Computed tomography (CT), with or without contrast

d. MRI

e. Plain Facial X-rays.

5.1.2. Laboratory

a. CBC, FBC

b. C- Reactive Protein (CRP)

c. Procalcitonin

d. Erythrocyte Sedimentation Rate (ESR)

Note: Infection parameters are essential in monitoring the infection

5.1.3. Biopsy:

a. Aspiration

b. Incisional/excisional

6. RECOMMENDATION TWO: CLASSIFICATION OF ODONTOGENIC\CERVICOFACIAL INFECTIONS:

6.1. According to spread to facial spaces:

6.1.1. The clinical presentation of an odontogenic infection is highly variable depending on the source of the infection (anterior teeth vs posterior teeth; maxillary vs mandibular teeth), whether the infection is localized or if it has become disseminated, as the table below demonstrates.

	Type of Infection	Clinical Presentation
1.	Dentoalveolar infection	Swelling of the alveolar ridge with periodontal, periapical, and Subperiosteal abscess.
2.	Submental space infection	Firm midline swelling beneath the chin. Caused by infection from the mandibular incisors.
3.	Submandibular space infection	Swelling of the submandibular triangle of the neck around the angle of the mandible. Infection is caused by mandibular molar infections. Trismus is typical.
4.	Sublingual space infection	Swelling of the floor of the mouth with possible elevation of the tongue and dysphagia.
5.	Retropharyngeal space infection	Stiff neck, sore throat, dysphagia, raspy voice. These infections are caused by infections of the molars. The retropharyngeal space infection has a high potential to spread to the mediastinum.
6.	Buccal space infection	Swelling of the cheek. Caused by infection of premolar or molar tooth.
7.	Masticator space infection	Swelling on either side of the mandibular ramus and is caused by infection of the mandibular third molar. Trismus is present.

8.	Canine space infection	Swelling of the anterior cheek with loss of the nasolabial fold and possible extension to the infraorbital region.

6.2. According to severity, life threatening cases:

6.2.1. Odontogenic facial space infections may cause life-threatening complications such as respiratory obstruction, bacteraemia, sepsis, descending mediastinitis, orbital abscess, Cavernous Sinus Thrombosis, osteomyelitis, Adult Respiratory Distress Syndrome, brain abscess & other thoracic complications. As the table below demonstrates.

	Type of Infection	Clinical Presentation
1.	Respiratory obstruction	Swelling of floor of mouth, trismus, edema, and abscess formation leading to narrowing and eventually to the loss of airway.
2.	Descending Necrotizing Mediastinitis	Most common primary oropharyngeal infection is odontogenic with mandibular second or third molar abscess. Characteristic radiographic findings in the neck and chest of gas in the tissues, an air-fluid level, loss of normal cervical lordosis, and mediastinal widening.
3.	Orbital Abscess	Organisms from an odontogenic source may gain entrance to the orbit through local tissue planes, by hematogenous spread, or via involvement of the paranasal sinuses.
4.	Cavernous Sinus Thrombosis	Seven percent of all cases of thrombosis of the cavernous sinus are of dental origin. Contrast enhanced CT scan may reveal the primary source of infection.

5.	Osteomyelitis	Osteomyelitis may develop in the jaws after a chronic Odontogenic Infections or for a variety of other reasons.
6.	Adult Respiratory Distress Syndrome	Caused by sepsis secondary to the Odontogenic Infections have been reported in literature. ARDS can be caused by many conditions, among which the most common are sepsis and septic shock.
7.	Brain abscess	Anaerobic species are responsible for the majority of cases of odontogenic (78%) brain abscess.
8.	Thoracic Complications	A diffuse brawny induration, with pitting edema or crepitation at the base of the neck and the thorax. It was documented that one case was secondary to a gravitating Odontogenic Infections of submaxillary and Para-pharyngeal spaces, and from there to the mediastinum and pleura, through the retro visceral space and Sibson's fascia.

6.2.2. Management of Simple & Life-Threatening Infections are elaborated in the **Appendix 18**.

7. **RECOMMENDATION THREE:** SPECIAL CONSIDERATIONS

7.1. In patients with compromised defence mechanisms in their ability to respond normally to an infective challenge is impaired. Their underlying medical condition could make the dental infection progress rapidly, increase the risk of invasive fungal infection and make antimicrobial treatment more complex.

7.2. Complications post-operatively are common, like the unexpected long intubation duration & such complications must be explained clearly to the patient before signing the consent form.

7.3. Medical conditions that may result in an immunocompromised host are listed below:

7.3.1. AIDS/ Human immunodeficiency virus infection

7.3.2. Diabetes

7.3.3. Steroid Therapy

7.3.4. Cancer Chemotherapy

7.3.5. Elderly

7.3.6. Asplenia

7.3.7. Sickle Cell Disease

7.3.8. Hypogammaglobulinemia

7.3.9. Hepatitis

7.3.10. Malignancies

7.3.11. Multiple Sclerosis

7.3.12. Malnutrition

7.3.13. Ulcerative Colitis

7.3.14. Crohn's Disease

7.3.15. Excessive Alcohol

7.3.16. Emotional Stress

7.3.17. Physical Stressors, such as inadequate sleep

7.3.18. Chronic Fatigue Syndrome

7.3.19. Autoimmune Disorders in general

7.4. A general dentist can treat a case when the case is detected early, the vast majority of odontogenic infections may be safely managed by the general dentist; however, several factors must be considered in determining whether an infection should be managed by a specialist. The decision should be based upon location, severity, surgical access and status of host defences.

7.5. A general dentist shall refer the case to an Oral and Maxillofacial Surgeon in the following cases:

7.5.1. Difficulty breathing

7.5.2. Difficulty swallowing

7.5.3. Dehydration

7.5.4. Moderate to severe trismus (inter-incisal opening <25 mm)

7.5.5. Swelling extending beyond the alveolar process

7.5.6. Elevated temperature >101°F (38.3°C)

7.5.7. Malaise and toxic appearance

7.5.8. Compromised host defences

7.5.9. Need for general anesthesia

7.5.10. Failed prior treatment.

G. GUIDELINES FOR ORAL MANAGEMENT OF PATIENTS AT RISK OF, OR HAVING MEDICATION RELATED OSTEONECROSIS OF THE JAW (MRONJ)

1. BACKGROUND

Management of patients with, or at a risk for, Medication-Related Osteonecrosis of the Jaw (MRONJ) has been controversial. This document contains current best practices associated to procedures for the diagnosis, staging, and management strategies. It was previously recommended to change the nomenclature from Bisphosphonate-Related Osteonecrosis of the Jaw (BRONJ) to the term Medication-Related Osteonecrosis of the Jaw (MRONJ) by the American Association of Oral & Maxillofacial Surgeons. The change is justified to accommodate the growing number of osteonecrosis cases involving the maxilla and mandible associated with other antiresorptive (denosumab) and antiangiogenic therapies.

MRONJ adversely affects quality of life; producing significant morbidity therefore, strategies for management of patients with, or at risk for, MRONJ are set forth & updated to serve for the best outcome for the patients.

Patients may be considered to have MRONJ if all the following characteristics are present:

1.1. Current or previous treatment with antiresorptive or antiangiogenic agents.

1.2. Exposed bone or bone that can be probed through an intraoral or extraoral fistula in the maxillofacial region that has persisted for longer than eight (8) weeks.

1.3. No history of radiation therapy to the jaws or obvious metastatic disease to the jaws.

It is important to understand that patients at risk for or with established MRONJ also can present with other common clinical conditions not to be confused with MRONJ, which can include, but are not limited to: Alveolar Osteitis, Sinusitis, Gingivitis, Periodontitis, Caries, Periapical pathology, Odontalgia, Atypical Neuralgias, Fibro-Osseous lesions, Sarcoma, Chronic Sclerosing

Osteomyelitis and Temporomandibular Joint Disorders. It is important to remember that exposed bone can occur in patients not exposed to antiresorptive or antiangiogenic agents.

MRONJ pathophysiology is not completely elucidated. Its unique localization to the jaws which may be explained by several hypothesis:

- Inflammation or infection: Jaws are uniquely different from other bones. Their relative vascularity and high degree of bone turnover (activity) may result in a greater uptake of bisphosphonate agents than other bones. The presence of oral bacterial flora contamination (infection) occurs frequently via periodontal disease, periapical abscesses, trauma to the fragile thin mucosa, and with extractions. The fragility of the mucosal barrier is demonstrated in cases of lingual mandibular sequestration with ulceration resembling mild cases of osteo-necrosis.
- Inhibition of angiogenesis: Reduced blood vessel formation can impair post interventional healing.
- Toxicity: Bisphosphonates may exert a direct toxic effect on the oral mucosa.

Note: For medications associated with MRONJ refer to **Appendix 19.**

2. SCOPE

2.1. To introduce decision-making criteria regarding diagnosis, management and treatment plan of patients at risk of, or having Medication-Related Osteonecrosis of the Jaw (MRONJ).

3. PURPOSE

3.1. To provide a risk estimates for patients of developing MRONJ.

3.2. To provide comparisons of the risks and benefits of medications related to osteonecrosis of the jaw (ONJ) to facilitate medical decision making for the treating physician, dentist, dental specialist and patients.

3.3. To create a guidance to clinicians regarding the differential diagnosis of MRONJ in patients with a history of exposure to antiresorptive or antiangiogenic agents.

3.4. To create a guidance to clinicians regarding MRONJ prevention measures and management strategies for patients with MRONJ based on disease stage.

4. APPLICABILITY

4.1. DHA licensed Oral & Maxillofacial Surgeons.

4.2. DHA licensed General Dental Practitioners.

5. **RECOMMENDATION ONE**: ASSESSMENT OF RISK FACTORS

5.1. Risk factors for MRONJ can be grouped into:

5.1.1. Drug-related

5.1.2. Local risk factors

5.1.3. Demographic/systemic factors.

5.2. Drug-Related Risk Factors

5.2.1. Potency of the Bisphosphonate (non-nitrogen-containing bisphosphonates are associated with a lower risk for ONJ than nitrogen-containing bisphosphonates).

5.2.2. IV Route of Administration results in a greater drug exposure than the oral route.

5.2.3. Duration of Therapy (cumulative dose): Longer duration of treatment poses a risk to develop MRONJ.

Note: Compared with patients with cancer receiving anti- resorptive treatment, the risk of ONJ for patients with osteoporosis exposed to antiresorptive medications is approximately 100 times smaller.

5.3. Local Risk Factors

5.3.1. Dentoalveolar Surgery (extent/degree of trauma)

a. Extractions

b. Dental implant placement

c. Periapical surgery

d. Periodontal surgery involving osseous injury.

5.3.2. Local Anatomy

a. MRONJ is more common in the mandible than in the maxilla (2:1 ratio) and more common in areas with thin mucosa overlying bony prominences such as tori, bony exostoses and the mylohyoid ridge.

5.3.3. Concomitant Oral Disease

a. Patients with a history of inflammatory (possibly infective) dental disease, e.g., periodontal and dental abscesses are at a greater risk for developing MRONJ.

Note: Patients at increased risk of MRONJ include those:

- Receiving the antiresorptive agents at higher dosages and more frequent treatment schedules associated with cancer-related indications, as compared with those for prevention/treatment of osteoporosis.
- Receiving the drugs for more than 3 years.
- With periodontitis or dentures.
- Patients receiving intravenous bisphosphonates and having dento-alveolar surgery are seven (7) times more likely to develop MRONJ, than patients who do not have such surgery. Caution must be applied in assessing this relationship, given that the presence of a dental infection or abscess is a frequent indication for surgery/extraction.

5.4. Demographic and Systemic Factors

5.4.1. Age

a. With each passing decade- there is a 9% increased risk for MRONJ in multiple myeloma patients treated with IV bisphosphonates.

5.4.2. Cancer Type

a. Multiple Myeloma more than breast cancer

b. Osteopenia/osteoporosis concurrent with cancer.

5.4.3. Concomitant Risk Factors

a. Corticosteroid therapy

b. Diabetes

c. Smoking

d. Alcohol use

e. Poor oral hygiene

f. Chemotherapeutic drugs.

6. **RECOMMENDATION TWO**: DIAGNOSIS AND MANAGEMENT

6.1. Clinical signs & symptoms of MRONJ

6.1.1. The reported incidence of MRONJ varies, but it is generally considered to be between 1% and 10% of patients taking IV bisphosphonates for the management of bone metastatic disease and between 0.001% and 0.01% in patients taking oral bisphosphonates for the management of osteoporosis.

NOTE: It is important for the physicians to be vigilant about MRONJ regarding the signs and symptoms which include pain; exposed necrotic bone; signs of infection such as fistulae swelling, cellulitis and pus exudation; hypoesthesia or paraesthesia in the lower lip or chin region; loosening of teeth; and halitosis.

6.1.2. The various stages of MRONJ are as below:

a. Stage 0: No clinical Evidence of exposed bone, but presence of non-specific symptoms or clinical and/or radiographic abnormalities.

b. Stage 1: Exposed bone, symptomatic.

c. Stage 2: Exposed bone with associated pain and adjacent soft tissue inflammatory swelling or infection.

d. Stage 3: Stage 2 symptoms + pathological fracture or extra-oral fistula or radiographic evidence of osteolysis extending to the inferior border of mandible or floor of the maxillary sinus.

6.2. General dentist guidance for patients on or planned for antiresorptive/antiangiogenic therapy is elaborated in **Appendix 20.**

7. RECOMMENDATION THREE: MANAGEMENT STRATEGIES FOR PATIENTS AT RISK OF MRONJ

7.1. Before antiresorptive or antiangiogenic therapy

7.1.1. Implementation of dental screening, a comprehensive oral/dental examination & radiographic examination before initiating antiresorptive or antiangiogenic therapy to lower the risk of ONJ including, but not limited to, an assessment of:

a. Oral Hygiene

b. Charting dental caries and periodontal disease

c. Bitewings, periapical and Orthopantomogram (OPG) radiographs where necessary. Repeat OPG every three (3) years

d. Assessment of patient's ability to maintain his/her dentition (interest/understanding, capacity manual dexterity/financial considerations)

e. Check for stability & retention of prosthesis & restorations if present

f. Extraction.

7.1.2. The main goal is to optimize patient's dental & oral condition as much as possible to avoid future surgical procedures.

7.1.3. It is important to identify acute infection and sites of potential infection to prevent future sequelae that could be exacerbated once drug therapies begin.

7.1.4. Considerations during the clinical and radiographic assessments include patient motivation, patient education regarding dental care, fluoride application, chlorhexidine rinses, tooth mobility, periodontal disease, presence of root fragments, caries, periapical pathology, edentulism, and denture stability.

7.1.5. Emphasize healthy diet, oral hygiene, fluoride toothpaste and mouthwash, stopping smoking/alcohol, regular dental checks & reporting any symptoms.

7.5.1. Extraction of non-restorable teeth & those with poor prognosis, other elective dentoalveolar surgeries should be done by an Oral & Maxillofacial Surgery specialist. In such cases & based on experience with osteoradionecrosis, it appears advisable that antiresorptive or antiangiogenic therapy should be delayed, if systemic conditions permit, until there is mucosal closure of extraction site (14 to 21 days) or until there is adequate osseous healing.

7.1.6. Treatment plan, meaning & prevention of MRONJ, risks, benefits, and potential complications must be discussed, before proceeding, with the patient & his/her family or those who make decisions for the patient.

7.2. After antiresorptive or antiangiogenic therapy

7.2.1. A general dentist, hygienist, prosthodontist, or endodontist may safely perform non-invasive surgical procedures that do not involve manipulation of the bone. These generally include the following:

a. Delivering local anesthesia

b. Scaling and prophylaxis

c. Placing restorations including crowns and fixed prosthesis

d. Fabricating dentures

e. Conventional root canal therapy.

7.2.2. Invasive surgical procedures should be performed by a specialist Oral & Maxillofacial surgeon in the following scenarios:

a. When treatment of dental and/or periodontal diseases has failed, surgical intervention may be unavoidable.

b. Referral to tertiary hospital for further management by an oral & maxillofacial surgery unit.

c. Before and after any surgical procedures involving bone, the patient should gently rinse with a chlorhexidine-containing rinse until healed. The regimen may be extended based on the patient's healing progress but use twice daily for 4-8 weeks would be a common regimen.

d. Tooth extraction is covered under antibiotic prophylaxis accompanied by smoothening of sharp bony edges and closure of wound. Monitoring is continued till complete mucosal healing is achieved.

e. No current evidence against or in favour of antibiotic prophylaxis and the duration however, it should be left as case by case basis according to the attending physician.

f. There is no definitive evidence that the risk will diminish or reduce if the patient temporarily discontinues the medication (drug holiday). The half-life of bisphosphonates in jawbone is long in some studies up to eleven (11) years; however, denosumab half-life is about twenty eight (28) days hence better able to manage any complications related to bone necrosis.

g. If systemic conditions permit, the clinician may consider discontinuation of oral BPs for a period of two (2) months before and three (3) months after elective invasive dental surgery to lower the risk of MRONJ. It is recommended that patients at risk of developing MRONJ should be reviewed post operatively at the following intervals: One (1) week, one (1) month, three (3) months, six (6) months, twelve (12) months. Thereafter, high risk patients should be placed on a four to six (4-6) month preventive recall program.

NOTE: Further changes can be done to the above criteria in case any new evidence emerges in the treatment &/or according to the decision of attending physician.

8. RECOMMENDATION FOUR: TREATMENT OF PATIENTS WITH EXTABLISHED MRONJ

MRONJ Staging	Treatment Strategies
At Risk- Clinically normal, asymptomatic patients who have received antiresorptive therapy	• No treatment beyond routine dental care • Patient education
Stage 0- No clinical evidence of exposed bone, but presence of non-specific symptoms or clinical and/or radiographic abnormalities	• Conservative local treatment measures • Analgesics and antibiotics as indicated • Communication with prescribing physician
Stage 1- Exposed and necrotic bone in patients who are asymptomatic and have no evidence of infection	• Antimicrobial mouth rinse • Conservative therapy- improve oral hygiene • Consider surgical treatment to remove necrotic bone • Smooth sharp bone to relieve soft tissue irritation, remove loose sequestra • Analgesics and antibiotics as indicated • Clinical follow-up every 3-6 months • Review indications for continued anti-resorptive therapy with prescribing physician

Stage 2-Exposed and necrotic bone associated with pain and/or signs of infection in the region of bone exposure with or without purulent drainage	**Stage 1 measures plus:** • Surgical treatment to remove necrotic bone • Systemic antibiotic to treat any infection • Topical antibiotic mouth rinses
Stage 3- Exposed and necrotic bone in patients with pain, infection, and at least one of the following: exposure and necrosis extending beyond the local alveolar tissues; radiographic evidence of osteolysis extending to the inferior mandibular border or the maxillary sinus floor; pathologic fracture; oro-antral, oro-nasal or oro-cutaneous communication.	**Stage 2 measures plus:** • Surgical debridement/resection as needed for control of pain or at sites of persistent active infection. • In extended cases, consider resection including jaw reconstruction. • Systemic antibiotic to treat any infection.

9. **RECOMMENDATION FIVE:** SPECIAL CONSIDERATIONS

9.1. Implementation of dental screening, a comprehensive oral/dental examination and radiographic examination before initiating antiresorptive or antiangiogenic therapy will eventually lower the risk of MRONJ.

9.2. If an extraction is indicated, explore all alternatives to retain teeth if possible.

9.3. Informed consent: Treatment plan, meaning & prevention of MRONJ, risks, benefits, and potential complications must be discussed with the patient & his/her family or those who make decisions for the patient prior to any surgical procedure.

H. GUIDELINES FOR THE MANAGEMENT OF TEMPRO-MANDIBULAR JOINT DISORDERS IN PRIMARY CARE

1. BACKGROUND

Temporomandibular Joint (TMJ) is a hinge that connects the jaw to the temporal bones of the skull, which are in front of each ear. It aids in the up and down and side to side jaw movement to enable one to talk, chew and yawn.

Problems with the jaw and the muscles in the face that control it are known as Temporomandibular Disorders (TMD).

The exact cause of TMD is not known, though it is considered to be due to injury to the jaw, the joint, or the muscles of the head and neck; like from a heavy blow or whiplash. The other causes are:

- Grinding or clenching of teeth, which puts a lot of pressure on the joint
- Movement of the soft cushion or disc between the ball and socket of the joint
- Arthritis in the joint
- Stress, which can cause to tighten facial and jaw muscles or clench the teeth.

Common symptoms due to TMD include the following:

- Pain or tenderness in the face, jaw joint area, neck and shoulders and in or around the ear when chewing, speaking, or opening the mouth wide
- Problems when trying to open the mouth wide
- Jaws that get "stuck" or "lock" in the open- or closed-mouth position
- Clicking, popping, or grating sounds in the jaw joint when opening or closing the mouth or chew. This may or may not be painful.
- A tired feeling in the face

- Trouble chewing or a sudden uncomfortable bite; as if the upper and lower teeth are not fitting together properly
- Swelling on the side of the face
- It may also present as toothaches, headaches, neck aches, dizziness, earaches, hearing problems, upper shoulder pain, and ringing in the ears (tinnitus).

2. SCOPE

2.1. To help Dentists in the diagnosis and primary care of TMD patients by providing them with a clear specialist referral pathway which can aid in the referring process of such patients.

3. PURPOSE

3.1. To guide dental GPs for a better diagnosis and management of TMD patients.

3.2. To identify patients improve with limited or no treatment (which can be provided in primary care).

3.3. To relieve TMD related pain.

3.4. To identify the correct investigation sequence in a TMD patient.

3.5. To identify a proper referring process for TMD patients.

4. APPLICABILITY

4.1. DHA licensed Oral and Maxillofacial Surgeons.

4.2. DHA licensed General Dental Practitioners.

5. **RECOMMENDATION ONE:** PATIENT ASSESSMENT, DIAGNOSIS AND INVESTIGATION

5.1. Healthcare providers should record the patient's description of symptoms, take a detailed medical and dental history and examine intra-orally and extra-orally, including the head, neck, face, jaw and occlusion. For assessment and diagnosis pathway refer to **Appendix 21.**

5.2. Occupational and lifestyle influences should also be considered during assessment.

5.3. Imaging studies may also be recommended.

5.4. Symptoms of TMD may include pain or tenderness, headache, toothache, muscle spasm, joint sounds (clicking), deviated or limited mandibular opening.

5.5. TMD can be divided into two categories:

5.5.1. Group 1- Masticatory Muscle disorders; the characteristics of which are mentioned below:

a. Protective Co-contraction

b. Local Muscle Soreness

c. Myofacial Pain

d. Myospasm

e. Chronic Centrally Mediated Myalgia

5.5.2. Group 2- Temporomandibular Joint Disorders; the characteristics of which are mentioned below:

a. Derangement of Condyle Disc Complex

b. Disc Displacement with Reduction

c. Disc Displacement without Reduction

d. Structural Incompatibilities

e. Inflammatory Disorders

5.6. When history and examination of the TMJ is indefinite, Imaging can aid in the diagnosis of TMD. Several imaging modalities are used to get added information about suspected TMD aetiologies.

5.7. Imaging includes:

5.7.1. Panoramic Radiography– shows acute fractures, dislocations and severe degenerative articular and asymmetry of condylar shape and size.

5.7.2. Computed Tomography (CT) - for evaluation of subtle bony morphology.

5.7.3. Magnetic Resonance Imaging (MRI) - the method of choice to study disease processes involving the TMJ soft tissues.

6. **RECOMMENDATION TWO:** TREATMENT OF TEMPOROMANDIBULAR DISORDERS (TMD)

6.1. Treatment of TMD Depends on the clinical signs & symptoms and radiographic or MRI findings. The clinical signs and symptoms and related treatment are elaborated in **Appendix 22.**

6.2. Treatment depends on the cause of TMD. If it is muscular in origin, a conservative approach is the only viable treatment, as surgery will not restore function in such cases.

6.3. The nonsurgical approach or conservative approach is also most commonly utilized in all TMD cases. Kindly refer to “Standards Of Care For Prosthodontics/Guidelines For Non-Surgical Management Of Temporomandibular Joint Disorder”

7. **RECOMMENDATION THREE:** SPECIAL CONSIDERATIONS

7.1. Primary Care

7.1.1. Patients with TMD firstly present to a general dental practitioner. A diagnosis is made after the GP assesses and thoroughly examines the TMJ. The patient should be given advice about habits such as clenching or grinding of the teeth. Furthermore, patients with clicks should be reassured that the condition is not serious and is usually self-limiting. First line of treatment also may include prescribing analgesics and fabricating a night guard. If symptoms were not resolved within approximately six months, a referral to a specialist should be considered for further management. If the dentist is concerned of a more serious condition, referral should be made for specialist assessment.

7.2. Secondary Care

7.2.1. Patient referral to the Oral and Maxillofacial specialist should be done if they meet any of the following criteria:

a. Refractory TMJ dysfunction - defined as dysfunction that has failed to respond to conservative or primary care measures after 6 months

b. Limitation or progressive difficulty in mouth opening

c. Persistent inability to manage a normal diet

d. Pain or reduced jaw function in patients with known rheumatic joint disease

e. Recurrent dislocation of TMJ and or associated syndromes

7.2.2. It should also be noted that MRI interpretation is based on certain criteria and requires a set of understanding, hence if sufficient training doesn't exist specialists are encouraged to seek assistance from a more experienced colleague.

7.2.3. For the referral Pathway, refer to **Appendix 23**.

7.3. The majority of patients do not require any aggressive types of treatment. Therefore, we strongly recommend using conservative treatments. More research is needed on the safety and success of most treatments for TMD.

7.4. Although a referral pathway has been explained in this guideline, nevertheless it's recommended to initiate therapy in primary care only if the GP is confident enough to proceed.

I. GUIDELINES FOR THE MANAGEMENT OF SKELETAL MALOCCLUSION

1. BACKGROUND

The etiology of maxillofacial skeletal deformities may be congenital, developmental or acquired. Deformities may be evident at birth or may manifest during subsequent growth and development, creating functional, degenerative, cosmetic, and/or psychosocial problems. The timing of corrective surgery can be critical and may occur during or after completion of growth. Radiographic evaluation prior to and following treatment is critical but should be used judiciously as clinically indicated.

Skeletal deformities are managed by different corrective surgeries such as orthognathic surgery, which is defined as the art and science of diagnosis, treatment planning and execution of treatment combining orthodontics and oral and maxillofacial surgery to correct musculoskeletal, dento-osseous and soft tissue deformities of the jaws and associated structures.

Orthodontic consultation and treatment in conjunction with surgical correction are frequently necessary and highly favourable in most cases. Treatment planning can involve single or multiple separate, staged surgical and nonsurgical treatments.

2. SCOPE

2.1. To create a standardized clinical guideline for management of skeletal malocclusions, and maximize patient outcome both functionally, and aesthetically.

3. PURPOSE

3.1. To create and restore normal form, function, occlusion and health.

4. APPLICABILITY

4.1. DHA licensed Oral and Maxillofacial Surgeons.

4.2. DHA licensed Orthodontists.

4.3. DHA licensed General Dental Practitioners.

5. RECOMMENDATION ONE: PATIENT ASSESSMENT, DIAGNOSIS AND INVESTIGATION

5.1. Consultation with the orthodontist and the oral & maxillofacial surgeon has to be done to set the treatment plan.

5.2. Patient's assessment includes, at a minimum:

5.2.1. Medical history

5.2.2. Physical examination

5.2.3. Diagnostic records, including:

a. Panoramic radiograph

b. Cephalometric analysis

c. Photographic documentation

d. Dental models and bite assessment

5.3. In selected cases, CT scanning and computer-assisted surgical techniques may be required, including the following:

5.3.1. 3-dimensional modelling

5.3.2. Digital planning

5.3.3. Rapid prototyping of surgical guides

5.3.4. Bone scanning

5.4. In case of excessive TMJ growth associated with abnormal or disproportionate growth and cases of delayed pubertal onset, additional information can be obtained from:

5.4.1. Repeated Bone scanning

5.4.2. Serial cephalometric radiographs

5.4.3. Clinical examinations, photographs and models

6. RECOMMENDATION TWO: CLINICAL MANAGEMENT

6.1. Each patient may require an individualized treatment based on factors:

6.1.1. 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.

6.1.2. Obtaining informed consent which requires clear explanation of the risks, benefits, potential complications & other treatment options to the patient, his/her family, or those who make decisions.

6.1.3. Presence of coexisting major systemic disease (e.g., disease that increases a patient's American Society of Anesthesiologists classification to II, III, or IV).

6.1.4. Age of patient.

6.1.5. Active and/or disproportionate maxillofacial growth.

6.1.6. Presence and severity of temporomandibular joint and/or muscular disorders.

6.1.7. Severity of maxillofacial skeletal deformity (e.g., severe hemi facial microsomia syndromes, distorted or unusual anatomy, malocclusions with large occlusal discrepancies (generally >1 cm)).

6.1.8. Presence and severity of acquired maxillary and/or mandibular skeletal, dento-osseous, or soft tissue deformities (e.g., secondary to facial trauma, compromised dentoalveolar health, previous surgical treatment).

6.1.9. Presence of para-functional habits (e.g., bruxism, clenching, tongue thrusting, finger sucking).

6.1.10. Presence of local or systemic conditions that may interfere with the normal healing process and subsequent tissue homeostasis (e.g., previously irradiated tissue, diabetes mellitus, chronic renal disease, liver disease, blood disorder, steroid therapy, contraceptive medication, immunosuppression, malnutrition)

6.1.11. Presence of behavioural, psychological, neurologic, and/or psychiatric disorders, including habits (e.g., substance abuse, including tobacco and alcohol), seizure disorders, self-mutilation that may affect surgery, healing, and/or response to therapy.

6.1.12. Degree of patient's and/or family's cooperation and/or compliance.

6.1.13. Presence of sleep-disordered breathing, including obstructive sleep apnoea, upper airway resistance syndrome, and the potential for obstructive sleep apnoea (recognizing that patients with borderline airway issues can be pushed into frank obstructive sleep apnoea with an imprudent treatment plan).

6.1.14. Maxillofacial skeletal surgery after prior adjunctive hard and soft tissue surgery (e.g., pharyngeal flap, cleft repair, distraction osteogenesis).

6.2. For treatment options for skeletal deformities Refer to **Appendix 24.**

6.3. For Management of Combined Orthodontics and Orthognathic Surgery refer to **Appendix 25.**

7. RECOMMENDATION THREE: SPECIAL CONSIDERATIONS

7.1. Procedures used for the correction of maxillofacial skeletal deformities may also be necessary to correct Obstructive Sleep Apnoea (OSA). It is recognized that obstructive sleep apnoea due to upper airway obstruction can effectively be corrected with maxilla-mandibular advancement procedures, whether or not traditional cephalometric landmarks and analysis diagnose a specific maxillofacial skeletal abnormality.

7.2. The surgical correction of maxillofacial skeletal deformities requires clear mutual understanding by both the surgeon and patient of the stated treatment objectives and expectations regarding the proposed treatment, and expected outcome recognizing the different treatment modalities for the same deformity may not only be acceptable but may also present different risks, benefits, and outcomes.

J. GUIDELINES FOR THE MANAGEMENT OF FACIAL FRACTURES

1. BACKGROUND

Facial fracture is simply defined as an injury resulting in a break to any part of the face that may involve single or multiple bones. Numerous mishaps may lead to facial fracture such as car accident, assaults, slips and falls, or during sports activities.

2. SCOPE

2.1. Management of oral & maxillofacial fractures to reach to the best outcomes.

3. PURPOSE

3.1. To restore the functions of mastication, breathing, vision if involved

3.2. To restore occlusion

3.3. To restore facial geometry and aesthetics

3.4. To reduce further injuries.

4. APPLICABILITY

4.1. DHA licensed Oral & Maxillofacial Surgeons.

5. **RECOMMENDATION ONE:** INITIAL MANAGEMENT

5.1. For **life threatening cases**, according to the advanced trauma life support (ATLS) regarding the scenarios of significant haemorrhage or airway compromise that needs to be addressed as soon as possible. Such, cases are to be sent immediately to the operation theatre, since stabilization measures cannot secure patient's life long enough. While **stable patients**, may undergo further investigations before being managed surgically or otherwise.

5.2. General principles of management:

5.2.1. **Stabilization**: to prevent further cervical or spinal injury & to monitor risk for airway obstruction or injuries to vital organs such as major facial nerves or vessels.

5.2.2. **History and examination**: history regarding the time and cause of the fracture & medical history which might interfere with the healing of the patient. Intraoral examination, facial examination and assessment of the nerves function both motor & sensory, and vision & extraocular muscles movements' examination.

5.2.3. **Wound care**: The wound is cleansed by irrigation with saline and removal of any debris or foreign fragments. Bleeding is controlled by several methods such as direct pressure and suturing. This is best performed within the first 12 hours or ideally within the first six (6) hours, in order to reduce the rates of infection and enhance the aesthetic result. If both fail to control, the bleeding then electro-cautery may be performed.

5.2.4. **Antibiotic coverage**: needed for any fracture that is viewed as an open fracture because of a communication to the oral environment through a laceration, crossing a tooth bearing area, or large hematoma, which may result in infection.

6. RECOMMENDATION TWO: DIAGNOSTIC MODALITIES

6.1. Facial fractures may be further classified into simple or complex fractures & displaced or non-displaced fractures or could be also classified depending on the location of the fracture on the face **Appendix 26.**

6.2. The use of radiographs & imaging aids clinicians in diagnosis:

6.2.1. **CT scan of Facial Bones**: one of the fundamental standard care measures in evaluating facial fractures due to its high accuracy in detecting even subtle fractures.

6.2.2. **CT brain/MRI**: fractures involving the brain. It is requested to rule out any intracranial injury.

6.2.3. **Orthopantomogram (OPG):** may be used to evaluate mandibular fracture.

6.2.4. **Plain radiographs**: different views as lateral oblique in mandibular fracture, Submentovertex in zygomatic arch fracture, Water's view in midface fractures, and reverse Towne's in condylar fractures.

6.3. Labs

6.3.1. As part of the preoperative assessment, the measurement of haemoglobin and haematocrit values is usually obtained. A baseline measurement is essential to assess the blood loss and inform the need for transfusion.

6.3.2. Other lab tests are requested according to the general health & condition of the patient.

7. **RECOMMENDATION THREE:** CLINICAL MANAGEMENT

7.1. Upper third fracture:

7.1.1. Frontal bone fracture is considered one of the life-threatening fractures due to its close relation to the brain, particularly whenever posterior wall is fractured

and/or displaced cranially. Inadequate management may lead to sinusitis, meningitis and brain abscesses.

7.1.2. The decision for the type of treatment of frontal bone fracture depends on several criteria such as:

e. Extent of displacement

f. Cerebrospinal Fluid (CSF) leak

g. Obstruction of the nasofrontal duct

h. In the presences of swelling, absence of a laceration that can be used as a surgical access, or neurological/neurosurgical unfitness, or hemodynamic.

7.2. Middle third fracture

7.3. Lower third fracture

Note: Refer to **Appendices 27, 28, 29** for methods for the management of Upper, Middle and Lower Facial Fractures.

8. **RECOMMENDATION FOUR:** SPECIAL CONSIDERATIONS

8.1. In cases of maxillary and mandibular fractures, dental occlusion has to be maintained during stabilization and reduction.

8.2. The greenstick fracture with extra ocular muscle entrapment in children requires early intervention. Since children heal quickly, muscle entrapment can result in fibrosis and shortening of the muscle within couple of days.

8.3. Instructions for orbital fractures:

8.3.1. If eyelid closure is affected, topical ophthalmic ointments are helpful in moisturizing the cornea.

8.3.2. Patients should be instructed to avoid nose blowing and heavy lifting or any activity that elevates blood pressure, at least 2 weeks post-surgery.

8.3.3. For 6 weeks, patients should avoid activities (airline travel, scuba diving) that involve changes in air pressure to prevent air embolization.

8.3.4. Follow up 4 and 8 weeks after the injury, long-term follow-up to 12 months.

8.4. The following maxillofacial injuries may have an adverse effect on the airway:

8.4.1. Nasopharyngeal airway may be blocked with posteroinferior displacement of a fractured maxilla.

8.4.2. Oropharynx may be blocked with the tongue in case of a bilateral fracture of the anterior mandible. It is both a life threatening and lifesaving condition, a high-risk consent must be obtained from the patient or his/her relatives

8.4.3. Oropharynx and larynx may be blocked by any of the following (fractured or exfoliated teeth, bone fragments, vomitus, blood, and secretions, dentures, debris, and shrapnel) which may lead to lung aspiration

8.4.4. Airway obstruction could also happen as a result of haemorrhage from distinct vessels or severe nasal bleeding.

8.4.5. Delayed airway compromise could also result from soft tissue swelling and edema.

8.4.6. Cervical airway obstruction risk is increased by trauma of the larynx and trachea.

8.4.7. Oral & Maxillofacial surgeons are directly involved in the management of facial trauma. Thorough understanding of the management of facial trauma and its sequelae is essential for the general dental practitioner, since patients will require further treatment following the reduction surgeries. Once a fracture is recognized, appropriate referrals to specialists are necessary **Appendix 30.**

KEY PERFORMANCE INDICATORS (KPIs)

1. Patient Happiness: Overall Assessment	
DHA Pillar	Patient Happiness
Indicator Name	Overall Assessment
Measure Type	Outcome
Data Source	Survey data
Measure Description	People who had a very favorable overall assessment of the facility during measurement period
Measure Denominator	All survey respondents who meet inclusion criteria
Measure Numerator	Survey respondent whose overall assessment of the facility was very high - patients with the highest possible score (scale has 2-7 options) or the two highest options (scale has 8+ options)
Measure Inclusion Criteria	Total number of valid responses to surveys that ask a patient to give their overall assessment of a facility
Measure Exclusion Criteria	None
Source	DHA
International Benchmark	None: Dubai facility surveys are not sufficiently uniform to allow benchmarking
Higher is Better	Yes
Risk Adjust This Measure	No

2. Patient Happiness: Recommendation to Others	
DHA Pillar	Patient Happiness
Indicator Name	Recommendation to Others
Measure Type	Outcome
Data Source	Survey data
Measure Description	Percentage of patients who were very likely to recommend the facility to other people during measurement period
Measure Denominator	All survey respondents who meet inclusion criteria
Measure Numerator	Survey respondent whose recommendation was very high - patients with the highest possible score (scale has 2-7 options) or the two highest options (scale has 8+ options)
Measure Inclusion Criteria	Total number of valid responses to surveys that ask whether the patient would recommend the facility to others
Measure Exclusion Criteria	None
Source	DHA
International Benchmark	None: Dubai facility surveys are not sufficiently uniform to allow benchmarking
Higher is Better	Yes
Risk Adjust This Measure	No

3. Patient Happiness: Doctors Made Sure Patient Understood All Information	
DHA Pillar	Patient Happiness
Indicator Name	Doctors Made Sure Patient Understood All Information
Measure Type	Outcome
Data Source	Survey data
Measure Description	Percentage of patients who answered favorably ('yes') that doctors made sure he/she understood all information
Measure Denominator	All survey respondents who met inclusion criteria
Measure Numerator	Survey respondent indicated 'yes,' doctors made sure that the patient understood all information
Measure Inclusion Criteria	Valid response to the survey question ('yes' or 'no')
Measure Exclusion Criteria	None
Source	DHA
International Benchmark	None: Dubai facility surveys are not sufficiently uniform to allow benchmarking
Higher is Better	Yes
Risk Adjust This Measure	No

4. Patient Safety: Rate of Medication Error	
DHA Pillar	Patient Safety
Indicator Name	Rate of Medication Error
Measure Type	Outcome
Data Source	Internal facility records, reports, or survey data
Measure Description	Rate of prescriptions per 100,000 with a dispensing error during measurement period
Measure Denominator	Number of medication prescriptions during measurement period
Measure Numerator	Number of prescriptions in which a medication error occurs (e.g. dispensing error, prescribing error, administering and preparing error, patient compliance error, vaccine error, administering a medicine for a known allergy patient, dose-related adverse drug reaction)
Measure Inclusion Criteria	All filled prescriptions
Measure Exclusion Criteria	Unsafe condition and near miss incident, adverse drug reactions
Source	TEC required measures http://apps.who.int/iris/bitstream/10665/252274/1/9789241511643-eng.pdf
International Benchmark	2.28 Per 100,000 (in the U.S.) Source: https://www.nationwidechildrens.org/newsroom/news-releases/2017/07/study-finds-rate-of-medication-errors-resulting-in-serious-medical-outcomes-rising . One medication error occurs for every five doses given in US hospitals and 1-2% of patients admitted to US hospitals are harmed by medication errors. Source: http://stateclaims.ie/wp-content/uploads/2017/11/Medication-Incidents-Report-2016.pdf
Higher is Better	No

Risk Adjust This Measure	No

5. Patient Safety: Rate of Medical Error	
DHA Pillar	Patient Safety
Indicator Name	Rate of Medical Error
Measure Type	Outcome
Data Source	Internal facility records, reports, or survey data
Measure Description	Rate of medical errors (errors in diagnosis, medication, surgery, equipment use, lab findings interpretation) per 100,000 patients in measurement period
Measure Denominator	All qualifying patients in measurement period
Measure Numerator	Medical errors as defined through proven reports (e-medical systems) during measurement period
Measure Inclusion Criteria	All patients with at least one medical encounter in measurement year
Measure Exclusion Criteria	None
Source	TEC required measures http://apps.who.int/iris/bitstream/10665/252274/1/9789241511643-eng.pdf
International Benchmark	To be discussed with DHA
Higher is Better	No
Risk Adjust This Measure	No

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APPENDICES:

APPENDIX 1: MAIN MEDICAL CONDITIONS ASSOCIATED WITH INCREASED RISK OF BLEEDING

	Medical Condition	Increased Bleeding Due to
1.	Chronic Renal Failure	Associated platelet dysfunction
2.	Liver Disease (caused by alcohol dependency, chronic viral hepatitis, autoimmune hepatitis, primary biliary cirrhosis)	Reduced production of coagulation factors. Reduction in platelet number and function due to splenomegaly Alcohol excess can also result in direct bone marrow toxicity and reduced platelet numbers.
3.	Haematological malignancy or myelodysplastic disorder	Impaired coagulation or platelet function (even in remission).
4.	Recent or current chemotherapy/radiotherapy[1]	Pancytopenia including reduced platelet numbers.
5.	Advanced heart failure	Resulting liver failure.
6.	Mild forms of inherited bleeding disorders including all types of hemophilia and Von Willebrand's disease	Defective or reduced levels of coagulation factors.
7.	Idiopathic Thrombocytopenic purpura (ITP)	Reduced platelet numbers.

[1] Chemotherapy or radiotherapy to the head or neck less than three months ago, or total body irradiation less than six months ago.

APPENDIX 2: MAIN DRUG GROUPS ASSOCIATED WITH HIGH RISK OF BLEEDING

	Drug Group	Effect
1.	Other anticoagulants or antiplatelet drugs[2]	Patients can be on dual, multiple or combined anticoagulant/antiplatelet therapies. These patients are likely to have a higher risk of bleeding complications than those on single drug regimes.
2.	Cytotoxic drugs or drugs associated with bone marrow suppression[3]	These can reduce platelet numbers and/or impair liver function affecting production of coagulation factors.
3.	Non- Steroidal anti-inflammatory drugs (NSAIDS) e.g. aspirin, ibuprofen, diclofenac and naproxen	Impair platelet function to various extents.
4.	Drugs affecting the nervous system • Selective serotonin reuptake inhibitors (SSRIs) • Carbamazepine	 SSRIs have the potential to impair platelet aggregation and although unlikely to be clinically significant in isolation, may in combination with antiplatelet drugs increase the bleeding time. Carbamazepine can affect both liver function and bone marrow production of platelet. Patients most at risk are those recently started on this medication or following dose adjustment.

[2] Patients may be taking non-prescribed aspirin and this antiplatelet agent can in effect convert a prescribed monotherapy into a dual therapy.

[3] Drugs prescribed to patients with inflammatory bowel disease or autoimmune/rheumatological conditions

APPENDIX 3: MAJOR DRUG INTERACTIONS BETWEEN ANTICOAGULANTS/ANTIPLATELETS AND MOST COMMONLY PRESCRIBED MEDICATIONS IN THE DENTAL FIELD

Oral Anticoagulants	Interactions (and possible side effects)
Warfarin	Penicillin including co-amoxiclav (reports of increased INR with amoxicillin)
Phenindione	
Acenocoumarol	Metronidazole, erythromycin, clarithromycin (anticoagulant effect enhanced in a minority of patients) NSAIDs aspirin, ibuprofen, diclofenac (may increase bleeding risk) Carbamazepine (reduced anticoagulant effect) Miconazole, fluconazole (established and clinically important increase in anticoagulation effect)
Oral antiplatelet Drugs	**Interactions and possible side effects**
Aspirin	NSAIDs- ibuprofen, diclofenac (may increase bleeding risk although note that antiplatelet effect of aspirin may be reduced by ibuprofen if used regularly).
Clopidogrel	NSAIDs aspirin, ibuprofen, diclofenac (may increase bleeding risk) Erythromycin (may reduce antiplatelet effect) Carbamazepine (may reduce antiplatelet effect) Fluconazole (may reduce antiplatelet effect) Omeprazole (may reduce antiplatelet effect)
Dipyridamole	Aspirin (may increase bleeding risk)
Prasugrel	NSAIDs aspirin, ibuprofen, diclofenac (may increase bleeding risk)

Ticagrelor	NSAIDs aspirin, ibuprofen, diclofenac (may increase bleeding risk) Clarithromycin (plasma concentration of Ticagrelor may be increased) Carbamazepine (plasma concentration of Ticagrelor may be reduced)
NOACs	**Interactions and possible side effects**
Apixaban	NSAIDs aspirin, ibuprofen, diclofenac (may increase bleeding risk) Carbamazepine (plasma concentration of apixaban may be reduced)
Dabigatran	NSAIDs aspirin, ibuprofen, diclofenac (may increase bleeding risk) Clarithromycin (may increase bleeding risk) Carbamazepine (plasma concentration of dabigatran may be reduced)
Rivaroxaban	NSAIDs - aspirin, ibuprofen, diclofenac (may increase bleeding risk) Carbamazepine (plasma concentration of Rivaroxaban may be reduced)
Injectable Anticoagulants	**Interactions and possible side effects**
Dalteparin	NSAIDs- aspirin, ibuprofen, diclofenac (may increase bleeding risk)
Enoxaparin	
Tinazaparin	

APPENDIX 4: DENTAL PROCEDURES THAT ARE LIKELY TO CAUSE BLEEDING

Dental Procedures that are unlikely to cause bleeding	**Dental Procedures that are likely to cause bleeding**	
	Low risk of post-operative bleeding complications	**High risk of post-operative bleeding complications**
Local anaesthesia (LA) by infiltration, intraligamentary or mental nerve block[a] LA by inferior dental block or other regional nerve blocks[a,b] Basic periodontal examination (BPE)[c] Supragingival removal of dental plaque, calculus and stains Direct or indirect restorations with supragingival margins Endodontics – orthograde Impressions and other prosthetic procedures Fitting and adjustment of orthodontic appliances	Simple extractions (1-3 teeth with restricted wound size)[d] Incision and drainage of intraoral swellings. Detailed six point full periodontal examination Root surface instrumentation and sub gingival scaling Direct or indirect restorations with sub gingival margins	Complex Extraction[e] (Adjacent extractions that could cause a large wound or more than 3 extractions at one) Flap raising procedures: • Elective surgical extractions • Periodontal surgery • Preprosthetic surgery • Periradicular surgery • Crown Lengthening • Dental Implant Surgery Gingival Recontouring Biopsies

[a] LA should be delivered using an aspirating syringe and should include a vasoconstrictor, unless contraindicated. Other methods of LA are preferred over regional nerve blocks whether the patient is taking an anticoagulant or not.

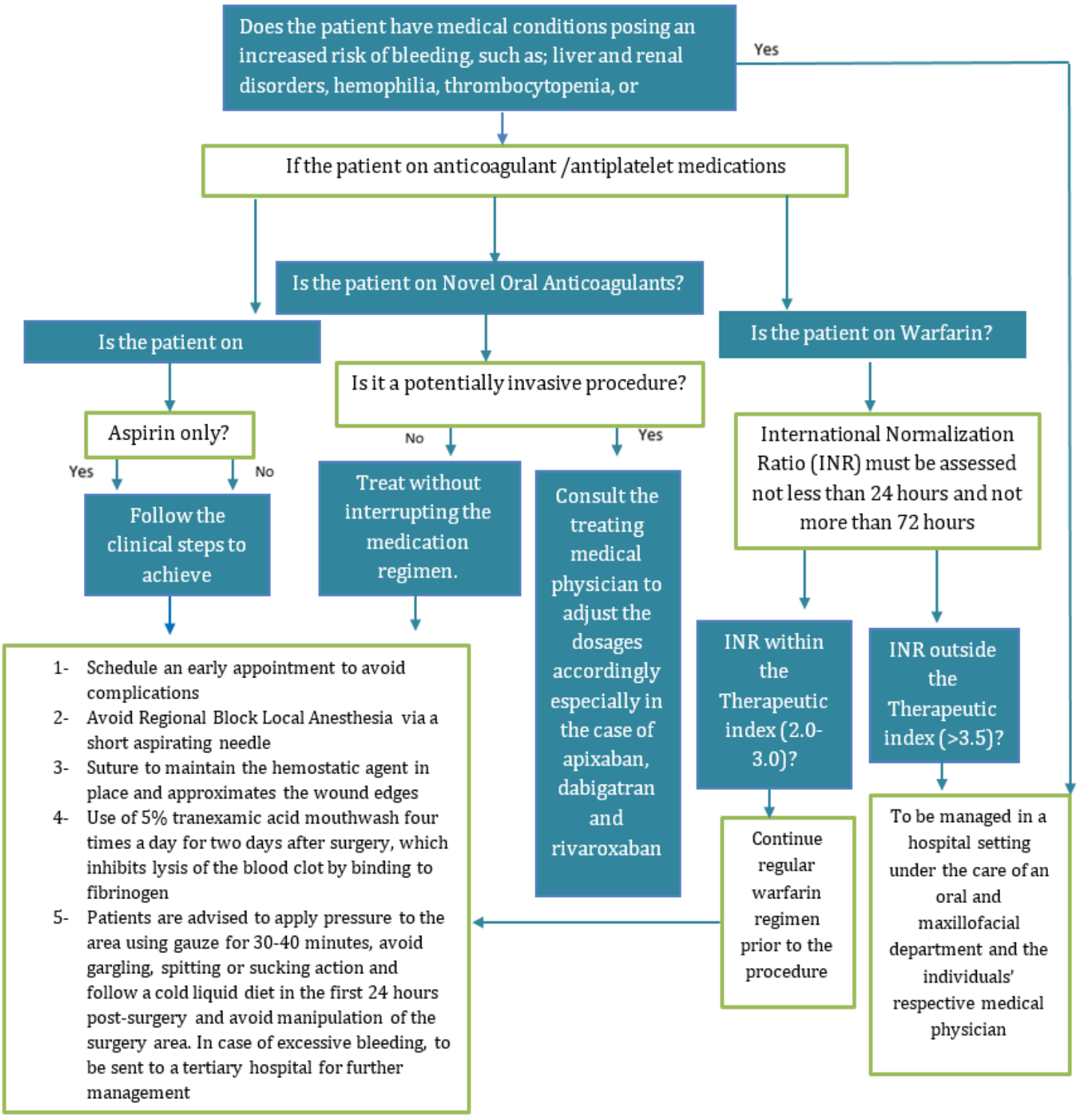
[b] There is no evidence to suggest that an inferior dental block performed on an anticoagulated patient poses a higher risk of bleeding. In case of patients taking Warfarin, if there are any indications of patient with unstable INR or other signs of excessive anticoagulation, an INR should be requested, before the procedure.

[c] Although a BPE can result in some bleeding from the gingival margin, it is extremely unlikely to lead to complications

[d] Simple extractions refers to those which are expected to be straightforward, without surgical complications.

[e] Complex extractions refers to those which maybe likely to have surgical complications.

APPENDIX 5: CLINICAL STEPS FOR PATIENTS WHO ARE AT RISK OF BLEEDING FROM AN ORAL SURGICAL PROCEDURE



APPENDIX 6: ANTIBIOTIC PROPHYLAXIS FOR ORAL/DENTAL PROCEDURE

Antibiotic Prophylaxis Regimen for Oral/dental procedures			
Regimen: Single dose 30-60 min before procedure			
Situation	**Agent**	**Adults**	**Children**
Oral	Amoxicillin	2 gms	50 mg/kg
Unable to take oral	Ampicillin **OR** Cefazolin or ceftriaxone	2 g IM* or IV+ 1 g IM or IV	50 mg/kg IM or IV 50 mg/kg IM or IV
Allergic to penicillin or ampicillin oral	Cephalexin ϕδ **OR** Clindamycin **OR** Azithromycin **OR** clarithromycin	2 g 600 mg 500 mg	50 mg/kg 20 mg/kg 15 mg/kg
Allergic to penicillin or ampicillin and unable to take oral medication	Cefazolin or Ceftriaxone δ **OR** Clindamycin	1 g IM or IV 600 mg IM or IV	50 mg/kg IM or IV 20 mg/kg IM or IV

***IM: Intramuscular**

+IV: Intravenous

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

δ Cephalosporin should not be used in an individual with a history of anaphylaxis, angioedema, or urticaria with penicillin or ampicillin.

APPENDIX 7: AAOS/ADA RECOMMENDATIONS FOR PREVENTION OF ORTHOPAEDIC IMPLANT INFECTION

AAOS/ADA Prevention Of Orthopedic Implant Infection Clinical Practice Guideline Protocol Recommendations
Recommendation 1
• **The practitioner might consider discontinuing the practice of routinely prescribing prophylactic antibiotics for patients with hip and knee prosthetic joint implants undergoing dental procedures.**
• **Grade of Recommendation: Limited**
Recommendation 2
• **We are unable to recommend for or against the use of topical oral antimicrobials in patients with prosthetic joint implants or other orthopedic implants undergoing dental procedures.**
• **Grade of Recommendation: Inconclusive**
Recommendation 3
• **In the absence of reliable evidence linking poor oral health to prosthetic joint infection, it is the opinion of the work group that patients with prosthetic joint implants or other orthopedic implants maintain appropriate oral hygiene.**
• **Grade of Recommendation: Consensus**

APPENDIX 8: PHYSIOLOGICAL CHANGES IN PREGNANCIES AND THEIR MANAGEMENT

Main physiological changes	Treatment considerations
Cardiovascular system	
Blood pressure decreases early in pregnancy returns to baseline levels by the end of the second trimester	• If the patient is placed in a supine position, this may lead to supine hypotension syndrome, which is clinically characterized; by hypotension, syncope, and bradycardia • To prevent or alleviate supine hypotension; the pregnant patient should be rolled to the left side by 5°–15° (a position in which the right hip is elevated 10–12 cm) which can be accomplished by inserting a wedge or pillow under the right hip. If this does not work to alleviate the hypotension, the patient can be placed in a full left lateral position
Respiratory changes	
• Superior displacement of the diaphragm • Dyspnoea • Rhinitis	• Ventilation patterns and patient position must be adjusted for the pregnant patient to avoid hypoxemia
Hematologic changes	
• Physiologic Anemia • Increased thromboembolic events, compared with non-pregnant patients	• Anti-coagulant prophylaxis is recommended for pregnant patients with a history of thromboembolic disease • For these patients, low molecular weight heparin is preferred because it does not cross the placenta
Gastrointestinal changes	
• Increased frequency of nausea/vomiting • Peripheral edema	• Morning appointments should not be scheduled • Avoid foods that could initiate nausea/vomiting • Patients with frequent vomiting should be encouraged to drink electrolyte rich fluids
Renal changes	
• Urination • Urinary tract infections (UTI)	• Asymptomatic bacteriuria can progress to urinary tract infection and eventually pyelonephritis if untreated • Before placing a urinary catheter, the surgeon should evaluate the patient for potential risk factors for asymptomatic bacteriuria

APPENDIX 9: LIST OF DRUGS DURING PREGNANCY

Drug Category	Safety in pregnancy
Local Anesthetics	• Adrenaline: - Used in the dental setting is of very low concentration - Beneficial, provided that aspiration is performed to minimize the risk of intravascular injection, as it will decrease their uptake systemically, helping to minimize the likelihood of toxicity - Accidental intravascular injection results in uterine artery vasoconstriction and decreased uterine blood flow • Both Lidocaine (total maximum dosage is 500 mg) and Prilocaine (total maximum dosage is 400 mg) showed no evidence of fetal harm.
Analgesics	• Safest to be prescribed during pregnancy is Paracetamol • Nonsteroidal anti-inflammatory drugs (NSAIDs): - Including drugs such as ibuprofen and naproxen have a less favourable use for pregnant patients. - NSAIDs late in pregnancy may prolong the length of the pregnancy through ineffective contractions during labor - Increased bleeding during delivery and premature closure of the ductus arteriosus. - If needed, ibuprofen can be prescribed in the first and second trimesters but should be avoided during the third trimester. • Aspirin should be avoided particularly during the third trimester of pregnancy as it can lead to constriction of ductus arteriosus of the fetus, and should also be avoided while nursing • Opioids: - Including codeine and oxycodone, usually given in combination with paracetamol or acetylsalicylic acid (ASA) when NSAIDs cannot be prescribed.

<table>
<tr><td></td><td colspan="2">- Oxycodone is the safest, whereas codeine has been reported to cause increased risk of congenital malformations including cleft lip and palate and other cardiac and circulatory malformations. Prescribing codeine (preferably in the second or third trimesters) for a short duration, when needed, is acceptable.
- Chronic use has been associated with fetal dependence, premature delivery, neonatal respiratory depression and delayed growth.
• If there is severe chronic pain, an interprofessional approach is best.</td></tr>
<tr><td></td><td colspan="2">General recommendations for the use of analgesics during pregnancy</td></tr>
<tr><td></td><td>General</td><td>• Eliminate the source of pain, if at all possible</td></tr>
<tr><td></td><td>For Paracetamol</td><td>• Paracetamol is the analgesic of choice in the otherwise healthy pregnant patient
• Use a dose of 500–1,000 mg every 4 hours to a maximum of 4 grams per day</td></tr>
<tr><td></td><td>For NSAIDs</td><td>• NSAIDs can be used cautiously in first and second trimesters
• NSAIDs should be avoided during the third trimester
• If NSAIDs are used in the pregnant patient, it is recommended to use the lowest effective dose for as short a period of time as possible</td></tr>
<tr><td></td><td>For opioids</td><td>• Opioid analgesics can be cautiously prescribed to the pregnant dental patient.
• If opioid analgesics are prescribed, low dose and short duration are recommended</td></tr>
<tr><td>Antibiotics</td><td colspan="2">• If a patient is allergic to penicillin, clindamycin can be given
• Erythromycin is no longer considered a preferred alternative and is best avoided. Furthermore, it has been recommended not to use the estolate form of this drug, as it has been associated with cholestatic hepatitis.
• Metronidazole use during pregnancy is controversial. It has been associated with increased risk for preterm birth, teratogenesis and fetal harm. In the first trimester, however, there was no evidence that there is an increase in the rate of congenital anomalies. Use of metronidazole is justified for significant oral and maxillofacial infections in the pregnant patient because the cause of dental abscesses comprises of</td></tr>
</table>

	the complex mix of strict anaerobes and facultative anaerobes. Metronidazole is highly active against most anaerobes.
Antifungals	• Amphotericin B remains the drug of choice for the treatment of deep and life-threatening fungal infections in pregnancy
Antivirals	• Acyclovir and valacyclovir are antiviral antibiotics that can be used to treat herpetic infections
Steroids	• Specific consideration for the use of corticosteroids during pregnancy is to reduce inflammation and decrease edema • Dexamethasone is used in pregnancy only when benefit to the mother outweighs risk to the fetus • Prednisone and prednisolone have been used clinically in pregnant women without adverse effects on the fetus • Triamcinolone and beclomethasone have not been associated with fetal defects in humans. They are safe locally but systemic use can harm the mother and the fetus and thus should be avoided during pregnancy • Pregnancy specific complications that arise are premature rupture of embryonic membranes, hypertension and gestational diabetes mellitus
Sedatives & Anxiolytics	• Nitrous Oxide (N_2O) is given in the first trimester if possible, and if it is necessary to be given at all in pregnancy, it should be administered for less than 30 minutes and with at least 50% oxygen. Nitrous oxide causes vasoconstriction and may reduce uterine blood supply. • Benzodiazepines are commonly administered for patients with anxiety requiring sedation. These drugs, when taken during pregnancy, were linked to fetal malformations, fetal abortion and craniofacial defects such as cleft lip and palate. When prescribed chronically in the third trimester they cause fetal dependence and withdrawal. They may be used with caution when sedation for dentistry is indicated • The use of diazepam and midazolam are particularly hazardous and must be avoided in the first trimester and last month of the third trimester of pregnancy

Conscious sedation and general anesthetics	• Intubation can be difficult in pregnant patients as there is a risk of epistaxis from nasal tubes due to friable mucous membrane • During pregnancy, Barbiturates and benzodiazepines must be avoided in induction • Thiopental and propofol are safe induction agents • Halothane, isoflurane, enflurane and desflurane are safe during pregnancy in appropriate doses

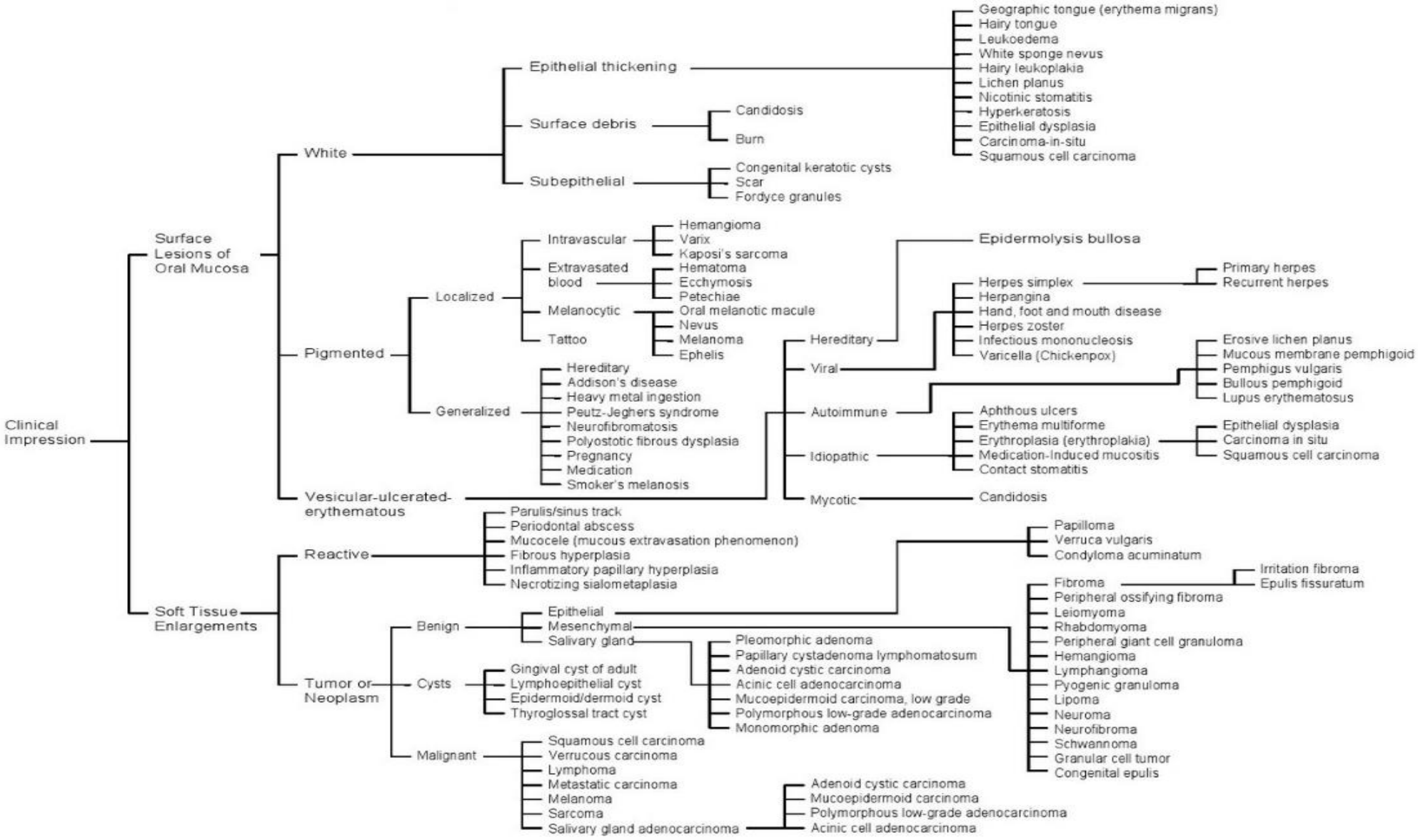
APPENDIX 10: TERATOGENS AND THEIR EFFECTS ON THE FETUS

Teratogens	Effects on Fetus
Ethyl alcohol	Fetal alcohol syndrome
Tobacco	Low birth rate, cleft lip and palate
Cocaine	Cognitive delay, Placental abruption
Thalidomide	Thalidomide embryopathy (damage of the limbs, face, eyes, ears, genitalia, and internal organs and the vertebral column. facial palsies)
Methyl mercury	Microcephaly, Brain damage
Anticonvulsants (all) Carbamazepine Valproic acid Lamotrigine Phenobarbital Topiramate	Orofacial clefts, Cardiac Malformations, Spina bifida Neural tube defects Neural tube defects Urinary malformations Abnormalities in all subjects
Warfarin (e.g. Coumadin)	Warfarin embryopathy (midface and long bone deficiency) spontaneous abortion.
Angiotensin-converting enzyme inhibitors	Oliguria, renal dysgenesis, lung and limb abnormalities
Retinoids	Spontaneous abortion Multiple malformations

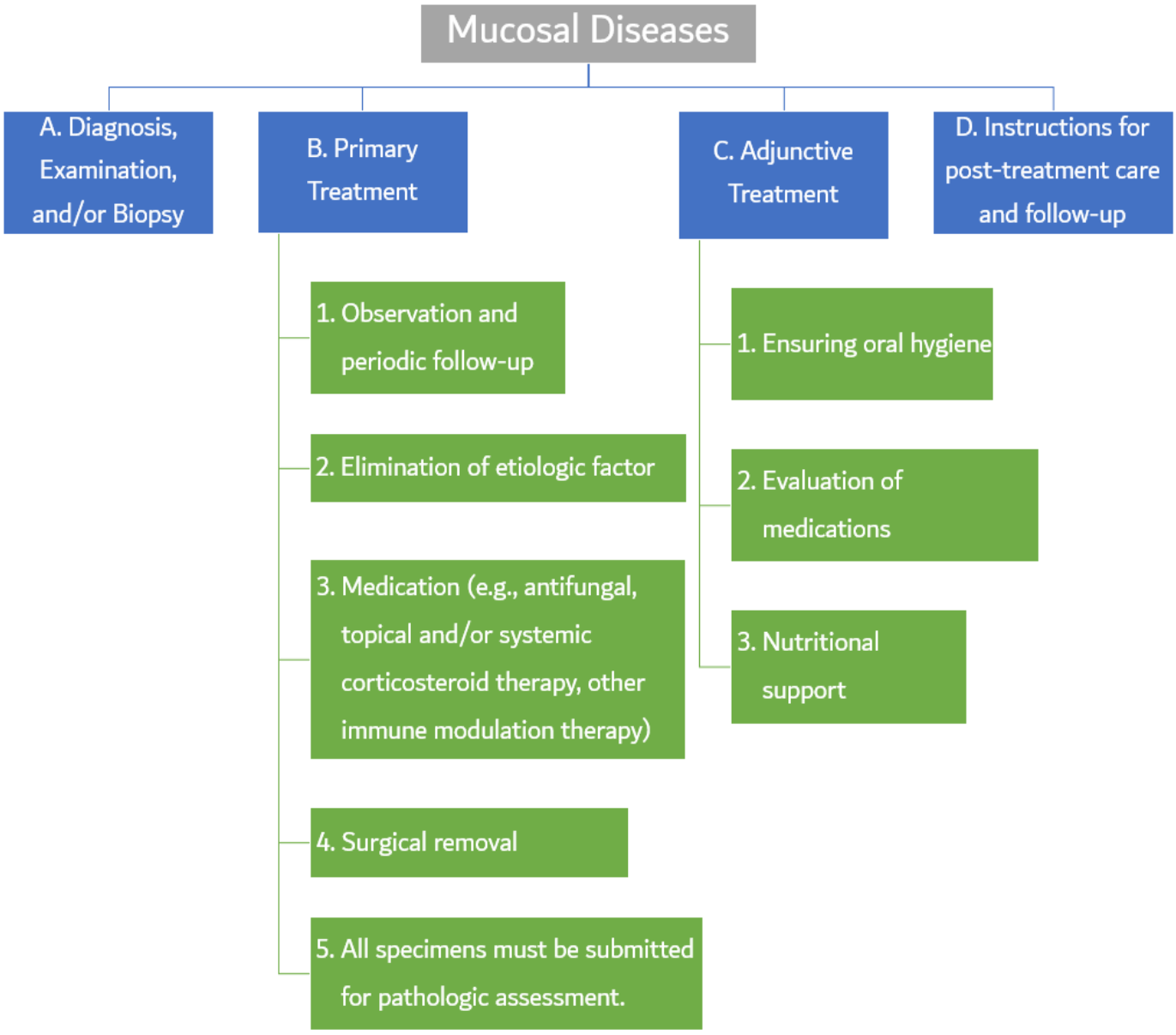
APPENDIX 11: FDA CATEGORIZATION FOR RISK FACTORS FOR METHEMOGLOBINEMIA IN PREGNANT WOMEN

FDA Category	Explanation
Category A	Controlled studies in women fail to demonstrate a risk to the foetus in the first trimester (and there is no evidence of a risk in later trimesters), and the possibility of foetal harm appears
Category B	Either animal-reproduction studies have not demonstrated a foetal risk but there are no controlled studies in pregnant women, or animal-reproduction studies have shown an adverse effect (other than a decrease in fertility) that was not confirmed in controlled studies in women in the first trimester (and there is no evidence of a risk in later trimesters).
Category C	Either studies in animals have revealed adverse effects on the foetus (teratogenic or embryocidal, or other) and there are no controlled studies in women, or studies in women and animals are not available. Drugs should be given only if the potential benefit justifies the potential risk to the foetus
Category D	There is positive evidence of human foetal risk, but the benefits from use in pregnant women may be acceptable despite the risk (e.g., if the drug is needed in a life-threatening situation or for a serious disease for which safer drugs cannot be used or are ineffective).
Category X	Studies in animals or human beings have demonstrated foetal abnormalities, or there is evidence of foetal risk based on human experience, or both, and the risk of the use of the drug in pregnant women clearly outweighs any possible benefit. The drug is contraindicated in women who are or may become pregnant.

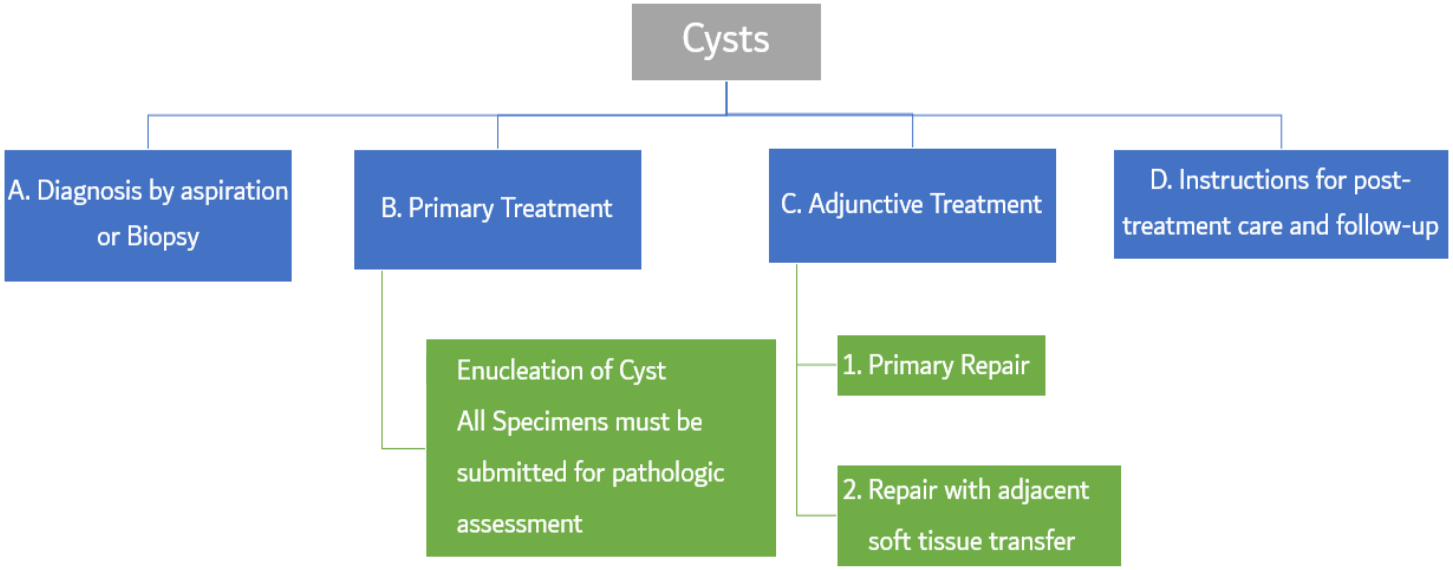
APPENDIX 12: CLASSIFICATION OF ORAL MUCOSAL LESIONS



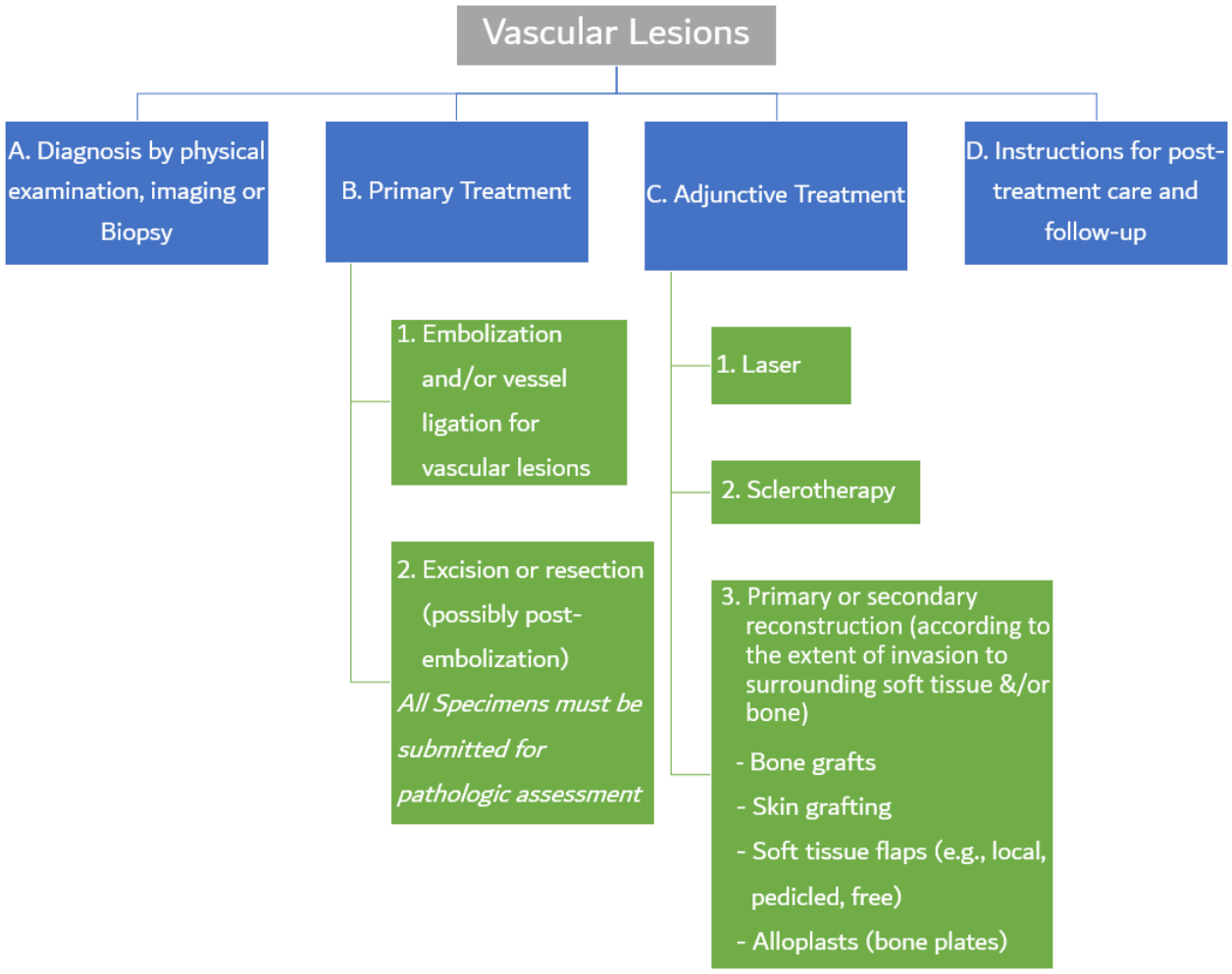
APPENDIX 13: MANAGEMENT OF MUCOSAL DISEASES



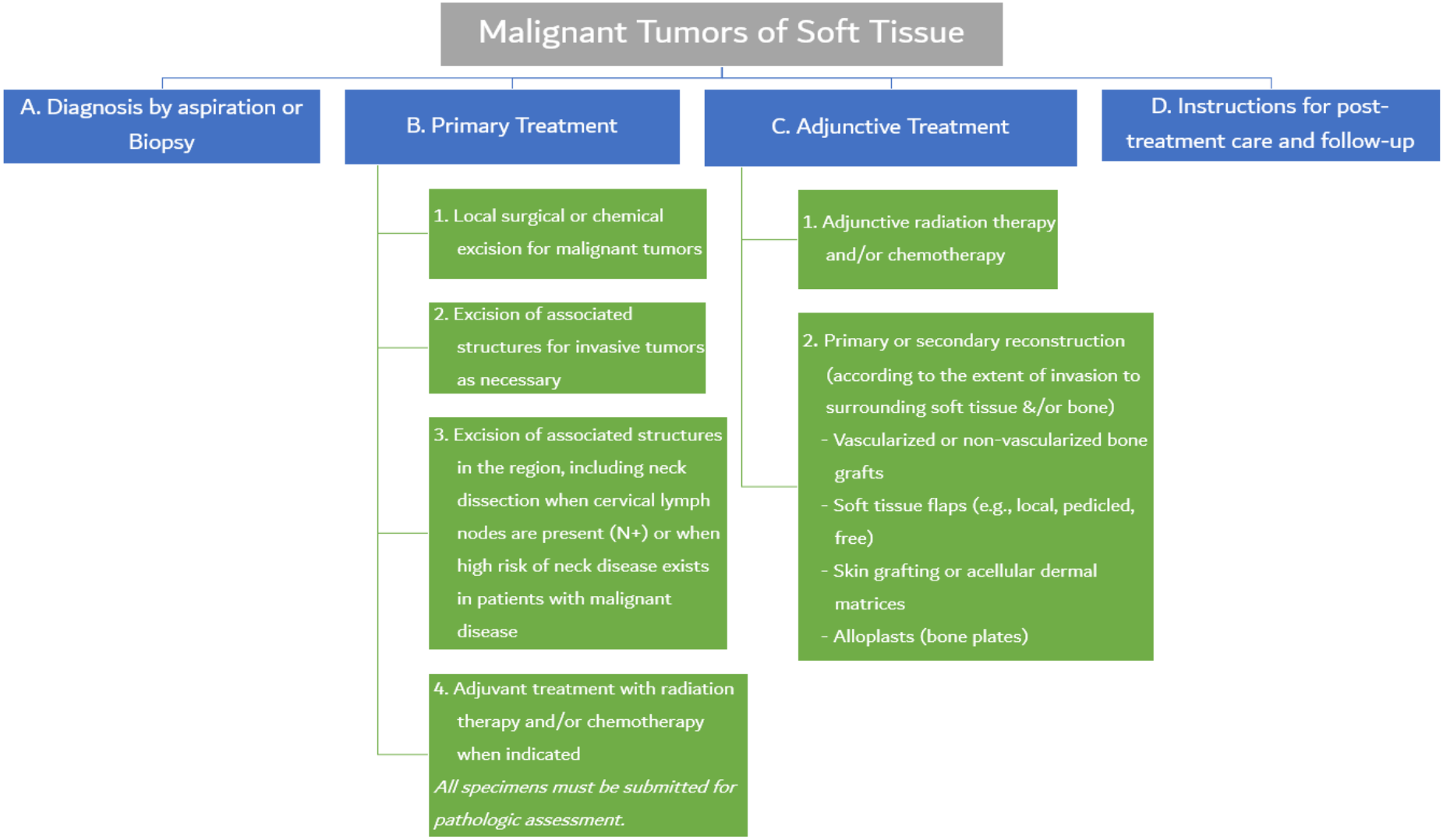
APPENDIX 14: MANAGEMENTS OF CYSTS



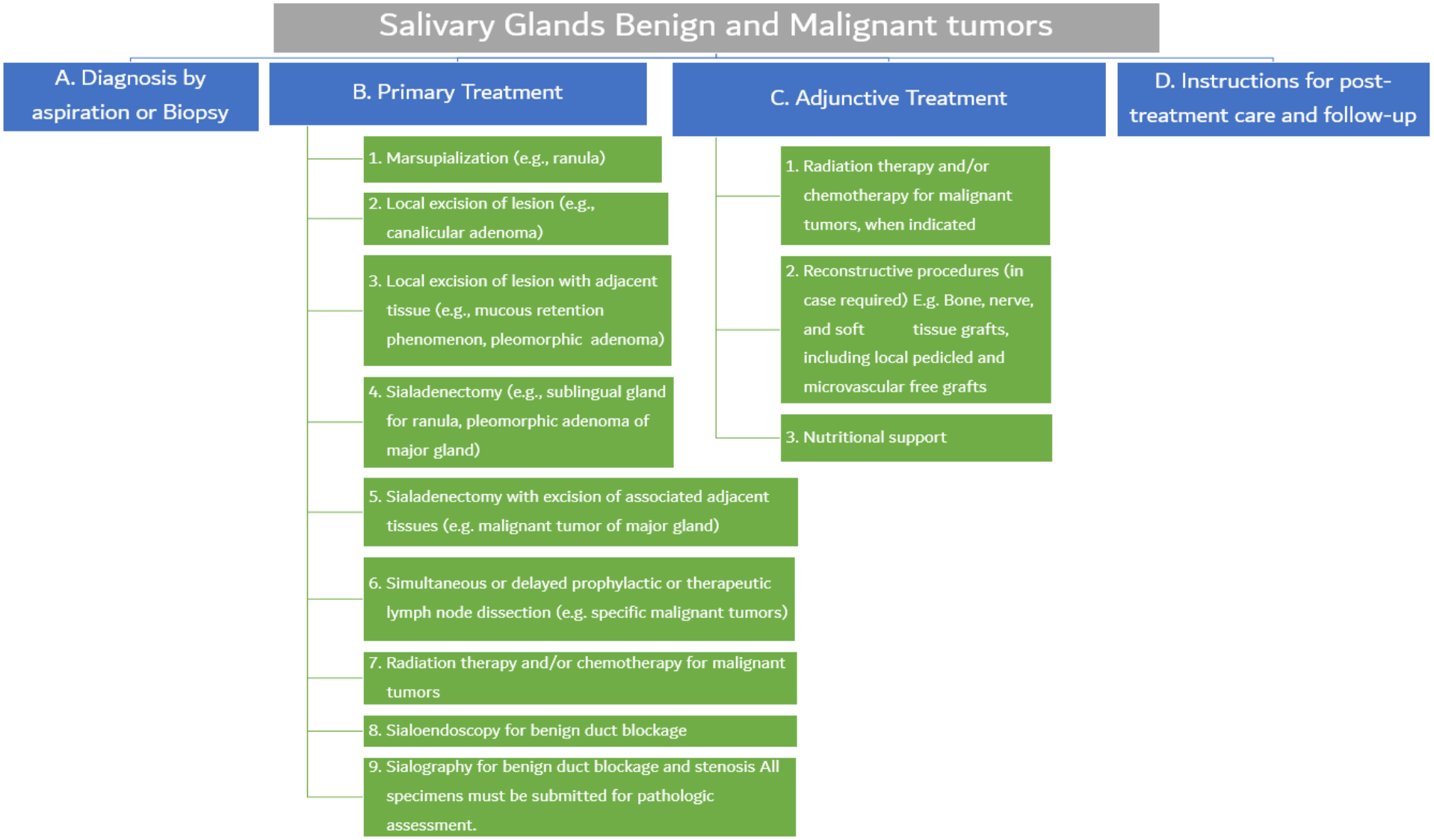
APPENDIX 15: MANAGEMENT OF VASCULAR LESIONS



APPENDIX 16: MANAGEMENTS OF MALIGNANT TUMORS OF SOFT TISSUE



APPENDIX 17: SALIVARY GLANDS BENIGN AND MALIGNANT TUMOR



APPENDIX 18: MANAGEMENT OF SIMPLE & LIFE-THREATENING INFECTIONS

Outpatient Clinic
General Dentist
Patient attends with an infection

A- Initial Examination:

1. Airway
2. Breathing
3. Circulation

If satisfactory, proceed with Vital Signs

B- Physical Examination:

1. Extra oral: Assess extent and location of any facial swelling
2. Intraoral: Assess focal swelling, halitosis, gross dental caries, broken dentition, drainage of pus, and

1. Understand the Chief Complaint; obtain proper history, and tests.
2. Lab Investigations (CBC/FBC, CRP, Procalcitonin and radiological)
3. Reach a Proper Diagnosis.
4. Is the Infection Life Threatening or Simple

Signs to keep in mind that an infection is life threatening or severe:

1. Dyspnoea
2. Stridor
3. Dysphagia
4. Odynophagia
5. Trismus
6. Crepitus

Determine Threat to the Airway (1 + one of the following present)

- Trismus (unable to open more than 2cm or width of two fingers)
- Airway Deviation
- Involvement of Maxillary Molars +/- any lower tooth
- Systemic signs: Fever, Hypotension, Tachycardia

If patient is systemically well & there was no airway obstruction (simple infection), we either:

1- Manage it in the Emergency Dental Clinic, perform the Emergency Dental Treatment by eliminating the source of infection & prescribe the medications needed
2- Or/and refer to the OMFS Specialist, for further management

In case, the patient was systemically unwell and had an airway obstruction. Refer to a tertiary setting hospital for further management, such as:

1- Urgent OT
2- IV Antibiotics
3- Analgesics
4- Management of medical conditions

In case, the patient was systemically unwell with no airway obstruction. Refer to a tertiary setting hospital for further management, such as:

1- IV Antibiotics
2- Analgesics
3- Management of medical conditions
4- Observation
5- Determine if there is a need for surgical intervention

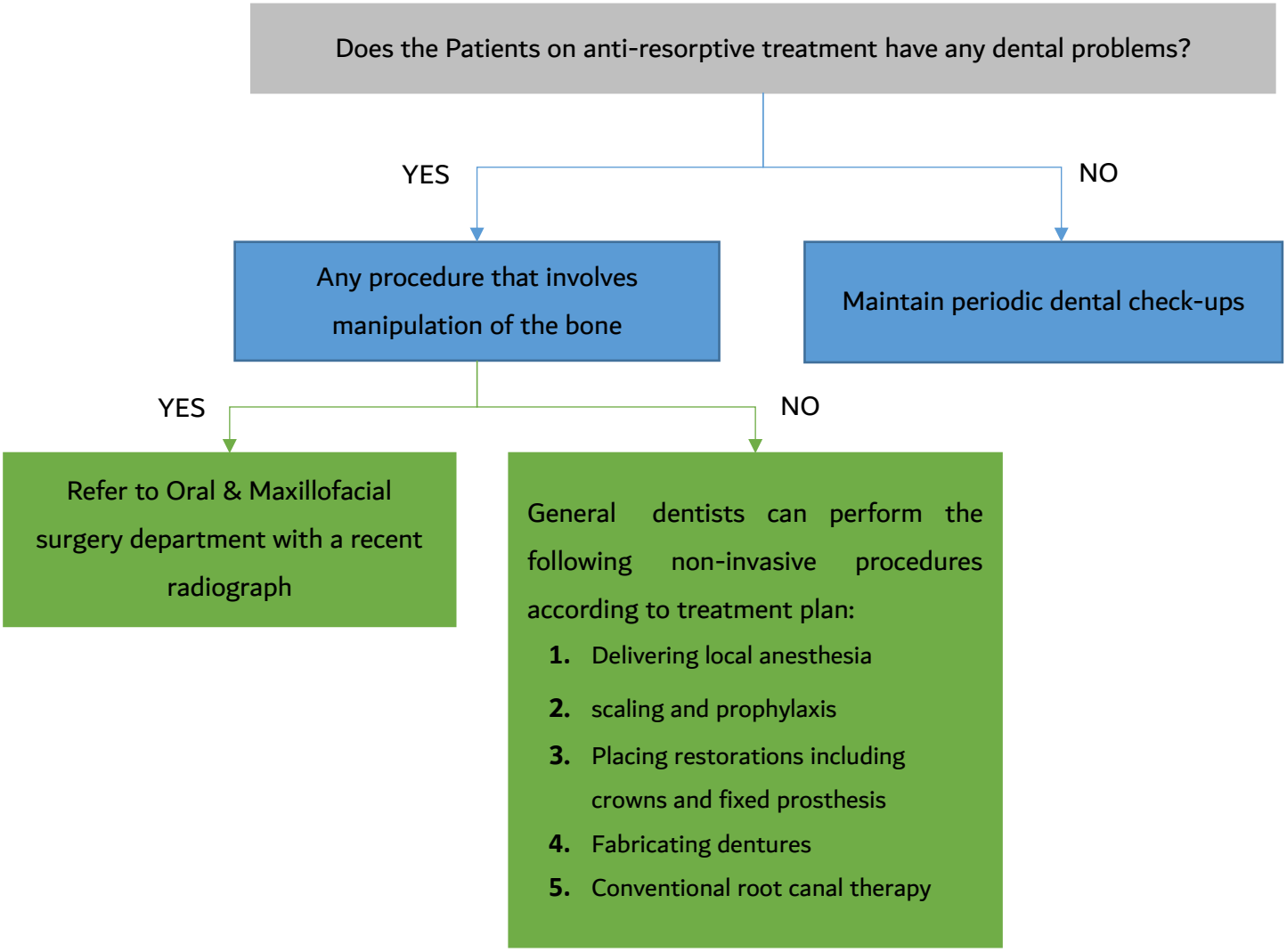
APPENDIX 19: MEDICATIONS ASSOCIATED WITH MRONJ

Medication	Indication
Anti-resorptive agents	
Bisphosphonates • Zoledronic acid (Zometa, Reclast) • Pamidronate (Aredia) • Alendronate (Fosamax) • Ibandronate (Boniva) • Risedronate (Actonel, Atelvia) • Etidronate (Didronel) • Tiludronate (Skelid)	**IV bisphosphonates:** are antiresorptive medications used to manage cancer-related conditions, including hypercalcemia of malignancy, skeletal-related events (SREs) associated with bone metastases in the context of solid tumors such as breast, prostate, and lung cancers, and for management of lytic lesions in the setting of multiple myeloma. • Once yearly infusion of zolendronate (Reclast®) • Parenteral formulation of ibandronate (Boniva®) administered every three months for the management of osteoporosis. **Oral bisphosphonates:** Used in less common conditions, such as Paget disease & osteogenesis imperfecta. However, their most common use is for osteoporosis and osteopenia
RANK-ligand inhibitor • Denosumab (Xgeva and Prolia)	• Denosumab (Prolia®) is administered subcutaneously every 6 months for osteoporotic patients. • Denosumab (Xgeva®) is used in metastatic bone disease from solid tumors when administered monthly. • Denosumab is effective in decreasing SREs related to metastatic bone disease from solid tumors when

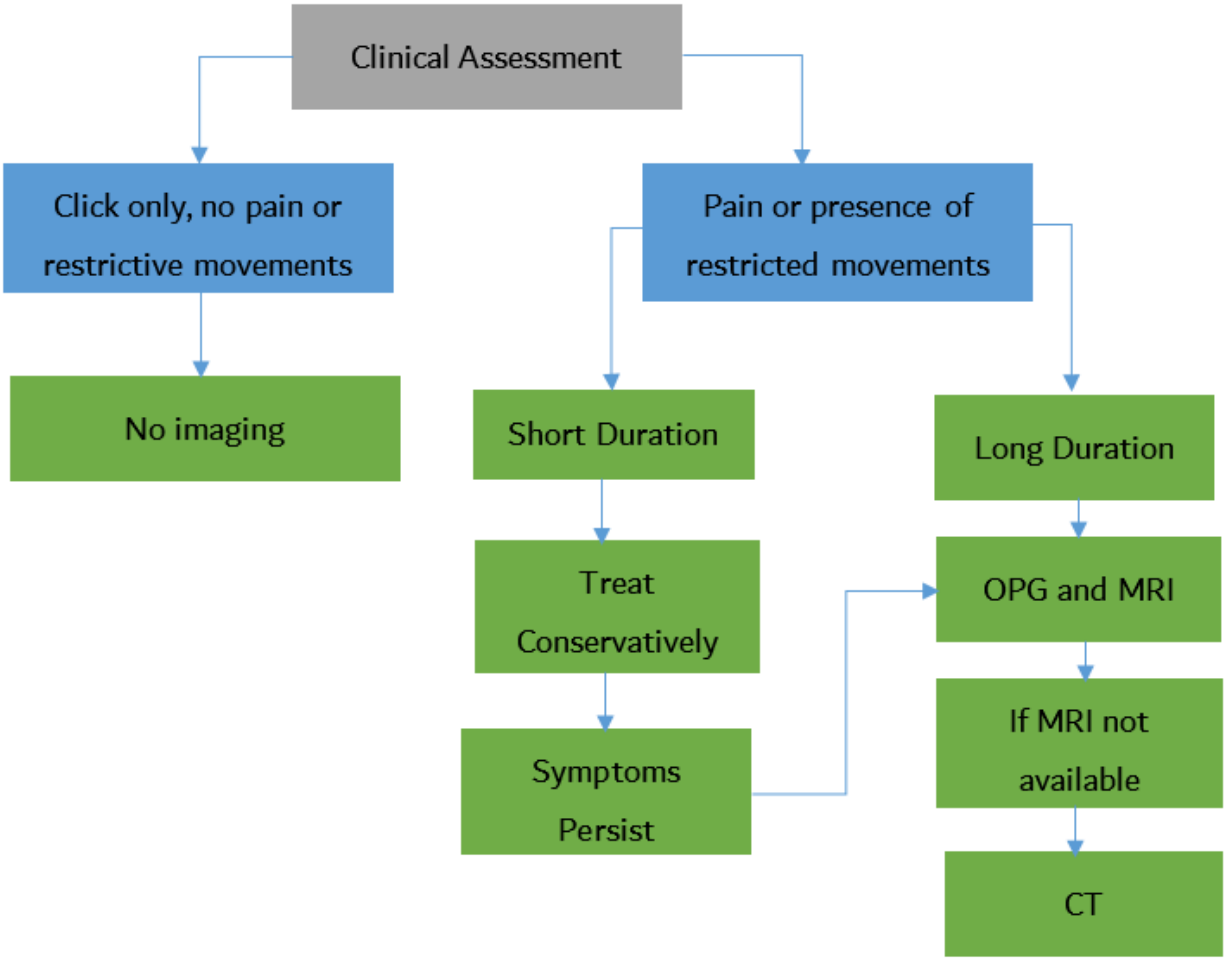
	administered monthly Denosumab therapy is not indicated for the treatment of multiple myeloma. Interestingly, in contrast to BPs, RANKL inhibitors do not bind to bone and their effects on bone remodelling are mostly diminished within six (6) months of treatment cessation.

Anti-Angiogenic Agents	
For the treatment of gastrointestinal tumors, renal cell carcinomas, neuroendocrine tumors and others	
• Sunitinib (Sutent) • Sorafenib (Nexavar) • Bevacizumab (Avastin) • Ziv-aflibercept (Zaltrap)	• Renal cell carcinoma • Gastrointestinal stromal tumor • Neuroendocrine tumor • Hepatocellular carcinoma • Thyroid cancer • Metastatic colorectal cancer • Non-squamous, non-small cell lung cancer • Glioblastoma • Cervical cancer

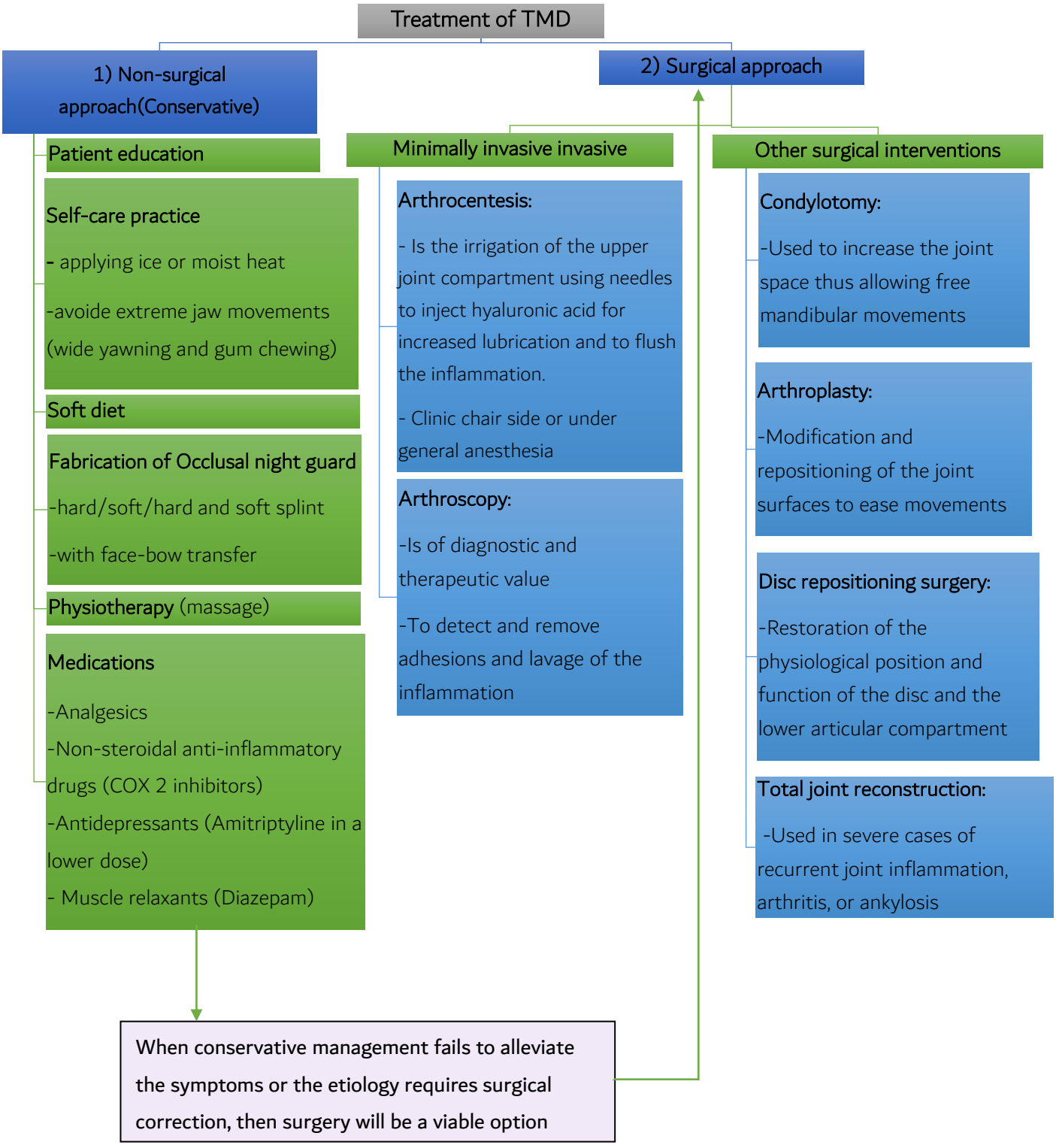
APPENDIX 20: GENERAL DENTIST GUIDANCE FOR PATIENTS ON OR PLANNED FOR ANTIRESORPTIVE/ANTIANGIOGENIC THERAPY



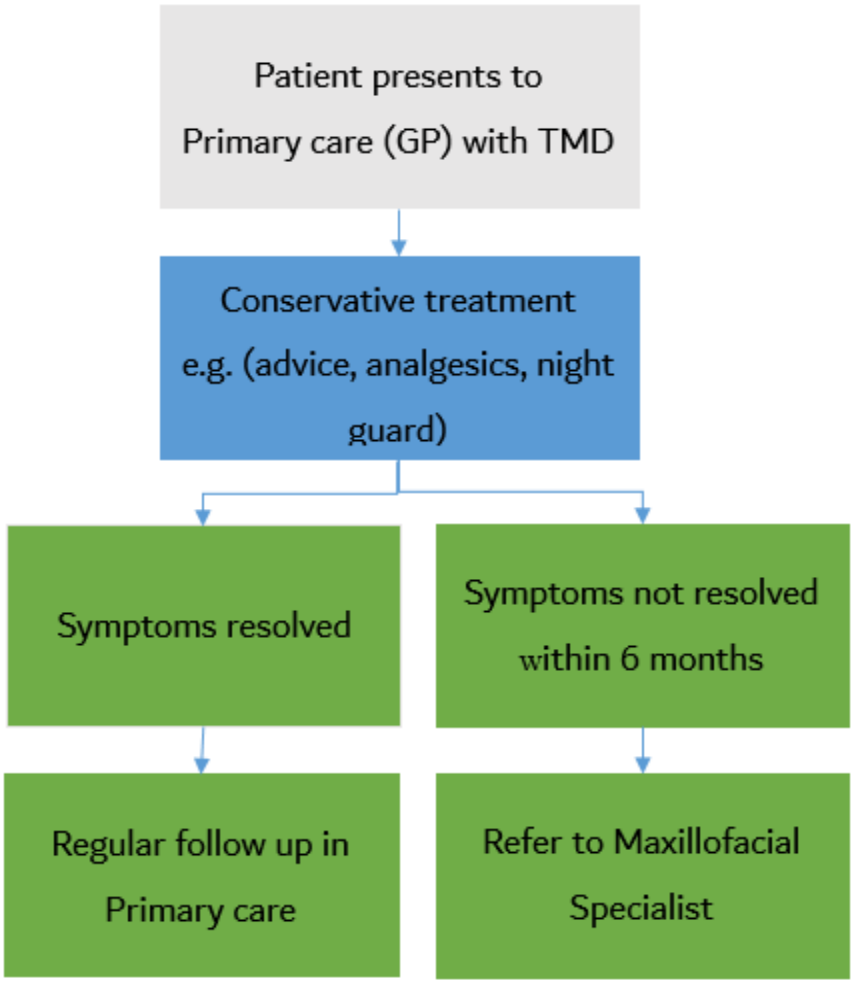
APPENDIX 21: TMD ASSESSMENT AND DIAGNOSIS



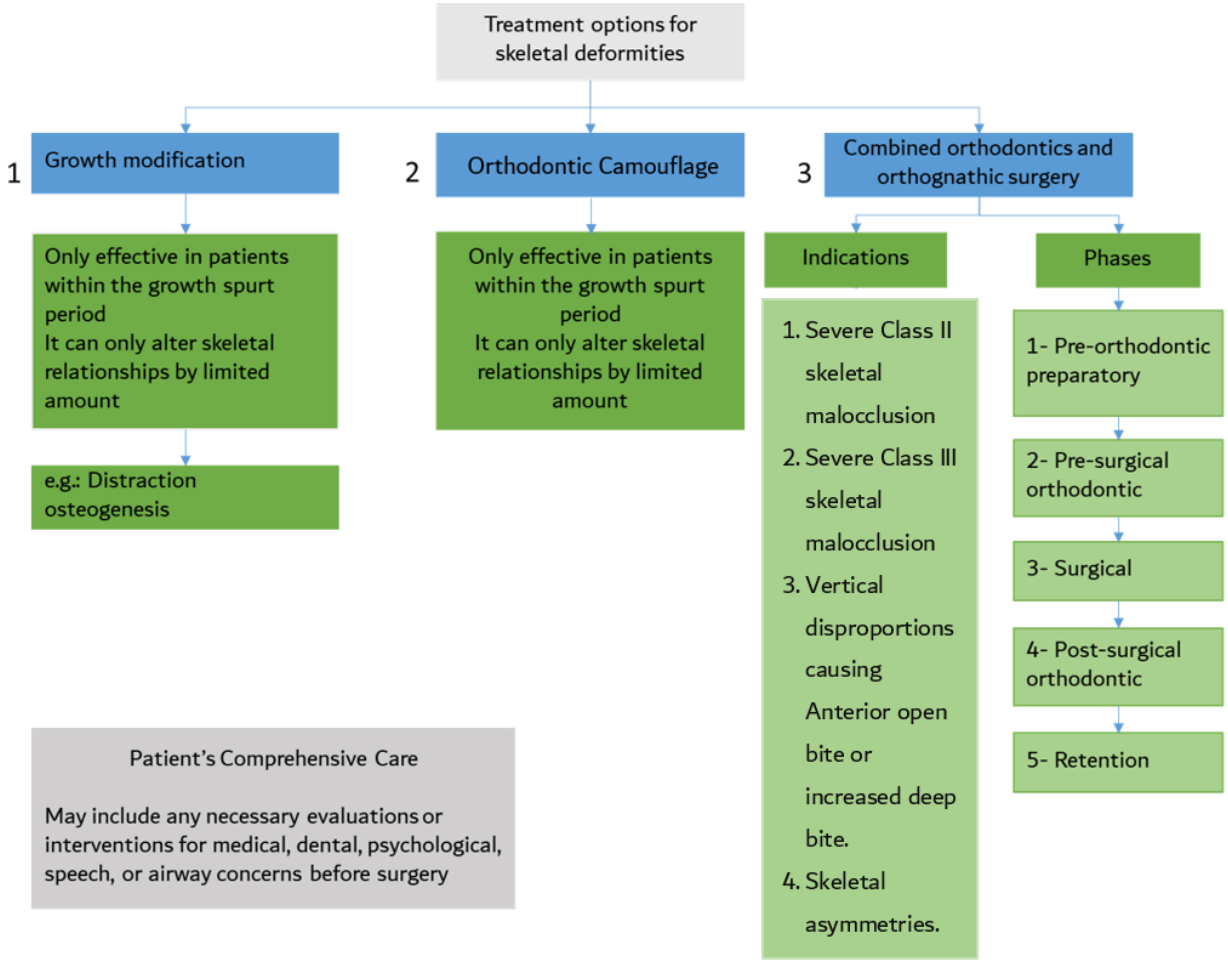
APPENDIX 22: TREATMENT OF TMD



APPENDIX 23: REFERAL PATHWAY



APPENDIX 24: TREATMENT OPTIONS FOR SKELETAL DEFORMITIES



APPENDIX 25: MANAGEMENT OF COMBINED ORTHODONTICS AND ORTHOGNATHIC SURGERY

Treatment options for skeletal deformities

Management of Combined Orthodontics and Orthognathic Surgery

Phases

1) Pre-orthodontic preparatory phase

This phase includes establishing a good oral hygiene and elimination of caries in patient's mouth. The amount of keratinized gingiva must be managed before any orthodontic intervention to avoid gingival recession.

2) Pre-surgical orthodontic phase

Duration 12-18 months

In skeletal malocclusions, the teeth tend to compensate for the skeletal discrepancies in order to achieve a functional occlusion.

The aim of this phase is to eliminate the dental compensation in order to

The teeth have to be decompensated and repositioned back to their ideal position in three dimensions

A) Anterior posterior segment involves the correction of maxillary and mandibular incisors

B) Transverse segment

C) Vertical segment: the amount of decompensation depends on:

Class II malocclusions

-Maxillary incisors are retroclined, and mandibular incisors are proclined to allow a functional bite.

-Decompensation requires up righting the proclined mandibular incisors, and advancing the maxillary incisors to create an adequate lip support.

-Extraction of maxillary second premolars, and mandibular first premolars is often required to gain a class I posterior pre-surgical occlusion, and relieve the compensation and

Class III malocclusions

-Mandibular incisors are proclined, and the maxillary incisors are retroclined.

-Extraction of maxillary first premolars and mandibular second premolars is often required to gain a class I posterior presurgical occlusion and relieve the compensation and crowding.

1) The amount of dental display of the maxillary incisors to the upper lip

When the dental display and gingival display are excessive, the extruded teeth that have compensated are intruded orthodontically.

2) The inter-labial gap

3) The lower anterior facial height

When the lower facial height is normal, the deep bite is corrected by intruding the incisors and extruding the first molars and premolars.

However, if the lower facial height is reduced (as in deep Class II skeletal conditions), the arches are not levelled

At the end of this phase, new set of records is taken.

Face bow recording is required to mount the models on a semi-adjustable articulator in cases of single jaw maxillary advancement, or in bimaxillary procedures.

Study models are fabricated to mimic the surgical plan.

3D planning model (optional)

Treatment options for skeletal deformities

Management of Combined Orthodontics and Orthognathic Surgery

Phases

3) Surgical

A) Anterior posterior segment:

- Concave face profile
- Class II Angle malocclusion

1) Retrognathism/ Hypoplasia

Because the location of the incisors often dictates the degree of surgical movement, the orthodontist positions the maxillary and mandibular incisors in the "ideal" position in the anterior-posterior and vertical planes. Failure to decompensate adequately limits the surgical correction and aesthetic outcome

Skeletal advancement is achieved by the bilateral sagittal split osteotomy (BSSO) of the mandible using techniques well described in the literature. Post- surgical management includes using "light" Class II elastics to override proprioception and to guide the new occlusion in the immediate postoperative period

2) Prognathism/ Hyperplasia

Concave facial profile

Class III malocclusion with lingually inclined mandibular incisors & proclined maxillary

Treatment options:

1- Intraoral vertical ramus osteotomy (IVO)

2- Bilateral sagittal split ramus osteotomy (BSSO)

Maxillary advancement must be also considered in such cases to limit the amount of mandibular setback required.

The surgeon must keep the tongue size in consideration, as it will be confined to a

3) Sagittal maxillary deficiency

Concave face profile.

They might be combined with mandibular Prognathism (class III).

In such cases, a combined mid-face skeletal advancement along with mandibular surgery will

B) Vertical

Vertical maxillary excess

In many cases, correction of significant VME requires double jaw surgery: differential Le Fort I impaction of the maxilla either as a single segment or a multi segment with mandibular BSSO

C) Transverse

D) Rotational

Surgical Correction of skeletal malocclusions has to address all the dimensions

Clockwise rotation is done to correct mandibular retrognathia

Treatment options for skeletal deformities

Management of Combined orthodontics and orthognathic surgery

Phases

4) Post-surgical orthodontic preparatory phase

Starts 6 weeks after the surgical procedure

Duration: 8-12 months

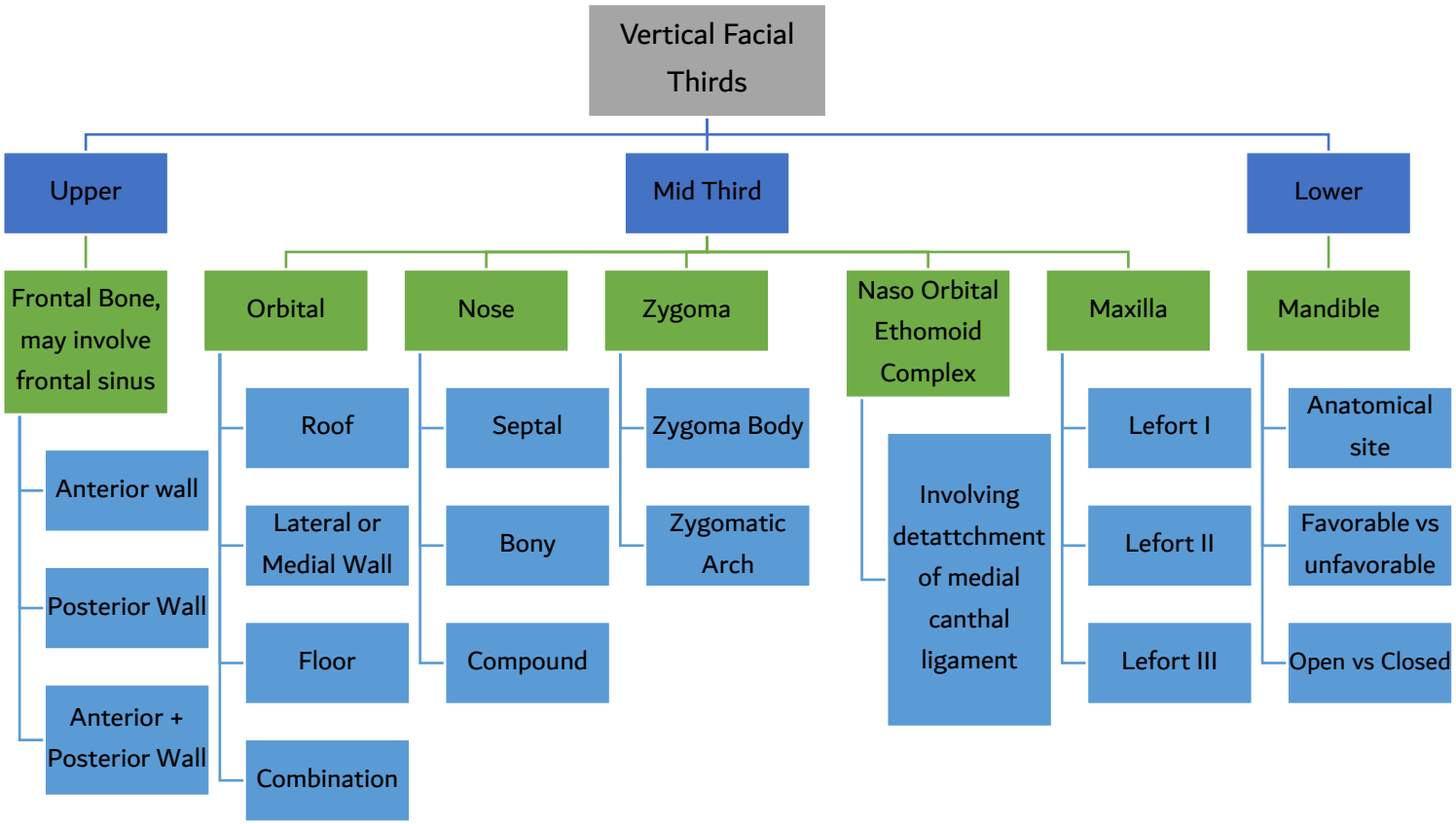
Any interdental spaces are closed, and maximum intercuspal relationship is

5) Retention

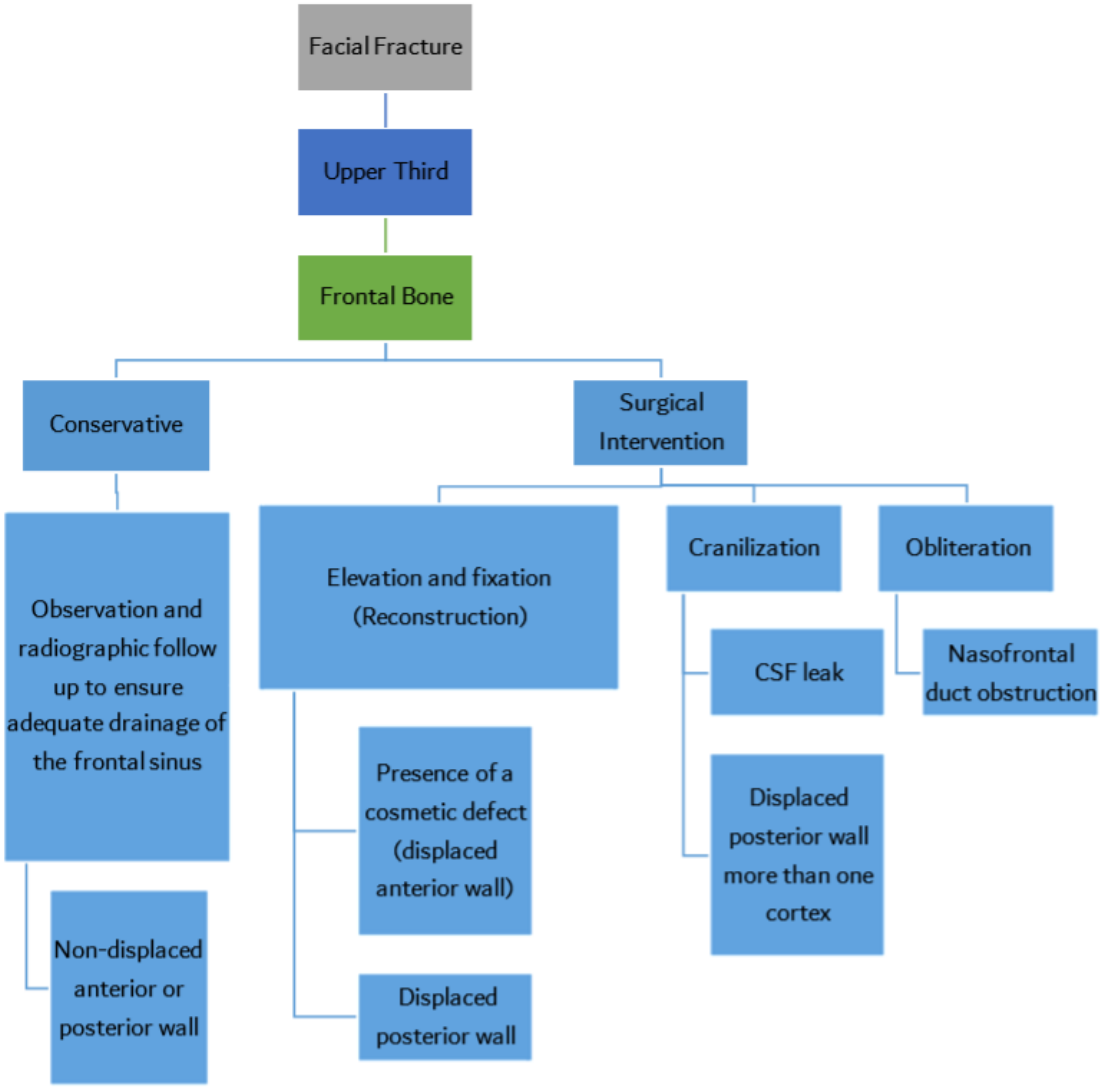
Orthodontic retainers are used to retain the teeth in their final correct position. The failure to comply with wearing the retainers might cause relapse

Another reason of relapse includes the possibility of residual mandibular growth in Class III patients

APPENDIX 26: CLASSIFICATION OF FACIAL FRACTURES

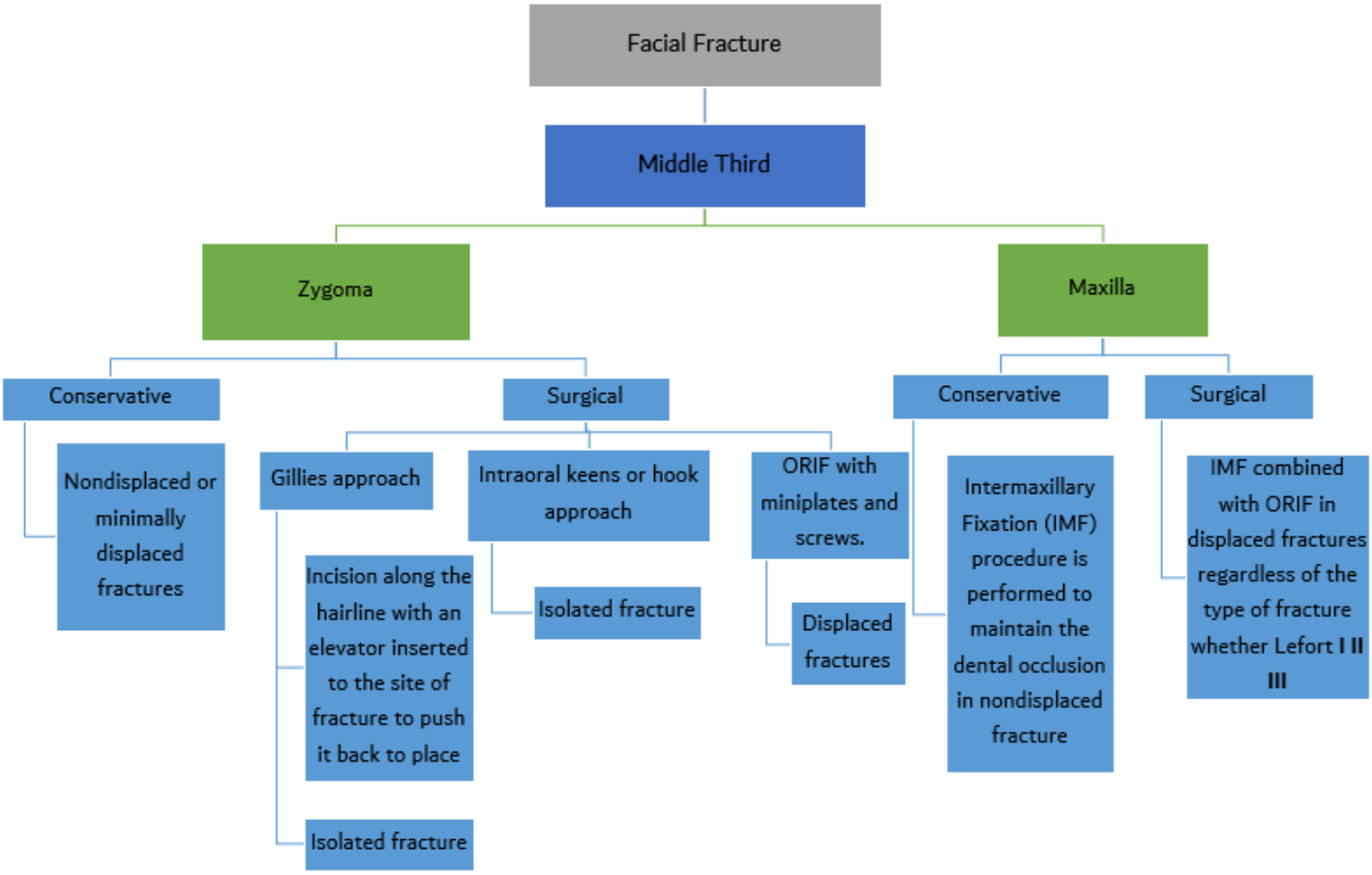


APPENDIX 27: METHODS OF TREATMENT FOR UPPER THIRD FACIAL FRACTURES

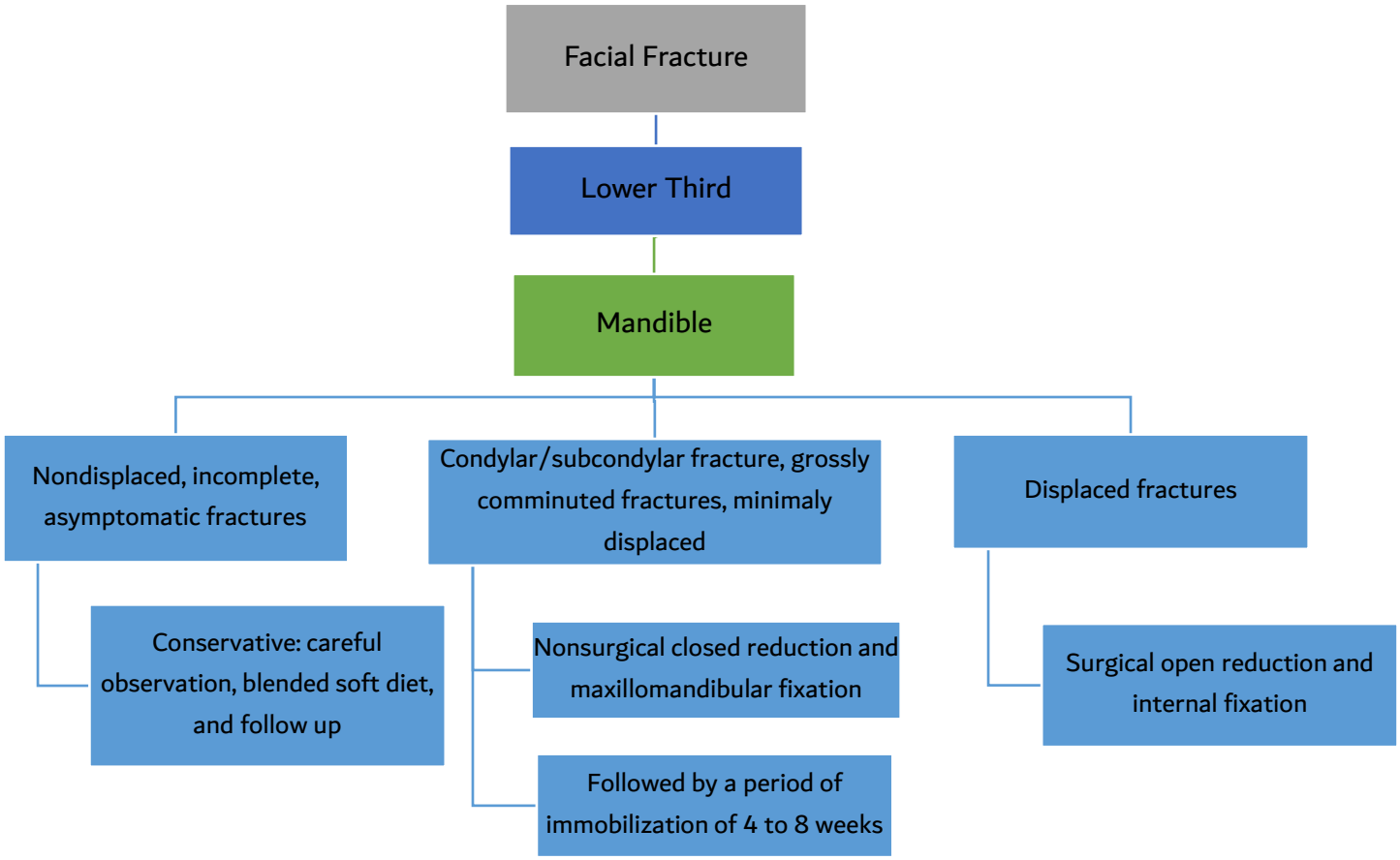


APPENDIX 28: METHODS OF TREATMENT FOR MIDDLE THIRD FACIAL FRACTURES

Depending on the diagnosis, different procedures are performed. Mainly conservative in cases of asymptomatic non-displaced fractures that involves regular routine follow-ups to monitor the location of trauma, and radiographs to observe the site of fracture. On the other hand all displaced fractures requiring ORIF, it must be performed following the main principles of open reduction & internal fixation.


Facial Fracture
Middle Third
Zygoma
Maxilla
Conservative
Surgical
Conservative
Surgical
Nondisplaced or minimally displaced fractures
Gillies approach
Intraoral keens or hook approach
ORIF with miniplates and screws.
Intermaxillary Fixation (IMF) procedure is performed to maintain the dental occlusion in nondisplaced fracture
IMF combined with ORIF in displaced fractures regardless of the type of fracture whether Lefort I II III
Incision along the hairline with an elevator inserted to the site of fracture to push it back to place
Isolated fracture
Isolated fracture
Displaced fractures

APPENDIX 29: METHODS OF TREATMENT FOR MANDIBULAR FRACTURES



Dentoalveolar fractures located in the mandible or maxilla may be treated by reduction and stabilization (either as closed or open reduction). According to the displacements severity the treatment will be selected. Rigid splint is used in the closed reduction while in extreme displacement cases open technique is performed.

APPENDIX 30: ALGORITHM FOR SECURING THE AIRWAY OF A PATIENT WITH MAXILLOFACIAL TRAUMA